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Maharaja Surajmal Institute (MSI) is a self-financing, quality conscious and trend setting Institute with the focus on providing equal opportunities for development of human potentials for every segment of the society. The Institute is a venture of its own kind where academics and professionals have joined hands to aid and direct the agenda of Education. The Institute is situated in the heart of Janakpuri, Delhi and is spread over about 8 acres of land and has best of infrastructure and academic facilities with highly qualified and experienced staff and state of the art computer labs. The Institute has been established through the dedicated and selfless endeavours of educationists and social workers who are deeply concerned with the standards of education and are determined to upgrade the quality content and direction of education. Institute is accredited by National Assessment and Accreditation Council (NAAC) and awarded ‘A’ Grade. MSI is awarded ‘A’ Grade by Joint Assessment Committee (JAC) of GNCT - Delhi consecutively for 5 years. MSI is also awarded ‘A+’ Grade by State Fee Regulatory Committee (SFRC), GNCT of Delhi and is recognised U/s 2(f) of UGC. It is also AISHE certified Institute.

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Emerging Trends in Big Data, IoT and Cyber Security

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Mr. Manoj Kumar, Ms. Rhythm Choudhary

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Hearty Congratulations to the entire team involved in the organization of National Conference on “Emerging Trends in Big Data, IoT and Cyber Security”. Such platform brings together educators, academic leaders and researchers to share ideas and contribute researches in these evolving technological fields. The term "big data" began appearing in dictionaries during the past decade, but the concept itself has been around since at least World War II. With the advent of Mobile communication and Internet 2.0, there is a massive generation of heterogeneous data. This Big Data has a lot of knowledge and wisdom hidden in it which is very significant for application domains like agriculture, medicines, industries, to name a few. Internet of Things (IoT) is another source of generation of such huge data. It is possible to turn anything, from something as small as a pill to something as big as an aeroplane, into a part of the IoT. Connecting all these different objects and adding sensors to them adds a level of digital intelligence to devices that would be otherwise dumb, enabling them to communicate real-time data without involving a human being. Such omnipresent data poses severe security threats that need attention and action. Appropriate protective measures are imperative, especially for critical infrastructure facilities. An approach that covers all levels simultaneously – from the operational to the field level and from access control to copy protection – is essential for comprehensively protecting data against internal and external cyberattacks.

I appreciate the support of our knowledge partner, Computer Society of India. I would also like to express my appreciation to all the resource persons for their valuable contribution in assembling the high-quality conference program. A conference of this size relies on the contributions of many volunteers, and I would like to acknowledge the efforts of every member in making the conference a grand success. I convey my best wishes to all the authors who trusted the conference with their work.

I would like to conclude my message with a quote:

“Learning gives creativity, Creativity leads to thinking, Thinking leads to knowledge, Knowledge make you great.” - Dr. APJ Abdul Kalam

With warm regards,

Sh. Kaptan Singh
President
Surajmal Memorial Education Society
Foreward

Excellence is a high quality, that delivers success and achievement.

-Mark F. Lamoure

Higher education has undergone significant transformation on account of widespread expansion, increased autonomy and introduction of programmes in emerging areas. The fact remains that there is tremendous quantitative increase in terms of access to higher education but at the same time it has also lead to the widespread concern on the quality and relevance of higher education. The traditional set-up for imparting higher education, comprising of mostly government funded public institutions of higher learning (IHL) is facing competition from the competitive private sector in the age of globalisation. Over the years, inertia has crept into the traditional set-up and despite having the faculty with better qualifications and experience, their systems for service delivery and quality have not responded to the fast pace of change encompassing the education sector.

Quality assurance in education is a methodology in the broadest sense of its application to check a process or outcome with different purposes of compliance, control, accountability and improvement (Harvey, 2012). Nowadays, quality assurance processes in higher education are becoming increasingly frequent and widespread across the nation. As the government and the industry advocate the need for a well-educated workforce, essential to increase productivity and maintain a competitive edge in the global knowledge economy, this has resulted in an increase in public funding for higher education and a drive to make post-secondary education more accessible, particularly for under-represented populations. This, in turn, has brought about calls for greater accountability on the part of educational providers and the measuring of outputs through quality assurance processes.

When quality has been successfully embedded within an educational system, there could potentially be sustainable enhancements to the process and procedures, and consequently students will benefit in terms of receiving better quality education and skills development, which in turn could also contribute to the nation’s economic and social success for the future. As good quality assurance practices require a strong internal quality assurance system, it requires balancing the policy roles and responsibilities of not only the higher education providers, but also the government, quality assurance agency and professional bodies to ensure that effective and sustainable quality management system can be successfully implemented in higher education institutions across the nation.

This two days National conference held by Maharaja Surajmal Institute, is aimed to provide a platform for educators, administrators, managers, leaders, policy makers, researchers, scholars, principals, supervisors, graduate students, practitioners, academicians, professionals and teachers from different discipline backgrounds to present and discuss research, developments and innovations in the fields of higher education with reference to quality assurance. This conference proceedings presents more than 56 papers which examine quality assurance and evaluation in higher education, including methodologies, procedures, and ideas from various states across the nation.

Prof. (Dr.) Rachita Rana
Director
Maharaja Surajmal Institute
Preface

We are in the era of the digital age with efficient communication practice. The issues and challenges of communication are always an engagement of scientific as well as an artistic community since the ancient age of human society. Big Data and the Internet of things (IOT) are two major trending subjects for scientific research. The research community always immerged with various tools in Big Data, IOT and Cyber Security. In the meantime, the questions based on security in terms of digital privacy, accuracy, and authenticity contains some hardest problem of the digital era. We can resolve those challenges through better scientific and technical education.

Maharaja Surajmal Institute has been established with a deep concern with the standards of education and a determination to upgrade the quality, content, and direction of education. Maharaja Surajmal Institute is a well-known institute in the field of scientific and technical education. In last two decades we organized various conferences and seminars to make a bridge between academia and industry successfully. This particular conference titled “Emerging Trends in Big Data, IOT and Cyber Security” has the major goal to provide a platform for sharing the latest research and development in this area among students, academia and industry. We received an overwhelming response from every section of the researcher viz. academia, industry and students. Paper received for the conference contains an enlarge scope of work. The scientific program consisted of plenary sessions and parallel sessions and included the following topics:

Artificial Intelligence & Machine Learning
Cloud Computing and Big Data
Cyber Security
Networks & Communications
ICT & E-Learning Methods
Internet of Things

This proceedings comprise written contributions of many of the presentations during the conference (13-14 March 2020); however, due to time constraint, a number of contributors were unfortunately not able to deliver their write-ups in due time. We Thanks all those participants from deep of our heart. We thank the anonymous reviewers for their careful reading of all manuscript of this proceeding and their many insightful comments and suggestions.

We express our heartfelt thanks to Prof. (Dr.) Rachita Rana, Director, MSI who has been with us with her unwavering support and encouragement since the inception of this conference and in bringing the compendium to its present state. We extend a sincere gratitude to our patrons: Sh. Kaptan Singh Ji (Sr. Vice-President), Sh. Ajit Singhji (Secretary SMES), Sh. Rajpal Solanki (Treasurer, SMES) and other office bearers of SMES, who directly and indirectly gave their support in this endeavor. We also extend our deepest gratitude to the keynote speaker Mrs. Kusum Duggal (Cyber Law University), guest of honor Mr. Pavan Duggal (Cyber Law Expert) and chief guest Prof. M.M. Pant (Pro Vice Chancellor, IGNOU) who have added immense value to this conference by their valuable contributions and presence. And last but not the least we extend our whole hearted thanks to the organizing committee of national conference “Emerging Trends in Big Data, IOT and Cyber Security” 2020 comprising of faculty, technicians, staff and students for their commendable team work in bringing the conference to its fruition. We are thankful to all members of editorial team for bringing the compendium in a coordinated manner and providing all the requisite support.
Dear readers
The idea of communication through the World Wide Web is the universal accessibility of large information. 6th August 1991 was the date of the launch of the first website with these three magical words World Wide Web. Across the world, the accessibility of the internet continues to transform how we connect with others, organize the flow of things and share information. China has the biggest online population at 829 million users, followed by India at 560 million and the United States at 293 million. East Asia has the top most internet users and English is the most popular language on the internet from the survey of the top most business data platform Statista. The global growth of cyber threats has pushed the world into the dilemma between information and miss information age. The following quote by George Orwell reveals the significance of information security in this internet age,

“If you want to keep a secret you must also hide it from yourself”
George Orwell

This conference is dedicated to the various keen aspects of internet viz. emerging trends in big data, IoT and Cyber Security. There are six sections in the proceeding that contains the paper related to Artificial Intelligence & Machine Learning, Cloud Computing and Big Data, Cyber Security, Networks & Communications, ICT & E-Learning Methods and Internet of Things respectively. The first section of artificial intelligence and machine learning contains the paper on future prospects of artificial intelligence on education, virtual reality. In the second section major highlights on data mining and big data is presented. Blockchain and cybercrime are discussed in the section of cyber security. The section of network and communication contains its various use and application ideas. The use of the internet and cyber tools for learning and teaching pedagogy presented in the section of ICT & E-Learning Methods. There are five papers based on the very recent topic, the internet of things in the last section.

We hope the readers and presenters would get multi-dimensional benefits from the participation of the conference. We are extremely thankful to all our contributors as well as the readers. Our sincere gratitude to the committee members of Excellent publishing house, editorial board members, authors and reviewers for their great contribution and support in realising this proceeding.

With kind regards

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Contents

Advisory Counsel ........................................................................................................................................ ii
Organizing Committee ................................................................................................................................. ii
President's Desk ......................................................................................................................................... iii
Foreward ....................................................................................................................................................... iv
Preface ........................................................................................................................................................... v
Editor's Desk ............................................................................................................................................... vi

TRACK: A - CLOUD COMPUTING AND BIG DATA

1. BASE: Big Data Analytics for Social Events .......................................................................................... 1
   Priyanka Dhaka

2. Cloud Computing: A Cost Effective and Efficient Approach for IT Services ........................................ 7
   Harjender Singh

   Nikita Malik, Dr. Menal Dahiya

4. Data Mining and Social Network Analysis ............................................................................................. 16
   Vinita Tomar, Tarunim Sharma

5. Survey on Privacy Preservation of Item Sets in Data Mining .................................................................. 20
   Suman Ahlawat, Dr. Anoop Sharma, Dr. Aman Jain

   Geeta Dalal, Asha Rani, Dr. Archana Dhankhar

   Minal Dhankar

8. Data Mining and Techniques ................................................................................................................ 33
   Kanika Kundu, Muskan Sharma

9. Analytics and Visualization Using Elasticsearch and Kibana ................................................................ 37
   Vinita Tomar, Tarunim Sharma, Sehej Sharma

10. Big Data Analytics: An Approach for Banking Industry ..................................................................... 42
    Dr. Suhasini Parashar

11. Big Data in People Analytics: The New HR Imperative ......................................................................... 45
    Dr. Shavita Deshwal

TRACK: B - INTERNET OF THINGS

12. Noise Detector and Sound Recording System Using IoT .................................................................... 49
    Manoj Kumar, Rhythm Choudhary, Karan Malik, Rishikant Sharma

13. Sustainable Smart Textiles - A thing of Today ....................................................................................... 54
    Pooja Dabas, Chetna Grewal
14. Omnichannel Personalisation: Merging of Virtual and Traditional Retail Industry in India .......................................................... 59  
   Dr. Rajeshwari Malik

   Dr. Rajeev Dahiya, Dr. Nisha Kumari

16. The Internet of Things and its Application in Healthcare Industry ............................................. 71  
   Arundhati Baweja

17. A Study of Different Commercial Heart Rate Monitors .......................................................... 76  
   Ravinder Singh

**TRACK: C - CYBER SECURITY**

18. Electronic Health Record: Blockchain ...................................................................................... 82  
   Rhythm Choudhary, Manoj Kumar, Himanshu Varshney, Sidharth Kumar Gehlot

19. Internet User and Cyber Crime in India ................................................................................... 86  
   Dr. Jasbir Singh

20. Blockchain – Novel Applications Over Obvious ....................................................................... 92  
   Tanya Arora, Arundhati Baweja

**TRACK: D - ARTIFICIAL INTELLIGENCE & MACHINE LEARNING**

21. Algorithmic Analysis of Moss Results ...................................................................................... 97  
   Rhythm Choudhary, Bhupesh Varshney

22. A Framework for Recommendation System for Food Court ................................................... 100  
   Amit Choudhary, Savita Ahlawat

23. An Introduction to Artificial Intelligence ................................................................................... 105  
   Minal Dhankar, Nipun Walia

   Pooja Singh, Seema Shokeen, V. Sree Lalitha

25. Artificial Intelligence in Education: The Journey So far and the Future Prospects ...................... 112  
   Dr. Monika Tushir

26. Introduction to Machine Learning ............................................................................................ 115  
   Suraj Pal Chauhan, Parichit Bahal

27. Data Science and eSports .......................................................................................................... 119  
   Sundeep Kumar, Hemendra Kumar

**TRACK: E - NETWORKS & COMMUNICATIONS**

28. PingMe- a mobile App with a Difference ................................................................................. 122  
   Kavita Pabreja, Aayushi Grover, Vinayak Sharma

29. Study of Code Optimization Techniques .................................................................................. 126  
   Dr. Pooja Singh, Sargam Gupta, Deepak

30. 5G Next Generation Mobile Wireless Technology: A Review ............................................... 129  
   Ajay Kumar Phogat
<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Authors</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>31.</td>
<td>Role of Social Media for Brand building among Students of 21st Century</td>
<td>Dr. Neetu Narwal</td>
<td>133</td>
</tr>
<tr>
<td>32.</td>
<td>Equator Principles: Green Steps towards Sustainable Development</td>
<td>Preeti Malik, Anviti Rawat, Suraj Pal Chauhan, Harish Singh</td>
<td>137</td>
</tr>
<tr>
<td>33.</td>
<td>5G Technology – Progression to Upheaval</td>
<td>Tanya Arora</td>
<td>143</td>
</tr>
<tr>
<td>34.</td>
<td>Assessment of White Label ATMs in India</td>
<td>Seema Shokeen, Pooja Singh</td>
<td>148</td>
</tr>
<tr>
<td>35.</td>
<td>Web-Real Time Communication: An Overview</td>
<td>Suraj Pal Chauhan, Mohit Dhaundiyal</td>
<td>155</td>
</tr>
<tr>
<td></td>
<td><strong>TRACK: F - ICT &amp; E-LEARNING METHODS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36.</td>
<td>Attend It – Attendance Management Application</td>
<td>Dr. Neetu Anand, Karan Sharma, Archit Bansal, Muskan Kanojia</td>
<td>157</td>
</tr>
<tr>
<td>37.</td>
<td>MSI Event Management Web Application</td>
<td>Rhythm Choudhary, Manoj Kumar, Amritesh Chandra Shrivastava</td>
<td>160</td>
</tr>
<tr>
<td>38.</td>
<td>In 2035, Quantum Processors Qubits will Run Small Applications</td>
<td>Pooja Singh, Ritika Mehra, Shrestha Priyal</td>
<td>167</td>
</tr>
<tr>
<td>39.</td>
<td>ICT Supported Collaborative Learning: An Approach to Prevailing Learning Environments</td>
<td>Hemendra Kumar, Sundeep Kumar</td>
<td>169</td>
</tr>
<tr>
<td>40.</td>
<td>Education 4.0 - The Future of Learning</td>
<td>Dr. Neetu Anand</td>
<td>172</td>
</tr>
<tr>
<td>41.</td>
<td>Catalyst for Innovation in Higher Learning: ICT and E-learning</td>
<td>Sundeep Kumar, Hemendra Kumar</td>
<td>176</td>
</tr>
<tr>
<td>42.</td>
<td>Challenges and Issues of E-Learning</td>
<td>Manju Dhillon</td>
<td>182</td>
</tr>
<tr>
<td>43.</td>
<td>Progression of Collaborative Learning and Its Importance for Critical Thinking</td>
<td>Dr. Sarita S. Rana</td>
<td>185</td>
</tr>
<tr>
<td>44.</td>
<td>ICT Based Individualized and Collaborative Learning</td>
<td>Dr. Monika Davar</td>
<td>188</td>
</tr>
<tr>
<td>45.</td>
<td>A Study on United States Trade Deficit</td>
<td>Arti</td>
<td>190</td>
</tr>
<tr>
<td>46.</td>
<td>Challenges and Opportunities for MOOCs in Indian Higher Education</td>
<td>Dr. Vijeta Banwari</td>
<td>195</td>
</tr>
<tr>
<td>47.</td>
<td>Role of ICT in Education</td>
<td>Dr. Ruchika Gahtot</td>
<td>200</td>
</tr>
<tr>
<td>48.</td>
<td>Technology Integration in Planning Lessons in Pre Service Teacher Education Programme</td>
<td>Dr. Vanita Anand</td>
<td>205</td>
</tr>
<tr>
<td>49.</td>
<td>Towards the Intention Method Engineering from Function Method Engineering</td>
<td>Neha Mathur</td>
<td>210</td>
</tr>
</tbody>
</table>
50. Transformation of Indian Education Panorama: E-Learning Platforms ........................................ 213
   Ekta Kharbanda

51. Role of Information and Communication Technology (ICT) in Financial Management and Financial Reporting ................................................................. 218
   Preeti Bedi

52. Internet and Tertiary Education in India .................................................................................. 222
   Dr. Anita Sharma, Dr. Preeti Malik, Harish Singh

53. Role of Information Technology and Media in Environment Awareness .......................... 225
   Dr. Promila Dabas

54. ICT as Emerging Tool of E Learning .................................................................................. 230
   Nisha Tokas

55. Role of ICT in Enhancing the Efficiency of Human Resource Management .................. 234
   Dr. Anupama Sharma, Dr. Sumita Kukreja

56. Elementary Education: Quality Teaching is Base of Technical Education ...................... 240
   Dr. Abheyender Singh
BASE: Big Data Analytics for Social Events

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ABSTRACT—In Today’s business world Big Data is becoming a new era of analysis. World is trapped across Big social events and there by jumping towards Big Data. There are number of practical applications which we require to process against large amount of data and this data comes more overly in unstructured form. Big Data typical deals with large size of data with different prospects this may include data processed through- Big Social events, Internet of things, social networking sites or from worldwide fundamental events. As of the data is so large and coming from many different sources, it is becoming a miscellaneous mixture of semi-structured and unstructured data. The data which is constantly accumulating from these events is termed as Big Social data. The social data explosion has resulted in a complete deep study of emerging new topics in Big Social data. Research analysts have perceived an increase in data that contains both useful and useless entities. In extraction of useful information, data warehouse finds difficulties in enduring with increasing amount of data generated. This Paper has focused on various aspects of dealing with analytics with the reference of Big Data in Social events.

Keywords: Data, Social events, HDFS, MapReduce, MongoDB;

1. INTRODUCTION

Everything in business world is influenced by analytics today. On the arrival of new and modern techniques for analytics and potentially to mine Big Data processes, it is now becoming essential to uplift the analytics in improved way. Big Data analytics is the method of examining Big Data to reveal hidden patterns, unmapped correlations and some other usable information that can facilitate to make better decision[2]. The major reason behind the rise of data emergence are tremendous amount of data and ease in its accessibility [3], [4], [5]. Reasons behind the emergence of big data are:

firstly, is social media (Twitter as the one of the biggest social media platform). The most difficult and crucial job is to build it over big data sets for observing and perceiving different shifts in user’s behavioral patterns e.g.; (sharing views, activities, opinions, likeness and dislikeness) to address different customer needs with requirements[8]. Secondly, introduction to internet-of-things (IoT), we are living in a fast, complex changing environment with increasing number of connections between humans and smart technologies, that leads us into a digital world. Data can be generated from multiple sources by multiple entities. The quantity of data produced across the globe and continue to grow at an accelerating rate causes the servers overflowing with log files, message streams, transaction records, businesses records and mobile device data records which are need to be effectively analyzed through some major analytical processing where ‘Big Data’ is commonly known With respect to the growth of data, different integrations and transformations among data incur new research challenges, which receive a lot of interest among the research communities [2].

This paper is organized as follows: Section 1 specifies about various aspects of Big Data analytics, Section 2 specifies Recent Developments in Big Data Technology, Section 3 describes Management of Big Data Analytics with NoSQL Tools, Section 4 Limitations of Traditional databases for Bigdata, Section 5 Case Study: Healthcare Analysis, Section 6 is the summary of this paper followed by references.

2. ASPECTS OF BIG DATA ANALYTICS

Recently, big data and business analytics approaches have been developed and implemented to analyze a large volume of data generated by different business organizations. Consequently, every business needs faster insight into growing volumes of transactional data. Analyzing data in real time helps organizations view the past and foresee the future. This is the beauty of streaming analytics and is endowed by knowing what occurred (descriptive), understanding why it happened (diagnostic), looking ahead to what might take place (predictive) and, ultimately, determining how to influence future occurrences (prescriptive). These Big data analytics basically deals with large amount of data sets which are of different sizes from terabytes to petabytes and zetabytes and this methodology is basically used to process the data with reduced latency. It follows one of the following features-high levels of volume, velocity and variety Furthermore, mobile Network location data can be used for data management to prevent data jams in big cities or better plan the public transport system. The goal of this study is to implement a comprehensive investigation into big data and business analytics methods for improved business decision making, technological approaches, applications, and open research challenges. Furthermore, the study attempts to draw attention to the tremendous benefits big data has brought to companies in developed countries and how these can be replicated by indigenous business organizations. Moreover, the study discusses various challenges facing big data analytics with a
focus on data security, management, characteristics, regulation, and compliances. Analysing big data requires analysts and researchers to take improved and quicker decisions for data that was formerly unserviceable and outback. Big Data requires high performance analytics which is generally processed by specialized software tools and applications for data mining, data optimization, text mining, and predictive analysis and forecasting. Applying Big Data tools on highly large volume of data sets helps the organization to find which data is relevant and can be analyzed to get good business decisions for future events.

3. RECENT DEVELOPMENTS IN BIG DATA TECHNOLOGY

Big data emerged for business with the development of social media and weblogs. This has placed basic analytics and business intelligence (BI) activity on new data sources and others deep, real-time analytics and business intelligence with operational integration. The volume of data generated in the digital world grows exponentially and has become difficult to manage using data warehouse technology. The massive amount of raw data generated using various data sources that require big data technology for analysis have been reported by a number of studies recently [12]. For instance, Wal-Mart processes more than a million customer transactions hourly and stores 2.5 petabytes of customer data [14]. The challenges related with analytics require more efficient algorithms to receive the perfect outcome. Big Data faces various challenges because it deals with heterogeneous data sets and there is also a difficulty that all sorts of data cannot be obtainable at the same time [15].

The increasing volume of data is one more challenge for Big Data analysis as there is always a call for timely response with acknowledgment to distributed processing of data. To take full advantage of Big Data analytics, organizations will need to address several challenges related to big data. Some of those key challenges are as follows:

I. Distributed computing: Big data in large-scale distributed computing systems, which is based on open-source technology, are providing direct access and long-term storage for petabytes of data while powering extreme performance.

II. Flash memory in solid-state drives allows computers to become universal. It delivers random-access speeds of less than 0.1 milliseconds unlike disk access of 3 to 12 milliseconds. There is a high possibility that future big data solutions will use a lot of flash memory to improve access time to data [17].

III. Mobile devices: Which represent computers everywhere, create much of the big data, and equally receives outputs from big data solutions.

IV. Cloud computing: This created an entirely new economy of computing by moving storage, databases, services, into the cloud and others great access for rapidly deploying big data solutions.

V. Data analytics: This is a multistage approach that includes data collection, preparation, and processing, analyzing and visualizing large scale data to produce actionable insight for business intelligence.

VI. In-memory applications: These are significantly increasing database performance. The accessibility of new in-memory technologies and high performance analytics that requires data visualization is giving a great way to analyze data very much faster than ever. Visual analytics enables business organizations to use raw data and represent it in a meaningful way.

4. MANAGEMENT OF BIG DATA ANALYTICS WITH NOSQL TOOLS

NoSQL Databases are developing up with the popularity and widely admired. These not only SQL databases are capable of storing all sets of data including unstructured data. The traceability of NoSQL databases like MongoDB, Cassandra and HBase make them a significant option for Big Data analytics [24, 25].

The business analytics programs are becoming capable to provide business users to simply examine data in NoSQL databases by the means of following factors:

- Rich visualization – Interactive web-based interfaces for ad hoc reporting and charting.
- Flexible exploration – Seeing data over dimensions like time, product and geography and over measures like gross and quantity.
- Predictive analysis – Effective predictive analytics abilities by employing hi-tech statistical algorithms such as classification, regression, clustering and association rules.

5. LIMITATIONS OF TRADITIONAL DATABASES FOR BIG DATA

Large variety of databases is RDBMS solution types. In such type of databases the data entered into the table is based on rigid schema, as per a SQL based query is required to read/write data to such databases. Because of having a rigid schema, the data stored into the table is not enough flexible this causes the difficulty in scaling very large databases. Here the large queries are solved manually which makes these traditional databases not feasible for Big Data Solutions.

Why NoSQL?

NoSQL puts a different path to figure out the Big Data problem. Key-value document based storage is taken into account in in most of the No-SQL databases, which are the basic unit of information in NoSQL databases providing superior performance, high availability, and simplified
scalability which aggregates documents and functions as in relational database table.

**Detailed Study about the NoSQL tool- MongoDB:**

MongoDB was developed by Dwight Merriman and Eliot Horowitz and the database was liberated to open source in 2009 and is accessible in terms of the Free Software Foundation’s GNU AGPL Version 3.0 commercial license.

MongoDB is an open-source database that uses document oriented model and pre- eminent NoSQL database which is written in C++. Instead of using tables and rows like in relational database, it comprises of key and value pairs which are the basic unit of information in MongoDB provides, superior performance, high availability, and simplified scalability which aggregates documents and functions as in relational database table[26]. MongoDB endorse a dynamic schema design enables a document to have different fields and structures. This database uses a Binary JavaScript Object Notation (BSON) format for document storage which is arbitrary-encoded serialization of JavaScript Object Notation (JSON)-like documents. Binary JSON (BSON) is lightweight, traversable and efficient to be used in MongoDB. MongoDB, a Big Data tool is designed to assure data security and also provides role based access control, encrypted communication and robust auditing. It provides easy to use integrated key management and protects the data within a given directory, it provides a clear structure of a single object and has no complex joins and it also uses internal memory for keeping the working sets and capable of providing faster access of data. MongoDB also adequate to assign index on any attribute.

**Why to employ MongoDB on dataset:**

- **Document-Oriented Storage:** Data is stored in the form of Binary JavaScript Object Notation (BSON) format, the maximum BSON format size is 16 Megabytes. This maximum size assures that a single document cannot use Maximum amount of RAM and during transmission inordinate amount of bandwidth.

- **Indexing:** Practice index on any attribute which reduces the problem of scanning each and every document in MongoDB because it supports effective resolution of queries. Indexes keep a small part of dataset in a simple to traverse form. Index Stores the value of set of fields sequential to value of field as nominal to index.

- **Replication:** It is the process of synchronizing data around multiple servers, it enhances the availability of data by providing multiple copies of data on different data servers hence offering redundancy, it protects the database from the deprivation of single server, it keeps the data safe, provides disaster recovery and replica set is transparent to application.

- **Map-Reduce command:** Map-Reduce function initially queries the collection and then maps the result document to give out key-value pair. Which is than reduced on the basis of keys having multiple values.

- **Auto-Sharding:** Sharding is the process of storing data records over multiple machines as the machines may not be suitable to store large amount of data and unable to provide an acceptable read-write throughput. Sharding provides all rights of replication to master node. Single replica set has a limitation of 12 nodes so there is a need to apply sharding. Sharding is necessary because memory size cannot be sufficient enough when active data set is large and vertical scaling is very large.

**There are three primary elements which are described as follows:**

**A. Query Router:** The query routers process the operations to shards and then return result to the clients. A Sharded cluster may carries multiple query router to split up the client request load.

**B. Shards:** Shards are employed to store consistent data on different machines providing high availability of requirements basically each shard is a distinguished replica set.

**C. Config Server:** Config. Server contains cluster’s metadata which carries mapping of cluster’s dataset to shards and query router utilize this metadata to object operations to particular shard, basically sharded clusters contain 3 config. servers.

Basically MongoDB consist of 16 MB namespace file which can support approximately 24, 000 namespaces and a namespace files cannot be larger than 2047 MB. MongoDB stores not more than 100 levels of nesting for Binary JavaScript Object Notation (BSON) documents and maximum document must be less than $2^{32}$ documents. Maximum size of MMAPV 1 (Original storage engine) of MongoDB based on memory mapped files is 32TB.

![Fig. 1. Running mongod command](image-url)
In figure 1 it is being demonstrated that mongod command is running with a directory of gave and place storage information examining that the database is running correctly and waiting for connection at port 27017.

**Limitations:**

- Every document in MongoDB consist of field name which causes the data size usually higher.
- Only small operations are subsidised at a single document level.
- MongoDB provides less flexibility as it has no JOINs.
- Less up to date information is available.
- At particular point in time the aggregation and data analysis process i.e. Mapping and reducing process is not very fast so faster configurations are required by adding Hadoop into admixture.

6. **CASE STUDY: HEALTHCARE ANALYSIS**

A better health care system requires a strong financing procedure, reliable datasets for building proper decisions and better healthcare facilities, but this procedure is going tough while maintaining huge datasets by database management tools, there is a requirement to gather and analyse the healthcare data by employing big data tools like MongoDB, this could improve treatment trials and also lowers down the cost of taking unnecessary trials by analysing dataset deployed in the tool[2, 3]. MongoDB also minimizes the total time and resources in conducting clinical research. In this chapter the worldwide dataset of various healthcare diseases is collected and analysed using MongoDB.

The desired information obtained from world health statistics was inserted into MongoDB as key-value pairs and after inserting the desired data one can find all the required information.

The information was inserted in MongoDB. Now obtaining information by using OR criteria:

Record 1:
```javascript
db.HivClusters.find({
  $or:
  [{
    "Estimated number of people (all ages) living with HIV 2013":
    {"Initial Cluster 1":6300000, "Initial Cluster 2":100}
  },
  {"Estimated number of people (all ages) living with HIV 2013":
    {"Final Cluster 1":3866667, "Final Cluster 2":163431}
  }
}).pretty()
```

**Result obtained is:**

```
{ 
  "_id": ObjectId("57109650974247ccc76987ef"),
  "Estimated number of people (all ages) living with HIV 2013": 
  { "Initial Cluster 1": 6300000, 
    "Initial Cluster 2": 100 
  },
  "Final Cluster 1": 3866667, 
  "Final Cluster 2": 163431 
}
```

**Big Social Data Correlating Big Events**

The Big Social data is basically a combination of many different forms like-

- **Big Data Science** that provides tools to operate and supervise social data including social media and social networking.
- **Big Data Analytics** capable of extracting the inner nature of social data.
- **Social Computing** provides technology-intercede social services.

Big Social events are generally processed to uncover the most interesting and inspirational work form various organizations whether related to businesses, ethical data, leading industries or even new game processing methodologies, through some planned strategies one can understand attendee behavior, a primary concept to design the event layout and a thoughtful process to attain varieties. There are many hosts that are capable of engaging the events with relevant data and information to their marked hearings. These type of hosts are-
1. **Google I/O**: The tech describes how to regenerate an event to serve attendees.

2. **Social Media Marketing World**: The conference uses Slack as the new tool in its big network strategy.

3. **Institute of Food Technologists Annual Meeting and Food Expo**: The food industry events are conducted in order to understand how to get a deeper knowledge of attendee and display behavior.

4. **Code Conference**: The conference ensures the diverse audience. Re/Code builds its attendee list.

### Classification of big social data types:

1. **Digital-self representation data**: It consists of data corresponding to identity categorization and communicative structure in digital environment for example profile data that consist of information about login data like name, nickname, email address and password. Mandatory data which consist of service and application required data- full name, contact number, birthday and many more. Extended data which comprises of profile pictures, education and qualification.

2. **Technology-mediated communication data**: It consist of data that is related to two-way communication, knowledge innovation and dispersion by technology. It consists of data types like public communication data, private communication data and collaborative communication data.

3. **Digital Relationships data**: It consists of data that provides digital social relationships pattern. Digital relationship data consist of explicit data and implicit data and these data is revealed through technology mediated communication data for example message posts and tweets can be analyzed through inter connections among individuals.

7. **CONCLUSION**

This paper has discussed about that everything is derived from analytics today. Starting from the decisions at small businesses to decision making at large companies certain type of analytics is required. On an increase in popularity of Big Data and its awareness on social media leads to its great extent of involvement in many big social events like in healthcare and biomedicine conferences, rethinking data privacy, born digital data in the humanities, Artificial intelligence and data science, smart cities innovation and in many more events. The data which is constantly accumulating from these events is termed as Big Social data. In today’s world society constantly interact with each other and this interaction is commonly mediated by information technology in a digital form. The social data explosion has resulted in a complete deep study of emerging new topics in Big Social data. Business Analytics arrives with challenges and with efficient text analytics and data correlation can get over from these challenges.

### REFERENCES


Cloud Computing: A Cost Effective and Efficient Approach for IT Services

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Abstract: Cloud Computing is an innovative technology that transforms businesses all over the world and help in so many developmental strides in the Enterprise Information Technology in Developed countries. It provides us the means by which we can access the applications as utilities over the internet i.e. it refers to manipulating, configured, configuring and accessing the application online as per requirements. Therefore, enterprise and users are now considering migrating and adopting the Cloud computing technology since it serves as a major driver in consumer-oriented business because of its ease of use, availability, scalability and other functions of delivering computing services – server, storage, databases, networking, software and more. But many enterprises are little more cautious in its acceptance due to security challenges related to it, which causes low acceptance and implementation. This paper investigates and reviews the challenges (i.e. reasons for low implementation) and possibilities of cloud computing acceptance in Emerging Countries. The paper is a review research to explore some of the reasons for low acceptance of cloud computing technology in emerging countries; it further addresses the possibilities of overcoming these challenges with recommendations on improving the level of adopting & implementation cloud computing technology in the Emerging Countries.

Keywords: Cloud Computing, Virtualization, Acceptance, Challenges and Possibilities, emerging countries.

1. INTRODUCTION

Cloud computing sets the giant stride for a new era of computing globally [1]. Cloud computing actually changes the way and manner applications are developed and maintain as well as the processes in which infrastructure are run by users. Cloud computing, also known as on-demand computing, is a kind of internet-based computing, where shared resources and information are provided to computers and other devices on-demand. It is a model for enabling ubiquitous, on-demand access to a shared pool of configurable computing resources [2]. Cloud computing and storage solutions provide users and enterprises with various capabilities to store and process their data in third-party data centers. It relies on sharing of resources to achieve coherence and economies of scale, similar to a utility (like the electricity grid) over a network. At the foundation of cloud computing is the broader concept of converged infrastructure and shared services. The “Cloud” in simpler term also focuses on maximizing the effectiveness of the shared resources. Cloud resources are usually not only shared by multiple users but are also dynamically reallocated per demand; this can work for allocating resources to users. This approach helps maximize the use of computing power while reducing the overall cost of resources by using less power, air conditioning, rack space, etc. to maintain the system. With cloud computing, multiple users can access a single server to retrieve and update their data without purchasing licenses for different applications. Cloud Computing permits the usage of information technology on the basis of effective functionalities on-demand by users. The cloud technology offers lots of possibilities to businesses and organization having an inadequate capital, lack of human resources, and also lack access to marketing network.

The rapid development of cloud technology indicates certainly non reduction in terms of acceptance and frequent utilization from different sectors by emerging countries like India, Singapore, America and others. According to 2016 BSA Global Cloud Computing Scorecard, estimates that by 2019 global market will exceed US$130 billion, The Scorecard positions the “IT infrastructure and policy environment — or cloud computing readiness — of 24 countries that account for 80 per cent of the world’s IT markets”, that Cloud computing as a current IT invention, has further supplement innovative measurement to that significance by increasing access to technology that pushes for economic growth generally at all levels.

But upon all these underlying possibilities the cloud technology brought into businesses in emerging countries a lot of challenges were faced that results to low implementation and will be discussed and recommend ways so as to improve the level of implementing the technology.

2. LITERATURE REVIEW

Cloud computing evolved from several technologies and business approaches that emerged over the years [3] the basic concept of Cloud Computing is separating the application from the operating system as well as the hardware its self. This processes of separation brought about the underlying technology of cloud computing called Virtualization.
Virtualization plays a vital role in cloud computing processes [4]. It is a method of installing and organizing computing resources. It separates the different levels of the application system comprising the hardware, software, data, networking, storage etc. It also break downs the division between the data centre, servers, storage, networking, data and the physical devices, by recognizing dynamic architecture, then attains the goals of organizing centralized and making use of dynamically the physical resources and virtual resources, improving the flexibility of the system, reducing the cost, improving the service and decreasing the risk of management. Cloud computing acceptances generally are attractive in planning businesses for more profitability, success and cost management. Most emerging Countries are not an exception their role in the service provision sector thereby making some giant strives and increasing their efforts to create more awareness and contribute substantially in helping companies migrate to the cloud [1] emphasized that the cloud technology saves costs for servers and storage, offers speed in processes and streamlines application deployment without upfront capital, that is why many organizations are now considering acceptance of cloud computing to provide more efficient and cost effective network services while other are afraid of the challenges. For those countries to overcome the challenges that lead to low acceptance some obstacles need to be addressed. However, it is no coincidence that business executives in emerging countries have developed a limitless desire for technology in order to drive and transform their businesses. [5]Business and technology are inseparable that makes it difficult to determine which one can work without one where profit maximization (revenue increase / cost reduction) is an essential performance indicator upon which business successes are measured.

3. CLOUD COMPUTING INFRASTRUCTURE

According to National Institute for Standards and Technology (NIST) [6] - Cloud Computing is a model that enables convenient on-demand network access to a shared pool of configurable computing resources like (network, server, storage, applications and services) that can be rapidly provisioned and released with minimal management effort of service provider interaction]. Typical Example of Cloud Computing Technologies are: Google Search, Web based Email (electronic mail, be it Gmail, yahoo mail), Google Documents (create Doc, Spread sheet, presentation and edit online) and others. The other components of cloud infrastructure are :

- Front end interface for end users.
- Management for handling n/w resources.
- Storage for virtual machine.
- Constant storage tool working in VM.
- Monitoring tools.

**Working models for cloud Computing**

There are various models:

Deployment Models: it defines the type of access to the cloud. There are 4 deployment access methods, these are :
- Public: services are accessible to general public. [less secure].
- Private: accessible within an organization. [more secure]
- Hybrid: it is the combination of public + private.
- Private -> Critical
- Public -> Non Critical

Community: it is accessible by group of organization

Services Models: these are the reference models on which the cloud computing is based.

- **Software as a Service (SaaS):** in this which application we are using in the cloud are discussing in SaaS, like email, games and CRM application. most of the responsibility for security management lies with the cloud providers.
- **Platform as a Service (PaaS):** it can provide different platforms like database, servers and deployment tools. It provides runtime environments for different applications.

- **Infrastructure as a Service (IaaS):** it provides infrastructure like we are required OS, virtual machines and storage, IP addresses, provide infrastructure, enhanced scalability and flexible.

4. **CLOUD COMPUTING ACCEPTANCE**

Cloud Acceptance is the procedure of partly or fully deploying an organization's digital assets, services, IT resources or applications to the cloud, [7]. The migrated assets are easily reached at the cloud's firewall. Cloud migration is sometimes refers to as Business Process Outsourcing (BPO), which may possibly involve transferring a total organizational infrastructure, where computing, storage, software and platform services are moved to the cloud for ease of access. Cloud computing is accepted to several organizations because of its scalability, ease of management and little costs expenditure. Cloud migration enables the implementation of flexible cloud computing.

An organization's cloud migration procedure sometimes comprises merging an on-site IT infrastructure through a hybrid cloud solution, which may be retrieved through the Internet for a specific charge. Hybrid cloud solutions move among one or many cloud service providers and commonly offer on-demand and provisioned server space, applications and services.

Cloud migration/acceptance is significant for attaining real-time, up to date performance and efficiency. As a result, cloud migration needs thoughtful exploration, planning and execution to guarantee the cloud solution's compatibility through organizational requirements.

The term "moving to cloud" also refers to an organization moving away from a traditional Capital Expenditure (CAPEX) model (buy the dedicated hardware and depreciate it over a period of time) to the Operational Expenditure (OPEX) model (use a shared cloud infrastructure and pay as one uses it). Proponents claim that cloud computing allows companies to avoid upfront infrastructure costs, and focus on projects that differentiate their businesses instead of on infrastructure. Proponents also claim that cloud computing allows enterprises to get their applications up and running faster, with improved manageability and less maintenance, and enables IT to more rapidly adjust resources to meet fluctuating and unpredictable business demand.

**Cloud Security Challenge and Risk: The Main Reason for Low Cloud Acceptance in Emerging Countries**

In addition to the usual challenges of emerging secure IT systems, cloud computing presents an added level of risk because important services are regularly outsourced to a third party (Cloud Service Provider) [8]. The externalized aspect of outsourcing makes it difficult to maintain data integrity and privacy, support data and service availability, and demonstrate compliance. In effect, cloud computing shifts much of the control over data and operations from the client organization to their cloud providers. Even basic tasks, such as applying patches and configuring firewalls, can become the responsibility of the cloud service provider, not the user.

There are several other challenges or reasons for low cloud acceptance, all of which state to the challenges that any major paradigm shifts or new acceptance can run into [9]. The major issues that will need to be addressed to in order facilitate the acceptance and their possibilities are as follows:

a) Difficulty in moving/migrating existing workloads to a Cloud. Although, new tools and techniques are already in place that addresses the issues of cloud migration.

b) Expensive Equipment that comprises the Hardware and software are expensive to users. Therefore, making it difficult for smaller enterprises with little capital to adopt, cheaper equipment is needed to address the issue.

c) The service providers’ high expectations in revenue generation as a business to their legacies which make several businesses fear the exorbitant prices resulting to low or no implementation at all, should devise means of generating revenue and make Services affordable.
d) Security concerns about the Cloud, generally the security aspect need to be improved so as to increase acceptance.

Even though, there are some general discomfort regarding migrations and adopting Cloud, these discomforts will begin to change once the benefits and or possibilities of the Cloud are taken into consideration. Some of them are:

- By whom data and applications will be accessed.
- Security methods for the data storage and transmission.
- How data and applications from various consumers reserved separately.
- Where will data be stored?

Apart from the reasons highlighted for low cloud computing acceptance in emerging countries, some challenges are discussed by many scholars but [2] added that technical challenges like availability of service and data lock-in, lack of scalable storage, performance unpredictability and data transfer bottlenecks are also challenges that could limit the growth of cloud computing acceptance in emerging countries. Moreover, he emphasized that Poor quality of internet service can hinder prompt availability of data, Fear of hackers, Privacy Issues. Lack of technical skills in the deployment of cloud computing services, Lack of flexibility of the policy or legal framework for cloud computing is discouraging a number of companies to adopt cloud computing, ignorance of the cloud computing technologies, lack of ICT infrastructures and social amenities needed to establish cloud computing data centres across the country and Insecurity problem that hinders cloud technologies providers from investing in most emerging countries among many other challenges.

5. CLOUD COMPUTING HAS A BRIGHT FUTURE IN EMERGING ECONOMIES

- Cloud Love Affair in Developing Economies
- The Perfect Rx for Healthcare Advancement
- The Cloud as Class Act in Education
- The Sky’s the Limit for the Cloud in Retail
- Manufacturing Looks for a Digital Makeover
- Our Money’s on the Cloud in Banking Services

Cloud Computing Possibilities in Emerging Countries

Cloud computing is a quite flexible technology approach, cost-effective, and proven delivery platform for providing business or consumer IT services over the Internet [10]. Cloud resources can be rapidly deployed and easily scaled, with all processes, applications, and services provisioned on demand, regardless of the user location or device. As a result, cloud computing gives organizations the opportunity to increase their service delivery efficiencies, streamline IT management, and better align IT services with dynamic business requirements. In many ways, cloud computing provides solid support for core business functions with the capacity to develop new and innovative services in businesses.

Countries like India, Singapore, and America who are developed already now based their whole multi-billion dollar business models on putting information on the internet, and storing the data in the cloud. Cloud computing offers worldwide access to virtually unlimited processing power, new storage capabilities and much more but left countries like Nigeria which is among the underdeveloped or emerging nation from possibly attaining this possibilities and boasting business opportunities like measuring of used resources for smaller companies that is payment based model (Pay per use), cost reduction, easing of Information Technology complexities and increasing the accessibility of update technology.

6. RESEARCH METHODOLOGY

This research paper depends mainly on intuitive data and reviews which are derived from previous literal works done on the research paper topic obtainable from textbooks, journals, newspapers and from the internet resources. in order to investigate and examine some of the challenges that lead to low acceptance or implementation of cloud computing in emerging countries.

7. LIMITATION OF CLOUD COMPUTING

- Availability of services: accesses via internet.
- Data lock inn: shifting of large volume of data from one platform to another.
- Data segregation: isolation of data of each other.
- Scaling resources: sudden demand of increased resource came.
- Location of data: geographically each country has its own rule.
- Deletion of data : users demand complete removed of data.
- Recovery and Backup: how free and fast it can be recovered.

8. CONCLUSION

In conclusion, we discussed how developed countries are using cloud computing to achieve scalability, agility, automation, and resource sharing. Cloud computing can provide an efficient, scalable, and cost-effective way for business in most emerging countries if fully adopted and implemented. A variety of different cloud computing services models are available, providing solid supports for core business functions and the flexibility to deliver new services. However, the flexibility and openness of cloud computing models have created a security challenges that hinders or result to low acceptance in those countries. IT resources are shared among many users, and security processes are often hidden behind layers of abstraction and services are provided online so
control over data and operations is shifted to the service providers.

In this paper, we presented and examine various challenges that lead to low acceptance and as well possibilities of cloud acceptance in emerging countries. The major issues that need to be addressed in order facilitate the acceptance and their possibilities are discussed by given some guidelines for the implementation and acceptance of cloud computing. We further recommend that the Ministry of Science, Technology and Communication in Nigeria should set up a committee and find out ways on how to improve the cloud computing acceptance in emerging countries, taking into consideration the challenges that cause low implementation of the cloud computing technology.

REFERENCES


Serverless Computing: Need, Impact and Challenges

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Abstract: Serverless computing as a cloud technology offers numerous benefits such as easy deployment, quick auto-scaling and pay-per-use model. It eliminates the majority of challenges that come with managing one's own hardware on-premise or using cloud services. Coupled with these benefits and a boom in public cloud adoption, organizations are migrating their services to serverless infrastructure at a rapid pace. This trend reflects the growing need for simplicity in managing cloud resources. Even though serverless computing is being hailed as the next step in cloud computing, it brings its own set of challenges and problems. In this paper, the biggest advantages that led to the quick adoption of serverless, its impact on the current technology trends as well as the biggest problems that arise while using serverless cloud technologies have been explored.

Keywords: Cloud Services, DevOps, Serverless Computing, AWS

1. INTRODUCTION

It has been over a decade since the launch of cloud technologies such as AWS (Amazon Web services), GCP (Google Cloud Platform) and Microsoft Azure. Since its conception, a growth has been observed in the number of organizations that have adopted cloud technologies as it is easily accessible, more manageable and costs much less compared to on-premise hardware [2].

Despite the huge potential and constant advancements in cloud-based technologies and tools, the cloud was still used as a platform for merely outsourcing computing services such as servers, databases, networking etc., as opposed to setting up on-premise hardware. Even though this made the provisioning of computing services fast and efficient, it failed to address the numerous challenges involved in managing and scaling these services [7]. Most of the technological advancements in cloud technologies are simply clones of legacy computing services like relational databases, object storage, queuing systems and web servers etc.

With time, software developers started realising the need for simplifying recurring operations required for the upkeep of these cloud services. To address this growing need, cloud vendors started offering a new technology under the name of “Serverless Computing” [9]. Serverless computing is growing in popularity and adoption at a rapid pace, and organizations are migrating their cloud services to serverless offerings, as depicted in Google trends (Figure 1). The “microservice architecture” has emerged as the clear winner for hosting web services since serverless makes it much easier to deploy microservices.

Fig. 1. Google trend showing growing popularity of serverless computing

Although serverless computing addresses most of the problems involved with provisioning, managing and scaling cloud services, it comes with its own set of new challenges that make it a less than an ideal candidate for the “future of cloud computing”.

1.1 Defining Serverless Computing

Over the years, the term “serverless” has been given different but overlapping definitions by multiple cloud providers like AWS, GCP and Azure. In an attempt to establish a basic definition that qualifies any resource as a serverless computing resource, it can be stated:

“Serverless Computing is an execution-based model where a cloud provider manages the allocation, management and distribution of resources automatically for handling dynamic computational tasks.” [4].

Serverless computing greatly simplifies the process of deploying software to cloud by automating and abstracting recurring tasks like scaling, capacity planning and maintenance of cloud resources.

1.2 Serverless Architecture

Serverless Architecture is based on the event processing system, which is the basic requirement and functionality of a serverless platform, as described in Figure 2. The architecture works on two levels: first is event/client side and the second
one is the master. The first level comprises of user interface (UI), API (Application Programming Interface) gateways and sources of cloud events. These events are sent over as HTTP requests. Before sending to the second phase, events are validated by checking for authentication and authorization, followed by checking for resource limits. All the valid events are then queued, and based on various criteria (like queueing states, event’s rate of arrival, allocation and deallocation of resources), these queues are processed. The platform follows the sequence: dispatching of the event, finding a function’s existing instance or creating a new one if not already existing, sending the event to this instance of the function, waiting for the function’s response, amassing logs for execution, making it available to the user, and stopping the function when not needed anymore [1]. The request is fetched by the worker and assigned an appropriate container. It then copies from storage to the container, the function use code, and runs the event. Stopping of idle function instances and deallocation of their resources is also managed by the platform [6].

Implementing this functionality acts as a challenge in view of metrics like fault tolerance, cost, scalability. Moreover, management of scalability issues and failures in a cloud set-up also needs to be carefully considered by the platform [1].

Fig. 2. Serverless Computing Architecture

2. NEED FOR SERVERLESS COMPUTING

This section discusses some of the popularly identified reasons that led to recognizing the need and importance of serverless technology.

2.1 Challenges with Traditional Cloud Services

No matter how accessible cloud services are, a user still has to deal with capacity planning, management and scaling of these services. Even though rapid introduction to new cloud-based technologies was visible, not a lot was done to bring down the time and effort required towards the upkeep of these services. Another challenge when working with traditional cloud technologies is to ensure resilience and availability. Some common techniques used to increase resilience are: monitoring, logging, replication and auto-scaling. Setup, configuration and optimization of these techniques requires time, effort and expertise [3]. This increases the need for specialized teams like DevOps and Infrastructure engineers, which further contribute towards complicating the software deployment process.

2.2 Growing Popularity of Microservice Architecture

Microservice architecture is a variant of the Service Oriented Architecture (SOA) where applications are arranged as loosely coupled services. The services/applications are kept fine-grained and lightweight protocols are used for communication. Different programming languages, software and hardware environments, and databases can be used to implement these services, which are independently deployable. Creating, managing and deploying microservices using traditional cloud services becomes more and more challenging as the number of services increases.

However, serverless technology satisfies the fundamental prerequisites to creating microservices and takes care of most of the management overhead involved with the upkeep of microservices.

2.3 Better Software Quality

With the growing demand for software with new features, technologies are becoming more complex than ever. The frequency of software deployments to production is also increasing to meet the pressures of the market and for staying ahead of the competition [5].

Software development methodologies like agile development are being practiced by organizations to better manage their resources for releasing new software frequently. Most serverless technologies come with GUI (graphical user interface) based quick setup and one click deployments, eliminating the need for provisioning, set-up and constant optimization.

Serverless computing frees up the developers from the recurring management and optimization tasks associated with traditional cloud technologies. It allows the software developers to focus on code and not the infrastructure.

3. IMPACT OF SERVERLESS

Serverless computing offers a new range of opportunities and potentials:

3.1 Emergence of a New Paradigm of Technologies

The advent and rapid adoption of serverless has caused an explosion of new technologies based on the serverless
architecture. These technologies span across services like queueing systems, databases, file storage and web servers. The biggest cloud vendors in the world, namely Amazon Web Services, Microsoft Azure and Google Cloud Platform have all come up with notable services based on serverless technologies like:

- AWS Lambda Functions, Azure Functions and Google Cloud Functions for web servers,
- AWS DynamoDB, Azure Cosmos and Google DataStore for databases,

Mirroring the success of serverless, these services are quickly replacing traditional legacy cloud services at a rapid pace, offering better availability, replication and latency, while bringing down the costs.

3.2 Changes in DevOps Trends

Post the widespread adoption of cloud services, a new vertical of technology has emerged, called DevOps, which is aimed towards automating the process between software development and software release. DevOps teams automate steps like resource allocation, building the code, testing the code & deploying the code.

As organizations are seen migrating to the serverless cloud services, changes in the primary functions of a DevOps team are also observed. Although serverless eliminates management and automation overhead, it poses the problem of monitoring the resources. Because it is so easy to deploy serverless resources, organizations can quickly end up with hundreds of small microservices that are hard to monitor for errors and performance. Thus, DevOps are now focussed on moving towards the automation of processes of monitoring, error detection, log collection and performance insights.

4. CHALLENGES AND OPEN ISSUES

As serverless concept is relatively new, various challenges towards serverless computing need to be addressed for its vast adoption, as discussed:

4.1 Scheduling and Performance

In comparison to continuously running code, serverless code which is not used frequently may respond with higher latency. Serverless service providers, in their attempt to save energy, usually make the execution environment go into a sleep-mode after long durations of idleness by saving the unused function’s state in a persistent storage to be restored later on invocation [8]. Referred to as ‘cold starts’, the price paid for preparing the serverless code to run, even when scaled to zero, may render the entire system useless and needs to be minimized [1]. Different approaches to scheduling the sleep mode of serverless services are:

Using machine learning techniques to predict the pattern in which requests will be received, based on parameters such as external events, related functions’ activities etc. [8].

Maintaining some warm containers (containers invoked for the same user previously) whose resources can be multiplexed between different inactive functions for readily handling their invocation until the main containers are started [6][8].

For a set of functions, prepare warm containers or an always-on service based on the service level agreements for latency-sensitive serverless applications [8].

4.2 Modelling, Monitoring and Debugging

The relatively new concept of serverless computing poses a challenge for its developers since the tools for development are not yet rich enough. Also, the code quality is reduced and it is a complicated task for developers to collaborate because of non-unified approaches of development owing to lack of proper paradigms of modelling. Besides modelling, just like any software development approach, serverless computing also includes tools for debugging and testing [8]. Tasks of diagnosing the performance or the problems relating to excessive resource usage creating bottlenecks are more difficult with serverless code as compared to traditional server code because it’s hard to dig into detailed timing of functions for different profiles and the only trace of function execution is what was recorded by monitoring serverless platforms. Different approaches that combine the process of monitoring and debugging or carry out integration testing have been proposed over the years for serverless functions [1][8].

4.3 Pricing and Resource Limits

As compared to the pricing of other cloud services, serverless services make more feasible online pricing. Different factors have an effect on each company’s offered prices, ranging from the platform used, revenue strategies adopted and the prices of energy in a particular region or time at which the function is executed. Other key decision factors are the load level on the provider at a time instant and the competitor’s offered price.

Based on the pricing scheme, customers can choose between various affordable options to reduce their costs as well as maintain the service quality (determined by response time). Therefore, with customer constraints and availability of multiple service providers, it is a challenging issue to find the optimal pricing strategy, which needs to be addressed [8].

Also, for high-performance computing like workloads, serverless computing doesn’t prove to be suitable because there are limits imposed by cloud providers on the resources and it is likely that bulk-provision of the numerous servers would be cheaper at a given time.

4.4 Security and Privacy

For any computation service, security aspects are always of indispensable concern. Security issues specific to serverless technology are [8]:

ISBN: 978-93-86238-93-1
• Implementation of effective authentication and authorization schemes for incoming requests to access the available functions

• Vulnerabilities introduced due to shared execution environment among functions of different owners

• Attacks aimed at exhausting resources by introducing fraudulent loads beyond the agreed service levels with the providers

• Susceptibility to breach of user’s privacy.

5. CONCLUSION

In this paper, the advent of serverless technology has been explored. The need for serverless computing environments in the face of issues in the traditional cloud services has been highlighted, focusing on the various opportunities that will be presented on adopting this computing platform. There also exist numerous challenges to this new computing paradigm which have been discussed, and serve as open research issues to be addressed.

REFERENCES


Abstract: Data mining is the drawing out of information from large file; it is an eminent innovative technique which helps firms laid stress on the most essential information in their data storehouse. It makes use of number of analytical, illustration and machine learning methods to get the knowledge which will be very useful for real world applications. In this paper we focused to present the review on data mining used for social network analysis which is becoming a popular field of research.

Keywords: Data mining; social network; Analysis

1. INTRODUCTION

Data mining is a strong tool that helps find different patterns and relations from the data to generate new information. Data mining does not mean drawing out new data but it extrapolate new patterns and knowledge from the already collected data? To derive meaningful data mining results we should understand data properly. There are number of reasons which have increased the interest of researchers in studying social networks [5]. Few of those factors include the availability of large amount of social network data and their graphs.

Data mining is an communal process in which patterns and relationships are based on what user requests and progress is defined by discovering through either automatic or manual methods. In other words Data miners find bundle of information based on logical relationships, classifications and association to draw conclusions about the behavior of their customers and their by effecting the performance of their business. Information available on web can be analyzed and utilized to optimize information access. Thus data mining generates story and unsuspected explanation of data.

Fig.1 shows the basic data mining task. The purpose of data mining falls under two categories:

a. Descriptive Data Mining: which generates remarkable data sets from existing data sets?

b. Predictive Data Mining: creates model for the system from the given data set.

The objectives of these above aims are achieved by the following procedures:

- **Characterization** - It generalizes, summarize and possibly different data characteristics.
- **Classification** - It is a complex data mining technique which segregates the data under different categories.
- **Regression** - This technique is mainly used for modeling and planning purpose it mainly predicts the likelihood of certain variable in presence of some other variables.
- **Association** - It discovers the patterns but more precisely dependently linked variables. In this we will look for specific events that are correlated to other events.
- **Clustering** - Clustering involves grouping of data into several new groups such that it explains the data. It breaks big data set into smaller data groups to make the designing and implementation process in a simplified form. The main task of these techniques is to increase the similarity among objects and to reduce it between the classes.
- **Change Detection** - This method shows the important changes in the data from the previously measured values.
- **Deviation Detection** - Deviation detection lays stress on the major deviations between the actual measured values of the objects and its expected values. This method finds out the deviation according to the time and the deviation among different subsets of data.
- **Link Analysis** - It recognizes the relations between the objects to develop replica based on the patterns in the relationships by applying graph theory techniques.
- **Sequential Pattern Mining** - This method involves the discovery of the recurrent occurring patterns in the data.

2. DATA MINING PROCESS

The data mining process is divided into three main phases Data Preprocessing: It involves data cleaning, data integration, data selection, and data transformation.
• **Data Extraction:** It performs the exact data mining tasks in which pattern evaluation and knowledge representation of data is done.

• **Data Evaluation and Representation:** This phase finally analyzes and represents the results. Fig.2 shows data mining process.

![Fig. 2. Data Mining Process](image)

There are many factors that determine the usefulness of data such as accuracy, completeness, consistency, timeliness. The data has to specify whether it satisfies the desired purpose. Thus preprocessing phase is crucial one in the data mining process.

The major points involved in data preprocessing are explained below:

1) **Data refinement**

Data refinement is the first phase in data mining. It is considered important as impure data if used directly in mining can create confusion in procedures and produce inaccurate outputs. This step involves the deletion of incomplete data from the collected data. Many methods that generally clean data by itself are available but they are not vigorous.

2) **Data Integration**

When various diverse data sources such as databases, cubie or files are combined together for analysis, this process is called data integration. This helps in improving the accuracy and rate of the data mining process. It can be performed using Data Migration Tools such as Oracle Data Service Integrator and Microsoft SQL etc.

3) **Data Reduction**

This technique is implemented to get the relevant data for analysis from the collection of data. The dimensions of the representation are much smaller in size and parallel maintaining integrity. Data reduction is performed using methods such as Decision Trees, Neural network etc.

4) **Data Transformation**

In this phase, data is converted into a form accurate for the data mining process. Data is integrated so that the mining process is more efficient and the patterns are easier to understand. Data Transformation is implemented using Data Mapping and code generation process.

5) **Data Mining**

Data Mining is a process to recognize engrossing patterns and knowledge from a large amount of data. In these steps, intelligent patterns are put in to extract the data patterns and relations. The data is represented in the form of designs and prototypes are structured using clustering and classification techniques.

6) **Pattern Evaluation**

This step involves identifying interesting patterns representing the knowledge based on intrusiveness measures. Data characterization and apprehend methods are used to make the data understandable by the user.

7) **Knowledge Representation**

It is a step where data visualization and knowledge representation tools are used to represent the submissive data. Data is envision in the form of reports, tables etc.

**Social Network:** It network is a miscellaneous and multi relational dataset represented with the help of a graph. Vertices represent the objects (entities), edges represent the links (relationships among objects), and both objects and relationships may have attributes. They are usually very large in capacity.

Social network can be used to represent many real-world scenarios, such as Phone calls, spread of computer virus. Constructing the network from general, real world data presents number of unexpected challenges owing to the data domains themselves, e.g., information extraction and preprocessing, and data structures used for knowledge representation and storage [6].

A social network can be generically understood to be some kind of computer application which facilitates the definition of social relations among people based on acquaintance, general interests, activities, professional interests, family and associative relations, and so on. It is based on common relation of interest. It can arise from information in sources such as text, databases, sensor networks, communication systems, and social media [1]. This question is due to many causes, including the vagueness of human language, multiple pseudo for the same user, representations of information which are mismatched.
3. METHODOLOGY

Methodology contains planning, conducting and reporting phases where each stage contains of several phases. At the planning phase we generate a review protocol; which has six stages. These are specifying research problems, designing the search methods, identifying the study selection procedures, specifying the quality assessment rules, describing the data extracted and synthesizing the extracted data to show the review protocol phases.

Examples of SOCIAL NETWORKING SITES
- Facebook.com
- Twitter.com
- Reddit.com
- Myspace.com
- Digg.com
- Meetup.com
- Vinipost.com
- Tumblr.com
- Pinterest.com

Fig. 3.

Social Network Analysis and Data Mining

Data mining tools can give solutions to industry queries that were very time consuming to resolve. Data mining of social networks can be done by using graph mining methods for instance classification/topologies, prediction, efficiency, pattern detection, measurement and metrics, modeling, evolution and structure, data processing and communities. To take out the information represented in graphs we need to define metrics that describe the global structures of graphs, find the community structure of the network and define metrics that explains the patterns of local interaction in the graphs, develop efficient algorithms for mining data on networks and understand the model generation of graphs.

Social network and its analysis is an essential field and it is extensively spread among many young researchers. Social networks research emerged from psychology, sociology, statistics and graph theory. Based on graph theoretical concepts a social networks explain the social relationships of individuals as points and their relationships as the lines connecting them.

The numerous kinds of Social network analysis are - :

1. Socio Centric (Whole) Network Analysis
   - Emerged in sociology.
   - Involves quantification of interaction among a socially well defined group of people.
   - Focus on identifying global structural patterns.

2. Knowledge based Network Analysis
   - Emerged in Computer Science.
   - Involves quantification of interaction between individuals, groups and other entities.
   - Knowledge discovery based on entities associated with actors in the social network.

3. Egocentric (personal) Network Analysis
   - Egocentric (personal) network analysis.
   - Emerged in anthropology and psychology.
   - Make generalizations of features found in personal networks.
   - Difficult to collect data, so till now studies have been rare.

4. DATA MINING TECHNIQUES RESEARCH AREAS

There are six different domains which applied various techniques in nine different research areas to mine the flow of big data from social media. The list is as follows - :

- Business and Management (BM)
- Education (EDU)
- Finance (FIN)
- Government and Public (GP)
- Social Networks (SN)

Fig. 4 Illustrates that social networks and business and management were the most dynamic domains used by data mining techniques with a percentage of 79% between all domains. Government and public with percentage of 9% illustrates the third active domain [1].
5. APPLICATIONS

Various Data mining applications are as follows -:

- Viral marketing
- Social analysis
- Expert findings
- Fraud detection
- Image analysis
- Financial data analysis
- Retail industry
- Telecommunication industry
- Biological data analysis and
- Other scientific applications

6. DATA MINING SYSTEM CLASSIFICATION

Data Mining system can be classified into various basis. Fig.5 shows the classification.

7. CONCLUSION

Recent work in machine learning and data mining has made very good pace towards learning highly accurate models of relational data. But to a small extent this work has made better use of research in other areas, for instance a social network analysis and statistics. Cross disciplinary efforts and joint research efforts must be persuaded to raise quick development and spreading of useful algorithms and data representation. This work must focus on the unique statistical challenges raised by relational data. The rapid growth of social networks gives strong efforts to the set of techniques developed for mining graphs and social networks. Social networks are embedded in many sources of data and at many different scales. Data mining gives skilled way to execute and make use of database. In this paper, we have in brief discussed various data mining techniques which are used for social network analysis and all its related applications.

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Survey on Privacy Preservation of Item Sets in Data Mining

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Abstract: Data mining denotes to knowledge mining or extracting from huge amounts of data. Discovering association rules are at the heart of data mining. Mining of suggestion instructions among items in huge database of trades conventions has been accepted such as an main space of database investigation. Extracting meaningful information plays an important role in the mining process. More accurate data can give better result. Solitude protection of gainful items is too required. We have presented the simple data mining; efficacy mining, unusual item fixed mining and repeated item fixed mining. A brief numerous algorithm overview and methods defined in various research papers has been provided in this paper.

Keywords: Data Mining, Association Rule Mining, Itemset Mining, Utility Mining, Privacy Preservation, k-anonymity, Anonymization, data mining

1. INTRODUCTION

Data mining is the procedure of determining the exhaustive data around the big amount of data which is put away in data warehouses and data sources. Data mining is the data novelty scheme from the big extent of data kept in numerous databases. Here the knowledge belongs to the valuable information which can be used further computation. The simple goal of the data mining is to mine greater-level invisible data as of raw information profusion. Data mining has been recycled in multiple areas of the data. Data mining can be observed as an algorithmic process that proceeds data as per input and produces several designs, for instance instructions of the organization, item sets, and rules of association, or summaries, as output.

Association Rule Mining (ARM) is a well-designed way that recognizes repeated item sets as of datasets and produces suggestion instructions via supposing that all substances have the similar implication and occurrence of incidence without seeing their convenience [1]. However in a number of actual-world uses like trade advertising, medical diagnosis, client separation, etc., efficacy of item sets is established on rate, revenue or profits. Efficacy Mining goals to classify item sets using maximum benefits through seeing revenue, amount, rate or further user references [2].

Data Mining contains an algorithmic procedure, which proceeds preprocessed input information and abstracts designs. Several methods occur, like association rule mining, organization, clustering, etc. A significant and broadly used data mining procedure is the unearthing of suggestion instructions. Relationship rule excavating aims at determining recurrent item sets from market carrier data and producing suggestion instructions. Maximum association rule mining algorithms indirectly study the benefits of the item sets to be the same [3]. A utility is a value attached to an item depending on its evaluation, e.g. if coke has supported 20 and profit of 2%, cookies may have support 10 but with a profit of 20%.

2. ASSOCIATION RULE MINING

There are various methods sufficient these purposes of data mining. Mining Suggestions are one of the methods convoluted in the procedure. These instructions can be successfully used to expose unknown associations, creating outcomes that can deliver a base for estimating and judgment creating. The unique problem addressed by association rule mining was to discover a association among trades of many products as of the study of a huge set of information[4].

Association rule mining (ARM) is the procedure of producing instructions built on the association among the set of items that the consumers buying. Of dawn, data mining detectives have improved upon the superiority of connotation rule mining for occupational growth over assimilating issues such as charge (utility), size of items retailed (weight) and revenue. The instructions quarried lacking seeing efficacy principles (revenue border) will top to a credible harm of gainful instructions.

Current work largesse an Apriori-based isolated rare element set (recurrent item set) procedure. It exacts the boundary by shortening connections. To address the tasks confronted via remaining work, a solitude conserving FP-growth (PFP-growth) algorithm, which contain re-processing phase and mining steps, is planned. Now the preprocessing phase, the database is transmuted to perimeter the length of communications. To apply like a limit, lengthy connections must be split end alternatively reduced. i.e., uncertainly a contract has further items than the bound, it is distributed into various subsets and assurance that every subset is in the limit.
To reserve other occurrence data in subsets, a graph-placed method is suggested to expose the association of items inside trades and use like association to escort the excruciating procedure. In the mining stage, established on the specified converted database and a user-described inception, recurrent item sets were revealed. In spite of the possible advantages of transaction splitting, it may bring frequency information loss. Runtime calculation method is used to offset such information loss. In specific, set the loud sustenance of an item set in the database renovated by contract excruciating, 1st assessment its real provision in the converted database, and formerly other calculate its real provision in the unique database. In calculation, using averaging the descending closure assets (that is, any supersets of an infrequent item set are infrequent), dynamic reduction method was used.

In common, the suggestion instruction is an appearance of the form X=>Y, where X is predecessor and Y is resultant. Suggestion instruction displays how many times Y has followed in case that X has now followed reliant on the provision and sureness value. Provision: It is the possibility of an item or item sets in the certain transactional database:

\[ \text{Provision}(X) = \frac{n(X)}{n} \]

Where \( n \) is the complete number of connections in the database and \( n(X) \) is the number of connections that encloses the item set \( X \). So, provision \( (X=>Y) = \text{provision}(XUY) \). Assurance: It is a provisional possibility, for an suggestion instruction \( X=>Y \) and definite as per

\[ \text{Assurance}(X=>Y) = \frac{\text{provision}(XUY)}{\text{provision}(X)} \]

Recurrent item set: Let \( A \) be a set of items, \( T \) be the contract database and \( \sigma \) be the user identified minimum support. An item set \( X \) in \( A \) (that is \( X \) is a subgroup of \( A \)) is assumed to be a numerous item fixed in \( T \) with deference to \( \sigma \), if providing(X) \( \geq \sigma \). Mining suggestion instructions can be ruined down into the resulting 2 sub-problems:

1. Creating all item sets that have provision greater than, or
equal to, the user identified least provision. i.e., creating
all huge item sets.
2. Creating all the instructions that have least sureness. We can produce the suggestion instruction using more than 1 number of resultant items is produced through the resulting process:
   a. Discover the instruction in which number of consequence = 1.
   b. For the given rules \( p(x \rightarrow y) \) and \( p(x \rightarrow z) \), the rule \( p(x \rightarrow yz) \) is generated by the intersection of both the association rules and get a new rule \( p(x \rightarrow yz) = p(xyz)/p(x) \).
   c. Association Rule Mining Approaches For Itemset Mining

A. Utility Mining

In the data mining association rule mining approaches consider an items utility through transaction set presence. As we know frequent item set mining is used to indicate the frequent items. But we can’t say if any item set which have sold frequently will make a profit. Maybe those item sets which are less frequent or rare item set can make more profit than frequent item set. One of the most stimulating tasks of data mining is the highest utility item sets mining efficiently. An identification set of item with the high utilities is known as Utility Mining. Utility can be dignified in relations of profit, cost or other different user Preferences expression. Such as, a computer system may be more gainful than a telephone in profit terms.

For example- if in a mobile shop, 100 mobile sets of Nokia worth rupees -2000/- are sold frequently, but at the same time in another shop a iPhone sold in 60, 000/- rarely so its cleared that if any item which sold frequently but with less prices and at the same time another item which sold rarely can make more profit.

Utility is a amount of an item set how gainful or beneficial \( X \) is. Item set \( X \) utility, that is, \( u(X) \), which is the abstract of all item set utilities \( X \) in enclosing \( X \) all the connections. An item set \( X \) is called an item set of great utility supposing \( u(X) \) greater than or equal to the min_utility, where min_utility is a user definite beginning of minimum utility. High-utility item set mining objective is to define every that item sets enclosing utility greater or equal to the user- definite least efficacy beginning.

In the mining of utility based the term utility refers to the user preference quantitative representation, i.e. an item set utility value is the item set important measurement in the consumer’s perspective. For e.g. if an analyst of sales concludes in few retail research requirements to discover out which item sets in stores earn revenue of maximum sales for the stores user will describe the any item set utility as monetary profit that store earns through selling all item set units. Now note that predictor of trades is not involved in the several connections that item set hold, then the user is one troubled around the profits created composed concluded each operation comprising the element set. In practice the item set utility value can be page-rank, profit, popularity, measure of few aesthetic aspects, for example, design or beauty or few other different processes of customer’s reference.

The conventional Association standard mining methodologies consider the utility of the items by its presence in the exchange (transaction) set. The recurrence of item set is not adequate to mirror (reflect) the real utility of an item set. For instance, the business administrator may not be occupied with continuous item sets that don’t create significant benefit. Recently, one of the most difficult information mining undertakings has been the mining of high utility item sets productively[5]. Differentiating evidence of the item sets using HU (high utilities) is known as UM (Utility Mining). The utility can be measured as far as expense, benefit or different articulations of client’s inclinations.
Information mining is the procedure of uncovering nontrivial, previously unknown and conceivably helpful data from huge (large) databases. An important role in multiple data mining challenges, like recurrent design mining, weighted recurrent design mining, and high efficacy design mining show for discerning beneficial designs secreted in a database. Between them, incessant design mining is an important. Mining high efficacy item sets as of databases mentions (refers) to determining the item sets with great profits. Now, the consequence of item set efficacy is interestingness, consequence, or usefulness of an item for users. The utility of an item in an exchange (transaction) DB comprises of two perspectives:

1) The significance of particular items, which is known as external utility, and

2) The significance of items in communications, which is known as internal utility.

Utility mining of an item set is considered as per the outcome of its outside efficacy and it’s inside efficacy. An item set is called as a great efficacy mining item set in case that its utility is no reduce than a client resolute minimum utility edge; else, it is named a little-utility element groups. Removal high utility element sets from databases is a serious responsibility has an extensive variability of operations, for ex., site instant stream analysis occupational improvement in sequence hypermarkets, irritated publicity in trade sites, online e-trade management, and movable business atmosphere positioning, and even determining authoritative strategies in biomedical customs.

**TABLE I: Transaction Database**

<table>
<thead>
<tr>
<th>Transaction Id</th>
<th>X</th>
<th>Y</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tr1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Tr2</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Tr3</td>
<td>3</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Tr4</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Tr5</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Tr6</td>
<td>5</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Tr7</td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Tr8</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Tr9</td>
<td>4</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Tr10</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>

**TABLE II: Unit Profit Associated With Items**

<table>
<thead>
<tr>
<th>Item Name</th>
<th>Profit</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>3</td>
</tr>
<tr>
<td>Y</td>
<td>10</td>
</tr>
<tr>
<td>Z</td>
<td>8</td>
</tr>
</tbody>
</table>

**B. Frequent Item set mining**

Frequent item sets [6] are the sets of item that present frequently in the any database transactions. Recurrent element set excavating, basic purpose is to find out every transaction dataset item groups. Mining of frequent item set perform a significant role in the practice and theory of numerous significant tasks of data mining, for example rule of the mining association, emerging pattern, long patterns. It has applied in the telecommunications field, census analysis and analysis of text. Frequent criterion is expressed in item sets support value terms. The item set support value is the transaction percentage that include the item set after that the support value will be compared with predefined threshold value, which was user generated. If support is equal or greater than the minimum threshold value than those values will be further processed for 2k mining of the frequent pattern, those which not succeed the least beginning will be unwanted.

**C. Rare Item set mining**

Item set that do not occur frequently in the database, Or we can say infrequent items in the database. Rare circumstances justify specific consideration since they signify algorithms of data mining main difficulties.

Rare item sets finding, and in rare suggestion instructions originating order from rare item sets, may be generally appreciated in medicine and biology. Suppose an expert in biology is involved to find out the cardiovascular diseases (CVD) cause for a particular medical records database. A repeated item set for instance “{prominent cholesterol level, CVD}” may be validate hypothesis that these two altered items are repeatedly connected, prominent to possible interpretation “people containing a high cholesterol level are at high CVD risk”. Another different hand, point that “{vegetarian, CVD}” is a rare item set might be authenticated that 2altered item sets suggestion is relatively extraordinary, important to the conceivable understanding “vegetarian individuals are at a CVD small threat”. Moreover, the item sets {CVD} and {vegetarian} can be both different frequent, while the item set {CVD, vegetarian} is rare.

The next example is occupied from the pharmacy co vigilance field, i.e., pharmacology dedicated detection field, survey and adverse drug effects study. Delivering an opposing drug things database, rare item set mining allows a official connecting drugs method using opposing effects, that is, finding cases where a drug had fatal or undesired effects on patients. In this technique, a repeated association as “{drug} ∪ {A}”, where “[A]” is an item set describing a desirable effect kind, means that this suggestion describes an predictable and acting right way for a drug. Over divergence, a rare item set for instance “{drug} ∪ {B}” may be inferred as the point that “[B]” describes an unusual technique of drug acting, probably leading to an undesirable effect.
So that this search can be fulfilled by identifying rare item set in the database. So in these type of condition rare item set convert more appropriate than regular item set.

In this item we current an example of occasional and non-current item-set removal. Input data is made up of a database of transaction, and every transaction is recognized through an ID and is made up of a set of items. In the actual world, transactions can be observed through a customer as a basket bought until the set period of time (day, week, month, etc.). Every basket is made up of a set of items that are bought consecutively. In Table 1 we signify an intellectual database, which is represented by D, where the letter of the alphabet is examined an item. Looking at the transaction database like that obtainable in Table 1, our aim is to discover 2 types of set of items, also known as item set. The 1st type is made up of those item-sets that are present in most of the 2-contract, and the 2nd type is made up of those item sets that are not in any contract and are made up of the maximum items equivalent to the biggest cardinality contracts. The number of items set in the database is known as item-set provision. Our case is equal to supremeprovision3 [7].

**TABLE III: Transaction database**

<table>
<thead>
<tr>
<th>ID</th>
<th>Transaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tr1</td>
<td>{a, b, c, d}</td>
</tr>
<tr>
<td>Tr2</td>
<td>{b, d}</td>
</tr>
<tr>
<td>Tr3</td>
<td>{a, b, c, e}</td>
</tr>
<tr>
<td>Tr4</td>
<td>{c, d, e}</td>
</tr>
<tr>
<td>Tr5</td>
<td>{a, b, c}</td>
</tr>
</tbody>
</table>

**Fig. 1. Lattice representing a hierarchically ordered space of item-sets and their frequencies**

The set of all item-sets that can be produced as of the contract database is accessible in Figure 1 using a diagram of the subset lattice for 5 items by the related occurrences in the database. In the lattice every level is made up of item-sets consuming the equal length. The highest component in the lattice is the blank set.

3. LITERATURE SURVEY

- Luca Caglierio and Paolo Garza [8] proposed a paper in which the discovering the rare issue and weighted item sets was handled. i.e., the IWI (infrequent weighted item set) mining problem. 2 new quality processes are suggested to the drive IWI mining process. Furthermore, two different algorithms that achieve IWI and Minimal IWI mining efficiencies, driven through proposed measures, were presented.

- Younghoe Kim et al. [9] proposed an efficient algorithm named weighted Support Frequent item sets (WSFI) was proposed which normalized weight mine over the streams of data, along with that a original tree structure as well suggested which is known as the WSFP-Tree (weighted support FP-tree), that stores compacted serious information around repeated item sets. The suggested WSFP Tree is an protracted FP-tree built data structure. It is an extended prefix-tree structure to store compressed, critical knowledge about the frequent patterns. The estimation demonstrates that the WSFI-mine outperforms the DSM-FI and THUI-Mine in mining frequent item sets over the data streams.

- G.C. Lan et al. [10] proposed a novel pattern type, known Rare Utility Item sets, which consider not only individual profits and quantities but also usual current periods and items branches in a multi-database atmosphere. An original method of mining called as the 2-Phase Algorithm for Mining Rare Efficacy Item sets in various Databases (TP-RUI-MD) was suggested to efficiently see rare efficacy item sets. The 2-Phase Algorithm for Mining Rare Efficacy Item sets in Various Databases algorithm is planned to discover rare-utility item sets environment. The 1st one is that we suggested an original item set type called rare-utility item set in a multi-database environment.

- Hua. Fu. Li et al. [11] Proposed two effective one pass algorithm, which known as MHUI-TID and MHUI-BIT, for mining high utility item sets from information streams inside of the exchange sliding window. These two distinctive successful thing learning representation and an amplified lexicographical tree-based rundown information structure is created to expand the mining high utility thing sets proficiency.

- David j. haglin et al. [12] suggested minimal infrequent item sets (MINIT) discovery process which was the 1st algorithm created particularly for classifying minimal infrequent item set (MIs). The computational period compulsory on the four dataset recommends a connection amongst the amount of MIs and the volume of calculation necessary. The Insignificant occasional item set problematic is NP-complete.
• **D. J. Haglin and A. M. Manning.** On minimal in-

• **J. Hu et al.[13]** classify high utility item groupings. In transaction to the traditional suggestion instruction and repeated item mining procedures, the goal of the algorithm is to discover data sections, definite using the few items (instructions) sets, which satisfy several conditions extant an actual assessment to crack it via specific partition trees, called as high profit partition trees and considered the various splitting schemes performance.

• **H. Yao et al. [14]** suggested the efficacy problem built mining is to find the item sets that are important agreeing to their efficacy values. In this paper apriori assets and unreliable restrain assets are not valid to the efficacy based item set mining issue. As an outcome, mathematical item set utility value properties were analyzed.

• **V.S. Tseng et al. [15]** suggest a novel method, specifically Temporal High Utility Item sets *(THUI)*-Mine, for the mining of temporal great efficacy item sets as of data streams excellently and efficiently. For our best information, from data streams, Novel *THUI-Mine* influence is that it can capably temporal great efficacy item sets classify over creating like that the presentation. Hence, the determining process every window can be succeeded capably using restricted memory space, fewer applicant item sets and time of CPU I/O. This meets the critical needs on efficiency of time and space for mining data streams.

• **Liu et al. [16]** proposed two different stage algorithms for high utility item sets discover. In 1“phase, a model relates “transaction-weighted descendant closure assets” to advance the applicant documentation on the search space. In another stage, one additional database scan is the high utility item sets identify performed.

## 4. COMPARATIVE ANALYSIS OF PRIVACY PRESERVING TECHNIQUES

<table>
<thead>
<tr>
<th>Method</th>
<th>Advantage</th>
<th>Disadvantage</th>
<th>Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>k-anonymity</td>
<td>It reduces the granularity of data representation.</td>
<td>The method is disposed to several types of attacks especially after background information is accessible to the attacker.</td>
<td>k-anonymous method</td>
</tr>
<tr>
<td></td>
<td>This granularity is condensed adequately that any specified record maps on partially k further records in the information.</td>
<td>The adversary can use an association between one or more identifier attributes with the sensitive attribute in order to narrow down possible values of the sensitive field more.</td>
<td></td>
</tr>
<tr>
<td>Randomization</td>
<td>Data is altered using totaling noise to the unique data.</td>
<td>The method on its own is weak and does not offer complete reliability, hence it is used in combination with other algorithms.</td>
<td>Additive Perturbation</td>
</tr>
<tr>
<td></td>
<td>Credentials of data openly is not probable.</td>
<td>The quality of data is disturbed and the procedure is irreversible.</td>
<td>Perturbation by random</td>
</tr>
<tr>
<td></td>
<td>The novel record values cannot be simply estimated after the inaccurate data.</td>
<td>Reconstructions leads to the leakage of Privacy, which relates to the possible risks</td>
<td>projection technique</td>
</tr>
<tr>
<td></td>
<td>It is relatively simple, and does not require knowledge of the distribution of other records in the data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Encryption</td>
<td>The method groups the data into various classes and the encryption is based on the key values generated within each class.</td>
<td>It involves complex mathematical computations.</td>
<td>Integer dividing built</td>
</tr>
<tr>
<td></td>
<td>Since the key is not a constant private or public key, the method provides a greater amount of protection.</td>
<td></td>
<td>encryption</td>
</tr>
<tr>
<td>Cryptography</td>
<td>Isolated events can mutually calculate any function of their inputs, lacking illuminating any further data.</td>
<td>There may exit Ruined events, who select their inputs freely of the truthful events' inputs.</td>
<td>Unconscious transfer</td>
</tr>
<tr>
<td></td>
<td>It covers all data apart from for the selected yield of the function</td>
<td>This assets is critical in a closed mart</td>
<td></td>
</tr>
</tbody>
</table>
5. CONCLUSION

PPDM (Privacy preserving data mining) is a novel time of study in data mining. Its eventual objective is to progress effective algorithms that agree one to abstract applicable information after huge data amounts, though check difficult data as of disclosure or inference.

Utility mining discovers each item sets whose utility values are equal or higher than a user identified threshold in a transaction database. But, the item set utility value does not justify the “descendent closure assets”. i.e., a great efficacy item set subset may not be a great efficacy item set. The utility mining task is in limiting the applicant set scope and simplifying the efficacy computing calculation. Therefore, consideration was rewarded on privacy preserving utility mining (PPUM) and suggested limited algorithms for it.

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[8] Luca Cagliero and Paolo Garza, “Infrequent Weighted Itemset Mining Using Frequent Pattern Growth", inIEEE Transactions on Knowledge and Data Engineering 26(4):903-915 April 2014
A Review on Cloud Computing and Its Architecture

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Abstract: Nowadays Cloud Computing is one of the buzz word that is used in computer networking society. In actual Cloud Computing is a broadcast of two terms namely “cloud” and the “computing”. Basically the term “cloud” is taken from the telecom companies’. With the help of Clouds user can interact with the cloud based application using internet connection from remote side areas and the resources that are used in a cloud are compute, storage and the networking. The term “computing” mainly holds the computer hardware and the computer software. So cloud computing is the generic term that is used for the computation, storage and accessing the data from the remote side by using internet facility. Basically Cloud Computing is a utility computing. Cloud computing is Internet based computing and the key characteristic of cloud computing is “computing in the cloud”. Cloud computing is a generalized term and there is no centralized infrastructure. The aim of this paper is to understand cloud computing concept. Cloud architecture have two parts back end and front end with enormous facilities like security, services, storage, management and client infrastructure to their users. This architecture enhance the capability of user to share data with large storage areas utilizing services with different application areas.

Keywords: Cloud computing, Iass, Paas, SaaS..

1. INTRODUCTION

In current scenario Cloud Computing is an emerging Technology. Cloud Computing is generally known as “the cloud”. Term Cloud Computing is used for sharing the resources that may include the whole infrastructure, software and different types of application including business processes. Cloud Computing totally uses the virtualizations concept. Cloud Computing is based on distributed architecture. In distributed architecture data is stored at different locations (units) if one location (unit) fails then other will take over automatically.

Advantages of cloud computing

- Lower IT infrastructure.
- Reduced expenditure.
- Lesser maintenance charges.
- Improved performance.
- Easy backup and recovery.
- High storage capacity.
- High data security.
- Automatic software updates.
- Anywhere accessibility
- Instant scalability
- Pay –per-use.

2. CLOUD COMPUTING TYPES:

In cloud computing the term cloud is categorized into different forms namely:

Public cloud: External cloud is another name for public cloud. Public clouds are the clouds where both infrastructure and control of these clouds is within the service provider. Google, Amazon, Azure cloud are the few examples of public cloud. Public cloud uses B2C i.e Business to Consumer types of interactions.
Advantages of public cloud

- lower cost
- no maintenance
- Provides scalability
- more reliable

**Private clouds**: “Internal cloud” is another name for Private Clouds. In Private Clouds the computed resources are governed by the private organizations. They can be used by the government agencies, institutions and organizations. A private cloud uses B2Bi.e Business to Business types of interactions.

Advantages of private cloud

- Private Clouds are flexible.
- Private Clouds are secure.
- Private Clouds provides scalability.

**Hybrid cloud**: The combination of public as well as of private cloud is known as hybrid cloud. Hybrid cloud uses B2B or B2C types of interactions. In hybrid cloud all computing resources are bounded each other by different clouds for example Microsoft.

Advantages of hybrid cloud

- More control
- Flexible.
- Easy to use.

**Community cloud**: This type of cloud provides computing resources for a community or for organizations.

3. **CLOUD COMPUTING ARCHITECTURE**

Based on previous Research and Analysis reports cloud computing architecture comprises of two main parts namely the frontend and the back end. Front end consists of client part of cloud computing system. It comprises of application and interfaces which help in assessing the feature of cloud computing. Example web browser.

Back End refers to the cloud itself. Back end is under the provider’s control. Back End is responsible for providing all the built-in security mechanism and it is also responsible for providing the protocols and the traffic control signals. Generally Back end consists of huge data storage, virtual environment, server etc. Its all over responsibility of this architecture to gives facility to user and to enhance the work culture of internet. Their back end tools to gives overall responsibility to smooth working on internet as well as flexibility in the work area of services, management, infrastructure and security. Cloud computing techniques give a huge storage area where we share our data with other resources.

4. **COMPONENTS OF CLOUD COMPUTING**

Some common components of cloud computing architecture are:

**Hypervisor**: Virtual Machine monitor is another name of hypervisor. It is hardware virtualization technique consists of software, hardware and the firmware which runs the virtual machine. Hypervisor is categorized into two types namely Type 1 and type 2.Type 1 is a native or bare metal hypervisors. Vmware ESXi, Microsoft hyper –V, oracleum are common examples of Type 1. Type 2 is also called hosted hypervisor. VMware workstations, VMware server, Microsoft Virtual PC are the examples of type 2 hypervisor.

**Management software**: Management software consists of various Strategies and plans, which help in increasing the performance of cloud by providing on line delivery of storage, security, online accessing and many other features.

**Deployment software**: The term cloud deployment refers to initiate the working of the SaaS, PaaS and the IaaS. All the mandatory installation and configuration of the cloud are done in the deployment software.

**Route of connectivity**: Route of connectivity plays the vital role in cloud computing architecture because whole cloud is connected by the virtual route.

**Server of the cloud**: Cloud server consists of all types of software that are needed during the computing. These are the virtual server running in the Cloud Computing atmosphere. Cloud Service are quick, secured, stable in nature.

**Cloud storage**: Cloud storage is a service model in which data is stored online in the form of Clouds. So whole data in cloud storage is maintained as well as managed and backed up remotely.

5. **CLOUD SERVICES**

Cloud Computing services are divided into three categories namely:

- **SaaS**: SaaS or Software as a Service is highly scalable internet based applications that are hosted on the cloud and it offers services to the end user. Now days SaaS is offered
by many companies such as Google docs, acrobat.com, salesforce.com.

- **PaaS**: PaaS or Platform as a Service. It provides a platform that is used to design, develop, and build & to test applications that are provided by the cloud infrastructure. Azure Service Platforms, force.com, Google App engine are some PaaS providers.

- **IaaS**: IaaS or Infrastructure as a Service normally provides storage & computing capabilities as standardized services over a network. Amazon web services, Go Grid, 3Tea are some examples of IaaS. It allows a Company to pay for only a much capacity of data is needed.

6. CLOUD ANTIVIRUS

Cloud antivirus is a software that consists of client & a web service components working together. Client is a small program running on our local computer which scans the system for any malware. Where a web service is a software running on one or more servers some where on the internet. Panda cloud antivirus is an example of cloud computing. It is antivirus software by Panda security. It is cloud based antivirus, it is free as well as paid available on net.

7. CONCLUSION

Cloud computing is a new paradigm for delivering IT services. In this paper we have discussed on its architecture, representative platforms, cloud service providers. Today cloud computing is expanding its area in public as well as in private field.

REFERENCES


A Critical Review of Data Warehouse Development: Business-Object Based Approach

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Abstract: Data Warehousing is a developing industry which is created for an organization to help in decision making and forecasting. The difference between a Data Warehouse and a Database is that a Data Warehouse is built with an aim of query & analysis rather than a transaction processing. This is the reason it contains historical and cumulative data derived from transaction data from single or multiple sources. The Data Analysis stage which comes after Planning and Data gathering plays a key role in the design of a successful Data Warehouse system. Not only for business organization but for any industry Data Warehousing and OLAP are becoming the most important tool for decision making and forecasting. In this paper we described some of the current tools and techniques available for Data Warehousing. We further analyzed current problems and challenges in the field of Data Warehousing and the success factors that leaded to an efficient implementation of Data Warehouse in different organizations.

Keywords: Data Warehouse, OLAP, Business Intelligence, Data Mar, ETL

8. INTRODUCTION

As we all know that business intelligence is the most important aspect for any company to grow well and do good. So, Business Intelligence is the act of transforming raw/operational data into useful information for business analysis. The first thing which every organization does is the planning, i.e., they plan what they want to be and depending on the plan they start gathering data. Once they gather data they know that they are in right direction now, so they know what to do and how to do. Now they do further analysis of that data and come up with the strategies. Finally, when they have a concrete plan they execute it into a business action. This is shown in Figure 1.

How does Business Intelligence work?

1. BI supported Data Warehouse technology extracts information from a company’s operational system.
2. The facts and figures are transformed (cleaned and integrated), and loaded into Data Warehouses.
3. Since this data is reliable, it is used for business insights.

Fig. 1. Business Intelligence process

9. DATA WAREHOUSE-MEANING AND IMPORTANCE

Data stored in various sources and stored in various databases cannot be directly visualized. As we have seen in the figure 2 we have different Operational Data Stores (ODS), so the problem comes when one team in the company is using one database and other team is using a different one. Now, the biggest problem people would find while they are doing visualization or analysis of data is that data is in different databases and they find a tough time while integrating them.

Here, the Data Warehouse plays the role and integrates data from all the databases, and processes the data so that visualization can be done.

So, a Data Warehouse is a central location where consolidated data from multiple locations or databases are stored. It is maintained separately from an organization’s operational database because the data should not be affected. So, you will have your operational data at one end where all your legacy data would be stored. Data warehouse extracts the data from operational databases whenever needed and from there business users can visualize the data with the help of Online Analytical Processing operations. Also Data Warehouse is not loaded every time new data is added to database.

Fig. 2. Data Warehouse Process
10. PROPERTIES OF A DATA WAREHOUSE

According to Bill Inmon, Father of Data Warehousing, “A Data Warehouse is a subject-oriented, integrated, time-variant and nonvolatile collection of data in support of management’s decision-making process.” According to the definition above the following are the properties of a Data Warehouse:

1. **Subject-oriented**: Data is categorized and stored by business subject instead of by application. This means that data in the data warehouse will be extracted in the form you wanted to. For example, if you have a retail company and you want to view data from three perspectives, i.e., from sales, services offered and customer preferences, then it is the Data Warehouse which comes to the rescue and allows you to integrate data from different areas.

2. **Integrated**: Data on a given subject is collected from disparate sources and stored in a single place. As we know data is collected from multiple sources and it is stored at one single place, so you don’t have to go to searching for data from multiple tables or sources.

3. **Time-variant**: Data is stored as a series of snapshots, each representing a period of time. So, when you do your analysis you can do bases on a series of snapshots of time. This means you can see your company’s status of a particular month in a year or what progress has been made so far and if the position is stagnant then what can be the reasons for that.

4. **Non-volatile**: Typically data in the data warehouse is not updated or deleted. Although, the data in the data warehouse can be updated but it is highly recommended that it should not be updated. This is why the data in the data warehouse cannot be corrupted and is a better option for analysis operation.

11. KEY TERMINOLOGIES IN DATA WAREHOUSE

1. **Data Mart**: Data Mart is a smaller version of the Data Warehouse which deals with a single subject. They are focused on one area and hence they draw data from a limited number of sources. The time taken to build Data Marts is very less compared to the time taken to build a Data Warehouse. For example, suppose your sales manager wants to view only sales data, so it can be done with the help of a Data Mart as Data Warehouse contains all the data and Data Marts are small versions of the Data Warehouse which are used to satisfy the need of only a certain group of users. The following table illustrates the difference between a Data Warehouse and a Data Mart:

   **TABLE 1: Difference between a DW and a DM**

<table>
<thead>
<tr>
<th>Data Warehouse</th>
<th>Data Marts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enterprise wide data</td>
<td>Department wide data</td>
</tr>
<tr>
<td>Multiple subject areas</td>
<td>Single subject area</td>
</tr>
</tbody>
</table>

**Types of Data Marts:**

a. **Independent Data Mart**: Data is directly received from the source system. This is suitable for small organizations or smaller groups within an organization.

b. **Hybrid Data Mart**: The data is fed both from OLTP systems as well as Data Warehouse.

2. **Information Systems: OLTP (DB) vs. OLAP (DWH)**

<table>
<thead>
<tr>
<th>OLTP</th>
<th>OLAP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contains present data</td>
<td>Contains historical data</td>
</tr>
<tr>
<td>Useful in operating the business</td>
<td>Useful in analyzing the business</td>
</tr>
<tr>
<td>OLTP uses Entity Relationship Model for working</td>
<td>OLAP uses Star, Snowflake and Fact Constellation Schema</td>
</tr>
<tr>
<td>Provides prehistoric and highly detailed data</td>
<td>Provides summarized and consolidated data</td>
</tr>
<tr>
<td>Used for inserting data into the database</td>
<td>Used for reading data from the database</td>
</tr>
<tr>
<td>Database size ranges from megabytes to gigabytes</td>
<td>Data Warehouse size ranges from gigabytes to terabytes</td>
</tr>
<tr>
<td>It provides fast results but not flexible</td>
<td>It is extremely flexible but not fast</td>
</tr>
<tr>
<td>Limited number of records can be accessed</td>
<td>Millions of records can be accessed</td>
</tr>
<tr>
<td>Ex: All purchase transactions made by a customer</td>
<td>Ex: Purchase transactions made by a customer at a specific period of time</td>
</tr>
</tbody>
</table>

3. **ETL (Extract, Transform, & Load)**: ETL is the process of extracting the data from various sources, transforming this data to meet your requirement and then loading it into a target data warehouse. So, the need for ETL is to process the heterogeneous data and make it homogeneous so that analysis operation can be done and business intelligence can be derived. All this process is done with the help of ETL tools like Informatica, Jasper ETL etc.

4. **Metadata**: Metadata is defined as data about data. It contains data about where your actual data is stored, size
of the data, location of that data and the source where it comes from. Metadata is also used to define which table is source and target and which concept is used to build business logic.

Figure 3: Data Warehouse Architecture

12. DATA WAREHOUSE ARCHITECTURE

As we know that data comes from the various sources, it can come either from the database or it can come from flat files. Much of the data comes from transactional or operational systems such as production, accounting and marketing. Data may also come from an ERP, such as those produced by SAP or PeopleSoft. Web data in the form of web logs may also feed into the Data Warehouse. And finally, external data may be included. These data sources time and again use different hardware and software, and a mixture of hierarchical, network, and relational data models for storing the data. It is not odd for a Data Warehouse to draw data over 100 source systems.

After this an action of ETL (extract, transform, and load) is performed on that data and it goes to the staging area. The data stored in the staging area is the temporary data. Also when the data goes from the staging area to the Data Warehouse the process of ETL continues. The processed data may then be used to support an operational data store. The data is also ready for loading into the Data Warehouse.

The Data Warehouse contains the repository of data used for decision making and Business Intelligence. In the Data Warehouse we have Metadata and Aggregate data in addition to raw data. This Data Warehouse can be used by the company as a whole or you can divide it into different Data Marts like sales, purchase and stock as shown in the Figure 3.

13. KEY CHALLENGES IN DATA WAREHOUSE

A. Understanding the Requirements

One of the key challenge in a business, if you want to ensure a success, is to spend the time necessary on understanding and documenting the business and its needs. The most important activity is the modeling of the business goals and concepts.

B. Data Integration

Data integration is a key challenge in the design of a data warehouse solution. A data warehouse should present an integrated and submissive view of organizational data to the investors. The integration process should be efficient enough to manage large volumes of data and is able to eliminate any redundancies and inconsistencies while data is integrated from various sources.

C. Data Warehouse Testing

Testing in data warehousing is a real challenge. A typical 15%-20%-time allocation on testing is just not enough. One of the reasons why testing is complicated is due to the reason that as organization develop, migrate or merge data warehouses, they must employ best practices for data warehouse testing.

14. CONCLUSION

Data Warehousing plays a key role in the Business Intelligence as it is the basis of automated decision support system. But there are still many issues to be tackled in the future in which Performance & Management are among the top major research areas. Some of the major research areas in Data Warehousing have been identified and the things to be done in future to achieve the best out of our Data Warehousing. The future of Data Warehousing is very bright as initially it is considered only a repository of data used for analytical applications. But today through the use of operational data stores it is used with operational applications to better understand market segments and buying behavior of customers. Finally, industry is starting to provide resources to help in teaching about Data Warehousing with the help of Data Warehouse stores like IBM (DB2), NCR (Teradata) & Oracle.

REFERENCES

Abstract: Data mining is a process which finds useful patterns from large amount of data. The paper discusses few of the data mining techniques, algorithms and some of the organizations which have adapted data mining technology to improve their businesses and found excellent results. It is an interdisciplinary subfield of computer science. It is the computational process of discovering patterns in large datasets (from data warehouse) involving methods at the intersection of artificial intelligence, machine learning, statistics, and database systems.

Keywords: Data mining, Data mining Techniques; Data mining algorithms.

1. INTRODUCTION

The term “Knowledge Discovery in Databases” (KDD) is coined by Gregory Piatetsky-Shapiro in 1989 and also at the same time he cofounded the first workshop named KDD. The term “Data mining” was introduced in the 1990s in the database community, but data mining is the evolution of a field with a slightly long history. Data mining techniques are the result of research on the business process and product development. This evolution began when business data was first stored on computers in the relational databases and continued with improvements in data access, and further produced new technologies that allow users to navigate through their data in real time.[1] In the business community, data mining focuses on providing “Right Data” at the “Right Time” for the “Right Decisions.” This is achieved by enabling a tremendous amount of data collection and applying algorithms to them with the help of distributed multiprocessor computers to provide real-time insights from data. We’ll learn more about the five stages proposed by KDD for data mining in the section on the framework for building machine learning systems.

2. DATA MINING

The development of Information Technology has generated large amount of databases and huge data in various areas. The research in databases and information technology has given rise to an approach to store and manipulate this precious data for further decision making. Data mining is a process of extraction of useful information and patterns from huge data. It is also called as knowledge discovery process, knowledge mining from data, knowledge extraction or data /pattern analysis.

Data mining is a logical process that is used to search through large amount of data in order to find useful data. The goal of this technique is to find patterns that were previously unknown. Once these patterns are found they can further be used to make certain decisions for development of their businesses.

1. Data Cleaning:

Data cleaning is defined as removal of noisy and irrelevant data from collection.

- Cleaning in case of Missing values.
- Cleaning noisy data, where noise is a random or variance error.

2. Data Integration:

Data integration is defined as heterogeneous data from multiple sources combined in a common source (Data Warehouse).
3. **Data Selection:**

Data selection is defined as the process where data relevant to the analysis is decided and retrieved from the data collection.

- Data selection using neural network.
- Data selection using Decision Trees.
- Data selection using Clustering, Regression, etc.

4. **Data Transformation:**

Data Transformation is defined as the process of transforming data into appropriate form required by mining procedure.

Data Transformation is a two-step process:

- **Data Mapping:** Assigning elements from source base to destination to capture transformations.
- **Code generation:** Creation of the actual transformation program.

5. **Data Mining:**

Data mining is defined as clever techniques that are applied to extract patterns potentially useful.

- Transforms task relevant data into patterns.

6. **Pattern Evaluation:**

Pattern Evaluation is defined as identifying strictly increasing patterns representing knowledge based on given measures.

- Find interestingness score of each pattern.
- Uses summarization and Visualization to make data understandable by user.

7. **Knowledge representation:**

Knowledge representation is defined as technique which utilizes visualization tools to represent data mining results.

- Generate reports.
- Generate tables.

3. **DATA MINING ALGORITHMS**

An algorithm in data mining is a set of heuristics and calculations that creates a model from data. To create a model, the algorithm first analyzes the data you provide, looking for specific types of patterns or trends. [3] The algorithm uses the results of this analysis over much iteration to find the optimal parameters for creating the mining model. These parameters are then applied across the entire data set to extract actionable patterns and detailed statistics.
rules. If the accuracy is acceptable the rules can be applied to the new data tuples. [4] For a fraud detection application, this would include complete records of both fraudulent and valid activities determined on a record-by-record basis. The classifier-training algorithm uses these pre-classified examples to determine the set of parameters required for proper discrimination. The algorithm then encodes these parameters into a model called a classifier.

**Types of classification models:**

- Classification by decision tree induction
- Bayesian Classification
- Neural Networks
- Support Vector Machines (SVM)
- Classification Based on Associations

3. **Association**

Association is related to tracking patterns, but is more specific to dependently linked variables. In this case, you’ll look for specific events or attributes that are highly correlated with another event or attribute; for example, you might notice that when your customers buy a specific item, they also often buy a second, related item. This is usually what’s used to populate “people also bought” sections of online stores.

Association and correlation is usually to find frequent item set findings among large data sets. This type of finding helps businesses to make certain decisions, such as catalogue design, cross marketing and customer shopping behavior analysis. Association Rule algorithms need to be able to generate rules with confidence values less than one. However the number of possible Association Rules for a given dataset is generally very large and a high proportion of the rules are usually of little (if any) value.

**Types of association rule:**

- Multilevel association rule
- Multidimensional association rule
- Quantitative association rule

4. **Outlier detection**

In many cases, simply recognizing the overarching pattern can’t give you a clear understanding of your data set. You also need to be able to identify anomalies, or outliers in your data. For example, if your purchasers are almost exclusively male, but during one strange week in July, there’s a huge spike in female purchasers, you’ll want to investigate the spike and see what drove it, so you can either replicate it or better understand your audience in the process.

This type of data mining technique relates to the observation of data items in the data set, which do not match an expected pattern or expected behavior. This technique may be used in various domains like intrusion, detection, fraud detection, etc. It is also known as Outlier Analysis or Outlier mining. The outlier is a data point that diverges too much from the rest of the dataset. The majority of the real-world datasets have an outlier. Outlier detection plays a significant role in the data mining field. Outlier detection is valuable in numerous fields like network interruption identification, credit or debit card fraud detection, detecting outlying in wireless sensor network data, etc.

5. **Clustering**

Clustering can be said as identification of similar classes of objects. By using clustering techniques we can further identify dense and sparse regions in object space and can discover overall distribution pattern and correlations among data attributes. Classification approach can also be used for effective means of distinguishing groups or classes of object but it becomes costly so clustering can be used as preprocessing approach for attribute subset selection and classification. For example, to form group of customers based on purchasing patterns, to categories genes with similar functionality.

Clustering is very similar to classification, but involves grouping chunks of data together based on their similarities. [2] For example, you might choose to cluster different demographics of your audience into different packets based on how much disposable income they have, or how often they tend to shop at your store.

**Types of clustering methods:**

- Partitioning Methods
- Hierarchical Agglomerative (divisive) methods
- Density based methods
- Grid-based methods
- Model-based methods

6. **Regression**

Regression, used primarily as a form of planning and modeling, is used to identify the likelihood of a certain variable, given the presence of other variables. For example, you could use it to project a certain price, based on other factors like availability, consumer demand, and competition. More specifically, regression’s main focus is to help you uncover the exact relationship between two (or more) variables in a given data set.

Regression analysis can be used to model the relationship between one or more independent variables and dependent variables. In data mining independent variables are attributes already known and response variables are what we want to predict. Unfortunately, many real-world problems are not simply prediction. For instance, sales volumes, stock prices,
and product failure rates are all very difficult to predict because they may depend on complex interactions of multiple predictor variables. Therefore, more complex techniques (e.g., logistic regression, decision trees, or neural nets) may be necessary to forecast future values. The same model types can often be used for both regression and classification. For example, the CART (Classification and Regression Trees) decision tree algorithm can be used to build both classification trees (to classify categorical response variables) and regression trees (to forecast continuous response variables). Neural networks too can create both classification and regression models.

Types of regression methods:

- Linear Regression
- Multivariate Linear Regression
- Nonlinear Regression
- Multivariate Nonlinear Regression.

7. Prediction.

Prediction is one of the most valuable data mining techniques, since it’s used to project the types of data you’ll see in the future. In many cases, just recognizing and understanding historical trends is enough to chart a somewhat accurate prediction of what will happen in the future. For example, you might review consumers’ credit histories and past purchases to predict whether they’ll be a credit risk in the future.

5. CONCLUSION AND FUTURE WORK

Data mining has importance regarding finding the patterns, forecasting, discovery of knowledge etc., in different business domains. Data mining techniques and algorithms such as classification, clustering etc., helps in finding the patterns to decide upon the future trends in businesses to grow. Data mining has wide application domain almost in every industry where the data is generated that’s why data mining is considered one of the most important frontiers in database and information systems and one of the most promising interdisciplinary developments in Information Technology.

Data mining is one of the most useful techniques that help entrepreneurs, researchers, and individuals to extract valuable information from huge sets of data.

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Analytics and Visualization Using Elasticsearch and Kibana

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Abstract: Elasticsearch is an open source Lucene based search engine. Its main functionalities include organization, indexing and scalable full-text searching. It is developed in Java and it uses the JSON format to input data and it offers a high level of functionality due to the simplicity of the format and readability of it. Elasticsearch includes all the recent security, speed and hardware efficiency. Kibana is an open source analytics platform designed to work with Elasticsearch, it is used to search, view and interact with data stored on the indices on Elasticsearch. It is a browser based interface assisting users in making dynamic dashboards and queries in real time. It offers clean and easy to understand visuals of various kinds such as pie charts, line graphs etc. These functionalities were used to derive the monthly average and general trend of the CPI (consumer price index) of India over the past 20 years to better understand the monthly impact and attain knowledge about high spending months and low spending months.

Keywords: Elasticsearch; Kibana; Analysis; Visualization; Open source

1. INTRODUCTION

Elasticsearch is built on top of Apache Lucene and to fully realise the worth of it one needs to work in Java as Lucene is extremely hard to work with. It is a distributed real-time document store where each field is indexed and searchable leading to coherent search results and carry out real time analytics [2]. It is usually worked with on the terminal or the command line. The hostname of Elasticsearch is “localhost:9200” and for Kibana it is “localhost:5608”. Once its up and running it uses “curl” inputs for direct commands. Elasticsearch allows one to create indexes of various kinds using JSON (java script object notation) which helps us define aggregatable classes for our data [1]. These classes can further be worked on to eventually work our analytics.

Kibana is the visual platform where it helps create visuals, these visuals can be various kinds and the final outcome depends on the depth of the aggregation terms and their values [2]. It is accessed from the browser and it performs real time changes on the data based on user inputs. The visuals can be histograms, pie charts, line graphs etc [3] and the frequency and ranges of these can be altered by the user according to their need. It furnishes a simple yet coherent picture of the data sets on hand.

Kibana offers some amazing visualization methods such as Pie charts, Histograms, Heat map, Region / co-ordinate maps etc.

Fig.1 illustrates the basic of kibana after it sources data from elasticsearch [3]. These are then compiled into user friendly and readable formats. Visualize enables us to create visualizations of the data in your Elasticsearch indices. We can then build dashboards that display related visualizations. Kibana visualizations are based on Elasticsearch queries. By using a series of Elasticsearch aggregations to extract and process our data, we can create charts that show the trends, spikes, and dips we need to know about.

Visualizations can be created from a search saved from Discover or start with a new search query. In the query bar, you can enter an Elasticsearch query to search your data. We can explore the results in Discover and create visualizations of saved searches in Visualize. Fig.2 show different visualization types.

The current index pattern is displayed beneath the query bar. The index pattern determines which indices are searched when you submit a query. To search a different set of indices, select different pattern from the drop down menu. To add an index pattern, go to Management/ Kibana/ Index Patterns and click Add New. We can construct searches by using the field names and the values we’re interested in.

Elasticsearch: As it forms the groundwork for our analysis, we begin with adding an index to Elasticsearch. An index is similar to a database. It is used to store the documents and read them from it. Elasticsearch uses Apache Lucene library to write and read the data from the index. Elasticsearch index may be built of more than a single Apache Lucene Index by using “Shards”. Elasticsearch spreads data to several physical Lucene indices these indices are called “Shards”, and all the parts of the index is called sharding [4]. We start by defining our index name using a command similar to the one as curl - XPUT ‘localhost: 9200/INDEX_NAME? pretty’ onto the terminal, the index is created in the cluster. Now we can further add various data inputs to out index using the command.
Curl- XPUT 'localhost:9200/megacorp/employee/1?pretty' -H 'Content-Type: application/json' -d '. This forms the basic concept of how we make entries onto our index in the JSON form. The JSON document in itself is quite simple in nature and a sample type of it is provided.

```json
{
  "first_name": "John",
  "last_name": "Smith",
  "age": 25,
  "about": "I love to go rock climbing",
  "interests": ["sports", "music"]
}
```

Fig. 1. Kibana (Discover interface) [3]

Fig. 2. Kibana Visualization Types
Once the index is created we can carry out searches on the data on hand right on elastic search, which we can also say is a mild form of analysis. Elasticsearch offers various kinds of search options such as searches using id number attached to each input, full-text searches, phrase search etc. These commands will organize data according to the constraints set during the search.

ID search - in these we simply specify the ID number of the input that we are looking for, it is to be noted that one needs to be aware of the ID.

curl -XGET 'localhost:9200/megacorp/employee/1? pretty' -H 'Content-Type: application/json' -d

Full-text searches - The searches so far have been simple: single names, filtered by age. Let’s try a more advanced, full-text search—a task that traditional databases would really struggle with.

curl-XGET 'localhost:9200/megacorp/employee/_search?pretty'-H 'Content-Type: application/json' -d

> {  
> "query" : {  
> "match" : {  
> "about" : "rock climbing"  
> }  
> }  
> }

Phrase search - finding individual words in a field is all well and good, but sometimes you want to match exact sequences of words or phrases.

curl-XGET 'localhost:9200/megacorp/employee/_search?pretty'-H 'Content-Type: application/json' -d

> {  
> "query" : {  
> "match_phrase" : {  
> "about" : "rock climbing"  
> }  
> }  
> }

The following types of search commands will create aggregations as well, they can settle data in accordance to the prompt and hence help the user with understanding certain amount of information pertaining to the index. We also get a max score and score value with each search result by which we can figure out how close each result is to the immediate correct result. The issue with these results is that they are not easy to comprehend if the results are vast in number, this is exactly why we need Kibana.

Kibana: To work on kibana we need to get it running on the terminal first and the sole requirement for that is that Elasticsearch cluster should already be functional on the terminal. Once it turns green all one has to do is launch it on their browser using the hostname. Kibana makes it easy to understand large volumes of data [6]. Its simple, browser-based interface enables you to quickly create and share dynamic dashboards that display changes to Elasticsearch queries in real time.

In the visualize tab of Kibana one needs to add their index name and all the data is sourced onto kibana, it automatically sorts the data, defines terms which are aggregatable and which aren’t, it also defines the type of input the data is (string, integer, float etc.). This all is done automatically by kibana and this is all available on the discover tab. Each input has it readable and JSON form available on kibana. All the user needs to do next is create visualizations of the data that they sourced to Kibana.

In the visualize tab users are provided with the options of Basic Charts (Area, line, vertical bar, horizontal bar, pie charts etc) Maps (Coordinate, region), Time Series (Timelion, Visual Builder) and Other (markdown, tag cloud). One can pick any type of visual based on their requirement and begin visualization.

For example if the user wants to make a line graph they are provided with an option of either defining and x-axis or splitting the entire series / chart. This way one can add averages to an already full line graph with multiple values. After the process is over we can save our visuals directly onto kibana.

Kibana offers a sense of simplicity and flexibility to the mounting task of data analysis, it also has time stamp based, real time based visual creation options for users [5]. Further strengthening the aspect of creating visuals of any kind and of any data sets.

Data Collection: The basic CPI data was collected in JSON form from the government website mygov.in. It was then manually added to the Elasticsearch cluster as JSON inputs which were divided based on month and the percentile change was considered to attain systematic and clean shifts in the data, also it is not uncommon to data results to get haphazard due to inclusion of extremely detailed values; this is why the said choice was made. The percentile change was selected from 2017 back till 1997, each holding a specific value for each month.

After addition to the cluster sample in terminal analysis was carried out to check the result scores (how high a search ranks in terms of the keyword). After this the data was exported to the Kibana online host. A simple transfer takes place that allows for one to load on their data and check which of the multiple constraints / terms are acceptable for aggregation. As specified the month values are pure float numbers which would make aggregation easier and workable.
The graph type (line, area and pie) are selected individually and the data displayed in terms of the selected month. The past 20 year values are included simply based on the month (keyword). The said visualizations were carried out using the below steps -

- Move to visualize and select the type of visual you want to create.
- Put in the type of data pointers and what function you want to create a visual of .
- Run the visual
- Add the average y-axis pointer
- Save the visualization.

The average pointer intersects the general graph line and gives the standard expected value from that month that is the sweet spot in terms of CPI percentage analysis.

2. RESULT

The following example results were attained and are explained below- Fig.3, Fig.4 and Fig.5 Show the result of Line graph, Area graph and Pie chart respectively.

Fig. 3. January Line Graph
The January line graph shows the past 20 year percentile changes. The Blue line shows the count hits and the green line shows the average hits [3]. As we can see they merge together at one point and that becomes the standard acceptable common point and in turn the actual general CPI change of the month. This is the actual result we were looking for to the trend of monthly expenditure. Similarly for the line graph but this case we see the gross difference in the size of the hits. The major highlight of this approach is the intensive trends that are generated to give various outlooks to out data. These two approaches gave their own unique outlooks to the complex data on hand.

Fig. 4. January Area Graph

Fig. 5. January Pie Chart
The line graph gives the general acceptable value and the area graph gives the difference in the expected trends [3].

3. CONCLUSION

It is been used quite a bit at the Open Knowledge Foundation over the last few years. Plus, as it is easy to setup locally it is an attractive option for digging into data on local machine. Elasticsearch is a standalone database server, written in Java that takes data in and stores it in a sophisticated format optimized for language based searches [1].

Kibana on the other hand is a visualization tool that creates easy to understand simple visuals based on data sourced from
elasticsearch. It is a browser based real time change including platform to bring out data to life in the form go graphs, charts or clouds. These two tools are highly efficient and functional in nature, as well as being simplistic in their approach.

These two combined helped us get a better picture of the Consumer Price Index that in its general course is extremely detailed and confusing. The approach helped us get a clear idea of the monthly trend of expenditure and the change percentile of the CPI. The addition of the average line / area also assisted in understanding the sweet spot and the space differences.

4. FUTURE SCOPE

Data analysis will continue to grow with a compound annual growth of 11.7 % according to Forbes magazine, it is one of the most dynamic fields of study in this era and is open to all approaches and software developments. The work with CPI has helped in understanding the monthly trend in a growing economy such as our India not only highlighting the scope of the expenditure power but also given a simplistic and sensible visual that is quite easy to read. Working with elasticsearch and kibana has also been an asset, that made the complex world of analytical inferencing much more viable and seamless.

The research and results aim to highlight the functionality of the software used and the descriptive and understandability of the model chosen (CPI percentile change). It created a sense of knowledge ability and affirmation regarding the resulting trends.

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Big Data Analytics: An Approach for Banking Industry

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Abstract: The motive is to study the feature, significance and uses of Big Data Analytics as an approach in Banking Sector. The reforms in Indian Banking sector as demonetization and digitalization, managing of data day to day becomes important issue. Sometimes banks are not successful to utilize the information within their own databases. The evolution called big data analytics with beneficial characteristics like volume, velocity and variety of data, improve the quality by strengthening risk management, optimizing human resources by providing new insights for fraud detection, customer segmentation and monitoring client behavior in real time. Big data analytics is the analysis of large and varied sets of data to uncover hidden patterns, markets demands and trends, unknown correlations, customer preferences and other useful information which helps in reaching major marketing goals. The Indian Banking Sector along with its new policies and application of new technological trends proceeds for the efficient use of Big Data Analytics.

Keywords: Big Data, Analytics, Risk management, Technology,

1. INTRODUCTION

Bank is a financial institution, collects the money in current or savings or fixed deposit accounts, collects cheques as deposits and pays money from the depositors' account through cheques. The big data revolution happened in and around 21st century in banking firms. Considering the valuable data, storing since many decades, this data has now unlocked secrets of money movements, helped prevent major disasters and thefts and understand consumer behavior. Banks have benefits from big data as they can extract information quickly and easily from the data and convert it into meaningful benefits for themselves and their customers.

Banks internationally are beginning, the power of data in order to derive utility across various spheres of their functioning, ranging from sentiment analysis, product cross selling, regulatory compliances management, reputational risk management, financial crime management etc.. Indian banks are functional up with their international counterparts. Big data analytics is the analysis of large and varied sets of data. In the Banking sector markets demands and trends, correlations, customer preferences and information which helps in achieving marketing goals. The data acquired ranges from structured, semi-structured to unstructured and also meta data like data from internet channels (click stream data), data from social media content, web browser history survey responses and machine data. The big data analytics is being successfully used in banking sector with aspects Spending pattern of customers, Channel usages, Customer Segmentation and Profiling, Product Cross Selling based on the profiling to increase hit rate Sentiment and feedback analysis, Security and fraud management etc.

The Motives of banks:
1. Acquiring customers,
2. Retaining customers,
3. Developing customers

2. SOURCES FOR BANK

(a) Credit card history: To track most used retailers.
(b) Transactions: To identify loyal customers
(c) Branch visits: To compare e-banking and traditional banking.
(d) Web and social media interactions: For efficient marketing of plans and schemes.

3. KEY AREAS FOR USAGE OF BIG DATA

The traditional tools are no longer sufficient to process the data for all types of decision making, insights, behavior. Thus, big data was born out of the necessity to handle the growing data from various sources, which if utilized properly, bring exemplary growth.

4. CHARACTERISTICS OF BIG DATA

(1) Velocity – The term 'speed' is speed of age of information. How quick the information is created and prepared to meet the requests, decides genuine potential in the information.

Enormous Information Speed manages the speed at which information streams in from sources like business forms, application logs, systems and web-based social networking destinations, sensors, Cell phones, and so on. The stream of information is huge and consistent.
(2) **Volume** – The name 'Huge Information' itself is identified with a size. The size of information assumes exceptionally vital part in deciding whether specific information can really be considered as a Major Information or not, is unlimited supply of information. Thus, 'Volume' is one trade mark which should be considered while managing 'Huge Information'. (a)To increase personalization and convenience, (b) Expedite credit card risk checks, (c) faster credit and loan applications.

(3) **Variability** – This alludes to the irregularity which can be appeared by the information now and again, accordingly hampering the way toward having the capacity to deal with the information successfully.

(4) **Variety** – The following part of 'Huge Information' is its assortment, to heterogeneous sources and the idea of information, both organized and unstructured. Generally, spreadsheets and databases were the main wellsprings of information considered by the greater part of the

5. TECHNOLOGY

(1) **Clustering:** It is the automation of finding correlated and meaningful data.

(2) **Text Analytics:** They rely on probability theory and rarity and occurrence of certain words which is used to predict the meanings and overall idea. Thus they assist in automatic reading and compilation to provide a summary from possible 1000s of documents. It is a classification algorithm to clearly define target field.

(3) **Neural Networks:** In this algorithm nodes are activated by a signal to active other nodes. Thus a transfer function then outputs a signals based on total received signal. They assign the data to a predefined target field and it is useful for answering questions related to event leading to action B or action C.

(4) **Link Analysis:** It is a subset of mathematics and it is called the graph theory. It represents a relationship between objects. Link Analysis constitutes both direct and undirected data mining. It is useful for identifying key sources of information on the web by analyzing links for findings influential customers from call patterns and to recruit new subscribers and so on.

(5) **Survival Analysis:** It is called time to event analysis. It is a technique used to evaluate when you should start worrying about an event. Survival Analysis answers the following questions: when is the customer likely to leave which factors likely increase or decrease customer tenure affects of various factors time period of when the customer moves to a new customer segment. Survival analysis is calculated using survival curves and hazard probabilities

(6) **Decision Trees:** They are the most powerful data mining techniques which are capable of handling diverse array of problems that can handle any data type. Decision trees split the data into small data cells. It aims at decreasing the overall entropy of data.

(7) **Random Trees:** The difference between possible errors and noise of individual decision tree.

6. BIG DATA IS USED FOR THE FOLLOWING

(a) **Sentiment Analysis:** Big Data is used to monitor the customer's opinion for identifying key customers, to examine customer feedback, to improve the quality of the products and services provided.

(b) **Customer 360 Degree:** We identify the customer's profile and capability, understanding product engagement, detection about when the customer is about to leave, analyzing the causes for potential loss of customers.

(c) **Customer Segmentation:** Customer is segmented on the basis of the potential and frequency of usage. Customer Demographics play a vital role in this analysis and through promotions and marketing; the banks try to target the target customers by building relationships. On the basis of segments banks decide targeted programs. They also create loyalty programs based on card usage. The pricing is optimized according to the segments.

(d) **Best offer:** It can be used to anticipate the financial goals of its customers, enhances the loyalty and increases the propensity of the product, uplift the revenue product bundling technique is used. Banks partner with famous retailers to offer discounts on products and services specifically used.

(e) **Channel Journey:** distributes relevant content in relevant channels, records and analyzes multi channel behavior measure effectiveness of that particular channel, also guides the customers towards favorable channels.

(f) **Product Management:** To identify where the customer is in the product lifecycle. This can have over whelming impact on marketing communications.

(g) **Design Targeted marketed programs:** This targets the right group of potential customers, also used for mis-regulatory and disclosure reporting. It protects the customer's interest and detects any types of fraud before its occurrence. It helps in being alert about suspicious transactions. This technology also increases security of investments and accounts and helps in efficient risk management.

7. BIG DATA AND BANKING SECTOR

Big Data analytics is now being implemented across various spheres of banking sector, and is helping them deliver better services to their customers, both internal and external, along with which is also helping them improve on their active and passive security systems. The focus is on analyzed
transactional and sentimental analysis for the Banking Sector, and the outcomes of the same are mentioned below:

(a) **Customer sentiments** are used to assess functioning of the bank. There are many more ways banks and other financial institutions have started to note customer related data for sentiment analysis, starting from social media websites to various market research channels.

(b) **Transactional analysis** observed how banks today use spending patterns of their customers. They monitor consumer behavior based on channel usage, consumption patterns and segment consumers depending upon the aforementioned attributes, and identify potential customers for selling financial products.

(c) **Indications** can be implemented easily into the financial systems used at banks, which can help banks strengthen data security and prevent any type of attack. While some of the checks, like suspicious wire transfers may result in “false positives”; combining several such transactional and sentimental indicators to arrive at a right decision making approach and thereby implement sophisticated mechanisms is certainly the need of the hour for the Banking sector.

8. **CONCLUSION**

The Indian Banking Sector along with its new policies and application of new technological trends precedes for the efficient use of Big Data Analytics. The future scope is trying and quantifying the financial and non-financial benefits. Bank’s effort of implementation of Big Data Analytics and predict the improvements in financial statements of the bank and also cover the various data mining techniques that can be used by banks to improve the analysis quality. Now a days, information as messages, photographs, recordings, checking gadgets, PDFs, sound, and so on is additionally being considered in the examination applications. Big data analytics and banking uses ‘insight as a service’. It is used for Educating, the Information gathering and awareness about market observations. Exploring - the Developing possible correlated strategies depending on the needs and challenges. Engaging for plot initiatives, executing- the uninterrupted application of advanced analytics. Thus, big data analytics helps in the full utilization and has the potential to anticipate unforeseen benefits and insights into the existing banks and the services provided by them.

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Abstract: We are now entering in a new era of HR. In the old fashioned, traditional business model, HR has supportive role focused solely on managing employees. However, times have changed and HR is expected to play a crucial role in achieving business outcome. We live in an incredibly information-rich world where data drives business decisions. The way we do business is transforming. We used to take decisions based on gut feeling, whereas now we analyze all type of data to set smarter goals and make smarter moves to reach those goals. This is where people analytics come into play. The People Analytics has emerged as a new fad for the management leaders that captured the headline for business world news. The purpose of the paper to unveil some of the hidden secrets of people analytics.

Keywords: New era, supportive role, employees, people analytics.

1. INTRODUCTION

Since the dawn of work, humans have been doing the work of machines: executing repetitive tasks for allotted amounts of time. The structures surrounding work – schedules, the work environment, tools – were devised to make humans more machine-like. But now, actual machines, driven by artificial intelligence (AI), are taking their rightful place as the agents of monotonous work, and for humans there’s new – infinitely more valuable – work on the horizon: human work. The Fourth Industrial Revolution relies on human capability more than ever, including empathy, complex problem-solving, creativity and of course, innovative thinking. Because work is changing, the way people work also needs to change. This means investing in a better understanding of employees, and devising new work structures based on this workforce intelligence. While it’s been an under-utilized asset thus far, employee data will be the key to finding and retaining top talent; fostering productivity, performance and well-being; and driving agile, flexible attitudes toward human-to-human and human-to-machine collaboration that unlocks innovation. There is a quiet revolution taking place in human resources and talent development departments around the world. Faced with a growing need for meaningful insights into the workforce, companies are beginning to recognize the enormous, untapped potential in what they already know, about their own people. It is called “people analytics” and it is changing the way companies think about everything from attracting and developing talent to employee engagement and retention. We are now entering in a new era of HR. In the old fashioned, traditional business model, HR has supportive role focused solely on managing employees. However, times have changed and HR is expected to play a crucial role in achieving business outcome. We live in an incredibly information-rich world where data drives business decisions. The way we do business is transforming. We used to take decisions based on gut feeling, whereas now we analyze all type of data to set smarter goals and make smarter moves to reach those goals. This is where people analytics come into play. The People Analytics has emerged as a new fad for the management leaders that captured the headline for business world news.

In an era when top talent is harder than ever to find and keep, organizations that know how to plan for future talents needs and predict and measure the impact of talent initiatives will have a massive competitive advantage in their industries. Fredrick Taylor, an industrial engineer, started this trend in 1911 when he published his report Scientific Management, which studied the movement and behavior of factory workers in steel mills. Since then companies have deployed thousands of engagement surveys, studied the characteristics of top leaders, done countless reviews of retention and turnover, and built massive human resources data warehouses. All in an effort to figure out “what can we do to get more out of our people?”

People analytics is the use of data and data analysis techniques to understand improve and optimize the people side of business. People analytics is known by different names: talent analytics, HR analytics, workforce analytics, people research and analytics, and HR business intelligence. And just as with the name, there is no standard definition [1].

It was reported that People analytics or HR analytics “is an evidence-based approach for making better decisions on the people side of the business; it consists of an array of tools and technologies, ranging from simple reporting of HR metrics all the way up to predictive modeling.” [2]

‘People Analytics’ (PA) has been appearing with greater frequency in executive leadership and Human Resource Management (HRM) circles. PA promises to help organizations understand their workforce as a whole, as
departments or work groups and as individuals by making data about employee attributes, behavior and performance more accessible, interpretable and actionable.[3]

People analytics enables HR professionals to make data driven decisions to attract, manage and retain employees, which improves return on investment. It helps leaders make decisions to create better work environments and maximize employee productivity. It has a major impact on the bottom-line when used effectively. HR professionals gather data points across the organizations from sources like:

- Employee surveys
- Telemetric Data
- Attendance records
- Multi-rater reviews
- Salary and promotion history
- Employee work history
- Demographic data
- Personality/temperament data
- Recruitment process
- Employee databases

HR leaders must align People/HR data and initiatives to the organization’s strategic goals. Once data is gathered, HR analysts feed workforce data into sophisticated data models, algorithms and tools to gain actionable insights. These tools provide insights in the form of dashboards, visualizations, and reports. An ongoing process should be put in place to ensure continued improvement.

The promise of using analytics in HR is linking people data with different types of business data to create outcomes aligned with company goals such as increased revenues and lowered costs.

The rise in the use of analytics has been caused by three main factors:

1. The explosion in data and data analytics due to improvements in technology and software.
2. HR departments are increasingly being asked to justify their decisions based on measurable outcomes. This has led to the push for business decisions to be made based on analytics and data rather than using gut instinct and subjective judgment.
3. Most HR departments are sitting on mountains of data about their employees including demographic data, performance data, job history, compensation, and training. Until recently, this data has yet to be effectively and strategically leveraged by organizations.

Three main types of talent-related data that can be analyzed are:

1. **People data** such as demographics, skills, and engagement.
2. **Program data** such as attendance, adoption, participation in training and development and leadership programs, and outcomes of key projects and assignments.
3. **Performance data** such as performance ratings and data captured from the use of instruments such as 360 assessments and succession programs.

2. **BACKGROUND OF PEOPLE ANALYTICS**

The term human resource management (HRM) comprises the traditional core activities such as resource staffing, planning, performance appraisal, training and development, compensation, labor relations, and safety and health. Besides these activities, HRM includes aligning these HR activities, managing organizational change and culture, and organizational design activities as part of its strategic role.[4] The role of HRM evolved greatly since the 1980s and has changed from the role of an administrator of mandatory HR practices to a more strategic role by acting as a strategic business partner.[5] The evolution of HRM has mainly been affected by the development of new technologies, which have changed the different HR processes and the way the work is managed and done in an organization.[6] This overall development of HRM had a significant impact on the practice and the overall focus of HRM. When looking back in the administrative role of HRM, its main objective was to make HR practices more cost-effective. However, since HRM takes over a strategic role the objective is more related to generating value for the overall organizational business, for instance by improving customer satisfaction through enhanced employee engagement.[5]

3. **TYPES OF PEOPLE ANALYTICS**

There are four types of data analytics:

1. **Descriptive Analytics:** It provides an answer to the following question: “What has happened?” It reflects on what has already happened in the past.
2. **Strategic Analytics:** It provides an answer to the following question: “Why did this happen?” This type of data analytics is defined by developing causal models and searching for the reasons behind a certain occurrence.
3. **Predictive Analytics:** It provides answer to the following question: “What could happen?” This type of data analytics is defined by using statistical models and forecast techniques that can predict the future based on the past.
4. **Prescriptive Analytics:** It provides answer to the following question: “What should we do?” This type of data analytics is defined by using simulation algorithms to
analyze a number of different possible solutions in order to choose the one most likely to provide the desired outcome.

4. CREATING PEOPLE ANALYTICS PROGRAM

- **Invest at a senior level in people analytics:** The function should provide global support, not just technical analysis, and requires CHRO and senior executive support, technical resources from IT, and a strong business-focused leader.

- **Establish clear leadership:** A single team and leader should own the initial stages of an analytics effort, even if that capability eventually becomes decentralized.

- **Prioritize clean and reliable data across HR and the organization:** Analyses are only as good as the data fed into tools and software. Working with consistent, timely, and accurate data is foundational to all analytics practices. Take concrete steps to ensure that data quality is a part of every analytics discussion. Educate HR’s stakeholders and implement data governance programs to clean and maintain data accuracy and consistency across HR and operational data stores.

- **Understand that analytics is multidisciplinary:** Bring together a multidisciplinary group from across the organization, not just PhDs and statisticians. Technical analysis is only a small part of the function. Data function, data quality, business knowledge, data visualization, and consulting skills are all critical to success.

- **Increase analytics throughout the organization:** Regardless of whether the analytics customers do the analysis themselves or have specialists supporting them, training for both HR and other business functions will be critical to operating at scale. Identify a curriculum or other partner to help with education, implementation of standard tools, and standardization of reports and dashboards.

- **Develop a roadmap for investment in analytics:** This investment is aimed at building a new business function for the company, not just a technical team within HR.

- **Focus on actions, not just findings:** To provide value, the analytics team must translate information into solutions, and stakeholders must take action.

- **Integrate HR, organizational, and external data:** Advanced people analytics programs increasingly rely on the intersection of data from HR, operations, and external sources. Organizations require a data strategy that encourages the integration and use of structured and unstructured data from internal and external sources.

5. BENEFITS OF PEOPLE ANALYTICS

- **Better HR decisions:** An important role of people analytics is to provide access to critical data and insights about the workforce which can be then analyzed for making better decisions. Not only does it improve the HR performance but also provides a better understanding of what motivates employees to work productively, and how do the organizational culture affects employee performance.

- **Better quality of Hire:** Running machine learning algorithms on jobseeker’s data allows companies to identify the best matching talent for a vacant position, thus improving the quality of hire.

- **Better Succession Planning:** Looking ahead to divine which key posts may become vacant, and what current options we have for filling or covering them, has often been a process of doubtful accuracy. However, HR analytics brings hard data to the task, including workforce demographics, training and skills records, and performance information to identify our future potential high-fliers and therefore reduce the risk of ongoing vacancies.

- **Employee Retention:** By using employee data, recruiters can recognize a pattern of high performing employees and accordingly modify their employee hiring and retention strategy. People analytics helps identify the departments suffering from the maximum attrition and the reasons causing it. It can also help HR in identifying the activities which have the maximum impact on employee engagement and thus allow organizations to invest in such activities.

- **Strategic Partner:** The application of People analytics can provide a unique advantage point to HR department to validate its importance and its role as a strategic partner in a business’ performance. HR professionals can provide business leaders with verifiable data to back their talent hiring, retention and engagement policies.

- **To predict the hiring needs of an organization:** People analytics can help predict the changes that may be in the organization’s future. Using People analytics, one can predict the skills and positions which are needed to improve business performance.

6. CHALLENGES OF PEOPLE ANALYTICS

- **It is true that the various HR tools being used today churn out huge amount of data every day, but without the clarity of how that data can be useful for a particular decision making process, it is difficult to tap into the true power of People analytics. Although there are many local challenges that a company might face while implementing a People analytics strategy, the major challenges that HR analytics face globally boil down to:**

- **Multiple Sources of Data:** With different HR tools catering to different functions of HR, there are too many sources of data working in isolation. Whether it is human resource information system, applicant tracking system, learning management system or an employee referral software, every tool creates its own data and integrating it with the other sources is a major challenge. Also, we cannot use the data from one source in isolation while
making a strategic business decisions. Thus a major challenge is to integrate these silo systems and make them communicate with each other.

- **Lack of Skills and Training:** While it’s true that data scientists are at the forefront of this data & analytics revolution, hiring managers have a preconceived notion that HR departments have little to no role to play in analyzing the data. Considering the technicalities involved, they hesitate to learn and implement these tools, supported by a mindset which is fearful of the learning curve. The HR managers would rather rely on their human intellect and understanding than going through training for a HR analytic tool. They often fall back on a faulty argument that machine intelligence will take out human from human resources, which is not at all true.

- **Data Quality:** As well as focusing on gathering the right amount of data, we also need to ensure on data quality. Data deluge can quickly lead to poor quality data, and we cannot create meaningful connections between different data sets. It is essential to guarantee data quality by focusing on ensuring data integrity and security.

- **Poor Executive Support:** HR analytics has not yet become the mainstream process for many companies and there is often a lack of executive support. But for the process to work, HR departments must be able to convince the leaders on the benefits of using analytics.

7. **CONCLUSION**

The emerging field of people analytics holds considerable promise for leaders hoping to significantly improve their operational and strategic performance through more effective workforce management. By extension, better data and analytics also have the potential to help employees manage and improve their own careers, through more effective feedback and career pathing systems. Yet there is peril in this opportunity as well. Incorrect, biased, or unethical decisions, once enabled by analytics, may be made not only much more quickly but also become embedded in the organization’s processes and routines and become very difficult to change. Thus, it is very important for workforce metrics and analytics systems to be grounded in the highest-quality social science research methods and statistics. Going forward, many elements of our work and personal lives will be automated. New roles and jobs will be created, while others will undoubtedly be eliminated through automation or efficiency gains. But what cannot be automated is a deep understanding of the cause–effect relationships needed to execute a workforce strategy and a concurrent understanding of the metrics needed to follow this process. The great promise of workforce analytics will require a much closer collaboration between scholars and practitioners in the service of all of the firm’s stakeholders.

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Abstract: Noise pollution is a growing problem in modern cities, thanks to rapid population growth, urbanisation and new technologies. Moreover, at times, it’s hard to catch the source of the noise. Talking loudly is an annoying habit in an office environment. Having a loud co-worker can distract us from our work and harm our productivity, also, in silence zone areas such as libraries and operation theatres, where any unnecessary noise can disturb the decorum or the concentration of the people engaged. To help solve this problem, we bring to you a noise detector with an automatic recording system. This device notifies users whenever it detects loud noise (when the sound crosses certain limits), as well as it automatically records the sound and saves this recorded sound in a file.

Keywords: Noise detector, Recorder, Automatic Detection, IoT

1. INTRODUCTION
The aim is to build a Noise Detector with Automatic Recording System using Arduino[1,2] with the concept of Internet Of Things(IoT). The menace of finding out the source of the noise pollution[3] is very difficult in libraries and offices. Our app tackles this problem by recording as soon as the noise in the surrounding crosses a certain threshold[4] and it also buzzes at the same time to ensure that the people talking loudly could refrain from doing so. If people ignore the alert and continue to talk loudly, it starts recording as proof and saves it for corrective action by the authorities.

2. FEASIBILITY STUDY
- Feasibility analysis of a system is conducted to gauge the possibility of the proposed system to be deployed in the real world. The feasibility study measures the prospects of the project in terms of its economic, technical, and operational feasibility. Each aspect of these three is important as they determine the applicability of the system. The economic feasibility judges the system on its deployment and operational costs in the context in which it is proposed. The technical feasibility judges the system’s prospects in terms of how it performs when compared to the existing system. Operational feasibility judges the system on how and who will operate the system and what are the prerequisites for operating it.
- Economic feasibility: The monetary cost of production of the module should be negligible as compared to the size of the facility it is deployed in.
- Technical feasibility: The proposed system is better because it automates the existing non-automated system. The software and the hardware used is simple in build and usage.
- Operational Feasibility: The person operating the system will not need to undergo any special training for operating the system.

A. Hardware used
1. Vibration motor
2. Bluetooth HC05
3. Sound sensor module
4. Arduino Uno

B. Software
1. Arduino IDE
2. Thunkable App Development Interface

3. INTEGRATION AND TESTING
The implemented system can be deployed in libraries, hospitals, and other silence zone areas for monitoring and surveillance purposes.
Power the Arduino[5] and connect the Bluetooth with our app. After successful connection, we can test it by making loud noises.
When sound level crosses the threshold value, the Noise Detector[6] device will buzz to alert the person making the noise to refrain from doing so and at the same time the app will start recording the sound and it will go on recording until the noise level comes down below the threshold level.

![Application Interface](image)

**Fig. 2. Application Interface**

![DFD Level 0](image)

**Fig. 3. DFD Level 0**

![DFD Level 1](image)

**Fig. 4. DFD Level 1**
Fig. 5. Logic Flowchart

**HOW TO TEST**

1. Connect your Arduino microcontroller to the computer.
2. Connect the VCC pin of your module to the to the 5V pin of your Arduino.
3. Connect the GND pin of your module to the GND pin of your Arduino.
4. Connect the Input pin of your module to the pin 13 of your Arduino.
5. Enter this program to your Arduino Integrated Development Environment (IDE):
   ```
   int buzzer = 13;
   void setup() {
     pinMode(buzzer, OUTPUT);
   }
   void loop() {
     digitalWrite(buzzer, HIGH);
     delay(1000);
     digitalWrite(buzzer, LOW);
     delay(1000);
   }
   ```
6. Lastly, click the Upload Button.

   **Testing Results:** The sample sketch above is a blink which is also applicable for LEDs. The output is the turning on and off of the buzzer every other second.

**4. APP DEVELOPMENT INTERFACE**

The app has been built on ‘Thunkable’, which is an online interface for block programming.
5. RESULTS AND CONCLUSION

This section illustrates the snapshots and results of the overall project.
CODE FOR BUZZER:

```cpp
int buzzer = 13;
void setup() {
    pinMode(buzzer, OUTPUT);
}
void loop() {
    digitalWrite(buzzer, HIGH);
    delay(1000);
    digitalWrite(buzzer, LOW);
    delay(1000);
}
```

To conclude, Noise Recorder can provide an insight into the sources of noise pollution in the institutions. It is easy to implement and can be amended according to the requirements by altering the threshold of noise.

6. SCOPE FOR FUTURE DEVELOPMENT

The project has a very vast scope in future. It can be used in a spectrum of fields and the sound sensor module can be replaced with a more powerful sound sensor to reckon even the slightest of variations in the decibels. It can also be used in future to analyse which object emits how much decibels by altering the structure a bit.

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Sustainable Smart Textiles-A thing of Today

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Abstract: This paper aims to elicit insights about smart wearable technologies by investigating recent advancement in smart wearable’s technology and their application. Wearable technology is all set to revolutionaries’ the human society by the kind of benefits they provide. This paper provides an overview of the wearable technology and explores its applicability and functionality. This paper aims at finding ways to lessen the market and technology uncertainty to provide the best value from a human oriented perspective and marks the basic problems associated with the use of these technology driven wearable’s and offers a complete overview of the state of the art and of the evolution of SWTs overtime. The focus is on the trend of smart textiles like bodily status monitoring, multi-wearable device control and smart networking between wearable sensors. It discusses about the major barriers in adoption of the e-Textiles and the opportunities that exist for making it a part of daily human life.

Keywords: Smart Wearable’s, wearable sensors, multi-wearable device control

1. INTRODUCTION

Smart wearable are those devices which have technology incorporated in them. These include all devices which are worn by humans and help them to ease their daily activities. Smart wearable are not a recent trend, it started with the fashion of wrist watches, followed by pocket and necklace watches, leading to present set of devices like Bluetooth headsets, GPRS trackers, smart watches etc. Smart devices are growing well in all the fields like medical, education, women safety, entertainment, gaming, and households, etc. With time smart devices have become affordable and indispensable to enjoy smart life style by using the capacity of perception, computing and transmission. A recent survey by the World Economic Forum (WEF) reveals that 92.1 percent of corporate leaders believe 10 percent of people will wear clothes connected to the internet by 2025, and 85.5percent believe 105 percent of eyewear will be internet connected[2]. Growing use across various industrial verticals such as sports and fitness, healthcare, military and defense is driving the smart clothing market globally. The rising demand for monitoring body activities through sensors is expected to surge the demand for smart clothing market over the forecast time span. Growing awareness among individuals regarding fitness is providing an impetus to the industry growth. In addition, the inclination of athletes towards the use of these products to prevent injuries and optimize their performance will have a positive impact on the business. Additionally, incorporation of newly developed and advanced fibers such as nanofibers and hybrid materials is expected to drive the growth of smart clothing market.

2. SMART APPARELS (E-TEXTILES)

This includes wearable like military clothing used for tracking, secret camera bow ties, helmets and caps. These can be used well in sports and medical fields to keep a track of regular activities. Smart textiles are also known as smart clothing or smart garments. They are the fabrics, which have digital components such as light, battery, smart chips, and other small electronic devices fitted into it. Such fabrics are innovatively designed and engineered to meet the requirements of major end user such as military, sports, textile, automotive, and healthcare.

Fig. 1. Smart Clothing: The Future-Textile

3. MARKET SIZE (E-TEXTILES)

The smart wearable market was valued at 216.18 million units in 2019 and is expected to reach 614.31 million units by 2025, at a CAGR of 19.1% over the forecast period 2020 – 2025[9]. Advancements in research have been leading to increased innovation in the recent years and has been instrumental in driving the demand for the wearable market and led to new product categories like the smart fabrics and hearable, among
others which incorporate high-end technology and design in daily living. Lately, the focus has been on providing an aesthetic design to devices to attract the customers. As per the US based global market research and management consulting company Global Market Insights Inc., the size of the smart clothing market was over US$ 150 million with shipments of around 800,000 units in 2016. The market is expected to balloon to over US$ 4 billion by 2024, and shipments are forecast to grow at over 50 percent CAGR [9].

Smart t-shirts are emerging as one of the most popular and widely used categories of this segment in recent times. Projected to grow at over 50 percent CAGR from 2017 to 2024[3], these smart garments can provide biometric data such as heart rate, breathing rate and volume, muscle activity, etc., which are utilized to optimize performance and workout plans professionally. Smart jackets are set to witness growth over the future owing to the ability of these products to control the mobile devices of the wearer and connect to several services such as music and camera, device charging, etc., directly from the jacket. Despite the rapid growth of wearable technology in fitness tracker and smart watch categories, other categories lacking dramatic growth. In particular smart clothing represents less than 1 % of the global wearable’s market [2]. Lack of expansion and adoption in this category is due to many factors:

1. Technical Challenges with sensor size, sensor accuracy and device power.
2. Cultural challenges in data privacy, device cost and style
3. Lack of compelling use cases for personal electronic consumers and the market value of developing and selling devices to end users.

Donald Norman, a cognitive scientist and pioneer in applying human cognition to design, mentioned that “much of what is being done with wearable devices is happening simply because it can be done. What Norman pointed out is that the current wearable technology trend mainly focuses on core technology development while ignoring practical extensions of mind and body through technology, which is an essential inherent objective of wearable technology. Nonetheless, it is now quite promising that more researchers and companies are focusing on researching wearable applications and services that can provide the best value from the users’ perspective.

The US smart clothing market is estimated to behold huge adoption and is expected to dominate the industry with a significant revenue share. The Asia Pacific smart clothing market is also expected to witness substantial growth over the forecast time span. This can be attributed to the growing adoption of various wearable devices coupled with the increasing demand for advanced features in the products. Rising security concerns and increasing military and defense budgets across countries such as India and China is predicted to witness huge demand for these products.[3]

4. THE INDIAN CONTEXT

The e-garment segment is still in nascent stages in India and very under developed compared to others countries in the Asia Pacific region. The Indian ecosystem is still experiencing the wearable technology on the fitness and healthcare sector, there is still a lot to come in the existing product line-such as gamification, and building augmented product by providing a comprehensive set of services and charging based on usage. Following are the best Indian companies ‘ad venting in to the smart garment industry.

SYGNAL – Hyderabad based startup, Broadcast Wearables Pvt Ltd. is an AI based wearable’s company on a mission to make everyday devices smart. It is the parent holding of SYGNALS who has the distinction of producing the world’s first touch- enabled t-shirt [10]. Loaded with a bunch of sensors packed in a small chip, the brand’s smart t-shirts are equipped to track a plethora of things including, the number of steps taken in the entire day, calories burnt even in the slightest form of exercise, floors climbed, distance walked or run. It can also navigate the wearer to a desired location. All the data is synched through Bluetooth to the app, and can be viewed for at least three days.

LECHAL – Hyderabad based Ducere Technologies Pvt Ltd., is another noteworthy name in the field of Indian smart fashion. The company’s offering Lechal uses GPS to track down the users location through a GPS linked app, which then sends vibrations to his soles, thus telling him which turn to take[10]. Built into the shape of a small pod which comes fitted into insoles, it functions through an app installed on a Smartphone. The app also allows the user to keep a record of his route and tracks the steps taken, the distance travelled and the calories burned. The pods have a claimed life of 15 days on each charge.

BOLTT – Boltt is a ‘sports tech-brand’ that is developing next generation consumer-centric solutions for personal health & fitness. Known for its advanced artificial intelligence (AI) ecosystem, Boltt provides ‘connected fitness solutions’ bundled with the hardware. The hardware includes smart shoes, stride sensor and activity tracker [10]. The Boltt sensor is powered by Garmin’s patented SDM Technology. Boltt’s AI is aimed at solving problems in health and fitness coaching by providing real-time audio feedback and provides customized workout suggestions. As of now, there are Boltt’s wearables portfolio encompasses such as Boltt Fit, Boltt Beat, Boltt Beat 2.0, Boltt Ace, Boltt Verve Luxe, etc.

ARROW – Popular shirt brand Arrow from Arvind Ltd., launched its first smart shirt and India’s first smart garment in 2016. The Smart Shirt comes with an built-in chip on the cuff that can be programmed by downloading the Arrow mobile app on a near field communication (NFC)-enabled smartphone[10]. The Smart Shirt allows the wearer to share things like his LinkedIn profile, his Facebook profile or visiting card through a tap on the shirt’s cuff with a
smartphone. Among other functions it performs are connecting via Bluetooth to play your favorite songs on the phone or switching your phone to ‘meeting mode’.

5. MARKET SEGMENTATION OF E-TEXTILES

![Market segmentation diagram]

Fig. 2. Segmentation of market [8]

1. The global smarttextile market is segmented on the basis of type, application, end use industry, and region.

On the basis of the type, the market is divided into passive smarttextile, active smarttextile, and very smarttextile. Among these segments, the passive smarttextile is holding the largest share of the market on account of lower cost as compared to its counterpart and relative lesser complex operations.

2. By the application, the market is categorized into sensing, architecture, medical, energy harvest, thermo-electricity, and others. The sensing segment is growing at a robust growth rate during the review period. This growth trend is primarily attributed to the increasing demand for the protective gears with health tracking devices. Also, the sensing is the most significant characteristic of the smarttextiles.

3. Based on the end use industry, the global smarttextile market is classified into military & defense, building & construction, automotive, textile, medical, sports, and others. The military & defense segment is the largest consumer of smarttextiles, which is holding over 30% share of the market. This is majorly attributed to the continuously increasing global threat driving the huge investment in defense expenditure by the major countries such as India, China, the U.S., and Russia.

6. BLOCKADES AND OPPORTUNITIES IN ADOPTION OF E-TEXTILES

Some of the most frequently quoted barriers to successful mass scale production of smart Garments using e-textiles involve the machinery, skills and know-how in constructing them. Enabling technologies, machinery and know-how are all expanding, making it easier for brands and manufacturers to access the technologies required to produce smart garments, but a range of barriers to mass-scale manufacture and adoption of e-textiles remain as challenges that the industry needs to overcome in order to move from small scale to mass scale production of these products. However, the potential disruptive effect of smart garments also means that there are new ways of competing and new opportunities arising for innovative suppliers to take advantage of this.

7. PORTABILITY BARRIERS

Smart phones, tablets and wearable electronics are incredibly well designed and high performing pieces of hardware that can cope with a wide range of challenging environment. One of the biggest challenges for e-textiles is the effect of laundering. Naturally occurring minerals and salts in water can have a detrimental effect on the conductivity of metal based yarns and the effect varies from location to location due to the naturally differing inclusion and concentration of these constituents’ indifferent geographies. The yarn manufacturers have been improving their products to minimize this impact, but the addition of detergents to the washing process is a further challenge. Detergents can also have an adverse effect on conductivity but also can tend to build up as residue in crevices on connectors, reducing the effectiveness of the connections. Many of these problems are being addressed by the designers and suppliers and it is not uncommon now to see garments capable of being washed over 80-100 times before their performance becomes affected. Ultra hydro and oleo phobic finishes giving a “lotus leaf” effect to prevent moisture damaging the electronics modules by use of coating technologies such as HZO or P2i’s plasma coating are becoming common in wearable electronics and are also particularly useful in the context of smart clothing. One of the biggest challenges presented by laundering is the mechanical stress caused during the spin cycle; particularly to connectors and any part of the garment where there is a significant difference in flexibility (the transition from soft conformable fabric to less flexible electronics modules). Primarily this is a design challenge that requires the weak areas to be made more robust or designed to cope with strain in other ways, but the effects can also be mitigated by using a laundering bag (such as those used for lingerie items).

8. INTELLECTUAL PROPERTY (IP) BARRIERS

E-textiles is an area where many early high-risk developments were developed by government sponsored academic projects. In fact the sector is populated by a high number of academic “spin-offs” which tend to have early stage Intellectual Property developed during these funded projects covered by patent protection. Small entrepreneurial startup shaves also invested heavily in IP protections to not only protect their ideas, but also to enhance the attractiveness of their company to the potential investors most need in order to grow their business.
Due to this there has been a proliferation of connectors/chargers similar to that in the early days of the mobile phone market where each device manufacturer created proprietary charging connectors. This represents a barrier in both costs (costs of chargers and cables reduced significantly after legislation forced and suppliers agreed to use a small number of “standard” charger connections) and in complexity for users (who need to remember and carry around multiple device chargers and cables). Unless using common materials or manufacturing techniques, many unique features created in order to find novel solutions to common problems or to avoid paying licensing fee to use others’ solutions are likely to result in higher production costs and lower efficiencies. Another consequence of the highly fragmented IP landscape is that many small brands in the space are unwilling to license their technologies to potential competitors. Instead of pooling resources to gain economies of scale and develop easier to use products for users, IP protection is often simply blocking potential improvements for the sector. Licensing could release this potential and help to accelerate better and more common solutions to connections. One more issue with IP is, universities and associated academics hold patents in the area to protect their inventions in early stages Universities and associated academics and start-ups, with the products and technology solutions remaining at a low Technology Readiness Level (TRL). This also means a potential licensee is required to take on the cost and risk of developing the IP to a commercially deployable form. All this can put potential new entrants off as they start to research the IP landscape and realize their options for successful development of many concepts is limited by existing IP or their licensing arrangements.

9. KNOWLEDGE BARRIERS

E-textiles and smart garments require collaboration between the textiles & clothing and consumer electronics industries. Both the products and technologies along with the underlying industry structures are very different, however. Many of the successful businesses in the sector are run by cross-functional teams and have skills in both textiles and electronics. Electronics and data processing experts need to work together with textile and garment developers in order to make a successful product.

“E-textiles are a highly interdisciplinary field. Our customers usually come from either one of the two worlds (textiles or electronics) and it is always difficult to make them realize and accept the rules and restrictions of the other field. Therefore communication in advance of a project is dominated more by the discussion of restrictions and not opportunities. With every successful project and product in the market however things get easier, because it is something that can be related to and built upon. This is still the challenge that e-textiles is facing.”

Forster Rohmer’s Jan Zimmer

Google’s announcement of Project Jacquard, a development from its Advanced Technology and Products (ATAP) division) in June 2015 was another interesting development. The firm showcased a fabric panel that acted as a capacitive touch screen. ATAP built a chip that interprets the signals from the conductive yarns as users touch it and developed its own metal filament wrapped yarns to weave the conductive panels. Google says it is building the entire supply chain to bring this technology to market and to create an ecosystem around it. It has set out to adapt its technology and ideas to fit the textile and garment industry on a mass scale rather than the other way around. The first partner it announced was Levi’s, but the applications were not discussed and there has been no further information released to date. MAS Holdings, a leading supplier of sportswear and lingerie has recently invested in an early stage monitoring start-up, Nanowear Inc. Following the acquisition of Zephyr Technologies by Covidien then Medtronic and the even more recent acquisition of Clothing+ by Jabil, it appears that the sector is finally beginning to consolidate partnership sand leverage joint expertise.

10. TECHNICAL BARRIERS

Interpreting data from wearable sensors is challenging. The data will be heterogeneous, coming from a variety of sensor types with different modalities. A second challenge is the non-uniform nature of the data. It may arrive sporadically, with temporal gaps, and excess noise. This increases the analysis complexity and can lead to false confidence in results. There is a significant amount of effort and research currently directed towards understanding how to interpret the type of multi-parameter, longitudinal data produced by heath monitors and wearable systems. However, the challenge remains to automatically labeling a vector of features values indicative of health of an individual amongst the population at large.

11. CONCLUSION

With this we can conclude computers are incredible but using technology in a conventional way by clicking, touching etc is disappointing, it means the future looking in screen not at each other. The idea is to use daily usage things to interact with digital life making world the interface and the use of keyboards, mouses, keys etc becoming null. The biggest challenges to it are:

- Changing purpose of things by invention technology and hacking into things by changing them. Invented sensor, injecting structures, electrical fields into motion gestures.
- Incorporating R&D to actual products, i.e., world of apparel is larger than world of technology. The key to increase sustainability and usability is to make technology in wearable’s as easy and common as sewing a ordinary garment.
- Technology need to be streamline to make existing thing better, original purpose would remain but digital functionality will be added to avoid fragmentation and create uniform user experiences.
Eventually we can say that the key to future e-textiles is giving devices to maker of things and let people make these things decide its functionality while it reconfigures along to the particular product.

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Abstract: The Indian retail industry has emerged as one of the most dynamic and fast-paced industries due to the entry of several new global players recently. This paper integrates extant literature on the retail industry covering both the traditional brick and mortar stores and the changed online landscape. India is on the way to become the world’s fastest growing e-commerce market, driven by robust investment in the sector and rapid increase in the number of internet users. Both organised and unorganised retail companies are working together to ensure better prospects for the overall retail industry, generating new benefits for their customers. The industry is set to grow at a much faster pace as a result of rising incomes, favourable demographics like young population, entry of foreign players, and increasing planned urbanization in form of smart cities. In the last five years, online retail - both direct and through marketplaces – has had a great ride, going from nascent to critical mass. So much so, today it has started to threaten the traditional brick-and-mortar retail and recognizing the danger, many physical retailers have started to establish or beef up their online presence thus blurring the lines between marketplace and market space. Through this paper we can understand the transformation that has taken place in retail industry and also analyse various reports on future of Indian Retail Industry.

Keywords: Retail Industry, Omnichannel, Personalisation, Transformation, marketplace, market space, e-commerce and online retail

1. INTRODUCTION

Asia Pacific region is becoming the leader of the e-commerce industry with a 35 percent of the global market in 2015 and over 40 percent in 2019. India’s large and aspiring middle class of 75 million households or 300 million individuals want products that are value-driven. The country’s 500 million people under the age of 25 have access to more money that has additionally resulted in independence, aspirations and a demand for products. Today India is the world’s fifth-largest global destination in the retail space. In last two decades the Indian retail industry has emerged as one of the most dynamic and fast-paced industries due to the entry of several new players. It accounts for over 10% of the country’s Gross Domestic Product (GDP) and around 8% of the employment. The Boston Consulting Group and Retailers Association of India published a report titled, ‘Retail 2020: Retrospect, Reinvent, Rewrite’, highlighting that India’s retail market is expected to nearly double to US$ 1 trillion by 2020, driven by income growth, urbanisation and attitudinal shifts among the major drivers. The overall retail market is expected to grow at 12 per cent per annum, modern trade would expand twice as fast as 20 per cent per annum and traditional trade at 10 per cent. The Indian retail industry is one of the fastest growing in the world. The Indian retail industry is one of the fastest growing in the world. Retail industry reached to Rs 66.39 lakh crore (US$ 950 billion) in 2018 at CAGR of 13 per cent and expected to reach Rs 76.87 lakh crore (US$ 1.1 trillion) by 2020. India ranked 63rd in World Bank’s Doing Business 2019. India ranked 73rd in the United Nations Conference on Trade and Development’s Business-to-Consumer (B2C) E-commerce Index 2019.

India is expected to become the world’s fastest growing e-commerce market, driven by robust investment in the sector and rapid increase in the number of internet users. India’s e-commerce market is estimated to expand to over US$ 100 billion by 2020. Online retail is expected to be at par with the physical stores in the next five years. According to a study by Assocham-PricewaterhouseCoopers, Indian e-commerce industry is expected to grow from its current level of US$ 17 billion to US$ 100 billion, a compound annual growth rate (CAGR) of 35 per cent over the next five years. The country is among the highest in the world in terms of per capita retail store availability. India’s retail sector is experiencing exponential growth, with retail development taking place not just in major cities and metros, but also in Tier-II and Tier-III cities. Healthy economic growth, changing demographic profile, increasing disposable incomes, urbanisation, changing consumer tastes and preferences are the other factors driving growth in the organised retail market in India. India ranked 77th in World Bank’s Doing Business 2019. The modern retail market in India is expected to grow from Rs 94, 421 crore (US$ 13.51 billion) in 2018 to Rs 1.86 lakh crore (US$ 26.67 billion) in 2021. The massive growth in e-commerce is mainly due to a low base and rising internet penetration along with
improvements in broadband, logistics and internet-ready devices.

The current estimated value of the Indian retail sector is about 550 billion USD and is pegged to reach 1.3 trillion USD by 2030. The penetration level of modern retail (currently 5%) will increase six-fold from the current 27 billion USD to 220 billion USD in 2020. The Indian retail sector is expected to grow at a CAGR of 15 to 20%. Factors driving the organised retail sector include the following:

- Higher incomes driving the purchase of essential and nonessential products
- Evolving consumption patterns of Indian customers
- New technology and lifestyle trends creating replacement demand.
- Increase in rural income as well as urbanization
- Increase in easy access to credit and consumer awareness
- Growth of modern trade format across urban, Tier I, Tier II and Tier III cities and towns
- Rapid urbanisation and growing trend towards nuclear families

![E-tailing Value Chain](image)

**Fig. 1. E-tailing Value Chain**

Increased Internet penetration, improved security measures, convenience of shopping, in lives pressed for time, and, of course, dozens of retailers to choose from – these are a few factors that are attracting more and more consumers to shop online. In fact, the recently concluded Google's Online Shopping Festival (GOSF) saw some 16 million Indians shopping online within four days. Yet, while online shopping is an easy way for comparison of different products on the basis of their features and specifications—without going from shop to shop, many consumers do find it difficult to choose the best and safest sites for making purchases. CRISIL Research believes some of them, who play to their strengths of physical reach and multi-location presence, will be able to build successful and, more importantly, complementary, business models – just as it happened in the US. It's still a small component of India's Rs. 38 trillion ($600 billion, roughly Rs. 38, 08, 200 crores) overall retail trade industry. Yet, the e-commerce format with sales of Rs. 1 trillion ($16 billion, roughly Rs. 1, 01, 552 crore) managed to create a buzz like never before - not just with mega promotions but also with mergers, acquisitions and some crazy valuations. Electronic retailing, as it is generally being called now, is the direct sale of products, information and service through virtual stores on the web, usually designed around an electronic catalogue format and auction sites. There are thousands of storefronts or e-commerce sites on the internet that are extensions of existing retailers or start-ups.
Retail is mainly a volume game, (especially value retailing). Going forward, with the competition intensifying and the costs scaling up, the players who are able to cater to the needs of the consumers and grow volumes by ensuring footfalls will have a competitive advantage. At the same time, competition, high real estate cost, scarcity of skilled manpower, and lack of infrastructure are some of the hurdles yet to be tackled fully by retailers. Luxury retailing is gaining importance in India. This includes fragrances, gourmet retailing, accessories, and jewellery among many others. The Indian consumer is ready to splurge on luxury items and is increasingly doing so. The Indian luxury market is expected to grow at a rate of 25% per annum. This will make India the 12th largest luxury retail market in the world. Rural retailing is another area of prime focus for many retailers. Rural India accounts for 2/5th of the total consumption in India. Thus, the industry players do not want to be left out and are devising strategies especially for the rural consumer. However, players should be ready to face some imminent challenges in rural area. For instance, competition from local mom and pop stores as they sell on credit, logistics hurdles due to bad infrastructure in rural areas, higher inventory expenses and different buying preferences amongst rural population.

2. LITERATURE REVIEW

The extant literature analysis included assessment of publications on the development of the Indian retail industry (www.indianground.com, 2008; Gupta, 2005; www.expresstextiles.com, 2005). These publications were mainly published between the years 2000 and 2014 in order to make sure that the most current industry and market activity were captured. Publications included popular Internet sites, industry publications, and reports by major retail houses. Other sources included blog spots and interviews of executive managers working in retail in newspaper publications like Business Line and The Hindu.

Sahu (2010) describes that a rise in consumer confidence, improvement in profitability and aggressive expansion plans signal better tidings for listed players in the organized retail space. Moreover, analysts believe listed retailers could attract foreign investments by spinning off their subsidiaries into separate companies which can provide a great opportunity for the improvement of this sector. Gellner (2007) explains in this context that in most retail meetings and/or publications, hardly ever is there any talk on problems that modern retail formats are encountering doing business in India. There is a significant profitability challenge, to deliver the brand promise in terms of quality and geographic spread in line with the growth in consumer demand. Also in year 2007, Nagesh describes that Indian retailing will see a sea of change in the next five years, driving consumption boom never seen in the history of any country. From a drought situation we will see a flood of modern retail. So Indian retail will be on a steady ground of sustained growth year after year and thereafter. Akash (2009) says that Retail business in India, as anywhere else in the world, plays a crucial role in an economy. Retail in India has the potential to add value over Rs 2, 00, 000 crore ($45 billion) business by the year 2010 generating employment for some 2.5 million people in various retail operations and over10 million additional workforce in retail support activities including contract production and processing, supply chain and logistics, retail real estate development and management. Gibson, CEO Retail Association of India opines (2007) that modern retailing today is growing faster than expected while the current growth rate is around 30 percent, the sector is expected to grow at 40-50 percent on a year basis. Shivkumar, Executive Director and
leader of Retail and Consumer Practices Price Warehouse Cooperatives, (2009) also holds the opinion that retailing is the next sunrise segment of the economic development of the country. Next-Generation Retailing in India: An Empirical Study Using Factor Analysis 27 Mishra (2008) says, there is a hectic activity in the sector in terms of expansion, entry of international brands and retailers as well as focus on technology, operations, infrastructure and processes. All these present a tremendous opportunity in this high growth industry. Yuvarani (2010) opines that according to a study the size of the Indian Retail market is currently estimated at Rs 704 corers which accounts for a meager 3% of the total retail market. As the market becomes more and more organized the Indian retail industry will gain greater worth. However, the future is promising, the market is growing, government policies are becoming more favorable and emerging technologies are facilitating operations. Biyani (2007) describes that we are on the cusp of change wherein a huge, multicultural India is transforming from a socialist economy to a consumption-led, creative economy. The scope and depth of change that is taking place due to the revolutionary retail market with a gigantic opportunity for marketers and retailers, not only in large cities but also in small towns. So retailing can play a significant role in creating the India of tomorrow. Kearney (2007) explains that the retail sector provides a unique platform to India. Government, both central and state, need to engage with the sector and utilize its potential for social development. So the Indian market and its consumers poised for a retail consumption explosion that will continue for future.

3. TRADITIONAL RETAILERS FORCED TO GO ONLINE

The retail sector can be broadly divided into two segments: Value retailing, which is typically a low margin-high volume business (primarily food and groceries) and Lifestyle retailing, a high margin-low volume business (apparel, footwear, etc). The sector is further divided into various categories, depending on the types of products offered. Food dominates market consumption with 60% share followed by fashion. The relatively low contribution of other categories indicates opportunity for organised retail growth in these segments, especially with India being one of the world's youngest markets. Transition from traditional retail to organised retail is taking place due to changing consumer expectations, growing middle class, higher disposable income, preference for luxury goods, and change in the demographic mix, etc. The convenience of shopping with multiplicity of choice under one roof (Shop-in-Shop), and the increase of mall culture etc. are factors appreciated by the new generation. These factors are expected to drive organized retail growth in India over the long run.

In the last five years, online retail -- both direct and through marketplaces – has had a helluva ride, going from nascent to critical mass. So much so, today it has started to threaten the traditional brick-and-mortar retail. Recognizing the danger, many physical retailers have started to establish or beef up their online presence. Penetration of computers and proliferation of the internet has given rise to many new forms of businesses, such as business process outsourcing, call centers based customer relationship management (e-CRM), medical transcription, remotely managed educational and medical services and of course, electronic retailing. There are certain essential ingredients like Attractive business to

![Fig. 3. Market Size and Details](image-url)
consumer (B2C) e-commerce portal, Right revenue model and Penetration of the internet etc for an electronic retailing business to be successful. One must consider these components well in advance before setting up an electronic storefront.

To stay in the game, traditional retailers have been working on their internet strategy. For instance, Shoppers Stop, which started its online store in 2008, has boosted presence and improved features and user interface to bring its online visage on a par with leading e-commerce websites. The company is also trying to leverage its physical network by giving customers the option to return products at its stores. Apart from Shoppers Stop, Croma has an online store with options such as store pickup and cash on delivery. Even manufacturers of retail products such as Titan Industries (watches, jewellery, eyewear, etc) and Aditya Birla Nuvo (apparel - Allen Solly, Louis Philippe, Peter England, etc) have set up beachheads in cyberspace. Going ahead, we believe more and more traditional retailers will board the online bandwagon. The rapid growth of online retail is, in a sense, reflected in the deteriorating financials of physical retailers over the past 3 years. At an aggregate level, operating and net margins of companies such as Shoppers Stop, Cantabil, Kewal Kiran, Provogue, and Trent have all shown a declining trend. Even operating parameters such as same-store sales growth, conversion ratio and sales per square feet have been on a decline. For example, in the case of Shoppers Stop, sales per square feet have declined from Rs 8,518 in 2010-11 to Rs 7,837 in 2012-13, while the conversion ratio has come down from 24 per cent to 22 per cent. Footfalls during festive season drop in shops in favors of e-commerce, hence the traditional stores are forced to explore the online options.

4. INVESTMENT SCENARIO: INDIAN RETAIL PREFERRED GLOBALLY

India’s population is taking to online retail in a big way. The online retail market is expected to grow from US$ 6 billion to US$ 70 billion during FY15-FY20. India is the fifth largest preferred retail destination globally. The country is among the highest in the world in terms of per capita retail store availability. India’s retail sector is experiencing exponential growth, with retail development taking place not just in major cities and metros, but also in Tier-II and Tier-III cities. Healthy economic growth, changing demographic profile, increasing disposable incomes, urbanisation, changing consumer tastes and preferences are the other factors driving growth in the organised retail market in India. Increasing participation from foreign and private players has given a boost to Indian retail industry. India’s price competitiveness attracts large retail players to use it as a sourcing base. Global retailers such as Walmart, GAP, Tesco and JC Penney are increasing their sourcing from India and are moving from third-party buying offices to establishing their own wholly-owned-wholly-managed sourcing and buying offices.

The Government of India has introduced reforms to attract Foreign Direct Investment (FDI) in retail industry. The government has approved 51 per cent FDI in multi-brand retail and increased FDI limit to 100 per cent (from 51 per cent) in single brand retail. The Indian retail industry in the single-brand segment has received Foreign Direct Investment (FDI) equity inflows totalling US$ 275.4 million during April 2000–May 2015, according to the Department of Industrial Policies and Promotion (DIPP). With the rising need for consumer goods in different sectors including consumer electronics and home appliances, many companies have invested in the Indian retail space in the past few months.

- US-based Amazon commits $2 billion in India’s e-commerce space
- Soft Bank invests $627 million in Snapdeal, $210 million in Ola cabs
- Flipkart gets $1.7 billion in funding, taking valuation to $7 billion
- Reliance Group exits Yatra.com with 12-fold increase in original investment
- Paytm plans to set up 30,000–50,000 retail outlets where its customers can load cash on their digital wallets. The company is also looking to enrol retailers – mostly kirana stores – as merchants for accepting digital payments.
- Mobile wallet company MobiKwik has partnered with Jabong.com to provide mobile payment services to Jabong’s customers.
- DataWind partnered with HomeShop18 to expand its retail footprint in the country. Under the partnership, HomeShop18 and DataWind would jointly launch special sales programmes across broadcast, mobile and internet media to provide greater access to the latter’s tablet range.
- Fashion and You has opened three distribution hubs in Surat, Mumbai and Bengaluru to accelerate deliveries.
- Abu Dhabi-based Lulu Group plans to invest Rs 2,500 crore (US$ 402.0 million) in a fruit and vegetable processing unit, an integrated meat processing unit, and a modern shopping mall in Hyderabad, Telangana.
- Aditya Birla Retail, a part of the US$ 40 billion Aditya Birla Group and the fourth-largest supermarket retailer in the country, acquired Total hypermarkets owned by Jubilant Retail.
- With an aim to strengthen its advertising segment, Flipkart acquired mobile ad network AdiQuity, which has a history of mobile innovations and valuable experience in the ad space.
- US-based Pizza chain Sbarro plans an almost threefold increase in its store count from the current 17 to 50 over the next two years through multiple business models.
- Amazon, the world’s largest online retailer, is readying a US$ 5.0 billion war chest to make India its biggest market outside the US.
Wal-Mart India Private Ltd, a wholly owned subsidiary of Wal-Mart Stores Inc., plans to open 500 stores in India in the next 10–15 years.

British retail major Tesco invested Rs 850 crore (US$ 133.8 million) in multi-brand retail trading by forming an equal joint venture with Tata group company Trent; to form the joint venture, Tesco purchased 50 per cent stake in Trent Hypermarket Ltd (THL). THL operates the Star Bazaar retail business in India.

The Government of India has taken various initiatives to improve the retail industry in India.

IKEA, the world’s largest furniture retailer, bought its first piece of land in India in Hyderabad, the joint capital of Telangana and Andhra Pradesh, for building a retail store. IKEA’s retail outlets have a standard design and each location entails an investment of around Rs 500–600 crore (US$ 80.4–96.5 million).

The Government of India has accepted the changes proposed by Rajya Sabha select committee to the bill introducing Goods and Services Tax (GST). Implementation of GST is expected to enable easier movement of goods across the country, thereby improving retail operations for pan-India retailers.

The Government has approved a proposal to scrap the distinctions among different types of overseas investments by shifting to a single composite limit, which means portfolio investment up to 49 per cent will not require government approval nor will it have to comply with sectoral conditions as long as it does not result in a transfer of ownership and/or control of Indian entities to foreigners. As a result, foreign investments are expected to be increase, especially in the attractive retail sector.

5. OMNICHANNEL PERSONALISATION

The Indian retail experience has gone beyond the traditional brick-and-mortar store and includes numerous touch points such as online stores, social networks, call centres, etc. Changing economic dynamics, diverse choices in products and services, numerous shopping formats and unparalleled access to information has empowered customers to expect more from their retail experience. The recent economic downturn has taught discipline to the customers. In today’s rapidly changing and digitally connected world, customers are more value-conscious while making purchase decisions. We know that personalization across physical and digital channels is the next big marketing opportunity. Personalization across physical and digital channels is the next big marketing opportunity. E-commerce has really flourished in India but there is no dedicated-commerce law in India till date. E-commerce has introduced significant choices for Indian consumers and customers. However, e-commerce in India has also given rise to many disputes by the consumers purchasing the products from e-commerce websites. There is no formal e-commerce dispute resolution regulatory mechanism in India as we have no dedicated-e-commerce laws in India.

With consumers shifting more of their spending from physical stores to e-commerce and increasingly looking for experiences rather than products, mall operators face serious headwinds. They’re using prescriptive and predictive analytics—built into...
user-friendly tools with strong data-visualization capabilities—to make smarter business decisions. Advanced analytics, in particular, has the potential to revolutionize almost all areas of the mall business. Unfortunately, many mall operators lag behind their tenants when it comes to using advanced analytics. One oft-cited explanation is that malls haven’t traditionally interacted directly with consumers, so they don’t have much consumer data to analyze.

Personalizing the in-person experience often results in changes to the customer-journey flow, which, if not done thoughtfully, can hurt the customer experience. The bar is high in making the physical experience intuitive and simple for the customer—such as signing in at a kiosk, downloading and engaging with an app, or providing information to an associate in a live interaction. The front line needs training to understand and reinforce the customer benefit of these new journey steps. Omnichannel personalization requires companies to rethink their organizational structure, capabilities, and incentives across the digital and physical parts of the business. This shift can happen only when incentives are aligned with outcomes and measurement is done across online and in-store channels. Traditionally, however, companies operate their digital and physical channels independently, each with its own strategy, goals, and ownership of the results. There is little incentive for one channel to support the others. Further, channel-specific teams lack visibility into what’s happening elsewhere, which prohibits meaningful collaboration. Omnichannel personalization is challenging, but it need not be overwhelming. Instead of waiting to develop a complete system, companies should start small, with the highest-value use cases and existing touchpoints, to prove its value. That’s a proven model for success and one that companies will need to develop as the lines between the digital and physical worlds continue to blend.

6. CONCLUSION

India’s sunrise retail sector is witnessing a major transformation as traditional markets make way for modern and indigenously development retail formats. Standing on the threshold of a retail revolution and witnessing a fast changing retail landscape, Indian retail is still growing at an enviable rate. In the new era of liberalization, there exists immense opportunities for retail business. Progressive policies, economic and political stability, liberal policies on technology, changing consumers profile and demographic character, increasing urbanization, improved infrastructure, increasing number of nuclear families, increasing working women population are new opportunities. Bulging of middle and upper middle classes, whose purchasing power is now substantial and turning Indian economy as the fourth largest economy in the world in terms of purchasing power, are opportunities galore for giving further boost to retail business in India.

The experience of China and Indonesia shows that traditional and modern retail can co-exist and grow, albeit at different rates. After 9 percent growth in India’s retail market from 2016 to 2018, which is further expected to reach $1.4 trillion by 2021, India ranks 2nd in A.T. Kearney’s 2019 Global Retail Development Index (GRDI). The GRDI is a bi-annual study of the global retailing landscape, serving as a source for retailers, consumer goods manufacturers, and international service providers to understand which economies are growing, stagnant, or declining, and why. The GRDI finds that rising consumer incomes and greater digital connectivity in India have both contributed to a 9 percent growth in the country’s retail market from 2016 to 2018, which is projected to reach $1.4 trillion by 2021. Retail accounts for 11 percent of the GDP, and is something the government continues to support through liberalized retail, e-commerce, and investment policies.

Indian consumers love online shopping, says the GRDI, predicting that the online retail market will increase at a CAGR of 25-28 percent to reach $55-60 billion by 2020. It will account for 25 percent of India’s total organised market, and grow to 37 percent by 2030. The average online spend per shopper is expected to nearly double to $309 by 2030 from its current $183, with Indians favouring purchases of electronics and lifestyle products the most. Online grocery promises to be the next growth wave at a whopping 87 percent CAGR by 2022. Customers keep coming back only if earlier shopping experiences have been pleasant and successful. E-commerce will go deeper through displacing traditional processes in manufacturing, go wider by encompassing products and services provided by different enterprises and go higher by acquiring requirements intelligently and interactively so that enterprise can deliver customized products. When business inter-operation has achieved a kind of equilibrium, the technologies will surely expand. The Indian retail experience has gone beyond the traditional brick-and-mortar store and includes numerous touch points such as online stores, social networks, call centres, etc. Changing economic dynamics, diverse choices in products and services, numerous shopping formats and unparalleled access to information has empowered customers to expect more from their retail experience. The recent economic downturn has taught discipline to the customers.

True omnichannel personalization should be delivered across engagement channels, throughout the customer lifecycle. In other words, personalization requires more than software. It requires creativity, knowledge, and resources—yet still, most marketers have traditionally seen personalization as simply a feature set that accompanies their technology investments. With an estimated $800 BN to be put forth to personalization efforts in the next 5 years, personalization is more than a priority for marketers—it is a necessity. Part of the problem is that the customer data that marketers have is not unified. Identity linking is a core piece to fixing this issue—customers engage with brands through various devices and channels, and marketers must figure out how to match customer identities across multiple touchpoints in 2019. Tying customer IDs together also involves audience management and
measurement. Measurement can finally be done on newer channels because marketers are tying IDs back with the help of partners and third parties who have their own ID. In today’s rapidly changing and digitally connected world, customers are more value-conscious while making purchase decisions. Indian retail sector seems to be enjoying this roller-coaster transformation due to rapid changes in information technology and is all set for being global player.

REFERENCES


Framework for Smart Grid Solar Photovoltaic Systems

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Abstract: A smart grid is an evolved grid system that manages electricity demand in a reliable, sustainable and economic manner, to facilitate the integration of all involved. The smart grid refers to cutting edge power frameworks, with multi-directional progressions of power and data to make a wide circulated arrange. Smart meters and home energy management systems allow customers to program how and when their home uses energy. The interest of vitality changes, in the night typically most reduced and most noteworthy from about early afternoon to evening time, however it can fluctuate as per climate designs and what's going on during that time. Power plants and utilities have to work harder to meet the needs of electric consumers when the demand is highest. The innovation will give buyers close to ongoing control of their vitality charges and encourage enormous scope electric vehicle charging. Because of these advantages keen matrix is future for electrical frameworks.

Keywords: Smart grid, Components, PV systems

1. INTRODUCTION

A smart grid is an electrical grid which includes a variety of operation and energy measures including smart meters, smart appliances, renewable energy resources, and energy efficient resources. The first alternating current grid system was installed in 1886 in Great Barrington, Massachusetts [1]. At that time, the grid was a centralized unidirectional system of electric power transmission, electricity distribution, and demand-driven control. Grid connected systems are system connected to a large independent grid usually the public electricity grid and feed power directly into the grid. These systems are usually employed in decentralized grid-connected PV applications and centralized grid-connected PV applications.

The improvement of new vitality sources is constantly upgraded on account of the basic circumstance of the synthetic modern energizes, for example, oil, gas and others. In this manner, the sustainable power sources have become a progressively significant supporter of the complete vitality devoured on the planet. Among the sustainable power source assets, the vitality through the photovoltaic (PV) impact can be viewed as the most basic asset. India is a quickest developing economy and to keep the pace of financial development India need to accomplish vitality security. Further, financial development, expanding flourishing, a developing pace of urbanization and rising per capita vitality utilization has prompted expanded interest for vitality in the nation. As on July 2016 India is creating 304.76 MW of power making it world's fifth biggest force maker and flip side of it is that over 60% of this force originates from coal based warm force plants. The force segment is confronting extraordinary difficulties from the twin viewpoints of reliance on imported coal and its quickly expanding cost [2, 3]. India is vigorously reliant on imported fuel which can end up being impeding to its monetary development because of unexpected topographical and political circumstance in the locale. So as to accomplish vitality freedom, the reliance on imported coal must be diminished by creating exchange vitality sources. For the topographically differentiated nation like India, sustainable power source is most suitable type of vitality as it can capacity to thousand of remote towns and villages and reasonable source to satisfy developing vitality need of the nation and to seek after success without dirtying the earth. India being a tropical nation lies somewhere in the range of 8° and 37° north latitude has normal yearly temperature going between 25° to 27.5°, with around 300 clear bright days in a year and every day normal sun powered vitality occurrence over India changes 4-7 kWh/m² offers extraordinary potential for using sun oriented vitality [4] and being a long waterfront line give plentiful breeze vitality consistently. To accomplish this mammoth objective of 100 GW, a thorough program covering R&D, exhibition and usage, marketed, modern advancement and mindfulness advancement of PV innovation has been propelled by service of new and sustainable power source (MNRE) [5].

Actually, Indian government is quick to improve sun based limit inside coming five years by advancing decentralized and rooftop top scale sun based tasks. The investigation did by TERI [6] assessed that potential for housetop SPV power plant (in view of market in urban settlement of India) is 124 GWp in the nation.

2. GRID CONNECTED PV SYSTEMS

Framework associated sun oriented Photovoltaic (PV) frameworks utilize the immediate change of daylight into
power which is nourished legitimately into the power matrix without capacity in batteries. This will be a generally excellent approach to support the current power creation limit in the nation, which is fundamentally from hydro and warm sources. This will contribute emphatically to the compounding vitality circumstance in the nation. Sunlight based vitality, being a sustainable source, will likewise give vitality without poisons and ozone depleting substance outflows. This can likewise assist with alleviating the unfriendly impact of an Earth-wide temperature boost just as add to feasible vitality advancement. It will likewise establish the tone for comparative undertakings to be created in different organizations there by accomplishing the objective of 10% sustainable power source in the power age blend set by the legislature. In the realm of the Smart Grid, buyers and service organizations the same have apparatuses to oversee, screen and react to vitality issues. The progression of power from utility to purchaser turns into a two-way discussion. Shrewd frameworks will give greater power to satisfy rising need, increment unwavering quality and nature of intensity supplies, increment vitality proficiency, can coordinate carbon free vitality sources into power systems.

Matrix interconnection of PV power age framework has the benefit of increasingly compelling use of created power. Framework interconnection of PV frameworks is cultivated through the inverter, which convert dc power created from PV modules to air conditioning power utilized for standard force supply to electric supplies. Inverter framework is in this manner significant for lattice associated PV frameworks [7]. The presentation of network associated PV frameworks can be assessed by researching the exhibition proportion (PR), which is characterized by the proportion of the framework effectiveness and the ostensible proficiency of PV modules under STC. P. Sritakaew et. al. [8] Investigated the presentation of PV network associated frameworks by examining recuperated genuine force, and stacking decrease of tie time/switch. G. Ofualagba talks about the mounting enthusiasm for photovoltaic innovation including universal and U.S. exercises [9]. The scientists have depicted Photovoltaic frameworks and talked about displaying, structure and monetary contemplations remembering its for lattice and off matrix applications. It is regularly accepted, in the investigation of framework associated generators, that the lattice supply shows an ideal voltage waveform and that the installed generators themselves are unaffected by annoyances of the network, for example any unsettling influence created is expected exclusively to the installed sources. In all actuality, be that as it may, the activity of these force electronic generators, and henceforth the present waveform they source into the system, can be altogether influenced by minor mutilation of the voltage waveform at the purpose of association [10]. JinhuiXue et.al. Concentrate the impact of intensity control strategy utilizing sinusoidal heartbeat width-tweaked inverter with lattice associated PV System. The scientists have portrayed plan of uninvolved fillers and topology of fundamental circuit; and propose neoteric network associating inverter synchronizing AC yield (sinusoidal) with utility line voltage; and control power age of each PV cell [11].

Smart grids are not only aligned perfectly with the needs and demands of our time, they are also predicted to have significant long-lasting effects. For example, the innovation will update maturing gear and update things. This will assist with diminishing the probability of power outages, burnouts and power floods. The innovation will likewise diminish both the expense of vitality utilization and creation. With its full usage, savvy networks will make inexhaustible force practical and prepare the matrix to satisfy expanding vitality needs. All the more critically, be that as it may, the innovation will give customers close to constant control of their vitality charges and encourage enormous scope electric vehicle charging.

3. GENERIC FLOW CHART FOR PROVIDING SOLAR PHOTOVOLTAIC POWER SYSTEM

Here is an attempt to develop a generic framework towards providing SPV power system. For this, authors propose framework in the form of a flow chart as shown in Fig 1. Step wise description of the proposed framework has been provided:

**Step 1:** Solar Radiation- An initial step in this regard may be ‘evaluation of site; and efficient measurement and recording of solar radiation amount’. This significant advance is going to make us ready to comprehend state of site, and accessibility of radiation (least, most extreme and normal accessibility) for outfitting consistently and furthermore other related prerequisites.

**Step 2:** Functional Requirement of SPV Power System- This step will help us in deciding specifications of required components, modules, software etc.

**Step 3:** Safety Measures- Each part of safety should be all around considered before we move towards planning of SPV power framework including issues identified with regulating security, substantive wellbeing, saw security and security. This may incorporate basically voltage security, current wellbeing, human security, physical auxiliary wellbeing, incidental wellbeing, safety against natural disaster and others in compliance with industry, state government, central government and international regulations.

**Step 4:** Designing of SPV Power System- This progression will incorporate structuring of size of SPV power framework followed by various plan stepssuch as calculating maximum number of modules in series, minimum number of modules in series, sizing of Inverter, strings in parallel to inverter etc.

**Step 5:** Developing Site Layout- This step may include evaluation of static load for housetop due to PV module and mounting, creating structure, completing concealing investigation, tilt edge assessment for

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ideal outcomes, choosing about module dividing, doing cluster design, getting modules' wiring, grouting of structure and every single other advance to make SPV power framework.

Step 6: Techno-Economic Analysis- Evaluation of SPV power system is the next step to analyze technical and economic outcomes SPV power system with respect to inputs.

Step 7: Analyzing limitations and scope- This step is about providing limitations of the SPV power plant to make us analyze impacts/implications of limitations for helping in deciding future course of actions. Additionally, scope should be chosen as far as issues, for example, regardless of whether the unit is going to run as 'remain solitary' or in joining with some other force age framework utilizing other sustainable/custom vitality source.

Step 8: Developing Maintenance Schedule and its Compliance- Appropriate compliance of systematically designed preventive maintenance schedule has to be done to either avoid if possible or at least minimize any kind of 'break down'.

Step 9: Future Extensions- A scope of future extensions has to be provided considering successful performance of power system and future demands of electrical energy.

4. SMART GRID COMPONENTS

To achieve a modernized smart grid, a wide range of technologies should be developed and must be implemented. These technologies generally grouped into following key technology areas as discussed below.

Intelligent Appliances: Wise machines have equipped for choosing when to consume energy dependent on client pre-set inclinations. This can lead to going away along toward reducing peak loads which affect power age costs. For example, smart sensors, like temperature sensor which is used in thermal stations to control the boiler temperature based on predefined temperature levels.

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Fig. 1. Generic flow chart for providing SPV power system
Smart Power Meters: The brilliant meters give two-path correspondence between power suppliers and end user consumers to automate billing data collections, detect device failures and dispatch fix teams to the specific area a lot quicker.

Smart Substations: substations are incorporated checking and control non-basic and basic operational information, for example, power status, power factor execution, breaker, security, transformer status, etc. substations are used to transform voltage at several times in many locations, that providing safe and reliable delivery of energy. Smart substations are additionally essential for parting the way of power stream into numerous headings. Substations require enormous and over the top expensive gear to work, including transformers, switches, capacitor banks, circuit breakers, a system secured transfers and a few others.

5. CONCLUSION

The smart grid technologies have been begun since when the innovation was first presented. The created nations as of now change their conventional force frameworks into keen matrices bust still they have some significant issues identified with approaches, principles and security. The less developed countries still lagging far behind by every technical and economical aspect. In any case, these nations taking solid activities to build up their labor and spending more assets on savvy framework ventures. Smart grid technology is an advantageous innovation for power framework solidity, consumer loyalty's, heap appropriation and a wide range of matrix tasks. The development of smart grid technologies will give friendlier environment for future, better force supplies administrations. Through this short review, the new researchers in the field of smart grids take advantages to comprehension about keen lattice, its gauges and late difficulties for additional exploration.

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The Internet of Things and its Application in Healthcare Industry

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Abstract: The Internet of Things is a tool which has led to creation of enormous advancements in industries, homes, healthcare etc. The IoT revolution has redesigned modern healthcare system. The IoT-enabled healthcare research is significant due to its valuable implications, including higher quality and lower cost of services and reliable preventive care. Through IoT it has even become possible for patients to get the cure of their disease without actually visiting the hospitals i.e. telehealth has been made possible. This paper reviews the current literature on the IoT in healthcare and discusses its applications and enabling technologies, as well as critical challenges.

Keywords: IoT, healthcare, telehealth

1. INTRODUCTION

The Internet of things (IoT) is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers (UIDs) and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction.[1]

The definition of the Internet of things has evolved because of the convergence of multiple technologies, time period analytics, machine learning, commodity sensors, and embedded systems. ancient field of embedded systems, wireless sensor networks, control systems, automation (including home and building automation), and others all contribute to sanctionative the internet of things. In the client market, IoT technology is most synonymous with products bearing on the concept of the "smart home", covering devices and appliances (such as lights, thermostats, home security systems and cameras, and alternative home appliances) that support one or a lot of common ecosystems, and might be controlled via devices related to that scheme, like smartphones and smart speakers.

The IoT has a wide range of applications and can be successfully implemented in areas such as the healthcare sector, retail business, travel and tourism, hypermarkets, event management, the manufacturing sector, environmental systems, logistic systems, hotels and restaurants and a lot more. This broad spectrum of application areas depicts the IoT as playing a vital role in the smooth functioning of society.[1]

There are a number of serious concerns about dangers in the growth of IoT, especially in the areas of privacy and security, and consequently industry and governmental moves to begin to address these.

Each ‘thing’ in the IoT network is provided with unique identifiers (UIDs) and has the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction. This technology, named as Internet of Things (IoT), "provides an integration approach for all these physical objects that contain embedded technologies to be coherently connected and enables them to communicate and sense or interact with the physical world, and also among themselves". The Internet of Things is a concept that’s reflects a "connected set of anyone, anything, anytime, anyplace, any service, and any network"[2]. One of the most attractive applications fields for IoT is the Healthcare, giving to us the possibility of many medical applications such as remote health monitoring, fitness programs, chronic diseases, and elderly care. The rapid advancement of cloud computing, mobile applications and wearable devices supports the IoT’s role in transforming the traditional approach to healthcare into smart and personalised healthcare.

2. HISTORY OF IOT

The term Internet of Things was first introduced [4] by the founder of the Auto-ID centre at the Massachusetts Institute of Technology. Auto-ID is used to describe all sorts of measures to identify and improve applications, such as work automation, efficiency enhancement, error reduction etc. In 2003, the Auto-ID centre released the electronic product code (EPC) network. The EPC enables tracking objects moving from one location to another. This gives an idea for the IoT implementation, where microchips can be used to create a network for mainstream commercial means. The radio frequency identification (RFID) implementation further cements the opportunities for developing the IoT as a new IT paradigm in both academic and industrial environments.[8] In the 2005 report of the International Communication Union, the IoT was proposed as a collaboration of computing and sensor-based technologies, such as sensors, wireless networks, embedded systems, object identifiers and nanotechnologies.[10] This combination enables the objects to be tagged, sensed and controlled over the
networks. The IoT is considered a combination of technologies aimed to provide interaction and communication among linked devices. [3]

3. **MAJOR APPLICATION OF IOT: HEALTHCARE**

The advancements of medical devices after the introduction of IoT include the emergence of medical IoT systems that can be connected to mobile phones. The medical IoT is basically a system comprising mainly health-monitoring devices. Firstly, Patients’ health parameters are remotely recorded by a back-end system, afterwards, the back-end system analyses the recorded data and provides appropriate feedback to the concerned doctor. The feedback helps in determining the current health situation of patients and immediately react to critical cases. A medical device can be used to monitor health parameters. At the same time, it should be taken into consideration that the dataset recorded by these devices is of utmost importance as it comprises the health records of patients. This system is quite useful for healthcare clinics, hospitals or outpatient clinics. The medical IoT system is a sophisticated setup that contains a variety of mechanisms and systems, such as medical equipment, smart sensors, network gateways, cloud computing, big data, clinical information systems and so on, that cooperate to control the healthcare environment.

4. **IMPLEMENTATION OF IOT TECHNOLOGY IN HEALTHCARE**

1. **Identifying Technology**

IoT networks are based on heterogeneous frequencies, standards and transmission rates for transferring data. These networks can be further be classified as long-distance and short-distance technologies. Long-distance technologies are intended to affect regular means of communication, like the web or mobile phones. Short-distance communication mostly utilises wireless technologies, like Bluetooth, Infrared Data Association (IrDA), Wi-Fi, ultra-wideband (UWB), RFID then on. A working model of the IoT has a large number of nodes/interfaces which generates data and have access to it, irrespective of its location.[3] To do so, it is necessary to identify the nodes. The identification process assigns a unique identification number (UID) to each node in order to provide unambiguous information exchange via the node. Each individual resource in a system is given a digital UID. This helps create relations among different entities in the digital domain. It enables the prompt location of the available objects within the network without fail. Various standards have been proposed for the unique identification of objects in the digital domain, such as a universally unique identifier (UUID). One such standard has been developed by the Open Software Foundation.

2. **Communication Technologies**

While considering an IoT-based system, the communication technologies enable the network infrastructure. The features of these technologies may differ in terms of the installation cost, transmission rates, distance, the number of entities, power consumption, maintenance cost and so on, based on differences in working radio frequencies and security standards.

3. **Location Technology**

In modern tracking systems, real-time location systems (RTLS) help locate objects. The global positioning system (GPS) is considered the most important RTLS. This satellite-dependent navigation system is capable of locating objects under various weather conditions. For healthcare applications, the GPS can help in precisely locating ambulances, patients, doctors and so on. Smart indoor positioning network systems can be created by combining the GPS or the BDS with an LPS in a high bandwidth wireless communication network. [12]

4. **Sensing Technologies**

Sensors form the heart of the IoT-based systems, as they are on-the-ground devices performing the critical part of monitoring processes, taking measurements and collecting data. For example, the pulse oximeter that was invented in the 1970s is used as a major device for diagnosis.[16] It helps a physician monitor a patient’s heart rate (HR) and blood oxygen saturation (SpO2), which are critical for emergency services. Other types of sensors include temperature, pressure, water quality and smoke sensors. The instruments comprise various sensors, including accelerometers, gyroscopes, surface electrodes, among others. It is possible to transform all the received data from the sensors into a digital form and immediately transmit it over a network. The prevalence of wireless sensors has made it possible for people to wear portable sensors capable of automated data collection and transfer.

5. **Cloud Computing**

During its operations, an IoT system generates a huge amount of data that has to be stored, processed and shared,[17]. Cloud computing forms the building block of the IoT architecture as it can support the storage and the processing of the immense data generated by individual sensors and devices. The cloud collects data from the individual devices in an IoT system to analyse and share it with other sensor devices on the network. It is possible for the cloud data centres to enhance or decrease the computing capacity, depending on the demand. Furthermore, research proves the huge potential of cloud computing for the next-generation smart systems for people with disabilities.[17]. All the future IoT systems are supposed to be based on the cloud. The associated devices from the computers can be decoupled by cloud computing by avoiding individual installation.[18]. An additional benefit of IoT devices is that they can be reconfigured without much user effort and time. Since cloud computing is reliable and platform independent, the setup of cloud centres in hospitals and medical centres facilitates resource sharing and leads to the
development of highly reliable medical monitoring and management systems[19]

5. EXAMPLES OF IOT SERVICES IN HEALTHCARE

An IoT-based healthcare architecture has three main layers: information perception, network transmission and application service. The information perception layer primarily consists of sensors that are used to continuously monitor people’s health statistics[20]. The collected data is transmitted over the networks and stored in cloud data centres. Wireless technologies, such as Wi-Fi, ZigBee, EnOcean and so on, are utilised to transmit data over the networks. The application service layer involves the IoT applied in a medical centre, providing a remote healthcare service.[21]

1. Electrocardiogram Monitoring: In electrocardiogram (ECG) monitoring, the system keeps track of the HR and the basic rhythm, along with the identification of multifaceted arrhythmias, myocardial ischemia and prolonged QT intervals by recording the electrical activity of the heart. The ECG monitor consists of a wireless transmitter and a receiver. An automated application can identify an abnormal heart activity. The data is transferred in real time to mobile phones and the doctor’s clinic via a network. The IoT system utilises algorithms for continuous ECG monitoring.

2. Glucose-Level Monitoring: A medical IoT system is capable of continuously monitoring glucose levels in a non-invasive way. The patients use wearable sensors capable of tracking their health parameters, and the collected data is transferred via an internet protocol (IPV6) network to significant healthcare providers. The tracking device consists of a blood glucose collector, a mobile phone and an IoT-based medical acquisition detector to monitor the glucose level[25]. Glucose-level monitoring provides individual patterns of modifications in glucose levels that can be utilised to decide about meals, physical activities, medication times and so on.

3. Blood Pressure Monitoring: A patient’s BP can continuously be monitored by using a wearable sensor device. The machine consists of a BP apparatus with network-based communication abilities. Blipcare is such a device that uses a home Wi-Fi network to record BP and upload the recorded data. The device also has an LCD display to show the BP. A device for remotely monitoring BP has been proposed.[21]

4. Body Temperature Monitoring: The change in body temperature is used to identify homeostasis, which forms an essential part of healthcare services. A TelosB mote, used in a medical IoT, has an embedded sensor to record body temperature. Jian and colleagues[22] propose a system that uses a home gateway for monitoring body temperature in a medical IoT. The home gateway uses infrared detection to transmit the recorded body temperature. The system primarily includes an RFID module that functions in collaboration with a body temperature monitoring device.

5. Wheelchair Management: Several studies have already been conducted to develop smart wheelchairs for people with disabilities who use the IoT application. For example, Yang[23] proposes an IoT-based healthcare system for persons with disabilities. The system utilises Wireless Body Area Networks WBANs technology to control and coordinate different sensors. The vibrations in the wheelchair are controlled by the system. It also keeps track of the status of the person using the wheelchair by monitoring his or her sitting position, as well as giving information about the surroundings.

6. Heart Rate Smartphones are increasingly used as integral parts of a medical IoT. All the newer electronic devices are now controlled by smartphones. Several healthcare-related hardware products have been integrated into and a lot of software applications have been developed for smartphones. Smartphones are currently equipped with a large number of healthcare applications. Several noncontact measuring sensors that work on image analysis algorithms are also used for healthcare applications[24]. A typical smartphone is now capable of diagnosing diseases such as asthma, chronic obstructive pulmonary disease, cystic fibrosis, allergic rhinitis, nose-related symptoms of the respiratory tract, HR, BP, SpO2, among others.

Fig. 1. Application of IoT in healthcare industry[27]

Fig. 2. Issues faced by patients[28]
6. CRITICAL ISSUES AND CHALLENGES OF IOT IN HEALTHCARE

People use IoT devices to monitor their daily health statistics. These devices use transmission networks to send/receive the health-related data of patients. This results in a potential threat by hackers. Hence, it becomes necessary to completely secure the IoT-based healthcare system. The medical IoT systems face the following threats:

1. **Scalability:** Millions of interconnected IoT devices generate huge amount of data for processing and storage[25]. Hence, scalability of the IoT system that handles these devices is essential. Currently, the large amount of data generated by the system is stored by using big data over the cloud.

2. **Interoperability:** Several manufacturers provide different products, services and devices that are used in IoT systems. Unfortunately, these firms do not follow any standard protocol for the manufacturing and the use of these devices which has become a major cause of interoperability issues[24]. The existence of a large number of diverse devices and the management of value-added services are key standardisation issues at present.

7. CONCLUSIONS

In the upcoming months, IoMT (internet of medical things) will gain much popularity due to its precise application. IoMT technology enables virtually any medical device to collect, analyse, and send data across the Web. In addition to the digital devices, such as heart monitors, non-digital items like hospital beds and pills will also be able to connect to the internet. IoMT lets medical equipment and healthcare products share live data with everyone who has a need for the information. IoMT can improve healthcare quality while reducing cost. Through IoMT, MRIs, X-ray machines, CT scanners, and other equipment can be remotely monitored for performance issues. Long before hospital staff notices a problem, the manufacturer or service vendor can detect issues that needs correction.[7]

Companies like GE, Siemens, Philips use IoMT for remote diagnostics, predictive maintenance, and performance upgrades to their imaging products.

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Abstract: With the increase in technology, recent developments have been seen in different fields of the study and health. Heart rate monitors are used to measure the heart rate of individuals. There are a lot of different heart rate monitors available in the market and consumers generally don’t have a clear idea about which device would be better. Objective: Compare the heart rate monitoring technology of 4 different commercially available heart rate monitors watches. Technology or Method: The purpose of this study is to measure the accuracy of the heart rate monitor feature of four wrist-worn devices in comparison to the ECG devices. The devices compared are the latest models of the respective brand in market. Four updated wrist-worn devices commonly used by competitive distance runners include the Fitbit Charge 3, Garmin Forerunner 235, Apple Watch series 5 and Polar Vantage V Results: The Apple Watch series 5, which uses ECG technology gave the most accurate reading. Conclusions: Give brief concluding remarks on your outcomes. Clinical Impact: By understanding their accuracy as compared to an ECG device, athletes can design specialized, effective, and safe training regimens.

Keywords: Heart rate monitor watch, Electrocardiography, Photoplethysmography, Heartbeat, Fitbit, Garmin, Polar, Apple

1. INTRODUCTION

Heart rate is a crucial metric to lead a healthy lifestyle and in this fast-paced world. Since the world is developing, there have been an enhancement in the technology to measure the heart rate. These days it is easy to measure the heart rate using the different devices available in the market. These devices may include activity trackers and built-in heart rate monitors in smartwatches. However, there is no certainty whether these devices give accurate readings or not. The heart rate which give accurate readings are generally those used commercially in clinics. These are used for medical purposes. They are, however, too bulky to be used in everyday life since it consists of a lot of wires and circuits. Presently, modern wearable devices not only provide simple fitness tracking measurements such as step count but also monitor important physiological considerations, such as Heart Rate Variability (HRV), glucose measure in the body, blood pressure readings, oxygen level of the body, and many such additional health-related information. Heart rate monitors are mostly used by sports persons and individuals who practice rigorous exercise. These individuals need to keep a regular check of their heart rate to avoid any harm. For such individuals, smartwatches would be the perfect alternative to the clinical equipment. This report analyses 4 different commercially available smartwatches which offer the heart rate monitoring services.

A. Heart Rate Monitor

A heart rate monitor (HRM) is a personal monitoring device that allows one to measure/display heart rate in real time or record the heart rate for later study. It is largely used to gather heart rate data while performing various types of physical exercise. Measuring electrical heart information is referred to as Electrocardiography (ECG or EKG). [1] There are commonly two different methods used in modern heart rate monitors to record heart signals.

- Electrical
- Optical

Both, the electrical and optical signals are able to provide the same basic heart rate data. These use fully automated algorithms to measure the heart rate, such as the Pan-Tompkins algorithm. [2]

ECG (Electrocardiography) sensors measure the bio-potential generated by electrical signals that control the expansion and contraction of heart chambers, typically implemented in medical devices.

PPG (Photoplethysmography) sensors use a light-based technology to measure the blood volume controlled by the heart's pumping action. [3]

B. Electrical HRM: Working

Heart-rate monitoring chest straps consist of a long, belt-like elastic band that wraps around the chest, a small electrode pad that sits against the skin, and a removable transmitter. Electrocardiography is used by these heart-rate monitors to record the electrical activity of the heart. This process involves electrodes, which are present in the shiny, flat pad against the skin. That pad requires moisture, water or sweat in order to pick up any electrical signal. [4]
When the individual is doing heavy exercise which results in sweating, the electrodes are activated and they pick up the electrical signals given off by their heartbeat. This information is sent to the transmitter.

The transmitter is characteristically the only part of the chest strap that is removable. There is a microprocessor inside the transmitter that serves the purpose of recording and analyzing heart rate from those electrical signals, as well as a battery and the chips needed for Bluetooth connectivity. The heart-rate data is sent to a mobile device via the transmitter using Bluetooth and a connected smartphone. Here, the smartphone acts as a receiver.

C. Optical Monitors

Optical heart-rate monitors gather heart-rate data through the process of "photoplethysmography" (PPG), or the process of using light to measure blood flow. A PPG device consists of a light source and a photodetector. The light emitted by the light source is reflected to a tissue which is then measured by the photodetector. The reflected light gives the data of the blood volume since it is proportional to blood volume variations. This data, along with motion information detected by the device's accelerometer, is later processed with algorithms to generate the comprehensible pulse readings.

The main source of light used in PPG sensor is an infrared light emitting diode or a green LED as the main light source. Infrared LEDs are generally used to measure the blood flow concentrated intensely in certain parts of body such as the muscles, whereas green light calculates the absorption of oxygen in oxygenated and deoxygenated blood.

D. Bioimpedance Technology

Apart from the above discussed two technologies, there has been introduction of a new technology to measure the heart rate. It is known as bioimpedance technology. Bioimpedance measures the resistance of body tissue to minute electric current. This enables the capture of a wide range of physiological signals including the heart rate. This technique is similar to the measuring of the body composition such as fat content. Bioimpedance fundamentally tests the amount of opposition to the electrical current sent through your body tissues.

Fig. 2. ECG components

Fig. 3. Working of Optical heart rate monitor technology

The wearable PPG sensors can only be positioned at certain body locations such as the finger, earlobe and forehead. However, different measurement sites have different degrees of accuracy. The most common wearable PPG sensor available in the market is positioned on the wrist. There are a few variations too, such as Moov's latest fitness tracker which consists of the optical heart-rate monitor on the temple.

Fig. 4. Fig: measurement of resistance by body tissues in (a) vertical and (b) horizontal direction
The heart pressure is measurement of pulse wave velocity (PWV), i.e. the measurement of the distance and the transit time of the pulse between two arterial sites.

This bioimpedance technology was used by a brand Jawbone for measuring the heart rate. However, the device only measures resting heart rate (just after you wake up) and passive heart rate throughout the day. There’s no option to track the active heart rate during a workout.

This company was shut down in 2017 due to financial issues. The bioimpedance technology is still however, experimented and improvements are being made.

2. MECHANISM
   A. Fitbit Charge 3

   Characteristics:

   Technology name: PurePulse – PPG

   Although Fitbit doesn’t mention photoplethysmography, but the technology uses optical heart rate sensors that maintain extended battery life. [10]

   SpO2 pulse oximetry sensor for sleep insights.
   1. This sensor is useful in making Pulse oximetry, which is a test that measures what proportion of the oxygen-carrying molecules in the blood (called haemoglobin) are actually carrying oxygen. This is known as oxygen saturation or SpO2. Fitbit uses this sensor to generate the readings while sleeping and reports of any abnormality in the oxygen saturation while sleeping.[11]
   2. Heart rate zones such as fat burn, cardio or peak zone
   3. Automatic exercise recognition
   4. All-day calorie burn
   5. Real-time pace and distance: connect with phone's GPS to see pace and distance during outdoor runs.
   6. Wireless sync to android, iOS and windows devices.
   7. 24X7 Heart rate tracking

   B. Apple Watch Series 5

   Characteristics:

   1. Technology name: ECG App

      The Apple watch uses ECG app to measure heart rate. This feature replicates a single-lead ECG with a titanium electrode in the watch’s Digital Crown and a layer of chromium silicon carbon nitride on the back of the watch. When you place your fingertip on the electrode, it creates a closed circuit from finger to heart to wrist and allows the watch to record the electrical impulses that make your heart beat.[12]

      2. Alerts when noise level increases.

   3. Compass and ground alleviation
   4. Fall detection
   5. International SOS trigger
   6. Apps designed to keep health conditions like diabetes, stress in control
   7. Advanced workout metrics

   C. Garmin Forerunner 235

   Characteristics:

   1. Technology name: Elevate- PPG [13]
   2. Garmin works on the PPG technology to measure the heart rate.
   3. Smartphone compatibility with iOS and Android
   4. Live track
   5. Step counter
   6. Move bar: to alert period of inactivity
   7. Sleep monitoring
   8. Calories burned
   9. Distance travelled
   10. GPS based distance, time and pace
   11. HR Zones

   D. Polar Vantage V

   Characteristics:

   1. Technology name: Precision Prime- PPG
   2. Polar technology also works using the optical HRM technology. Its technology uses three methods to provide accurate heart rate: nine optical channels using several colors and wavelengths of light, 3D acceleration and an electrical sensor that measures the quality of sensor-skin contact. [14]
   3. 9 LED Optical HR sensors
   4. Electronic sensors for skin contact measurement
   5. Extensive fitness features
   6. Multisport mode to track several different sports in one session
   7. Support for swimming metrics and cycling sensors
   8. Bluetooth Connectivity

   Comparison of Heart Rate Monitors

   The heart rate measurements of Fitbit Charge 3, Apple Watch Series 5, Garmin Forerunner 325, Polar Vantage V watch were compared with an ECG device. The ECG device gives
readings with an accuracy of about 98%. These readings are compiled from various sources.[15][16][17]

Graph description: Mean changes in heart rate (HR) over time. Time represented in mins vs mean HR bpm on y-axis for both HRM watch and ECG device.

1. **Fitbit Charge 3**

![Fig. 5. Image source: researchgate.net](image)

Observation: We can see from the graph that the readings of FB Charge 3 are not in sync with that of the ECG device though it has a similar pattern like that of the ECG device.

2. **Apple Watch Series 5**

![Fig. 6. Image source: exist.io](image)

Observation: We can see from the graph that the readings of the Apple watch are quite in sync with that of the ECG device (Mio Alpha). This may be due to the fact that Apple watch uses the same technology as the ECG device. Therefore, their readings are similar.

3. **Garmin Forerunner 325**

![Fig. 7. Image source: cnet.com](image)

Observation: We can see from the graph that the Garmin Forerunner cannot cope up with readings of the ECG device under extreme conditions. The average reading is almost close to the ECG readings.

4. **Polar Vantage V**

![Fig. 8. Image source: gadget.fitness](image)

Observation: We can infer from the graph that the Polar Vantage V is lagging and takes time to warm up. The readings are, however, similar to the ECG readings.

### RESULTS AND DISCUSSION

Comparing the accuracy rate and features of the four watches, we observe the following.

<table>
<thead>
<tr>
<th></th>
<th>FITBIT CHARGE 3</th>
<th>APPLE WATCH SERIES 5</th>
<th>GARMIN FORERUNNER 325</th>
<th>POLAR VANTAGE V</th>
</tr>
</thead>
<tbody>
<tr>
<td>HRM technology</td>
<td>PPG</td>
<td>ECG</td>
<td>PPG</td>
<td>PPG</td>
</tr>
<tr>
<td>Connectivity</td>
<td>iOS and Android</td>
<td>iOS</td>
<td>iOS and Android</td>
<td>Bluetooth</td>
</tr>
<tr>
<td>Accuracy</td>
<td>Not very accurate</td>
<td>Accurate</td>
<td>Accurate only for normal activities</td>
<td>Accurate but slow</td>
</tr>
</tbody>
</table>
From the result table and graphs, we could observe that all the systems were capable of generating the accurate reading under normal circumstances, i.e. when the user is not doing any heavy exercise. However, some of the watches show inaccurate readings when the user is doing heavy exercise.

Apple Watch Series 5 has stood out among the other 3 with accurate readings even under extreme circumstances.

The heart rate monitoring accuracy of the four devices can be ranked in the following order:

I. Apple Watch series 5  
II. Polar Vantage V  
III. Garmin Forerunner 235  
IV. Fitbit Charge 3

CHALLENGES IN MEASURING HEART RATE USING WRIST-BASED DEVICES:

Since wrist-based HRM devices mainly depend on testing the light absorption of skin to determine the heart rate, it may face some challenges in order to get an accurate reading. The following are a few such challenges: [18]

- The light of the heart rate sensors may be blocked due to tattoos.
- It may not give accurate reading for dark skinned people since light sensors may not be able to penetrate through the skin.
- Wrong positioning of the band may result in incorrect readings.
- The band needs to be tightly worn around the skin
- Cold weather may infer with the readings of the device

4. CONCLUSION

The present study compared four commercially available online heart rate monitoring systems with its main focus on their use in daily life of individuals. The Apple Watch series 5, which uses ECG technology gave the most accurate reading. The athletes and other individuals competing in extremely vigorous activity need to be able to track exertion levels and design training plans that are appropriate, in order to avoid injury, leading a healthy lifestyle and improving their fitness training.

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A Study of Different Commercial Heart Rate Monitors

Electronic Health Record: Blockchain

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Abstract: Social networking has been the need for every human being on this earth. With the advent of Web 2.0, the Internet usage for social networking purpose has been made possible. There is a wide presence of many Apps already in the market with various useful and interesting features but the need was felt to develop an App that has features of Parental control so as to know the emotion and sentiments that prevail in a chat along with the knowledge of gender and age group of the contact person. In addition to these features, the next level of security that includes Biometric authentication, Identity Protection, Intruder Alert and Hide App Icon have been added in this app to make it stand different from rest of the Apps in the market.

Keywords: Blockchain, Health Record System, Blockchain Security, Blockchain databases

1. INTRODUCTION

It is a well-known fact that health is a core pillar of human development and is a key indicator for assessing the achievements in capability of enhancements and well-being. Good health is a cherished goal as it helps in realizing human capabilities and thus contributes to well-being. Studies show that healthy people are more productive and their contribution augments economic development and fuels growing incomes. On the other hand, ill-health stifles the full realization of psychological, social and economic capabilities, and has financial implications in terms of loss of income and productive time as well as the need to avail of medical care. India being the second most populous country has a population of 1.2 billion people who are responsible for the development and betterment of the country and its people. Healthcare should be the main concern for the government at the current stage as the modern age habitation is leading itself towards an environment where there are dominant unhealthy habits and surroundings.

A person's regular health checkups and their periodic reports are important to be updated and kept exact to provide better results and better diagnosis for them. During the course of checkup or diagnosis there are series of test records and other images or videos that are to be stored for the study of body or for future references. Considering the traditional method of storage of health records, this method to store the records physically and to carry them every time we move from one health centre to another is not efficient as it takes a lot of physical space and carrying around everything whenever required is a hectic job. There can be a risk of misplacing some documents that is dangerous and could lead to inevitable consequences.

To overcome this we can use the technologies to create a virtual database that is easy to use and reduce the use of physical space and risk of losing the documents. There are different technologies that can be used to develop the system that stores the Electronic Health Record. The different technologies that can be considered are cloud storage, database management, blockchain database.

2. HEALTH RECORDS

During a health checkup [1] not only is there a prescription of a doctor but also several reports and past records are taken into examination. A regular health checkup or during any kind of diagnosis the doctor or the medical staff demands for the past laboratory test reports, different allergies, past clinical records, radiology images, medications or immunization dates. All these records are considered to be the health record which is essential for any kind of medical treatment.

2.1. Electronic Health Record:

Electronic Health Record: Traditional or current approach of keeping these records is by maintaining the hard copy record of each and every date with oneself and then provide it to the medical officer whenever required. This method is hectic to maintain and requires more paper storage. To overcome this and to provide an ease method to maintain the health record of a person the concept of Electronic Health Record[2] comes into action. The electronic health record maintains the data of all kinds of laboratory reports, radiology images, medications and past clinical records in a digital medium where the centralized server would help them to store it and carry it along whenever and wherever they want. The records here will be generated by the help of digital medium and will be stored digitally hence it can be shared to anyone at any time with just the usage of authentication for security. This will reduce the time taken in sharing the health record and the medical officers can also access this without any long duration of paper arranging and reading. Overall the Electronic health record can be a viable option to upgrade the health records of a person.
2.2. Need for Electronic Health Record

Health records in general are an important part of the routine health checkup or for any kind of diagnosis. While the traditional method could result in losing some set of data due to human error, Electronic health record will provide the history of a patient without any missing report.

Electronic health records will also create an arranged set of data according to the requirement of the users.

While there will be a centralized system there will be a set standard that will help the user to maintain the record and this will be helpful in data analysis also.

We are moving towards the age of data and data analysis, our health record maintained with the standards will be also treated as the data and analysis could be done on it which will again yield some beneficial result that can be used for the betterment of people’s health.

3. BLOCKCHAIN

Blockchain technology[3] is a disintegrated time stamped series of data connected with each other in a form of blocks. The blocks are the individual database where data can be stored in any form and as soon as the transaction is completed the data is then hashed to return the hash code for reference and is stored in the next block. Blockchain can be seen as a linked list where the data stored has the reference of previous data block, but in a more secure way. The recording of data in the block is termed as transaction and for each transaction to be done the user has to perform some kind of work in the blocks to generate the hash code of the same block.

To store the data in the blockchain database[4] the following steps are required:

- A transaction has to be done, transaction here refers to the addition of any kind of data in the blocks and this is completed after the data is successfully mined into the block.
- After the transaction is completed the data is to be verified by the concerned authorities that the data entered is valid and relevant for that block.
- After the verification of the transaction the data is finally stored into the block and is now a part of the blockchain.
- Since the blockchain is secured by the hash keys therefore the last step of storing data is generation of the hash key to secure it from public access.

3.1. Blockchain Security

Security issues related to blockchain can be acknowledged by the functioning of any kind of blockchain [5]. The process to introduce data into the blocks or add a new block requires proof of work.

Proof of work refers to the term where a user has to show that he/she has performed some complex computational mathematics. This way a simple block addition also requires time and system requirements to alter or corrupt the data in a block that is not efficient enough for hackers or third party applications.

Other than this the blocks are hashed and then their locations are saved into the next block and hence the locations are also secured enough and it also requires computation of complex mathematical problems.

Blockchain database system provides the security of data in the sense that it is not open for editing by any third party or any kind of hacking elements since the blocks are protected by the hash codes and is disintegrated that is a set of data maybe available at 10 different blocks in 10 different not known systems.

By default blockchain data is visible to the public but to even secure the data inside the block we can use private key encryption which will also protect the data stored inside the blocks. The private key encryption will allow just the concerned user to view the information inside the block.

Since the database is not centralized and the blocks are scattered into disintegrated systems the private key will be secure within the hands of the user and there will be no fear of sharing the data from a centralized server.

While if someone manages to compute the equations and attain access to one block, he will have to again perform the same amount or more to achieve the next block information as the hash values of the block keeps changing as soon as you access the block.

Hence this kind of threat is only possible if one has an access of 51% of the blockchain system so that he will not have to spend more and more time decoding the blocks and editing the data. Hence this concept makes the blockchain database security hacking proof.

3.2. Blockchain Database

Blockchain databases[6] will consist of different disintegrated blocks that will store the data of the user. The concept is different from the traditional method of databases in a way that the traditional databases have a centralised system or server that consist all the data that has been entered by the user. The centralised database can have many security threats as all the data are stored in one location any threat to even one database may hamper all the data stored in the database. The third party can have easy access to the data by just entering through one loophole.

While in the blockchain database each and every block is separated from each other and has a hash code encryption to secure their locations. Over that to edit any kind of data in the blocks it is difficult as they have to access the hash code, retrieve the private key encryption and then edit the data in it.
Now to edit the whole bunch of data they have to perform the same in several blocks which is time taking and ineffective.

4. ELECTRONIC HEALTH RECORD THROUGH BLOCKCHAIN

Electronic health records[7,8] are the most sensitive data for a person as the data consists of all kinds of his past history and medication data with laboratory reports. If these kinds of data are kept out in public with high risk of vulnerability [9] then it may cause life and death to a person. The proper diagnosis is only expected when the previous records are considered without any alteration.

To overcome the risk of corruption of data one can include many terms and clauses or forms of security to the server or system but the threat still lies as the data will be stored in one location and attack to that location will lead to attack to all the data that has been stored there.

While blockchain[9] being a decentralized system the power does not lie at one place and the whole system is distributed and everyone has data in a network so there is no chance for data loss and the security doesn’t allow the corruption of data.

4.1. Security

The main concern for the blockchain system [10] inclusion is the security of the system as the electronic health records requires the highest level of security when a digital record is considered.

4.2. Availability

The users of electronic health records will have to keep their records up to date and may require access to the record anytime of the day hence the centralised system failure may result in delay if the records are required urgently. On the contrary the blockchain system or the decentralised system has the copy of data in every system connected to that network so users can view the data even if one of the systems is hampered.

4.3. Anonymity of the User

The location of the blocks are stored in the other blocks in hashed form and does not reveal the exact location details. The hash codes are not easy to crack if one doesn’t know about the computational algorithm of that code. This way the data might be visible to all but the user of the data is still anonymous.

5. CONCERNS REGARDING BLOCKCHAIN

Health-care[11] is fundamentally a very complex and sensitive sector. Adaptation of technology is always very slow due to legislative requirements.

However, interoperability and collaboration are very important in this sector for service delivery and innovation.

Blockchain can be used to enable interoperability and collaboration without compromising the security of the health care providers.

Applying blockchain[12] in the health sector without rigorous research and usability tests could be catastrophic. For example, doctor’s access may get delayed due to the scalability issue of blockchain[13] in a critical moment, which may cause bad consequences.

Other than this blockchain set up cost and each transaction cost differs for different kinds of blockchain that is present in the market, hence it may affect the efficiency of the idea. While considering the amount of security provided by blockchain[14] the cost factor can be ignored up to an extent.

6. CONCLUSION

Electronic health record is the next big step that a nation should take to advance the health sector. EHR in many ways is an efficient and well-conceived idea to help the different Medical institutes and users when it comes to the storage and usage of health records that can be laboratory test reports, radiology images, personal health chart, immunization reports, allergies list. All these records when kept in a digital medium will help them to deduce better and quicker results. While there is a traditional method to create database but there are many points that makes the centralised database a non-viable option when data regarding health of individuals are concerned.

Blockchain systems are a new method to create the database, blockchain databases are decentralised and are secure enough to not let any kind of third party or hacker to corrupt the data that has been stored there. This way the crucial and sensitive health records are stored securely as the data is digitally signed. Studying about the blockchain many new possibilities and new obstacles were discovered when it comes to store the medical data. We have discussed some of the points and hence came to a conclusion that the traditional databases are not as efficient as blockchain databases when it comes to store the Health Records because of the factors like centralised and decentralised, security, and transparency. While there are some points that might raise a concern when it comes to storing the data in blockchain.

7. FUTURE SCOPE

Looking at the broader picture we are moving towards more advancement in all sectors with the help of technology. New methods to unfold better results are being used on a daily basis so that new kind of information is deduced and helps in the research or new methods for diagnosis. Considering the health department there are numerous amounts of data that can be used for analysis like the medication history according to the demographics. Number of patients of certain disease for the drug department to deal with it, or the diagnosis record for the government to frame a scheme accordingly.

Electronic Health Record with the help of blockchain will ensure the sharing of data without any disclosure of individuals identity.
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Internet User and Cyber Crime in India

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Abstract: The phenomenal growth of computers and Internet services has engendered the problem of cyber crime proliferation on the account of investigation difficulties and lack of strong evidences further, existing laws and preventive measures are not effective to curb such crimes. India has witnessed an unprecedented index of Cyber-crimes whether they pertain to Trojan attacks, salami attacks, e-mail bombing, DOS attacks, information theft, or the most common offence of hacking. Despite technological measures being adopted by corporate organizations and individuals, we have witnessed that the frequency of cyber-crimes has increased over the last decade. Since users of advance technology, computer system and internet are increasing worldwide in large number day by day, where it is easy to access any information easily within a few seconds by using internet which is the medium for huge information and a large base of communications around the world. Certain precautionary measures should be taken by all of us while using the internet which will assist in challenging this major threat Cyber Crime. In this paper, I have discussed various categories of cyber-crime and cyber-crime as a threat to person, property, government and society. In this paper I have suggested various preventive measures to be taken to snub the cyber-crime and consequences of cyber-crime.

Keywords: Internet User, Global, Cyber-crime. Computer crime, hacking, cyber fraud, consequences, Prevention of cyber-crime.

1. INTRODUCTION

Cyber crime is different from Conventional crime (“a legal wrong that can be followed by criminal proceedings which may result into punishment.”(1)). Cyber crime is the latest and perhaps the most complicated problem in the cyber world. It is defined as “Any criminal activity that uses a computer either as an instrumentality, target or a means for perpetuating further crimes comes within the ambit of cyber crime” (2). A generalized definition of cyber crime may be “unlawful acts wherein the computer is either a tool or target or both”(3). Cybercrime is also substantially different from computer crime. It’s like the difference between people who use computers for all they can be versus people who use computers as a tool like a typewriter. Cyber crime is hard to detect, thus giving the perpetrators plenty of time to flee the area in which the crime was committed, because of this fact the criminals can be in another country far away from the scene of the crime by the time it is detected. Computer is a major source for cyber crime. Cyber crime is any illegal activity arising from one or more Internet components. Cybercrime can include everything from non-delivery of goods or services and computer intrusions to

There are two ways this is done - phishing and harming, both methods lure users to fake websites, where they are asked to enter personal information. This includes login information, such as usernames and passwords, phone numbers, addresses, credit card numbers, bank account numbers, OTP and other information criminals can use to “steal” another person's identity.

India had 451 million monthly active internet users as on 31 March 2019, which is followed to China's 800 million plus user base. India's internet users expected to register double digit growth to reach 627 million in 2019, driven by rapid internet growth in rural areas. Internet usage in the country has exceeded half a billion people for first time, pegged at 566 million, driven by rural internet growth and usage. In 2018 it noted that the number of internet users in India has registered an annual growth of 18 percent and is estimated at 566 million as of December 2018, a 40 percent overall internet penetration, it observed.

It projected a double digit growth for 2019 and estimates that the number of internet users will reach 627 million by the end of this year. Out of total internet user, 87 percent or 493 million Indians are defined as regular users, having accessed internet in last 30 days. Nearly 293 million active internet users reside in urban India, while there are 200 million active users in rural India. A report found that 97 percent of users use mobile phone as one of the devices to access internet. While internet users grew by 7 percent in urban India, reaching 315 million users in 2018, digital adoption is now being propelled by rural India, registering a 35 percent growth in internet users over the past year.

It is now estimated that there are 251 million internet users in rural India, and this is expected to reach 290 million by the end of 2019. "Increased availability of bandwidth, cheap data plans and increased awareness driven by government programmes seem to have rapidly bridged the digital gap between urban and rural India. Consequently, the penetration in rural India has increased from 9 percent in 2015 to 25 percent in 2018." Bihar registered the highest growth in internet users across both urban and rural areas, registering a growth of 35 percent over last year.
The report also noted that the internet usage is more gender balanced than ever before with women comprising 42 percent of total internet users. There would be 2.1 billion networked devices by 2023 and M2M (machine to machine) modules would account for 25% (524.3 million) of all networked devices, according to the report.

2. CYBER CRIMES IN INDIA

India will have over 907 million internet users by 2023, accounting for 64% of the population, according to Cisco's Annual Internet Report. The report says devices and connections are growing faster (7% CAGR) than the population (1% CAGR) in India, boosting the growth in the average number of devices and connections per household and per capita. There would be 2.1 billion networked devices by 2023 and M2M (machine to machine) modules would account for 25% (524.3 million) of all network.

Out of the 451 million users, 385 million belong to the age group of 12 years and above, while 66 million are aged between 5 and 11 years, suggesting that a significant number of India’s demographic on internet are actually school children.

Despite the Smartphone penetration and availability of 4G services at shoestring prices across India, there is a huge gender disparity that still exists in terms of internet usage by women.

Maximum number of cases under cyber-crimes were reported in Uttar Pradesh (2, 639 cases) (21.4%) followed by Maharashtra (2, 380 cases) (19.3%) and Karnataka (1, 101 cases) (8.9%) during 2016.

During 2016, 48.6% of cyber-crime cases reported was for illegal gain (5, 987 out of 12, 317 cases) followed by revenge with 8.6% (1, 056 cases) and insult to the modesty of women with 5.6% (686 cases).

Corruption, Cyber and Economic Crimes in States/UTs (2016): Cyber Crime (7.7%), Forgery (8.6%), Prevention of Corruption Act (2.8%), Counterfeiting (0.9%), Criminal Breach of Trust (11.7%), and Cheating (68.4%)

The advancement of technology has made man that dependent on Internet for all his needs. Internet has given to a man easy access to the internet. There is an easy access to the internet. There is an easy access to the internet.

3. DIFFERENT KINDS OF CYBER CRIMES

The different kinds of cyber-crimes are:

1. Unauthorized Access and Hacking: Unauthorized access means any kind of access without the permission of either of the rightful or person in charge of the computer, computer system or computer network. Hacking means an illegal intrusion into a computer system and/or network. Every act committed towards breaking into a computer and/or network is hacking. Hackers write or use ready-made computer programs to attack the target computer. They possess the desire to destruct and they get the kick out of such destruction. Some hackers hack for personal monetary gains, such as to stealing the credit card information, transferring money from various bank accounts to their own account followed by withdrawal of money. Government websites are the most targeted sites for the hackers.

2. Web Hijacking: Web hijacking means taking forceful control of another person’s website. In this case the owner of the website loses control over his website and its content.

3. Pornography: Pornography means showing sexual acts in order to cause sexual excitement. The definition of pornography also includes pornographic magazines produced using computer and the internet pornography delivered over mobile phones.

4. Child Pornography: The Internet is being highly used as a medium to sexually abuse children. The children are viable victim to the cyber-crime. Computers and internet having become a necessity of every household, the children have got an easy access to the internet. There is an easy access to the pornographic contents on the internet.

5. Cyber Stalking: Cyber stalking is as the repeated acts of harassment targeting the victim such as following the victim, making harassing phone calls, killing the victims pet, vandalizing victims property, leaving written messages or objects. Stalking may be followed by serious violent acts such as physical harm to the victim. Cyber Stalking means repeated acts of harassment or threatening behavior of the cyber-
criminal towards the victim by using internet services. Both kind of Stalkers i.e., Online & Offline – have desire to control the victims life.

6. Denial of Service Attack: This is an attack in which the criminal floods the bandwidth of the victim’s network or fills his e-mail box with spam mail depriving him of the services he is entitled to access or provide. This kind of attack is designed to bring the network to crash by flooding it with useless traffic. Another variation to a typical denial of service attack is known as a Distributed Denial of Service (DDoS) attack wherein the perpetrators are many and are geographically widespread.

7. Virus attacks: Viruses are the programmes that have the capability to infect other programs and make copies of it and spread into other program. Programmes that multiply like viruses but spread from computer to computer are called as worms. These are malicious software that attaches them to other software. Virus, worms, Trojan horse, Time bomb, Logic Bomb, Rabbit and Bacterium are the malicious. Viruses usually affect the data on a computer, either by altering or deleting it. On the other hand worms merely make functional copies of them and do this repeatedly till they eat up all the available.

Trojan horse is a program that acts like something useful but do the things that are quiet damping. Trojans come in two parts, a Client part and a Server part. When the victim (unknowingly) runs the server on its machine, the attacker will then use the Client to connect to the Server and start using the Trojan.

8. Software Piracy: Software piracy refers to the illegal copying of genuine programmes or the counterfeiting and distribution of products intended to pass for the original. These kind of crimes also include copyright infringements, trademarks violations, theft of computer source code, patent violations etc.

9. Salami Attacks: These attacks are used for the commission of financial crimes. The key here is to make the alteration so insignificant that in a single case it would go completely unnoticed. e.g. a bank employee inserts a programme, into the bank’s servers, that deducts a small amount of money (say Rs. 5 a month) from the account of every customer. No account holder will probably notice this unauthorized debit, but the bank employee will make a sizable amount of money every month.

10. Phishing: Phishing is the act of sending an e-mail to a user falsely claiming to be an established legitimate enterprise in an attempt to scam the user into surrendering private information that will be used for identity theft. The e-mail directs the user to visit a web site where they are asked to update personal information, such as passwords and credit card, social security, OTP, Credit/Debit Card details and bank account numbers that the legitimate organization already has. The Web site, however, is bogus and set up only to steal the user’s information. By spamming large groups of people, the phisher counted on the e-mail being read by a percentage of people who actually had listed credit card numbers with legitimately.

11. Sale of illegal articles: This category of cyber-crimes includes sale of narcotics, weapons and wildlife etc., by posting information on websites, auction websites, and bulletin boards or simply by using email communication.

12. Online Gambling: There are millions of websites; all hosted on servers abroad, that offer online gambling. In fact, it is believed that many of these websites are actually fronts for money laundering. Cases of Hawala transactions and money laundering over the Internet have been reported.

13. Email Spoofing: Email spoofing refers to email that appears to originate from one source but actually has been sent from another source. Email spoofing can also cause monetary damage.

14. Cyber Defamation: When a person publishes defamatory matter about someone on a website or sends e-mails containing defamatory information to all of that person’s friends, it is termed as cyber defamation.

15. Forgery: Computers, printers and scanners are used to forge counterfeit currency notes, postage and revenue stamps, mark sheets etc. These are made using computers, and high quality scanners and printers.

16. Theft of information contained in electronic form: This includes theft of information stored in computer hard disks, removable storage media, in mobile phones etc.

17. Email Bombing: Email bombing refers to sending a large number of emails to the victim resulting in the victim’s email account (in case of an individual) or mail servers (in case of a company or an email service provider) crashing.

18. Data Diddling: Data diddling involves changing data prior or during input into a computer. The information is changed from the way it should be entered by a person typing in the data, a virus that changes data, the programmer of the database or application, or anyone else involved in the process of having information stored in a computer file. It also include automatic changing the financial information for some time before processing and then restoring original information.

19. Internet Time Theft: Internet time refers to usage by an unauthorized person of the Internet hours paid for by another person.

20. Theft of Computer System: This type of offence involves the theft of a computer, some part(s) of a computer or a peripheral attached to the computer.

21. Physically Damaging a Computer System: This crime is committed by physically damaging a computer or its peripherals.

22. Breach of Privacy and Confidentiality: Privacy refers to the right of an individual/s to determine when, how and to what extent his or her personal data will be shared with others.
Breach of privacy means unauthorized use or distribution or disclosure of personal information. Confidentiality means non-disclosure of information to unauthorized or unwanted persons. In addition to Personal information some other type of information which useful for business and leakage of such information to other persons may cause damage to business or person, such information should be protected.

Generally for protecting secrecy of such information, parties while sharing information forms an agreement about the procedure of handling of information and to not to disclose such information to third parties or use it in such a way that it will be disclosed to third parties. Many times party or their employees leak such valuable information for monitory gains and causes breach of contract of confidentiality. Special techniques such as Social Engineering are commonly used to obtain confidential information.

23. E-commerce/ Investment Frauds: An offering that uses false or fraudulent claims to solicit investments or loans, or that provides for the purchase, use, or trade of forged or counterfeit securities. Merchandise or services that were purchased or contracted by individuals online are never delivered. The fraud attributable to the misrepresentation of a product advertised for sale through an Internet auction site or the non-delivery of products purchased through an Internet auction site. Investors are enticed to invest in this fraudulent scheme by the promises of abnormally high profits.

24. Cyber Terrorism: Targeted attacks on military installations, power plants, air traffic control, banks, trail traffic control, telecommunication networks are the most likely targets. Others like police, medical, fire and rescue systems etc. Cyber terrorism is an attractive option for modern terrorists for several reasons.

STEPS TAKEN BY INDIAN GOVERNMENT: Indian Government has undertaken number of legislative, technical and institutional measures for addressing cyber security issue and strengthening cyber security system in country. Some steps taken by Govt. are as like:

• National Cyber Coordination Centre (NCCC): It is an operational cyber security and e-surveillance agency in India which is intended to screen communication meta-data and co-ordinate intelligence gathering activities of other agencies. It generates situational awareness about potential and existing cyber security threats and enables timely sharing of information for proactive, preventive and protective actions by individual entities.

• National Cyber Security Coordinator (NCSC): Under this National Security Council Secretariat (NSCS) coordinates with different agencies at the national level for cyber security matters.

• Enacted Information Technology (IT) Act, 2000: This act provides legal recognition for electronic communication, electronic commerce and cyber-crimes etc. IT Act has acted as deterrent provisions to deal with cyber threats and cyber-attacks.

• Established National Critical Information Infrastructure Protection Centre (NCIIPC): This Centre give protection of critical information infrastructure in the country.

• Formulated National Cyber Security policy (2013): This framework ensures a secure and resilient cyberspace for citizens, businesses and government.

• Set up Indian Computer Emergency Response Team (CERT-In): This team solves the issues alerts and advisories regarding latest cyber threats and countermeasures on regular basis. It conducts regular training programmes for network and system administrators and governments Chief Information Security Officers (CISOs) and critical sector organisations regarding securing the IT infrastructure and mitigating cyber-attacks.

• Launched Cyber Swachhta Kendra (which is Botnet Cleaning and Malware Analysis Centre): This Kendra work for detection of malicious programmes and provide free tools for their removal.

• Cyber Crime Prevention for Women and Children (CCPWC) Scheme: Under this scheme Government of India released grants to States/UTs to set up a Cyber Forensic cum Training Laboratory and to organize capacity building programme on cyber awareness and cyber-crime investigation. A Division has been established under Ministry of Home Affairs to deal with Cyber and Information Security.

PREVENTION OF CYBER CRIME: Prevention is always better than cure. It is always better to take certain precautions while working on the net. One should make them a part of his cyber life. 5P mantra suggests for online security: Precaution, Prevention, Protection, Preservation and Perseverance.

• Identification of exposures through education will assist responsible companies and firms to meet these challenges.

• One should avoid disclosing any personal information to strangers, the person whom they don’t know, via e-mail or while chatting or any social networking site.

• One must avoid sending any photograph to strangers by online as misusing or modification of photograph incidents increasing day by day.

• An update Anti-virus software to guard against virus attacks should be used by all the citizens and should also keep back up volumes so that one may not suffer data loss in case of virus contamination.

• A person should never send his credit card number or debit card number to any site that is not secured, to guard against frauds.
• It is always the parents who have to keep a watch on the sites that their children are accessing, to prevent any kind of harassment or depravation in children.

• Web site owners should watch traffic and check any irregularity on the site. It is the responsibility of the web site owners to adopt some policy for preventing cyber-crimes as number of internet users are growing day by day.

• Web servers running public sites must be physically separately protected from internal corporate network.

It is better to use a security programs by the body corporate to control information on sites.

• Strict statutory laws need to be passed by the Legislatures keeping in mind the interest of citizens.

• IT department should pass certain guidelines and notifications for the protection of computer system and should also bring out with some more strict laws to breakdown the criminal activities relating to cyberspace.

• As Cyber Crime is the major threat to all the countries worldwide, certain steps should be taken at the international level for preventing the cybercrime.

• A complete justice must be provided to the victims of cyber-crimes by way of compensatory remedy and offenders to be punished with highest type of punishment so that it will anticipate the criminals of cyber-crime.

4. GLOBAL CYBER-SECURITY STATS

So far, 2019 has brought us a bumper-crop of incidents and concerns, and things will only become worse as we move into 2020 and beyond. Although cyber-security insurance spending is expected to increase to $14 billion in US dollars by 2022, 68 percent of businesses have no liability coverage at all. In fact, 80 percent of enterprises don’t even have a comprehensive cyber-security prevention and mitigation plan in place.

Another trending threat is the rise of bring your own device (BYOD). It’s estimated that 59 percent of employers allow employees to conduct business on their personal smart-phones, tablets, or laptops. Allowing staff to work from home or use their own devices is convenient and cost-effective for business owners, but it also leaves companies more vulnerable to social engineering exploits and ransom ware attacks.

Globally, one of the most vulnerable sectors is healthcare, which suffered three out of the top seven most costly breaches in 2015. This is followed by manufacturing in second place, and the banking/finance industry to round-out the top three.

As far as attacks and exploits, those are becoming more sophisticated and harder to detect. There is a hacking attempt launched every 39 seconds and more than half of those are aimed at small businesses. Last year alone, more than half a billion personal records were stolen by cybercriminals. By next year, the average cost of a data breach will reach an estimated $150 million.

5. CONCLUSION

In conclusion, computer crime does have a drastic effect on the world in which we live. It affects every person no matter where they are from. It is ironic that those who in secret break into computers across the world for enjoyment have been labeled as deviance. Many hackers view the Internet as public space for everyone and do not see their actions as criminal. Hackers are as old as the Internet and many have been instrumental in making the Internet what it is now. Hacking and computer crime will be with us for as long as we have the Internet. It is our role to keep the balance between what is a crime and what is done for pure enjoyment. Government is making an effort to control the Internet. Yet, fully control over the Internet is impossible, because Internet was created. Families and the institution of education is needed, parents need to let their children know what is okay to do on the computer and what is not and to educate them on the repercussions of their actions should they choose to become part of the subculture of hackers. Natural truth is that nobody know about what computer crime will include in the future is totally unknown. What was criminal yesterday may not be a crime the next day because advances in computers may not allow it. Passwords might be replaced for more secure forms of security like biometric security. Most of the recorded computer crimes cases in most organization involve more than individual and virtually all computer crime cases known so far are committed by employer of the organization. Criminals have also adapted the advancements of computer technology to further their own illegal activities.

Since users of computer system and internet are increasing worldwide in large number day by day, where it is easy to access any information easily within a few seconds by using internet which is the medium for huge information and a large base of communications around the world. Certain precautionary measures should be taken by all of us while using the internet which will assist in challenging this major threat Cyber Crime.

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University of Chicago and CEPR Paul Heaton University of Chicago December 4, 2006


### TABLE 1: Cyber Crimes in India in 2016

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<td>Total Cyber Crimes</td>
<td>9,622</td>
<td>11,592</td>
<td>12,317</td>
<td>20.5%</td>
<td>6.3%</td>
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Source: Crime in India Statistics 2016

### TABLE 2: Cyber Crime under various Acts in India

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<td>0.4</td>
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<tr>
<td>Trade Marks Act, 1999</td>
<td>119</td>
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<td>186</td>
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<tr>
<td>Total</td>
<td>12556</td>
<td>1.0</td>
<td>13472</td>
</tr>
</tbody>
</table>

Source: Crime in India Statistics 2016
Blockchain – Novel Applications Over Obvious

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Abstract: The research paper gives a brief overview of implementation of the Blockchain in domains beyond crypto-currency. Today, in the world of Internet of Things and cloud computing, blockchain is an essential addition to the technology. The accelerated development of blockchain and its multiple applications has made it a force to be recognized. But the scope of blockchain is not limited to bitcoin or the cryptocurrencies implementation. This paper enlightens the stipulation of blockchain beyond cryptocurrency and reveals the insights of blockchain technology concepts, evolution, mechanisms and challenges based on literature review. In Blockchain, Proof-of-Work (PoW), a cryptographic puzzle is used to confirm transactions and produce new blocks to the chain, thus ensuring Blockchain security by maintaining a digital ledger of transactions. Furthermore, Blockchain uses a Public Key (PK) which is used to generate an actual cryptocurrency address which serves as a user’s account identifier to which funds can be paid thus recording user’s identity. Latest research articles and projects were considered and surveyed to assess the application of Blockchain in field other than crypto-currency.

Keywords: Blockchain, Public Key, Proof of Work, Cryptocurrency

1. INTRODUCTION

Blockchain is comparatively a new technology, a stratified sample of research is presented, spanning over the last ten years, ranging from the early work in this field which included investigation in different types of usage of Blockchain, associated challenges, applications, security and privacy issues. The main focus of the review study is to identify the most beneficial direction for future use of Blockchain beyond crypto-currency[1]. Key benefits of blockchain technology include encryption, provenance and immutability.[2] Blockchain is considered essential for forming the backbone for ensuring enhanced security and privacy for various applications in other domains like the Internet of Things (IoT) eco-system. The Proof-of-Work (PoW) maintains a digital ledger of transactions that is unalterable thus ensuring Blockchain security. Furthermore, to provide an extra layer of privacy, Blockchain uses a changeable Public Key (PK) to record the users’ identity. The successful adoption of Blockchain has been implemented in diverse systems like in online voting, decentralized messaging, distributed cloud storage systems, proof-of-location, healthcare and so on[1]. Recent research articles and projects/applications were surveyed to work out the implementation of Blockchain for enhanced security and to spot its associated challenges and thence to propose solutions for Blockchain enabled enhanced security systems. The knowledge base of the research is within the realm of the digital ledger, specifically, in Blockchain.

2. TECHNOLOGY FUNDAMENTALS OF BLOCKCHAIN

This section briefly describes the fundamentals of the technology behind the Blockchain. A Blockchain comprises of two different components:

1. Transaction: A transaction depicts the action triggered by the participant, in a Blockchain,

2. Block: A block, in a Blockchain, is a collection of data recording of the transaction and other associated details such as sequence, time of creation, etc. The Blockchain may be public or private depending the scope of its use. A public Blockchain enables all the users with read and write permissions like in Bitcoin, access to that. However, there are some public Blockchains that limit the access to only either to read or to write or private Blockchains which limit the access to selected trusted participants only, to keep the users’ details concealed. This is particularly applicable amongst governmental institutions. One of the major benefits of the Blockchain each participating entities possesses is an updated complete record of the transactions and the associated blocks. Thus the information remains unaltered, as any changes are going to be publicly verifiable. Although, the data in the blocks are encrypted by a private key and hence cannot be interpreted by everyone. Another advantage of the Blockchain technology is that it is decentralized ie

- The transactions aren't subject to approval of any single authority or need to abide by specific rules.

- Its implementation technology is public. There is no single device which stores the info, they're distributed among all the participants throughout the network supporting the Blockchain.

- The overall security of a Blockchain eco-system. Only new blocks are allowed to append in the system. Since the previous blocks are public and distributed, they can't be altered or revised. For a brand new transaction to be added
to the present chain, it has to be validated by all the participants of the relevant Blockchain eco-system. For such a validation and verification process, a specific algorithm must be applied by the participants. The relevant Blockchain eco-system defines what's perceived as “valid”, which can vary from one eco-system to a different. A number of transactions, thus approved by the validation and verification process, are assorted together in a block. The newly prepared block is then communicated to all other participating nodes to be appended to the prevailing chain of blocks. Each succeeding block comprises a unique digital fingerprint known as hash, of the preceding one. Figure 1 demonstrates how Blockchain transactions takes place, using a step-by-step example.

![Blockchain diagram](image)

**Fig. 1. Step by step functioning of blockchain transaction[12]**

3. **Blockchain Usage Beyond Cryptocurrency**

Though Bitcoins and cryptocurrencies are the primary popular application of Blockchain technology, they're not the sole ones. The nature of Blockchain technology has led businesses, industries, and entrepreneurs from all round the world to explore the technology’s potential and make revolutionary changes in several sectors.

The Internet is a gigantic tool to aid every sphere of the modern digital life but it is still very much flawed in terms of the shortage of security and privacy, especially when it involves FinTech and E-commerce.

With the utilization of Blockchain, the interaction between two parties through a peer-to-peer model is definitely accomplished without the need of any third party. Blockchain uses P2P protocol which allows all the network participants to carry a uniform copy of transactions, enabling approval through a machine consensus. For example, if you wish to make any transaction from one part of the world to another, you can do that with Blockchain all by yourself within a few seconds. Moreover, any interruptions or extra charges won’t be deducted within the transfer.

Blockchain validates all the transactions and preserves a permanent record of them while ensuring that any identification related information of the users are kept incognito. Thus all the private information of the users are sequestered while substantiating all the transactions. Blockchains are decentralized in nature meaning that no single person or group holds the authority of the general network. While everybody within the network has the copy of the distributed ledger with them, nobody can modify it on his or her own. This unique feature of Blockchain allows transparency and security while giving power to the users. Blockchain thus appears to be the ideal “Trust Machine” [11] paradigm.
Liang et al. [4] puts forward a Blockchain based trusted cloud data provenance architecture, ‘ProvChain’, which is fully decentralized. Such adoption of the Blockchain during a cloud environment can provide strong protection against records being altered thus enabling an enhanced transparency also as additional data accountability. In the cloud [9, 10] environment, the history of creation of any cloud data object and its subsequent operations performed thereupon are recorded by the info structure mechanism of ‘Data Provenance’, which is a type of cloud metadata. Thus this is often vital to supply the utmost security to the info provenance for ensuring its data privacy, forensics and accountability.

Underwood [5] considers the appliance of Blockchain technology to completely overhaul the digital economy. Ensuring and maintaining trust is both the first and initial concern of the application of the Blockchain. Blockchain can also be used to gather chronological and sequence information of transactions, because it could also be seen as a huge networked time-stamping system. For example, NASDAQ is using its ‘LinQBlockchain’ to record its private securities transactions. Meanwhile the Depository Trust & Clearing Corporation (DTCC, USA) is functioning with Axoni in implementing financial settlement services like post-trade matters and swaps. Regulators are also interested for Blockchain’s ability to offer secure, private, traceable real-time monitoring of transactions. Infact, Bitcoin is simply an exemplary use of the Blockchain. Blockchain is considered to be a novel revolution within the domain of computing enabling limitless applications like storing and verifying legal documents including deeds and various certificates, healthcare data, IoT, Cloud then forth. Tapscott [6] rightly indicated Blockchain to be the “World Wide Ledger”, enabling many new applications beyond verifying transactions like in: smart deeds, decentralized and/or autonomous organizations/government services etc. In an IoT ecosystem [12, 13], most of the communication is in the form of Machine-to-Machine (M2M) interactions. Thus establishing trust among the participating machines is a huge challenge that IoT technology still has not been met extensively. However, Blockchain may act as a catalyst during this regard by enabling enhanced scalability, security, reliability and privacy [3]. This can be achieved by deploying Blockchain technology to trace billions of devices connected to the IoT eco-systems and used to enable and/or coordinate transaction processing. Applying Blockchain in the IoT ecosystem will also increase reliability by axing the only Point of Failure (SPF). The cryptographic algorithms used for encryption of the block data also because the hashing techniques may provide better security. However, this shall demand more processing power which IoT devices currently suffer from. Thus further research is required to beat this current limitation.

4. SCOPE AND FUTURE OF BLOCKCHAIN

As per the Gartner Hype Cycle for Emerging Technologies 2018, shown in Figure 2, below, Blockchain still is in the region of “Peak of Inflated Expectation” with forecast to reach “Plateau” in “five to ten years”. However, this technology is shown stooping into the region of the “Trough of Disillusionment”. Because of the extensive adoption of the Blockchain in a wide range of applications beyond...
cryptocurrency, forecasting is a shift in classification from “five to ten years” to “two to five years” to reach maturation. Blockchain possesses a great potential in empowerment of the citizens of the developing countries once broadly adopted by egovernance applications for asset ownership transfer of precious commodities such as silver, gold and diamond, identity management, healthcare and other commercial uses as well as in financial inclusion. However, this will immensely depend on national political decisions.

![Gartner Hype Cycle, 2018](image)

5. CONCLUSION

The application of the Blockchain concept and technology has grown much beyond its use for Bitcoin generation and transactions. The properties of its traceability, time-stamping, privacy, security and inherent data provenance has seen its adoption past its initial application areas. The Blockchain itself along with its variants are now used to secure all types of transactions, be it human-to-human communications or machine-to-machine. Its adoption appears to be secure all the more with the global emergence of the Internet-of-Things. Its decentralized application across the already established global Internet is also very imploring in terms of assuring data redundancy and survivability. The Blockchain is especially identified to be suitable in developing nations where ensuring trust is the main concern. Thus the invention of the Blockchain can be seen to be an integral and much required additional component of the Internet that lacked in security and trust before. Blockchain technology still has not reached its maturity with a prediction of five years as offbeat applications continue to be implemented world-wide.

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Algorithmic Analysis of Moss Results

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Abstract: Moss or Measure of Software Similarity is a great tool for professors to judge plagiarism in programming assignments. Although Moss is still not a complete solution to detect plagiarism, it has some limitations.

- It has no way of knowing why codes are similar.
- Moss Results are not a proof of plagiarism. Someone must still look at the code.

1. INTRODUCTION

Analyzing Moss data is not easy hence we try to provide some algorithmic ways which can help professors make sense of Moss results.

Assuming that we are analyzing results for only 1 programming problem. (For e.g 40 students submitted a solution to the same programming problem and out of those 20 solutions were detected with plagiarism by Moss. We analyze these 20 solutions.)

For testing purposes we submitted 7 programming solutions coded in Java to a common problem of finding Fibonacci Series.

The test data can be viewed at github.com/codeclassroom/PlagCheck/tree/master/testfiles

Following results were obtained by Moss on submitting the above mentioned test data.

We now define some new metrics for analyzing this data.

2. NODE

Nodes are results returned by Moss i.e every individual file name which is returned by Moss is a single node.

For e.g In Fig 1, we have 7 nodes namely test_java5, test_java3 etc.

3. M-GROUP

We define m-groups (moss-groups) as groups of solution which have similar code. For example A student who solves a programming problem may share their solution with 3 of his/her friends, that is a single m-group with 4 nodes.

M-groups can be visualized as Directed Graphs. A single m-group may fall in one of the 2 categories:

1. Cyclic Graph
2. Acyclic Graph

Examples of valid m-groups.

Fig. 1. Moss Results

Fig. 2.1

Fig. 2.2. Acyclic m-group with 3 nodes
In Fig 2.1, Student A shared code with students B and C.

In Fig 2.2, A cyclic relationship arises when the same code was shared exactly between 2 or more students.

In Fig 2.3, Student A shared code with B and Student B shared code with student C.

4. PROPERTIES

Although m-groups show similar behaviour as Directed Graphs, they have some unique properties:

1. m-groups do not have self loops.
2. Different m-group may be combined into a single Disconnected Directed Graph.

5. TAGS

Tags are roles which a file serves i.e. a tag is a potential distributor or potential culprit or both. In real world scenario when a student cheats there are 2 parties involved one who shares the code (the Distributor) & the one who copies it (the Culprit). These two parties are termed as Tags.

Note: In some cases the copied code may be shared with other too, this results in the person being both a Distributor as well as a Culprit hence both a potential distributor and a culprit at the same time.

Distributors: Students who distributed their code in a group.

Culprits: Students who copied the shared code.

Tags are denoted as:
- D – Distributor
- C – Culprit
- DC – Both a Distributor & Culprit

In following figures we assign tags to different nodes:

In Fig 3.1, The distributor is A and the culprits are B & C.

In Fig 3.2, Both nodes B & C can be potential Distributors or Culprits, this scenario arises when the percentage match of both files is equal i.e a student both shares the code to someone & copies it from someone.

In Fig 3.3, A distributed their code to B which makes A a distributor and B a culprit, B on other hand distributed the code to C which make C a culprit and B as both a Distributor and a Culprit.

6. ASSIGNING TAGS

Tags are assigned based on the percentage match which is returned by Moss. For example in Fig1, the 2nd result is read as:

90% of test_java2.java matches with 46% of test_java3.java or simply stated,

90% of test_java2.java is similar to 46% of test_java3.java

We assign test_java2 as a Culprit (C) & test_java3 as Distributor (D) as 46 < 90, so there is a clear chance that the student who coded test_java3 shared his solution to student who submitted test_java2.

In case the percentage match of 2 different solutions is same we assign both solutions/nodes as DC as we are not sure who might have shared the code & who might copied it. This is depicted in the 1st result of Fig 1 where percentage match of both test_java4 & test_java5 is same i.e 94%.
7. ANALYSIS

Our goal of this analysis is to find students who actually did all the work (distributors) & students who copied (culprit). Based on the previously discussed metrics namely m-groups and tags, we perform an analysis of the Moss data depicted in Fig 1.

With the help of below depicted graph we can extract out following relations:

1. D to C
2. D to DC
3. DC to C
4. DC to DC

Fig. 4. m-group of the first 7 results

8. ALGORITHM

Step 1: Divide the Moss results into m-groups.

Step 2: For each node in a m-group assign a tag D, C or DC.

Step 3: Display D-C, D-DC, DC-C & DC-DC paths from each m-group.

Based on the above algorithm following paths are computed.

1. D to C
Node 3 distributed their code to Node 1 & 2.

2. D to DC
Node 3 also distributed their code to Node 4 & 5.

3. DC to C
Node 5 & 4 shared their code with Node 2.

4. DC to DC
Node 4 and Node 5.

9. APPLICATION

The analysis done in this paper is available as a software solution.

The code is Open-Source & can be viewed at github.com/codeclassroom/PlagCheck

10. CONCLUSION

Our purpose for this analysis was to provide an insight on top of Moss Data. The goal was to find all distributors and culprits. D to C & D to DC paths yield more concrete results on who might have copied & who distributed their code.

Using these metrics helps us give an insight to Moss results hence helping the evaluator with making appropriate judgement.

Note: The above mentioned process and metrics for determining potential distributors and culprits is based on pure algorithmic assumptions in reality they may not be 100% correct therefore professors and evaluators are advised to go with their intuition and judgement while evaluating Moss Results.

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Acknowledgements

[6] Moss was written and is maintained by Alex Aiken, aiken@cs.stanford.edu.

[7] The HTML interface was conceived of and designed by Guido Malpohl (s_malpoh@ira.uka.de), the author of JPlag, a plagiarism detection system for Java programs.

[8] Syed Owais Ali Chishti, author of mosspy (Python client for Moss)
A Framework for Recommendation System for Food Court

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Abstract: These days, one of the most serious issue eateries and food courts are confronting is the current queueing framework which makes the circumstance of long lines and charging difficulty. Clients need to hold up extended periods to arrange their sustenance which brings about losing the clients' enthusiasm because of long hold up in the line. The framework clarified in this undertaking utilizes portable application innovation to empower correspondence between nourishment courts and their objective clients for request administration and charging that will guarantee great client connection administration and enhance general execution of eateries. The motivation behind prescribing nourishment things is accomplished by Machine Learning. Information science is the entire procedure of finding important examples and connections in information by utilizing strategies like machine learning and insights by means of complex information examination apparatuses.

The point of this proposal framework is to kill downsides of the current line framework and self-administrations; increment productivity of nourishment court and sparing client's time.

1. INTRODUCTION

The problems that we face these days in food courts are: long waiting in the queues, billing lines and issues, and also, less knowledge about which food item is most popular and which is not. We are well aware of the fact that in food courts there is a wide range of food items available for the customers and so the quality of food and its taste is a major concern for the customer.

Some of the existing systems that are used in food courts to improve their performance are:

A. Traditional System

The customary sustenance court orchestrate organization structure uses a self-advantage contrive, wherein customers need to visit each sustenance court to present their demand and should assemble their solicitations independently. The varieties open in the sustenance courts powers a gigantic errand of finding a fair sustenance counter for the customer to present their demand and to be content with the result. Much of the time customers need to visit more than seven to eight sustenance courts until the point that the moment that they can make up their cerebrums from accurately which sustenance counter they should need to put in their demand. This stances as a colossal endeavor of examining for a tried and true sustenance counter as shown by the buyer reliability.

B. Electronic Token System

Electronic token-based framework utilizes a different equipment gadget that is given to the client when the client lands at the counter. The client submits the request and takes the equipment gadget along. When the request is prepared at the eatery the eatery framework application makes an impression on the equipment gadget which is associated by a remote correspondence framework to the eatery application server. When prepared request message is sent to the equipment gadget and the gadget vibrates which flags the client that the sustenance is prepared to be picked from the nourishment counter in this way lessens clients holding up time. The framework just saves money on the capricious holding up time yet the charging and requesting capacities as found in the conventional strategy. The technique proposed in this paper can additionally diminish the time taken for remaining in the line at nourishment court and furthermore to charge.

C. Tablet Device Based System

In this framework, each table has a tablet which is introduced with an application to take requests and make installments. The client can get to the tablet on the table that he/she sits on and places arrange by means of an application on the tablet which is associated with eatery server. The downside here is that the framework is costly since each table requires a tablet gadget. Regardless of whether single gadget is utilized for taking request the issue of long line isn't understood. Tablet gadget based framework will demonstrate wasteful considering the situation at the sustenance court. Since wellbeing of tablet gadget can't be totally ensured. The point of the thought disclosed further is to kill downsides of the current line framework utilized for nourishment requesting which prompts loss of important client's time.

D. Solution

With the end goal to spare client's significant time, a framework is utilized which interfaces the nourishment courts
in shopping centers utilizing portable applications that will maintain a strategic distance from the circumstance of long lines and charging bothers and subsequently guarantee great client connection administration. Associating Food Courts in Mall utilizing Mobile App will make it feasible for the clients to arrange sustenance online specifically shopping center. Moreover, the rundown of sustenance thing alongside the points of interest of cost and portrayal can be seen by the client. The client can utilize the truck alternative to add things to the truck or expel things from the truck. This will empower the client to choose which things they need to request and look at menu cards of various sustenance courts. When the request is set, the client will get the affirmation and can continue for the installment after which the client will get the affirmation message from the server. Additionally we utilize site for the sustenance court attendants to deal with the approaching requests and installments and furthermore we incorporate the component of input shape from which the nourishment court chief ready to distinguish the most prominent sustenance, quality and the inclinations in nourishment determinations so we propose or suggest the client the objective client's this is finished by utilizing Machine Learning Algorithms.

The framework utilizes versatile application innovation to empower correspondence among eateries and their objective clients for request administration and charging that will guarantee great client connection administration and enhance generally execution of sustenance courts. Information science systems are named suggested and clear techniques. While the reason for distinct techniques is characterizing the idea of information, making future suggestion dependent on current perceptions is the primary objective of this framework. Information science is the entire procedure of finding important examples and connections in information by utilizing strategies like machine learning and insights by means of complex information examination apparatuses. The prescient techniques utilized in this manner are very appropriate and versatile for up and coming nourishment requests of clients. With the assistance of these strategies, day by day utilization designs are uncovered and a by and large precise indicator is gotten for thing constructed nourishment utilization expectation situated in light of their quality.

2. LITERATURE REVIEW

In this work there are two ways of applying predictions, either applying decision tree or random forest. Albrecht Schmidt talks about enhancement of food systems by presenting a detailed description about recent advances in 3D printing technologies and laser-cutting methods that could be a good starting point for digitally produced food developments [1]. Tan Hsu Tan et al. [2] worked for a recommender for customer-centric services. The author work on changing the traditional methods for billing used in food outlets and providing more efficient ways to do so. Their system provides online menu-ordering and reservation-making functions, as well as a personal menu recommendation service. Many researchers have suggested the MCDM approach as a way for personalized recommendation schemes in electronic commerce by considering multiple aspects of the products. This study constructed an intelligent e-restaurant system using RFID, WLAN, database technologies, and a menu recommender to offer customer-centric service to enhance customer service quality and improve restaurant industry competitiveness.

Global Positioning System (GPS), one of the growing technologies of geolocation, is widely used in taxis and a recommendation system for taxis is developed in [3] offering customer-centric service to enhance customer service quality and improved the restaurant industry competitiveness. The work of [4] gives idea of relationship quality of customer-owner which is increasingly emerging as a strategy for organizations that strive to retain loyal and satisfied customers in today’s highly competitive environment. Particularly, in labor-intensive services such as restaurants. The quality is maintained during the process of service delivery or during servicing staff and customers encounter.

In [5], an instrument is described to measure service quality that must have adequate means of assessing customers’ perceptions of service quality during these service encounters. Customers can thus appreciate high quality service, which in turn highly promotes enterprise image and increases business revenue for the restaurant.

As QR barcodes are used extensively due to their beneficial properties, including small tag, large data capacity, reliability and high-speed scanning. A design of a secret QR code sharing approach is used in [6]. In [7], a new rich QR code that has two storage levels and can be used for document authentication is proposed by the authors.

The growing popularity and development of data mining technologies bring serious threat to the security of individual’s sensitive information. An emerging research topic in data mining, known as privacy preserving data mining (PPDM), has been extensively studied in recent years [8]. The basic idea of PPDM is to modify the data in such a way to perform data mining algorithms effectively without compromising the security of sensitive information contained in the data. The two levels of security are public and private. Data mining has attracted more and more attention in recent years, probably because of the popularity of the “big data” concept. Data mining is the process of discovering interesting patterns and knowledge from large amounts of data.

As fluctuations and unpredictability in food demand generally cause problems in economic point of view in public food courts. To overcome this problem and to predict actual consumption demand for a specified menu in a selected date, three decision tree methods (CART, CHAID and Microsoft Decision Trees) has been utilized in [9]. The work used dataset of two year which is gathered from food courts of Hacettepe University in Turkey during the analysis. In [10], the work
emphasized the theoretically aspects of optimal trade-off between accuracy and non-discrimination for pure classifiers.

3. ANDROID APP FOR CUSTOMERS

The proposed android application aims to solve the issue by reducing the customer’s time waiting in the queue. The customer gets plenty of time having a look at the menu before actually buying it, making it possible along with the queue management. This app is useful for both the customers and vendors. Customer can tally the menus of all the vendors in the food-court by scanning the QR-Code which is available on the tables. Vendors have a web-app for registering and putting the corresponding data. They get the customer request for deliver their food on their table. The focus of this app is to reduce the time of the customer which they waste on long queues. It’s simple and attractive user interface helps the users to use the app. The main screen of the app consists of option to scan a QR code and then proceed to list of vendors at that food court. Option for selecting vendors from the list of vendors are available in the next screen. The web screen is the portal for the vendors where the vendors can add, edit, and manage orders placed by the customer.

Key Features:

Step by step processing of food order using Food Court Order Management System is described below:

1. Initially, the user has to download the application on his/her android phone and install it.
2. User will scan QR code from a table and Various food courts menu will appear. The user needs to click on one particular menu of their choice.
3. After clicking on the food court icon, the menu page will be displayed. There will be a “ADD” button through which the user can add the items to the cart.
4. The next page will display all the items selected by the customer. This page will also have the option of deleting the selected items.
5. After finalizing the items, the user can proceed for the payment.
6. Payment can be done through credit card, debit card or other payment gateway.
7. The payment details will be sent to the food court after which the food court will confirm the order via a message on mobile application.
8. After the order is ready, a notification will be sent to the user through the app.
9. The user can then collect the food from the respective food counter in the food court.

4. WEB APP FOR VENDOR

The system explained in this work uses mobile application technology to enable communication between food courts and their target customers for order management and billing that will ensure good customer relation management and improve overall performance of restaurants. The purpose of recommending food items is achieved by Machine Learning. The aim of this recommendation system is to eradicate drawbacks of the current queue system/ self-service and increase the efficiency of food court and saving customer’s time.

Key Features:

1. This app lets the vendors to take orders from the users which automatically adds all the shops of a particular food court.
2. User can order food from their table just by scanning a QR code available on that table in the app which will appear on the vendor’s web app.
3. Through this, vendors can update their menu if they want to depending upon the popularity of the food item.
4. It has a web portal for the vendors of that food court which let them edit their food on daily basis and also update special offers.

5. MACHINE LEARNING ALGORITHMS

Machine learning is firmly identified with (and regularly covers with) computational measurements, which additionally centers around forecast making using computer systems. It has solid connections to numerical enhancement, which conveys techniques, hypothesis and application spaces to the field. Machine learning is once in a while conflated with information mining, where the last subfield concentrates more on exploratory information investigation and is known as unsupervised learning. Machine learning can likewise be unsupervised and be utilized to learn and set up standard social profiles for different substances and after that used to discover important peculiarities.

Inside the field of information investigation, machine learning is a strategy used to devise complex models and calculations that loan themselves to forecast; in business utilize, this is known as prescient examination. These systematic models permit specialists, information researchers, designers, and experts to "create solid, repeatable choices and results" and reveal "concealed bits of knowledge" through gaining from authentic connections and patterns in the information.

A. Decision Tree

Decision tree or random decision forests are an ensemble learning method for classification, regression and other tasks, that operate by constructing a multitude of decision trees at training time and outputting the class that is the mode of the classes (classification) or mean prediction of the individual trees.

B. Logistic Regression (Predictive Learning Model)

It is a statistical method for analyzing data set in which there are one or more independent variables that determine an
outcome. The outcome is measured with a dichotomous variable (in which there are only two possible outcomes). The goal of logistic regression is to find the best fitting model to describe the relationship between the dichotomous.

In this work, we use Decision tree algorithms to classify our dataset and predict the good quality food on the basis of the dataset we have and also we recommend that predicted food items through android app which helps customers to choose tasty and better food for their meal.

6. METHODOLOGY

The work here proposes a recommender system, which uses android app, web app, data mining techniques and decision tree algorithm. The proposed system predicts the food items based on their quality to the customers. In android app, the customer scans the QR code kept on the table of food court so that the menu of all the restaurants of the food court gets displayed to the user. Using this app, the customer can order the food by sitting at a table and can also make his payments. The food is served to them at the table and the issue of queues and billing hassle gets reduced.

The web app is developed for the vendors. The vendors have an idea about the whole food court and which food item of their particular restaurant is famous and which is not. Predictions are made for customers about what they should eat from the restaurant. The web app helps in managing the orders and also tells about day to day sales. This idea helps them to expand their business ideas and strategies, so that they could provide better quality of food and get profits as well.

Now, the predictions in the system are made based on quality of food. The decision tree algorithm helps in classifying the data of the system. Thus, these predictions help the customers to get an idea about what they should order at the food court.

7. DISCUSSION OF RESULTS

In this work, we are applying Decision Tree and Logistic regression algorithm from which the Decision Tree algorithm gives the 70-75% accuracy in predictions while logistic regression gives about 60-65% accuracy in predictions. Hence, we have used decision tree algorithm for further executions and operations in this work. Now by this work, we are able to predict the food items on the basis of food quality. The accuracy of various algorithms can be examined by creating the confusion matrices and analyzing them.

8. CONCLUSION

The ultimate objective of our project is to provide a platform where users can save their precious time standing in queues. This system focuses on three major goals:
• **Recommendation of food items**: on the basis of customer’s feedback food items is listed on the food menu.

• **Future prediction for food outlet owners**: on the basis of popularity of food items, outlet owners can get the idea of current demand of food cuisine.

• **Reduce queues and billing hassle**: Customers have to wait long hours to order their food which results in losing the customer’s interest due to long wait in the line.

To sum up, designing such system is a very useful exercise and we believe that the literature survey we have done was very useful for us in order to understand the logic behind the recommendation systems. We have also searched about some algorithms we wanted to use in this work. We have implemented some prediction using Regression algorithm. Moreover, implementing such a project demonstrated how a knowledge-based system can actually encapsulate knowledge. Moreover, the present system is dynamic in that if a vendor wants to update menu of their restaurant, they can do it.

Thus, by using mobile application it enables efficient ordering and payment system to reduce queues at food courts in malls. The system discussed in the paper will ensure good service and improves overall food court experience of a customer making the “poor order management process” a simple one for the counters at the food court. Also, infrastructure needed is less expensive. Hence it is a viable solution to the queues problem faced at food courts in malls.

9. **FUTURE SCOPE**

In future, review text and user rating evaluations (whether other users thought a particular user’s review was funny, useful, or helpful) can be used as features in the prediction model. Hybrid approaches can be explored for evaluating their performances.

As this work is done on the basis of restaurants, the prediction is done on food items only which are sold by different restaurants in the food court. We have compared the food items on the basis of food quality and price. After application of prediction we see the food items listed in our recommendation column.

This work is limited to one food court at a time but it can be modified to cover various food courts. We can also use google maps and current location of customer to get details of all the nearby food courts. In this way, customers will have various options of meal and best deals offered to them. This recommendation system can also be modified to get customer feedbacks and on this basis, the vendors of respective restaurants can make changes in the food items they provide, the food quality and many more customer suggestions. Vendors will get an idea about the demands of particular food items and how they can get profits as well as popularity.

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Abstract: Artificial intelligence or AI for short is a way of providing a computer or a robot or simply some machine to think, process information and act on their own or in simple words providing the machines with an ability to think like a human. No doubt that recreating a human brain seems like a dream and still we haven’t achieved it yet but that one thing that is impossible to recreate is human consciousness. The AI includes several other fields like neural networks, deep learning, statistics, machine learning which is proving to be successful in various domains like security, research, robotics, voice recognition, transportation, and many more. AI is proving to not only reducing the workload of humans but also opening new fields that once only dreamed by us.

Keywords: Data science, neural networks, data mining, statistical approach, probability.

1. INTRODUCTION

AI is a branch of computer science by which we can create intelligent machines which can behave like a human, think like humans, and able to make decisions on their own. Artificial Intelligence is composed of two words artificial which define something that’s made by humans and intelligence which refers to the ability to think on its own, and hence this makes artificial intelligence “thinking power made by human”.

This field was formed with an idea that one day machines will be able to think or in other words, we can replicate the feature that makes us human, our intelligence along with our consciousness. This may sound like a sci-fi or a new age concept but the fact is, there has been reference to such things in mythologies and several other texts, scriptures, and artifacts as well. AI has been a turning point not only in the field of research but has also been playing a keen role in revolutionizing industries and work as we know it today.

With an ultimate goal to create consciousness, AI goes through several stages of planning, reasoning, analyzing data, prediction of outcomes and acting accordingly.

AI also involves the use of statistics and probability and various other mathematical tools (neural networks and machine learning is mostly based on these).

2. ELEMENTS OF AI

The basic elements of AI are-

1. The Human Element

This refers to a link between humans with the machine. The machine or simply an algorithm understands a language of 0’s and 1’s which is hard to understand and process by humans. Thus comes in the role of an interactive interface that can take direction from the user, process, and then provide accurate results.

2. Knowledge Base

The AI works on analyzing data present in it. The more data is fed with, the more efficient result it will provide. The knowledge base also includes previous results to review and look for some sort of patterns. The AI analyzes the data, process and compares large chunks of information to provide optimum results. It uses data algorithms and various other logic stored to find a solution to the problem present.

3. Algorithm set

The AI interface even though fed with a large chunk of data, it requires a certain set of instruction or algorithm to process and perform operation on that data. Such algorithms are provided by programmers and data scientists working together using various mathematical tools such as statistics, probability, calculus, and algebra.

3. COMPONENTS OF AI

Mimicking human intelligence or creating artificial intelligence requires several qualities to be focused on. These qualities rather than acting as a separate entity work as an array of components comprising following items-

1. Learning

Learning can be categorized into various forms. One of the simplest of them all is the hit-and-try method. For example, while creating a drug to cure a disease various combination of drugs are tested until a cure is found. The program analyzes and remembers each combination along with its effects. Thus when such a situation arises again the program is able to produce an answer immediately or as fast as it could produce. The process of memorizing simple items like phrases of words or solutions to a problem etc is known as Rote learning.

Now suppose a program is made to learn tenses. So to make a word like “create” into the past tense the program has to encounter the word “created” at least once. A better way of dealing with this situation is by teaching it the “-ed rule” so
that it can change the tense without encountering the word even once. This technique is known as Generalization.

2. Problem solving

Problems solving methods are divided into two categories: special-purpose and general-purpose. Special-Purpose methods are specifically designed to solve specific problems like controlling the coolant release in a nuclear power plant. General-purpose, on the other hand, is applicable to a wide variety of problems like instructing a robot to move right, left, forward, backward.

Further, the AI algorithm can be divided into two parts: classifiers and controllers.

Classifiers are pattern finders that find the closest pattern match to a problem. They act as a backbone for AI systems. Classifiers are fed with data and observation which gets stored in sets of predefined class according to some pattern similarities among them. Thus more the data its fed with, the more accurate result we will get.

Controllers are instruction givers and takers which work on the results provided by the classifiers.

For example, the purity of a mineral is tested and the classifiers which are already equipped with the data classify them and then with the help of the classification, the controller separates the impure one from those that are pure.

3. Logic & Reasoning

Reasoning refers to creating conclusions that are relevant to the task or situation in hand. There are two types of reasoning—inductive and deductive reasoning.

In inductive reasoning, general conclusions are drawn from specific instances like ‘All men are strong’. In deductive reasoning, specifics are taken into consideration to draw a general conclusion. For example ‘All cars have engine. I have a car. So my car has engine’.

Logic is used for information representation and problem-solving. There are several different types of logic used by AI algorithms.

- Propositional logic-Also known as sentential logic is a set of statements that can either be true or false.
- First-order logic -This type of logic is used to show facts about objects, their characteristics, and their relationship with each other.
- Fuzzy logic- It is a type of logic that allows the result(truth) to a statement between 0(false) and 1(true). This type of logic is used when the results are uncertain. These logics are mostly used in quantum computers.
- Subjective logic- This logic focuses on uncertain results more explicitly.

4. Perception

Perception means to scan and analyze objects or the environment along with its features and relationship through any sort of artificial organ or device at various depths and angles. Today artificial perception has advanced itself to enable cars on open roads or robots working as waiters at restaurants.

5. Language-understanding

Language is not only the words we speak in certain form as in english or hindi, it also comprises of our expression and gestures. The way we move our eyebrow or change our facial expression according to our mood all comes under the domain of language. There are some AI algorithms these days that can read facial gestures and depict the mood of the user.

6. Neural network

The human brain is filled with hundreds of neurons that actively work every second in us and help us to analyze things, find a relation between them through electrical impulses. Collectively these neurons form the neural network of our brain. Similarly, AI has its neural network that is a series of algorithms that recognize the relationship between a set of data. These networks can adapt to changing input, thus the need to redesign the model each time a new set/type of data is entered is not needed.

The neural network incorporates set of layers of interconnected nodes. Each node is a perceptron (an algorithm for supervised learning of binary classifiers). In a multi-layered perceptron (MLP), perceptrons are interlinked in layers. The input layer receives input patterns while the output layer contains classification according to which input patterns may get arranged. There are hidden layers present that fine-tune the input sets until the neural network’s error percentage reaches its lowest. A simple neural network is shown in Figure 1.

7. Machine learning

Machine learning is a part of artificial intelligence that allows the system to learn on its own.

![A simple neural network](image-url)

Fig. 1. A simple neural network
It is based on the observations, data, or instruction either with or without human intervention and observes patterns in previous decisions and thus provides optimum results or approach towards a problem.

For example, machine learning algorithms are used by various companies to study previous market trends to predict future sales and new innovative ways to rise up their sales.

4. SECTORS OF ARTIFICIAL INTELLIGENCE

1. Genetic programming

Just like humans evolved, the fittest genes mutated over multiple generations to evolve the human race. Similarly, inspired form the human evolution, genetic programming executes an algorithm that performs random mutation, crossovers, over multiple generations to find a solution for the user-defined task.

2. Data mining

Data mining is a process in which a large chunk of raw data is turned into a useful set of information by the help of AI algorithms which looks up for patterns or trends in the data, filter it out, and brings in a clean set of useful information.

3. Pattern recognition

Pattern recognition is a process in which a machine-learning algorithm is used to classify and sort large databases on the basis of information previously obtained or statistical records based on certain patterns present in the data.

4. Expert system

An expert system simulates the decision-making ability of a human expert. These systems are designed to take complex decisions, act the way that experts would have acted through complex reasoning algorithm and using if-else structures.

5. IMPLEMENTATION OF AI

Case study 1- A baby that’s not real

Mark Sagar, CEO of soul machines, has made a software called “baby X” a software that mimics her own 2-year-old daughter. This software uses replicates the human brain of a 2-year-old with the help of neural networks that works the same way our brain does. Instead of neurons, nodes are created in these networks. Each time the baby learns somethings more nodes are formed. It’s very much similar to our human brain where more the neurons are present, the smarter the person is. The software instead of using scripted information, Baby X learns from each day’s events just like a baby. It uses object recognition to differentiate among objects, a thing that we naturally. It analyzes various features that differentiate things like a car and a human. It also uses affecting computing a develop a stress system for the baby i.e it cries when it’s scared and laughs when it’s happy, through perception, through conversation. So each time it interacts, new nodes form and it learn some sort of speech.

Case study 2- A paralyzed player who can speak

Tim Shaw, a former NFL player had ALS (amyotrophic lateral sclerosis) which killed almost all of his neuron muscles making him completely bedridden and even made difficult for him to even speak.

Project Euphonia has created an algorithm that not only understands and speak words said by such people but to also give them their original voice. It’s done with the help of voice recognition. The voice recognition algorithm converts speech into waveforms. These waveforms, with the help of machine learning, are labeled along with millions of other such waveforms. Then using deep learning modules it produces output sound using rules such as grammar and syntax, predicting each being spoken. All these process all performed on millions of voice samples to make the software learn better.

Using this algorithm, Tim was able to hear his own voice after years. Even though the speech output wasn’t 100% accurate but still it was start.

Case study 3- A climber with a bionic limb

Hugh Herr, professor at MIT, made bionic limbs for his mountain climbing friend who lost his limbs some years back. What made these limbs different from the synthetic one is the feeling of having the limb as a part of him, and not as a tool. This is done by linking muscles in pairs, so when a he thinks to move his leg a signal is sent directly to his bionic limb in such a way that not only helps move but also sends signals to his neurons with a sensation of moving his leg. This is done using machine learning algorithm that interprets data taken form actions of neurons and thus imitating the same to send and receive electrical signals to the brain. This is shown in Figure 2.

Case study 4- Meat that’s not meat

NotCo. is a company that’s using AI to make people think they are eating meat when actually they are not. And not only meat but also various dairy products like milk etc. This is achieved with the help of genetic programming, which studies and understands the DNA of various products to understand their
qualities, how they look, how they taste. Then through various algorithms, it mixes different DNA’s traits to recreate the taste of the product as it originally had.

**Case study 5- Looking for life out there**

Every minute space research facility is fed with data in terabytes. Such a huge chunk of data is impossible to infer by a human and thus comes in AI. AI along with machine learning algorithm analyzes the data to look for patterns and look for something that doesn’t look natural or usual. It takes large data to stack them up and then compares to find a difference. This pattern recognition is shown in figure 3.

![Pattern recognition using AI](image)

**Fig. 3. Pattern recognition using AI**

### 6. CONCLUSION

In this way Artificial Intelligence can achieve great discoveries and advances for humanity due to its multiple possibilities. A number of case studies have been discussed here which provides great possibilities for future research. Most artificial intelligence systems have the ability to learn, which allows people to improve their performance over time. The evidence suggests that AI can provide real value to our lives. AI bases its operation on accessing huge amounts of information, processing it, analyzing it and, according to its operational algorithms, executing tasks to solve certain problems. This paper not only made comparison between different AI technologies but also raised a number of questions for future search as well. Due to the new computing architectures of the cloud, this technology becomes more affordable for any organization.

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Can Virtual Reality Substitute for an Actual Reality?

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Abstract: Innovations and new technologies are changing the world and our everyday lives. Many things that were barely imaginations of the past are now a reality. Gradually, these various technologies are being combined to provide us with services and amenities. And most of the time a computer is the heart of such integration. One such technology is Virtual Reality which is a combination of advanced mechanisms.

Virtual Reality is a technology based on computer which assimilates specialized input and output devices by allowing the user to interact with and experience an artificial created environment as if they were in the real world[2]. By artificially stimulating our senses, our bodies become tricked into accepting another version of reality. Digital mechanisms are used to help generate the realistic images, sounds and other sensations that represent and simulate a user’s physical presence in this environment[5].

1. INTRODUCTION

Virtual Reality induces targeted behavior in an organism by using artificial sensory stimulation, while the organism has little or no awareness of the interference [6].

There are four key components of Virtual Reality:

1) Targeted behavior: Virtual or Artificial Environment that the organism is experiencing. Examples include flying, walking, exploring, playing sports and socializing with other organisms.

2) Organism: This could be any human being or animal.

3) Artificial sensory stimulation: Through digital mechanisms, one or more senses of the organism become co-opted, at least partly, and their inputs are replaced by artificial stimulation.

4) Awareness: While having the experience, the organism is completely unaware of the outer world, thereby being “fooled” into feeling present in a virtual world. This unawareness results in a sense of presence in an alternative world. It’s accepted as being natural [2].

2. NEED AND APPLICATIONS OF VIRTUAL REALITY

With the growing advancements in technology, needs and preferences of people have changed. Virtual Technology being one of the most prominent and efficient technologies has been preferred by many as it has made the human life simpler and easier.

Some of the growing needs of virtual reality are as follows:

1) Military

Militaries of countries like US, UK have adopted the use of VR in their training as it allows them to get trained under virtual safe environment and replaces dangerous training situations.

2) Sports

VR is heavily used in sports industry by both players and viewers. It’s used by players as an aid for training for analyzing athletic technique and performance. It’s used by viewers to stream live games and to enhance viewing experience.

3) VR in Healthcare

Medical VR is used to reduce chronic pain which shortens the duration of stay in hospital. VR is used to treat anxiety, depression and phobias. Patients are treated in a safe, controlled and virtual environment to help them overcome their fears. It is also becoming one of the primary methods to treat post-traumatic stress.

4) Education

VR has been adopted for teaching and educating Students. They are able to experience and interact in a 3D Environment. It’s used to teach student with special needs such as autism.

5) Entertainment

The Entertainment Industry is the most enthusiastic consumer of Virtual Reality specially the gaming industry. Gaming Industry uses VR which are enabled with interactive software and hardware. VR games are experienced and controlled by body movement which enables the user to immerse in the virtual world.

3. DEVICES USED FOR VIRTUAL REALITY

- Head Mounted Display
- Haptic Suits
- Voice Recognition
• Cave Automatic Virtual Environment (CAVE)
• Gloves
• 3D Mouse
• Space Ball
• Video Camera And Shadows
• Biological Sensors

**HEAD MOUNTED DISPLAY**

A head-mounted displays (HMD) also referred to as VR Glasses are a display device, which are worn on the head like a helmet, that has a small display optic in front of one (monocular HMD) or both eyes (binocular HMD). Its use in gaming, aviation, medicine and engineering. HMD are the primary components of virtual reality headsets.

**CAVE AUTOMATIC VIRTUAL ENVIRONMENT (CAVE)**

A cave automatic virtual environment (CAVE) is a virtual reality arena in which walls, ceilings or floor of an empty room are used to create an immersive virtual reality space. Rear Projection screens are used to make the walls of the CAVE. People use Gloves, Joysticks, Wands and other input devices to interact. With CAVE users can see objects floating in the air and can even walk around them as they get a proper view of whatever they are experiencing.

**HAPTIC SUITS**

A haptic suit or a gaming suit is a wearable gadget that provides haptic feedback to the body. Haptic feedback is the sense of artificial touch created by applying forces or vibrations.

It creates a complete immersive virtual environment and let users feel it.

4. **CHALLENGES**

As we know, nothing interesting is ever completely one-sided. Virtual Reality also has its share of disadvantages. It has technical, social and cultural challenges. These challenges can be minimized if proper measures are taken.

Some of the challenges are:

• **Social Impact**

There are many concerns expressed regarding the negative impact of VR towards society. Users who play VR Video Games may become less sensitive because of violent games and may show similar behavior in real world.

• **Human Sensory Limitations**

It is important for designers to understand the design constraints which are there because of human sensory and motor physiology.

Many issues can impact the design like Visual Perception, Auditory Perception, and Haptic and Kinesthetic Perception.

For Auditory Perception audio should be realistic, Haptic Sensation (touch) is linked to stimuli exposure, all these things should be taken care of by the designers otherwise it may have negative impact.

• **Direct micro/macroscopic Effect**

Sometimes Health and safety of users may get compromised while using VR and can also lead to injuries. Developers should ensure advancement but not at the cost of human lives. Brain needs to work more while experiencing VR which can cause dizziness, fatigue and nausea. It sometimes leads to imbalance in body movements and may cause injury.

• **Cyber Sickness**

Cybersickness is a kind of a motion sickness and discomfort caused by using virtual reality technology. VR games involve a lot of movements and might create imbalance in the body.

5. **CAN VIRTUAL WORLD REPLACE OUR REALITY?**

As the technology is advancing day by day, we people are getting habitual of newer technologies. Technologies which were impossible or unimaginable decades ago now seem pretty trivial[9]. These days no one can imagine life without laptops, smartphones or Internet. Virtual Reality is one such technology. Virtual Reality is an artificially generated reality. Just by putting headphones on, a person can get into virtual world, a world which feels like real. Virtual Reality creates a convincing world for the user to immerse in.

VR may develop more and provide a more realistic experience to people but there some things which it simply can’t replace like eating, sleeping, etc. Physiological needs of the body can neverbe simply replaced since they are the ones that make living possible[17]. The use of Virtual Reality is only going to increase in the future but it replacing actual reality seems impossible.

6. **CONCLUSION**

Future of Virtual Reality depends upon the attitude and belief towards science and the breakthroughs in technological development. It also depends upon the interest and acceptance of general population as adjusting to life with VR is different. It doesn’t matter how much better VR gets but reality is always there to remind you that it’s there.

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Can Virtual Reality Substitute for an Actual Reality?


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Abstract: Artificial intelligence (AI) can be described as a veritable area of computing related with building smart machines which are capable of performing tasks that typically require human intelligence. AI is, basically, an interdisciplinary science with multiple approaches. In simple terms AI can be defined as a computer system able to accomplish tasks that ordinarily require human intelligence.

According to "Preparing for the Future of Artificial Intelligence, "a 2016 report released by the Obama Administration, AI, with its focus on performing specific tasks, has experienced numerous breakthroughs in the last decade that have had significant societal benefits and have contributed to the economic vitality of the nation, " [1] A world bereft of the wonderful things like Google search, Image recognition software, Siri, Alexa and other personal assistants is unthinkable. Self-driving cars and IBM's Watson are some of the well known examples of artificial intelligence being employed for human advancement. In the present paper an attempt has been made to highlight the benefits of Artificial Intelligence in education.

“If we teach today as we taught yesterday, we rob our children of tomorrow”.

John Dewey

“Robots will replace teachers by 2027” (Anthony Seldon, British Education Expert.)

The research field of Artificial Intelligence in Education (AIED) embraces a wide diversity of research interests [2]. Over the years there have been various reforms in the education system the world over bringing significant changes in the way the teachers and learners approach education. The role of a teacher is no more restricted to the delivery of course contents to the students and to secure good grades in the exam but is way beyond and above that. A teacher is expected to be a mentor to all the students, the one who is able to offer guidance to the students and motivate them, inculcate values facilitating them to come to terms with the meaning of life and to guide them to be better citizens. With the advent of AI, a revolutionary change in the teachers’ role and their approach to teaching is likely. It is a widely believed fallacy that robots will replace the teachers soon. But the question arises about the viability of this presumption and the when and how of it. Can robots be the facilitator and mentor like a teacher or will they only be helping in the teacher in the delivery of their course content and extending help in administrative tasks.

In the present paper an attempt has been made to highlight the benefits of Artificial Intelligence in education.

AI has already been applied to education primarily in some tools that help develop skills and testing systems. Various learning apps are popular now a days that provides global and easy access to learning. These apps also ensure that the learners get a suitable learning experience based on their capabilities.

As AI educational solutions develop, it is hoped that AI can help fill need gaps in learning and teaching.

Recently, a survey was conducted by McKinsey [3] to understand how teachers are spending their time today and how that might change in a more automated world. More than 2,000 teachers in four countries with high adoption rates for education technology: Canada, Singapore, the United Kingdom, and the United States were surveyed. The survey was conducted to know how much time did teachers spend on 37 core activities, from lesson planning to teaching to grading to maintaining student records. It was found that only 49% of the total time is spent on direct interaction with the students. Even in developed and technology advanced countries, majority of the time is being spent on other related work.

AI can drive efficiency, personalization and streamline admin tasks to permit teachers the time and freedom to supply understanding and adaptability—uniquely human capabilities where machines would struggle. By leveraging the simplest attributes of machines and teachers, the vision for AI in education is one where they work together for the simplest outcome and leaving more time with teachers for interacting with the students.

Artificial intelligence can benefit in the teaching-learning process in the following ways:

A) Universal access for all students:

Artificial intelligence tools can help make global classrooms available to all or any including those that speak different languages or who may need visual or hearing impairments. Presentation Translator may be a free plug-in for PowerPoint that makes subtitles in real time for what the teacher is saying. This also exposes...
Artificial Intelligence in Education: The Journey So far and the Future Prospects

B) Automate Administrative Tasks

AI can computerize basic activities in education, like grading system and assignments tasks. In education, grading homework and tests for a teacher requires a lot of efforts and consumes a lot of time of the teacher. It is assumed and believed that AI would help the teachers in grading the assignments and tasks and can save a lot of time of a teacher which can be used for more productive work and in building better teacher student relationship. The time saved can also be used for the professional development.

C) Students can get additional support from AI tutors.

AI is expected to bridge the gaps between education and learning and will also provide additional support to tutors.

D) AI-driven programs can give students and educators helpful feedback

AI can't only help teachers and students to design courses that are tailored to their needs, but it also can provide feedback to teachers and students about the success of the course. Some schools, especially those with online offerings, are using AI systems to watch student progress and provides feedback to the faculty coordinator about the problems being faced by the teachers.

E) AI can make learning less frightening

It is expected that AI will provide a judgement free learning environment to the students and will result in providing the best support to the students.

AI could change the role of teachers. There will always be a task for teachers in education, but what that role is? Teachers will supplement AI lessons, assist students who are struggling, and supply human interaction and hands-on experiences.

In some ways, technology is already driving a number of these changes within the classroom, especially in schools that are online or embrace the flipped classroom model. Some of the problems and solutions offered by AI are:

<table>
<thead>
<tr>
<th>Problems</th>
<th>AI Solution</th>
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<tbody>
<tr>
<td>Standardized curriculum does not cater to individuals needs</td>
<td>Personalized learning</td>
</tr>
<tr>
<td>Large class sizes means children’s questions often go unanswered</td>
<td>Virtual classroom assistants</td>
</tr>
<tr>
<td>Increasing drop out rates at universities</td>
<td>AI sentiments analysis</td>
</tr>
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</table>

Source: EduTechAsia@Terrapinn

Artificial intelligence is changing the teaching-learning process in education. Teaching methods across the world is being revolutionized as per the change in technology and environment. AI is expected to meet the changing need and will provide more structured education system to offer better and to have rationalized results. It is also going to have a significant impact on the jobs in teaching field. A study states that by 2021, the appliance of AI in education and learning will increase by 47.5%. Beyond academics, it also can streamline students’ career choices [4].

7. CONCLUSION

The future of higher education is intrinsically linked with developments on new technologies and computing capacities of the new intelligent machines [5]. The World Economic Forum estimates that, by 2022, an outsized proportion of companies will have adopted technologies like machine learning, and thus strongly encourages governments and education to specialize in rapidly raising education and skills, withattention on both STEM (science, technology, engineering and mathematics) and non-cognitive soft skills, so as to satisfy this impending need. Microsoft’s recent study shows that, by 2030, students will got to have mastered two facets of this new world by the time they graduate - know the way to utilize ever-changing technology, like AI, to their advantage and understand the way to work with people during a team to problem solving effectively, preparing students to figure alongside [7]. Technology giants like Apple, Google, Microsoft and Facebook currently compete in the field of artificial intelligence and are investing heavily in new applications and research [8].

The learning environment for learners isn’t, nowadays, restricted to the boundaries of classrooms. With the advent of technology, learners can learn anytime anywhere. Various learning apps are offering a variety of courses targeting almost every age group of learners. Universities also have various approved courses on their platter through such platforms ensuring global access to education for all. Anyone can learn anytime. India, which will have over 907 million internet users by 2023, accounting for 64% of the population, according to Cisco’s Annual Internet Report, is going to be a major beneficiary of AI augmented learning [9].

In future we may face threats, we will probably experience cases where teachers are replaced by AIED solutions (2). This clearly indicates that online learning or learning through artificial intelligence will soon become indispensably necessary for a country of millions of learners like India and it, arguably, will be a major tour de force throughout the world in near future.
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Abstract: Machine learning is a trendy topic in this age of Artificial Intelligence. The fields of computer vision and Natural Language Processing (NLP) are making breakthroughs that no one could’ve predicted. We see both of them in our lives more and more, facial recognition in your smartphones, language translation software, self-driving cars and so on. What might seem sci-fi is becoming a reality, and it is only a matter of time before we attain Artificial General Intelligence. Machine learning is an integral part of many commercial applications and research projects today, in areas ranging from medical diagnosis and treatment to finding your friends on social networks. Many people think that machine learning can only be applied by large companies with extensive research teams. The applications of machine learning are endless and, with the amount of data available today, mostly limited by your imagination.

In this paper, I will be covering how ML will progress towards the future and why Python is widely used to develop ML models.

1. INTRODUCTION

In the early days of “intelligent” applications, many systems used hand-coded rules of “if” and “else” decisions to process data or adjust to user input. Think of a spam filter whose job is to move the appropriate incoming email messages to a spam folder. You could make up a blacklist of words that would result in an email being marked as spam. This would be an example of using an expert-designed rule system to design an “intelligent application. Manually crafting decision rules is feasible for some applications, particularly those in which humans have a good understanding of the process to model. However, using hand-coded rules to make decisions has two major disadvantages:

- The logic required to make a decision is specific to a single domain and task. Changing the task even slightly might require a rewrite of the whole system.
- Designing rules requires a deep understanding of how a decision should be made by a human expert.

One example of where this hand-coded approach will fail is in detecting faces in images. Today, every smartphone can detect a face in an image. However, face detection was an unsolved problem until as recently as 2001. The main problem is that the way in which pixels (which make up an image in a computer) are “perceived” by the computer is very different from how humans perceive a face. This difference in representation makes it basically impossible for a human to come up with a good set of rules to describe what constitutes a face in a digital image. [1]

Using machine learning, however, simply presenting a program with a large collection of images of faces is enough for an algorithm to determine what characteristics are needed to identify a face. From suggesting keywords whenever we type a word in our smartphones keyboard to the big multinational corporations like YouTube using machine learning algorithms to suggest similar videos, ML is used in almost every imaginable aspect of our life.

Netflix Cor., said in a press interview that their Machine Learning algorithm saves them billions of dollars every year and helps in maximizing profits. According to a study, the figure was more than $86,000,000,000!!

Machine learning is an application of artificial intelligence (AI) that provides systems the ability to automatically learn and improve from experience without being explicitly programmed. Machine learning focuses on the development of computer programs that can access data and use it learn for themselves.[2]

The process of learning begins with observations or data, such as examples, direct experience, or instruction, in order to look for patterns in data and make better decisions in the future based on the examples that we provide. The primary aim is to allow the computers learn automatically without human intervention or assistance and adjust actions accordingly. [4]
Machine learning algorithms are often categorized as supervised or unsupervised.

Supervised machine learning algorithms can apply what has been learned in the past to new data using labeled examples to predict future events. Starting from the analysis of a known training dataset, the learning algorithm produces an concluded function to make predictions about the output values. The system is able to provide targets for any new input after sufficient training. The learning algorithm can also compare its output with the correct, intended output and find errors in order to modify the model accordingly.

Unsupervised machine learning algorithms are used when the information used to train is neither classified nor labeled. Unsupervised learning studies how systems can deduce a function to describe a hidden structure from unlabeled data. The system doesn’t figure out the right output, but it explores the data and can draw conclusion from datasets to describe hidden structures from unlabeled data.[3]

![Machine learning](image)

Fig. 2.

Machine learning enables analysis of massive quantities of data. While it generally delivers faster, more accurate results in order to identify profitable opportunities or dangerous risks, it may also require additional time and resources to train it properly. Combining machine learning with AI and cognitive technologies can make it even more effective in processing large volumes of information.

2. CONCEPTS AND MODELS

As in the previous section, we learnt about the supervised and unsupervised learning patterns.

In this section, we’ll learn about the models and approaches used in ML. Other than the supervised and unsupervised learning, there are following learning patterns:

- Self learning
- Feature learning
- Sparse dictionary learning
- Anomaly detection
- Association rules

Self-Learning: Self-learning as machine learning paradigm was introduced in 1982 along with a neural network capable of self-learning named Crossbar Adaptive Array (CAA). It is a learning with no external rewards and no external teacher advices. The CAA self-learning algorithm computes, in a crossbar fashion, both decisions about actions and emotions (feelings) about consequence situations.

Feature Learning: Several learning algorithms aim at discovering better representations of the inputs provided during training. Classic examples include cluster analysis. Feature learning algorithms, also called representation learning algorithms, often attempt to preserve the information in their input but also transform it in a way that makes it useful, as a pre-processing step before performing predictions.

Sparse Dictionary Learning: Sparse dictionary learning is a feature learning method where a training example is represented as a linear combination of basis functions, and is assumed to be a sparse matrix. The method is difficult to solve.

Anomaly Detection: It is also known as outlier detection. It is the identification of rare items, events or observations which raise suspicions by differing significantly from the majority of the data. Typically, the anomalous items represent an issue such as bank fraud, a structural defect, medical problems or errors in a text. Anomalies are referred to as noise, deviations and exceptions. In particular, in the context of abuse and network intrusion detection, the interesting objects are often not rare objects, but unexpected bursts in activity.

3. MODELS IN MACHINE LEARNING:

Performing machine learning involves creating a model, which is trained on some training data and then can process additional data to make predictions. Various types of models have been used and researched for machine learning systems. We’ll learn about the most widely implemented one i.e., Neural Networks. [6]

Artificial neural networks

Artificial neural networks (ANNs), or connectionist systems, are computing systems vaguely inspired by the biological neural networks that constitute animal brains. Such systems "learn" to perform tasks by considering examples, generally without being programmed with any task-specific rules.

An ANN is a model based on a collection of connected units or nodes called "artificial neurons", which loosely model the neurons in a biological brain. Each connection, like the synapses in a biological brain, can transmit information, a "signal", from one artificial neuron to another. An artificial neuron that receives a signal can process it and then signal
additional artificial neurons connected to it. In common ANN system, the signal at a connection between artificial neurons is a real number, and the output of each artificial neuron is calculated by some non-linear function of the sum of its inputs. [7]

- The connections between artificial neurons are called "edges".
- Artificial neurons and edges typically have a weight that adjusts as learning proceeds.
- The weight increases or decreases the strength of the signal at a connection.
- Artificial neurons are aggregated into layers.
- Different layers may perform different kinds of transformations on their inputs. For e.g., Signals travel from the first layer (the input layer) to the last layer (the output layer), possibly after traversing the layers multiple times.

The original goal of the ANN approach was to solve problems in the same way that a human brain would. However, over time, attention moved to performing other tasks as well. Artificial neural networks have been used on a variety of tasks, including computer vision, speech recognition, machine translation, social network filtering, playing board games and medical diagnosis.

4. LANGUAGES USED IN ML

- Python leads the pack, with 57% of data scientists and machine learning developers using it and 33% prioritising it for development. Little wonder, given all the evolution in the deep learning Python frameworks over the past 2 years, including the release of TensorFlow and a wide selection of other libraries. Python is often compared to R, but they are nowhere near comparable in terms of popularity. The prioritisation to usage ratio for Python is at 58%, the highest by far among the five languages, a clear indication that the usage trends of Python are the exact opposite to those of R. [9]

- R comes fourth in overall usage (31%) and fifth in prioritisation (5%). This means that in most cases R is a complementary language, not a first choice.

- C/C++ is a distant second to Python, both in usage (44%) and prioritisation (19%).

- Java follows C/C++ very closely.

- JavaScript comes fifth in usage, although with a slightly better prioritisation performance than R (7%).

- Other languages used in machine learning, including the usual suspects of Julia, Scala, Ruby, Octave, MATLAB and SAS, but they all fall below the 5% mark of prioritisation and below 26% of usage. [8]

**Why Python?**

Although, there is no such thing as a ‘best language for machine learning’ and it all depends on what you want to build, where you’re coming from and why you got involved in machine learning. But there are certain aspects to the point which weighs in favour of Python.

Python has become the holy grail for many data science applications. It combines the power of general-purpose programming languages with the ease of use of domain-specific scripting languages like MATLAB or R. Python has libraries for data loading, visualization, statistics, natural language processing, image processing, and more.

This vast toolbox provides data scientists with a large array of general- and special-purpose functionality. One of the main advantages of using Python is the ability to interact directly with the code, using a terminal or other tools like the Jupyter Notebook.

Also, Machine learning and data analysis are fundamentally iterative processes, in which the data drives the analysis. It is essential for these processes to have tools that allow quick iteration and easy interaction. [9]

As a general-purpose programming language, Python also allows for the creation of complex graphical user interfaces (GUIs) and web services, and for integration into existing systems.

In the image given below, we can clearly see why developers choose Python over other languages.
5. CONCLUSION

The basis of machine learning is hard to implement easily for beginners without Python. Even for data scientists, it provides a plethora of libraries to use and implement on different aspects of technological problems.

The Deep Learning frameworks in the Python are implemented everywhere nowadays. Scikit, Pandas, Matplotlib help in creating graphical and logical data with good GUI.

In fig.4, we already have seen the prioritization of Python by developers and data scientists. It’s because of the tools and libraries that Python supports

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Abstract: In the past few years, eSports has become one of the most popular forms of entertainment in the world, rivalling traditional sporting events like the NFL Super Bowl to the MLB World Series. The eSports industry has seen tremendous growth over the years both in terms of viewership and revenue. eSports is also experiencing growth in several other aspects, which are interrelated in one way or another. At the pace of the growing eSports scene is the need and dependency for data science and data scientists. Just as data analytics is helping golfers, athletes, F1 teams, football clubs and cricketers improve their performance, eSports is well-placed to follow suit. The winning strategy and the analysis of past performance are the secrets to success depending on data and eSports is overflowing with it. For data engineers, data scientists and game analytics, eSports is becoming a hot spot for data science.

In eSports, there is access to both real-time and historical data about any action taken in the virtual world. This aspect motivates the research presented here, the question asked being: can the information buried deep in such data, unavailable to the human eye, be unlocked and used to improve the live broadcast compilations of the events?

1. INTRODUCTION

Electronic video gaming has extended from being a hobby into a serious sport and business. Recently, eSports officially became a medal event in the 2022 Asian Games. There’s been an explosive growth in eSports popularity over recent years, fuelled by games specifically designed with online competition.

According to Business Insider, the eSports industry is estimated to generate over $1 billion of revenue for the first time in history in 2019. The increase in revenue originates from the growth of investments, advertisements, and media coverage that the eSports scene has built over the last decade. The key eSports contributors in the revenue are League of Legends, Overwatch, Fortnite, and Super Smash Bros. Newzoo estimated that by 2022, the eSports market will be approaching roughly $1.8 billion. With more accelerated growth, this number could increase to over $3 billion by 2022.

Along with funding, one of the factors that contribute to the growth of eSports is the consistent growth in viewership for eSports competitions.

The relation between data science and eSports is very vital to the gaming ecosystem. Similar to game analysts and sports, data is essential to understanding how to optimize gameplay. By using large samples of data, data analysts are able to discover different strategies, techniques, and gameplay that optimize results to ensure victory. After every game, data is gathered and sorted, which can then be analysed and broken down step-by-step.

2. KEY DATABASE PLAYERS

Mobalytics is one of the largest databases dedicated to League of Legends and other games developed by Riot Games such as Team Fight Tactics. This database contains different beginner guides to getting started, top team compositions, characters with the highest win rates, and more. Other popular gaming websites like OP.GG, Overbuff.com, and even more also provide player statistics for gamers all over the world. These websites have become an integral part of optimizing gameplay.

3. AI AND ESPORTS

AI and eSports are divided into 3 different perspectives:

- **AI playing gaming sports themselves:** Gamers have been pitting their wits and skill against computers since the earliest days of video games. The levels of difficulty were pre-programmed, and at a certain point in the game, the computer was simply unbeatable by all but the most gifted gamers. AI Gaming companies want to develop smarter AI bots that would compete against each other in an effort to grow smarter and more competitive.
DeepMind’s AlphaGo used some surprising tactics while playing against Lee Sedol, world’s best Go player. A similar discovery of new tactics and strategies can happen in eSports.

CSGO has a ‘6th man’ setup where an observer advises the players on their strategies. An AI bot can instead replace the ‘6th man’, a form of ‘Augmented advising’. Teams will have to augment the bot’s recommendations into their gameplay. Teams who do this well will be the winners. Since a lot of machine learning algorithms are democratized there won’t be a situation where teams are unfairly matched.

- **Game analytics platforms**: These platforms provide the insights and details about the players and their gaming behaviour and tactics.
  - Shadow,g is a Counter-Strike analytics platform and its creators claim will cause a significant leap in how eSports professionals currently approach preparing for a match by giving fast and easy access to a large number of in-game statistics for any match in the platform’s library.
  - NXTAKE, an advanced CSGO analytics, is built by former daily fantasy sports professionals. NXTAKE is a leader in eSports analytics and broadcast augmentation. The company is focusing to provide real-time analysis, coupled with live streams.

- **Data science in the gaming industry** focuses to manage the business side of the games as products. Data science is utilized for various aspects in eSports industry:
  - Targeting new gamers using data analytics
  - Competitive game pricing
  - Improving gameplay experience
  - Game analytics to improve gaming infrastructure
  - Analysing competitors

4. **BIG DATA, DATA SCIENCE AND ESPORT**

Data analytics has already become economically relevant in eSports, and its impact on the sector is going to increase. Data collection, aggregation, and analytics leads to highly scalable business models, especially in a dynamic digital industry.

Competitor and performance analysis is central to professional eSports preparation. This involves players watching and analysing their opponents’ gameplay, strengths and weaknesses before tournaments and trying to use this information in key moments during a game. AI-supported analytics tools analyse hundreds of data points harvested from digitally recorded games. They provide significant statistics, identify weaknesses of competitor players and teams, and predict the likelihood of an opponent’s next move in any given situation. Data analytics services in eSports are highly valuable to players and their coaches, and to the betting industry.

5. **DATA AVAILABILITY**

eSports introduce a set of interesting changes to content production and delivery that sets them apart from traditional sports. In eSports, live broadcast and on-demand content is almost exclusively delivered online, via video-platforms such as Twitch and YouTube. Many eSports titles also deliver live and on-demand matches as raw data streams that capture every aspect of the virtual world, such as the movement of the players. On the PC of a viewer, this data can be reassembled to create an interactive view of the match in which spectators can change camera angles, rewind, and interact with virtual objects. Match data also contains many statistics, timings and other additional layers of information that are not usually visible to the eye. Using specialised tools, such data can be extracted and translated into audience-facing content, such as graphs and statistics, enhancing the viewing experience.

In eSports, the utilization of data and statistics has particular potential to benefit coverage and to help mainstream audiences enjoy and extract meaning from watching professional eSports. Compared to many traditional sports, gameplay in eSports can be much more complex, making it hard for non-expert viewers to follow the action.

eSports data is often publicly available, and in terms of its detail and volume rivals even the most data-rich traditional sports, such as Formula One. The data-rich ecosystem surrounding eSports has attracted attention by a series of work in the area of Game Analytics, the practice of extracting insights from data generated through digital games.

6. **KEY APPLICATION OF DATA SCIENCE IN ESPORTS**

- **Game Development**: The primary application of data science in gaming for the development process of game process. Insights gained from gaming data are utilized for the idea of game, its functionality, and design play a critical part in keeping the player engaged and interested in playing.
  - Data science is utilized to build models, to analyse and identify optimization points, make predictions and empower machine learning algorithms, identify patterns and trends to guide service maps and improve gaming models.

- **Game Monetization**: This is an essential factor in the general increase in revenues. There are three substantial models of video games subscription: pay-to-play, free-to-play, and freemium. In any case, Big Data analytics tools help make sure the game is profitable.
  - The data is used for predictions on behaviour and optimization of games in such a way that players will
come back again and will be ready to pay money for playing.

- **Game Design:** Gaming data insights along with the developers' creativity help to create an interactive and complex scenario for the games. The insights from the gaming analytics are utilized to obtain the specific knowledge of what the player wants, to predict the gaming bottlenecks, reasoning, and timing. New game concepts, storylines, and mechanics are designed using the data gained previously.

- **Object Identification:** Object identification models and algorithms are used to identify body movements in order to transmit and reflect these actions on the screen for interactive games.

- **Visual Effects & Graphics:** Modern video games developers try to use advanced algorithms to push the visual boundaries of the game. Real-time rendering techniques are used for this purpose. Photogrammetry, in its turn, involves taking photographic data and converting into engaging, realistic digital models.

- **Personalized Marketing:** Personalized marketing in gaming helps to increase the activity of the users and at the same time attract new ones. Data mining allows marketers and game developers to focus on highly targeted interaction with customers and leads by creation of meaningful marketing messages and delivering them to proper people.

- **Fraud Detection:** Various solutions for verification of the players are widely applied in gaming. These techniques allow detecting doubtful accounts and action at early stages. Moreover, these techniques are used to avoid identity theft, which is quite widespread in the virtual world of gaming.
  - Application of machine learning allows identification of suspicious activity and makes fraud detection more automated and efficient due to the amount of data they can process.

- **Social &Customer Analysis:** It allows the video industry to get customers insights into their attitude towards the brand and predict customers purchase decisions and brand loyalty.
  - The interaction between players often results in the creation of separate social communities based on competition and interest in achieving the same goals. Customer data, in its turn, contains feedbacks along with the data that helps to segment the audience and tailor the product better.
  - This interaction between multiplayer online networks often results in the creation of separate social communities based on competition and interest in achieving the same goals.

- Other major applications include identifying team encounters in eSports data, predicting match outcome, identifying factors that determine success in professional play, as well as recommender systems that help players make better tactical decisions.

7. **CONCLUSION**

eSports teams want to gain the edge over their competition as they practice and develop strategies, while operators want to provide more enhanced viewing experiences and better regulation. New ways of analysing the Big Data that are generated by the matches, giving a deeper understanding of how teams play and what information streams fans demand. Data scientists are developing more advanced forms of tracking and analysing match information on the cloud, the introduction of more sophisticated tools for players and casters, and cross-collaboration on data analysis research projects.

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PingMe- a mobile App with a Difference

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Abstract: Social networking has been the need for every human being on this earth. With the advent of Web 2.0, the Internet usage for social networking purpose has been made possible. There is a wide presence of many Apps already in the market with various useful and interesting features but the need was felt to develop an App that has features of Parental control so as to know the emotion and sentiments that prevail in a chat along with the knowledge of gender and age group of the contact person. In addition to these features, the next level of security that includes Biometric authentication, Identity Protection, Intruder Alert and Hide App Icon have been added in this app to make it stand different from rest of the Apps in the market.

Keywords: Mobile application, Parental control, Security features, Google firebase, Android studio

1. INTRODUCTION

Over the recent years, we have seen a spike in the download and usage of messaging and social media apps. This category has maintained its grip on every smartphone used and it continues to grow. People first started using messaging apps to communicate with each other without actually having to call. This is the dawn of the era where people spend a lot of time on their phones communicating rather than going out and actually meeting up with people. As the years pass by, people expect the messaging apps to be more and more secure. With every new messaging app hitting the market, they bring something new to the table and the previously popular apps get inspired to inculcate those features to retain the users who switch platforms every time a better one comes along.

There are several highly successful and popular messaging apps currently in the market, like WhatsApp, Telegram, Hike, and some social media platforms which added messaging features after the boom in the area, like Instagram, Facebook and Twitter.

Both Whatsapp and Telegram are [1][2] strong contenders of the messaging world. Both of them serve the basic purposes of a communication medium, i.e., sends and receives messages, media and documents in real-time. The additional features that are common to both the apps are- gifs, stickers, audio message, image editor, cloud sync, internal media player, live location, passcode lock, voice calls and web/desktop versions. Although Telegram has some more additional features that make it more secure than WhatsApp. It allows sending messages through usernames when the mobile number is not shared.

The features of Messaging services are inbuilt in some applications like Instagram, Twitter and Facebook Messenger[3][4][5] and provide an ease of communication even on the social media platforms. These messaging activities are generally used to share the data from the same platform, for example, sharing Instagram post from your account to your friend’s account without the help of any third-party messaging application. Although these activities provide a connectivity to people on the same app, they lack other features that are found in any mainstream messaging application. Table I gives a comparison of features offered by various popular social networking websites [6]. As can be observed from Table I that PingMe app developed in this research work offers very important parental control features viz. finding sentiment of the chat, prediction of the age and gender of the person with whom chat was done. Such features are not offered by any other app in the market. The paper is organized as follows: - Section II explains hardware and software requirement of this app, section III explains the structure of the database, section IV elaborates the new features of the app, finally section V explains the conclusions and future scope.

2. SOFTWARE AND HARDWARE USED

ANDROIDSTUDIO and GOOGLEFIREBASE have been used to create this app for android. PingMe works for android devices with android version 9.0 and above.

ANDROID STUDIO

Android Studio was announced on May 16, 2013 at the Google I/O conference [7]. It was in early access preview stage starting from version 0.1 in May 2013, then entered beta stage starting from version 0.8 which was released in June 2014. The first stable build was released in December 2014, starting from version 1.0. The current stable version is 3.5, was released in August 2019.

The motive of the company was to develop an advanced operating system which can be used in digital cameras, but when they realized that the market required for that was not
large enough to capture, and they diverted their efforts in producing the operating system similar to Symbian and others. Software development kit consist of debugger, libraries, documentation, sample code, tutorials, emulator which run has some default handset devices profiles [8].

**GOOGLE FIREBASE**

Google Firebase is a Google-backed application development software that enables developers to develop iOS, Android and Web apps[9]. Firebase provides tools for tracking analytics, reporting and fixing app crashes, creating marketing and product experiment.

Firebase offers a number of services, including: Analytics, Authentication, Cloud messaging, Real-time database, Crashlytics, Performance, Test lab [10]. The software used to develop and test is Android operating System (9.0 and above) and requires a minimum of 512 MB RAM.

PingMe was tested on android phones of various screen size and specifications having the android version of 9.0 or above.

3. **STRUCTURE OF DATABASE**

All Firebase Real-time Database data is stored as JSON objects[11]. The database has an appearance of a cloud-hosted JSON tree. Unlike a SQL database, there are no tables or records. When data is added to the JSON tree, it becomes a node in the existing JSON structure with an associated key. We can provide our own keys, such as user IDs or semantic names, or they can be provided by using childByAutoId. Therefore, the Entity Relation Diagram and Data Flow Diagram cannot be created for a JSON tree.

In the ‘chats’ node shown in Fig. 1, all the messages sent through the app are stored under a unique key generated automatically. This key is unique for every message and every message creates a new child node under ‘chats’. Each message is stored with date, seen status, delivered status, message body, sender, receive and time. All the above data is stored for each and every message ever sent.

![Fig. 1. Chats node of PingMe](image1)

In the ‘users’ node, shown in Fig.2, every user registered is given a unique key to encrypt the email ID used to register. Each registered user is saved as a new node to the ‘users’ node. This node then contains the unique ID of the user, Image URL for profile picture, date and time the user is registered and the username is shown on the app.

**Fig. 2. Users’ node of PingMe**

4. **FEATURES**

Apart from utility features, there are some unique features of this app, related to Security and Parental control. These are explained below:

**Security Features**

1. **Biometric Authentication:** PingMe uses fingerprint authentication every time you need to access the app to provide an additional layer of security[12] apart from the existing phone lock. The fingerprint is matched with the fingerprint used to set up the mobile lock. This authentication works even when the mobile fingerprint is disabled after logging the prints in the system. The fingerprint authentication will be blocked for 1 minute if a wrong fingerprint is used to access the app.

2. **Identity Protection:** PingMe never asks for your mobile number so that you can chat with just the username. This secures the identity of the user over the internet. At the time of registration, PingMe asks for a valid email address so that intruder alert can be sent.

![Fig. 1. Chats node of PingMe](image2)
3. **Intruder Alert:** While logging into PingMe, you need a password associated with an existing email id. When a wrong password is entered for your account, you will receive an intruder alert on your email id you used to register with the details of the device that was used to log into your account.

4. **Hide App Icon:** PingMe allows the users to hide the app icon from the app drawer by the click of a button. The button will direct the user to the phone dialer and a code (**11##**) would be pre-inserted that needs to be dialed to hide the app. The app icon will show when the user enters another code (**22##**) into the dialer.

**Parental Control**

1. **Sentiment Analysis:** With PingMe, a user can understand the sentiment of the complete chat with just one click[13]. PingMe uses a trained model to analyze the sentiment of the chat and categorize them into positive, Negative and Neutral.

2. **Gender and age analysis:** PingMe can also predict the age and gender[14][15] of the person a user is talking to with 95% accuracy rate. These models are trained using blogs written by various men and women of different age groups.

**Utility Features**

1. **Text Translation:** PingMe can translate a message [16] received into a preferred language chosen by the user.

2. **Reminder:** PingMe also allows the users to set in-app reminders for the day.

3. **Works on multiple devices:** PingMe can be used to log into different devices with one same account.

5. **CONCLUSION**

The application has been completed successfully. The system is designed as it was decided earlier in design phase. The project gives good idea on developing a user-friendly application which satisfies different users’ needs. The uniqueness of this app lies in providing features like sentiment of the chats, knowing gender and age group of the person with whom chat has been done. This gives a very important facility to parents to get insight into the type of chats and knowledge about the person with whom chatting has been done.

This application has a user-friendly screen that enables the user to use the PingMe without any inconvenience. Validation checks induced have greatly reduced errors in PingMe. Provisions have been made to upgrade the application. The application has been tested with live users and has provided a successful result. Hence the application has proved to work efficiently.

The system created met its objectives, by being simple to use, is easy to download from app store. This software is developed with scalability in mind. Additional modules can be easily added when necessary. However, there is still a lot of scope for future improvement and add on in functionality.

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### TABLE I: Comparison between different messaging apps

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<th>Features</th>
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<th>Telegram</th>
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<th>Twitter</th>
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<tr>
<td>Multiple devices</td>
<td>yes</td>
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Study of Code Optimization Techniques

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Abstract: This paper proposes to gives an insight on the code optimization. It includes the various reasons for optimization of code and how it can be implemented using various techniques. It also lists the main factors that can affect the code optimization of a given program. The emerging application areas of all the various code optimization techniques are also listed.

1. INTRODUCTION

In general, optimization refers to the changes or improvements made in any task or process to reduce the time taken for it to complete, make it easier to understand or reduce the cost (if any). Primary focus while doing optimization is to keep the output and its after effects exactly the same as the non-optimized version of the task.

Now in terms of code, when we talk about optimization of a code or a program, we optimize it in a way so that the lines of code is reduced (in some cases some extra code may be written to increase efficiency), the program executes faster than before, takes less time to finish execution and take less storage. Code readability might be compromised after optimization because the extra blank spaces in the code may be removed to reduce lines of code. This optimization can be done manually or with the help of few optimizer softwares.[1]

2. NEED FOR OPTIMIZATION

We need to optimize the code of a program so that it has following benefits-

- Increased speed of execution- An optimised code uses less resources and takes less time for generating output saving both time and system resources.
- Easy debugging- An optimised code is easy to analyse, test and debug which speeds up the code development process.
- Easier code maintenance- When we have an optimised code, we understand the complete coding thoroughly and fixing any errors or making changes becomes easier.
- Better code readability- With reduced lines of code and redundancy the code we get after optimization is better readable.
- Modifying and improving the existing code- When we use a pre-existing code it becomes easier to work on it and modify it if it is highly optimised.
- Better workflow management- Easy to divide responsibilities in code development among workforce if it is simple, well-written and optimised.
- Constant innovation- When we have the most efficient version of the code in hand, we can focus on the new approaches and innovation without constantly worrying about any errors or changes in the code.

3. FACTORS AFFECTING OPTIMIZATION

- The machine itself- Different machines require different optimization techniques because they have different specifications. Available system resources play an important part in calculation of execution time of a program.
- System architecture- More the no. of CPU registers and memory references, faster the speed of execution.[6]
- Type of use- Optimization of code depends on the way the code is intended to be used.
  - Debugging- The code is generally not optimised during the debugging phase as it will only complicate the debugging process and confuse the developers.
  - General Use- The code is optimised in such a way that it can run efficiently in a general machine having common and popular configurations.
  - Special Use- The code is optimised differently for special uses on user-specific systems for example, the same code may be optimised to run just fine on a low specification system to perform any task but highly optimised for research purpose on high end systems.

4. TECHNIQUES OF CODE OPTIMIZATION

Code optimization techniques can be divided on two main basis. One, on the level of optimization being it low-level or high-level. Second, on its dependency on the machine.[1]

- The low-level optimization techniques are very specific to the design of the machine. These can be further divided into many subparts:
  - Register Allocation- It refers to the assignment of the huge number of program variables to the CPU registers. This makes their access faster and hence optimize the code. It can be performed on a simple block where it is known as local register allocation or on a complete function code called as global register
allocation or around the function boundaries which is traversed by call-graph called as the inter-procedural register allocation.[2]

- Instruction Scheduling- It is mainly used to enhance the instruction-level parallelism which in turn upgrades the performance of machines with an instruction pipeline. It mainly tries to rearrange the code to avoid the pipeline stalls and avoid the semantically incorrect operation calls. It can be a local scheduling ie., the code cannot be relocated outside the block boundaries or global scheduling in which the code can be relocated outside the block boundaries. Other forms include modulo scheduling, Trace Scheduling and Superblock scheduling. [4]

- Branch Prediction- It refers to an architectural property which provides the compiler a different path to transfer the control and implement the instructions. It mainly works by executing both the parts and then allowing the actual execution of that alternative which does not modify the architectural state.[3]

Some other low level optimization techniques include peephole and profile-based optimization which is executed on small code sections and make them faster and floating-point units optimization that allows the execution of floating point operations in an efficient manner.

- The intermediate optimization techniques are very specific to the language the code uses. These include:[1]
  - Elimination of general subexpressions – It basically checks the expressions which return the same value and then works to find out if it would be beneficial to replace them with a single variable that directly hold the same value and use the same at every place.
  - Constant Propagations- This is very similar to the elimination of general subexpressions. The only difference is that it evaluates the value of the expression at the compile and automatically replaces it everywhere without checking its need.
  - Dead code elimination- As per the name, dead code elimination means the removal of the code that does not affect the result and execution of the program which reduces the size and in turn the execution time also gets reduced.
  - Strength Reduction- In this process, a costly expression is replaced by an economical one. For example, in case a multiplication operation is being performed in a loop, it is replaced by addition being an addition is faster and economical and multiplication is repeated addition itself.

Other methods include jump threading and loop invariant code motion.

- High Level Code Optimization is also language dependent type of optimization. This optimization works in proximity with the source code of a program. It inlines the code of a function call which is the replacement of the function call by function body. It also includes the loop reordering, array alignments, padding and much more.

### Machine independent-

In this we try to optimize the code of a program irrespective of the platform. Focus is on reducing the lines of code by removing unnecessary dead codes, conditions, loops, function calls etc which are not getting used in any test cases.

### Machine dependent-

The code is optimised according to the machine on which it will be used. It involves understanding of the machine CPU registers and memory references. The code is changed in a way so that it maximises the utilisation of system resources and hence increasing the efficiency of the code and resources.

#### 5. APPLICATIONS OF CODE OPTIMIZATION

Some of the various applications of code optimization include:[5]

1. Industrial Engineering and Manufacturing Systems- In the real world scenario, manufacturing industry requires an optimized method to produce a product that is exact in all terms. For the manufacturing process to be fast and accurate we need an optimized code to execute in the machines that will manufacture goods at a faster pace and with exact dimensions.

2. Engineering Design- Designing plays a crucial role in engineering. If a design created by the CAD machine is optimized then the result will be precise. The optimised conversion of a 2D models to real world machines is a vivid application of code optimization.

3. Multi criteria Design Making – While creating a design which has multiple conditions to be executed to get a perfect outline, we need the backend code to be the most optimised and accurate.

4. Operations and Supply Chain Management- To determine an optimum ordering policy and current stock status, a software requires an optimized code that calculates the result the fastest.

5. Genetic Engineering- Extraction of DNA, replication of cells and many more operations on the genes can only executed efficiently only when the code is optimized.

#### 6. CONCLUSION

It can be concluded that code optimization is a very useful process which when done correctly can enhance a code’s efficiency significantly. Optimization can be used in future applications as well as the already existing ones.
Earlier applications or programs were heavy on system resources when code optimization didn’t exist, but with today’s advancements and researches in code optimization, it is possible to create the lite versions of those heavy applications and run smoothly on low end systems.

REFERENCES


5G Next Generation Mobile Wireless Technology: A Review

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Abstract: Wireless technology is differentiated on the basis of their range. Some offer connectivity within few feet’s viz. Bluetooth and other cover medium sized office space. The mobile phone covers whole continents. Wireless technology offer e-commerce more flexible and in-expensive ways to send and receive data.

The ability to communicate with people on move has evolved remarkably, since Guglielmo Marconi, first demonstrated radio ability to provide continuous contact with ships. The mobile wireless evolved in a very short span of time. In this paper, we will throw light on evolution of mobile Wireless Communication Networks along with their significance and advantage of one over the other.

In few past decades, the mobile wireless evolution progressed from Zero Generation (0G) to First Generation (1G), Second Generation (2G), Third Generation (3G), and now Fourth Generation (4G) systems are being deployed with the aim Quality of Service (QoS), efficiency and performance. Mobile wireless technology has reached to 4G or 5G of Technology. 1G technology made large scale mobile wireless communication possible. Digital communication has replaced analog technology in 2G which significantly improved wireless communication. Voice communication was main focus in 3G technology, and converged networks for both voice and data communication was main focus in 3G technology, and converged networks for both voice and data communication is emerging.

Currently 5G term is not officially used. In 5G researches are being made on development of World Wide Wireless Web (WWWW), Dynamic Adhoc Wireless networks (DAWN) etc. In buildings or crowded areas, using 5G will help improve the speed of data downloads, while in outlying areas, 4G seems to be the only option.

Keywords: wireless communication, LTE, 5G.

1. INTRODUCTION

Mobile wireless industry has started its technology creation, revolution and evolution since early 1970. From Mid 1990’s the cellular communication industry has witnessed explosive growth. Wireless communication networks have become much more pervasive than anyone could have imagined when the cellular concept was first deployed in 1960’s and 1970’s. Mobile cellular subscribers are increasing 40% per year, and by the end of 2010 there will be 4 times more mobile cellular subscription than fixed telephone lines. The rapid worldwide growth in cellular telephone subscribers has demonstrated conclusively that wireless communications is a robust, viable voice and data transport mechanism. The wide spread success of cellular has led to the development of newer wireless system and standards for many other types of telecommunication traffic besides mobile voice telephone calls. Why we use wireless communication Wireless technology are differentiated on the basis of their range. Some offer connectivity within few feet’s viz. Bluetooth and other cover medium sized office space. The mobile phone covers whole continents. Wireless technology offer e-commerce more flexible and in-expensive ways to send and receive data. The four key benefits of wireless technology are as under: - 1. Increased efficiency: - High technology communication systems lead to faster transfer of information within business and between customers. 2. Rarely out of touch: - No need to carry cables or adapters in order to access office Networks. 3. Greater flexibility for users: - Wireless workers in the office can be networked without sitting at dedicated PC’s. 4. Reduced Cost: - Wireless networks are mostly cheaper to install and maintain than wired networks.

2. LITERATURE REVIEW

A vast body of publications is relevant for 5G and more articles come out every month. Therefore, the literature selected in this section is restricted to very recent popular magazine level articles and selected white papers. More specifically, IEEE Communications Magazine has issued a two-part feature topic on 5G in February and May 2014, respectively, and the papers therein are briefly summarized here. A. Overview of IEEE Communications Magazine Feb. 2014 5G Section Paper [4] challenges us to rethink relationship between energy and spectral efficiency (EE vs. SE). Co-design of these should be important part of 5G research. The ideal future system should have EE improvement for each SE point, larger win-win and smaller EE-SE trade-off region and smaller slope in EE-SE trade-off region. No more cells is another statement that suggests 5G to shift from cell-centric thinking towards soft user and C-RAN centric designs. The third point
is to rethink signaling and control mechanisms for diverse traffic types. As the fourth aspect [4] introduces the concept of invisible base stations. It covers the deployment of massive MIMO in the form of irregular antenna arrays where antenna elements can be embedded into the environment (thus making base stations virtually invisible). Finally, full duplex radio is proposed as one useful technology component for 5G. Similarly to the previous article, Boccardi et al. in [5], list five disruptive viewpoints toward 5G. Conventional base station based cellular structures (up/downlink, control/data channels) are expected to give way to more agile device-centric architectures where diverse nature of traffic and network nodes can be handled better. Additional broad bandwidths are available in millimeter waves and should be taken into use. Massive MIMO has potential for 5G as it is scalable technology at node level and enables new deployments and architectures. Devices are getting more intelligent and that should be reflected both at node and higher architectural level. As an example, D2D connectivity and mobile device caching have implications on 5G system design. An integral part of 5G should also be natural support for machine-to-machine (M2M) communication where the number of connected devices can be extremely large and high reliability and low latency are required. 5GNOW project’s vision on 5G waveform design is reflected in [8]. The idea is to loosen the synchronism and orthogonality requirement by design and allow a controllable amount of waveform crosstalk. The resulting multi-carrier waveforms have some competitive edge over well-established OFDM technology. Lower end of the frequency spectrum has already been reserved to a large extent for various legacy systems. Therefore, broad contiguous bandwidths are only available at high center frequencies, e.g., millimeter waves. Reference [9] delves into millimeter-wave beamforming and its feasibility as a candidate technology for 5G. In addition to the theoretical prospects, prototyping status is reviewed so that practical aspects of millimeter-wave communications become addressed as well.

3. A NEW ERA

A. It’s not Just about the speed

In 2015, the ITU set about planning the target goals for 5G to address the deficiencies of 3G and 4G standards that are in use today. In addition to vastly improving the existing cellular voice and mobile broadband capabilities of these network standards, the ITU listed a number of goals to address several new needs driven by:

1. The huge increase of data volume (x1000)
2. The massive increase of the number of connected devices (x10-100)
3. The large diversity of use cases and their performance requirements
   a. x10-x100 typical user data rate
   b. x10 longer battery life for machine to machine communication
   c. x5 reduced end-to-end latency

Let’s take a closer look at these new use-cases which have ignited the design of the upcoming 5G standard, and consider the promises, as well as the challenges ahead.

When we think about the advancement from 2G to 3G, and more recently to 4G, the first “benefit” that comes to mind is speed. 5G, however, won’t simply be about faster speeds. 5G is also set to support IoT devices that will have varying demands in terms of reliability, low latency and real-time communications.

How 5G Works As any other cellular network, 5G networks will consist of cells divided into sectors and send data through radio waves. Each cell is connected to a network backbone through a wired or wireless connection. 5G may transmit data over the unlicensed frequencies currently used for Wi-Fi. It promises a smarter, faster, and efficient network. The goal of 5G is to have far higher speeds available, at higher capacity per sector, and at far lower latency than 4G. In order to increase network efficiency, the cell is subdivided into micro and pico cells [6]. 5G will be a new mobile revolution as it is expected to provide gigabit-per-second data rates anytime, anywhere. In a 5G wireless network, every mobile phone will have an IPv6 address depending on the location and network being used. 5G utilizes user-centric network concept World Wide Wireless Web (WWW) instead of operator-centric as in 3G or service-centric as in 4G [7]. WWW will be capable of supporting applications and services and interconnected the whole world. 5G includes the latest technologies such as cognitive radio, Internet of things, nanotechnology, and cloud computing.

Recent research published by Darrell M. West, vice president and director of Governance Studies and founding director of
the Centre for Technology Innovation at Brookings, highlights four factors which will distinguish 5G from its predecessors: connected devices, fast and intelligent networks, back-end services, and extremely low latency. These qualities will enable a fully connected and interactive world with a variety of applications, including new possibilities in terms of health care, such as imaging, diagnostics, data analytics and treatments.

Darrell describes a 5G world where “real-time health services will become the norm rather than the exception”, bringing patients “closer to a science fiction concept of digital integration than ever before”.

B. Internet of things

The internet of things (IoT) promises to create a global network of billions of data-collecting machines and mobile devices. Transmitting and processing all of the data in the rapidly growing IoT will require new wireless infrastructure with enhanced capabilities. In a new paper, Darrell West, vice president and director of Governance Studies and founding director of the Centre for Technology Innovation at Brookings, discusses how fifth generation (5G) wireless technology will provide the backbone for IoT that greatly improves data transfer speeds and processing power over its predecessors. This combination of speed and computing power will enable new applications for mobile technologies, especially in health care. Rather than travelling to a doctor or specialist for expensive medical treatments, IoT allows patients to receive care nearby and in real time. Health IoT has the potential to improve outcomes by expanding access to medical treatments and reducing the cost to patients and taxpayers.

5G networks will combine numerous wireless technologies, such as 4G, Wi-Fi, and millimeter wave technology to push mobile connection speeds over 100 megabits per second. Instead of point-to-point communications provided by legacy mobile networks, 5G will move packets of data following the most efficient path to their destination. This shift enables real-time aggregation and analysis of data, moving wireless technology from communication to computing. On-demand cloud computing and network function virtualization both decrease the cost of creating services that leverage 5G technology. The advent of 5G will expand networks far beyond computers and smartphones to include everything from driverless cars to medical devices.

4. SHAPING THE FUTURE OF HEALTH CARE

5G networks open up new avenues for the delivery of health care. Instead of bringing patients to a doctor for treatment, 5G networks can connect patients and doctors from across the globe. Connecting more medical devices to IoT will enable doctors to monitor patients without the need for costly in-patient care. Digital imaging can be sent anywhere in the world for analysis, expanding access for patients who live far away from health care providers and lowering the cost of getting a second opinion. Wearable devices, much like the already-popular fitness trackers, can transmit vital statistics to doctors and alert them to changes immediately. In addition to expanding treatment options, IoT will provide medical researchers with more data on how diseases impact individuals so they can customize treatments to specific cases.

The barriers to the rollout of 5G networks are not merely technological; regulations must also pave the way for faster networks that do not compromise privacy and security. As industry groups agree on technical standards for new wireless technologies, telecommunications regulators like the Federal Communications Commission must free up new wireless spectrum. Meanwhile, the addition of medical devices to IoT will require the Food and Drug Administration to evaluate their effectiveness for treating patients. Finally, health insurance reimbursement rules must be changed so that in-patient care is not privileged over telemedicine. Combining new technologies with appropriate regulations will unleash the potential of 5G to lower costs and improve outcomes in health care.

We can expect a new generation wearables for tracking heart health and fitness, diagnostics for proactive patient care, powerful data analytics and more. Just imagine a world where a patient’s condition can be assessed and treatment can be administered via wearable devices. Imagine a time when a patient’s data can be transmitted to a doctor on the other side of the world, who can then administer the treatment a patient needs — and even deliver a medication through the device itself. It’s not far off.

The transition from 4G to 5G presents several transformational challenges which must be tackled to fully realize the 5G vision. There are challenges faced with the new technologies enabling 5G. There are also challenges with the integration of this technology to provide services in different application scenarios. Some have criticized 5G for its high projected cost and that it is incompatible with the previous generations. Just as 2G phones could not connect to 3G or 4G networks, 3G and 4G phones will not connect to a 5G network. One is forced to buy a new phone which is likely to be more expensive than 4G/LTE service. To address these challenges, we need a drastic change in the design of cellular architecture. We also need to meet 5G system performance requirements such Mfentocells, stringent latency, network scalability, very long battery life, and green communications. It is a challenge to satisfy these requirements and minimize costs at the same time.

5. SMART VEHICLE TRANSPORT AND INFRASTRUCTURE

C. 5G-connected cars

When cars can share data, maybe they’ll act in unison and drive themselves safely enough for us humans to sit back and daydream. But the car-to-car chat would have to occur at data transfer speeds a lot faster than those our pokey 4G cellular service can muster.
The necessary 5G cellular technology was demonstrated for the first time at a BMW race track near Inchon, in South Korea. Two BMWs shared information with the human drivers; in a future, self-driving setup, such sharing of data might allow cars to coordinate actions almost instantaneously.

The purpose-built 5G network covered 240,000 square meters (59 acres, or about half the size of Vatican City) according to SK Telecom, the South Korean company that installed it along with Sweden’s Ericsson. The back-and-forth communication had less than a millisecond of latency, par for the course for a system with a peak transmission rate of 20 gigabits per second.

Each car had a 5G station of its own, through which on-board cameras could upload ultrahigh-definition video for displaying to an audience. The cars were from the X5 and the S7 series (the first production vehicle to park itself driverless, as IEEE Spectrum reported in April).

The coming of 5G is keeping the idea of cellular car-to-car connections alive. It may even end up driving a stake through the heart of alternative wireless schemes—notably dedicated short range communications, or DSRC, based on IEEE 802.11p. That’s the system upon which Europe’s Cooperative ITS Corridor, from Amsterdam to Vienna, is now being built.

6. CONCLUSION

5G is the next “G” or “Generation” of wireless networks. It will let more data move at higher speeds with lower latency and ultra-reliability, and it will be essential in supporting the billions of connected devices—everything from smart buildings to internet-connected wineries.

The whole system must work in tandem, and each piece requires a significant amount of compute power and data synthetizations. The accumulated collected data enables them to absorb and learn from aggregated experiences and environments.

Again, it’s too soon to say for sure, but don’t count on it in the next couple of years. The most optimistic targets would see the first commercial network up and running by 2020, but even that may be too optimistic. As with LTE, it will take years for the network to become widespread.

REFERENCES

Role of Social Media for Brand building among Students of 21\textsuperscript{st} Century

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Abstract: Social Media has become prominent part of everyone’s life. Different types of social media application are there and each portrays different aspect of human personality. Social Media has both positive and negative effect on personal psychology. Social Media if wisely used provides very fruitful results. This article studies few celebrities who have achieved fame using Social media as brand building tool. The paper discusses how we can use Social Media as a platform for personal brand building. We can harness the power of Social Media, reach masses and build our own image.

1. INTRODUCTION

Social Media are Interactive Web 2.0 Internet-based applications.

User-generated content, such as text posts or comments, digital photos or videos, and data generated through all online interactions, is the lifeblood of social media. Social networks like Facebook, Twitter and YouTube have rapidly become a part of many people’s everyday lives, especially for the generations who have grown up with so much technology at their fingertips.

According to BrandwatchSocial media statistics [1] as of Dec 2019, total worldwide population is 7.8 billion. The internet has 4.54 billion users. There are 3.725 billion active social media users

On average, people have 7.6 social media accounts.

The average daily time spent on social is 142 minutes a day91% of retail brands use 2 or more social media channels81% of all small and medium businesses use some kind of social platform

Some of the most popular Social Media Sites:

Facebook: It is the largest social networking site in the world and one of the most widely used. Apart from the ability to network with friends and relatives.
You can also access different Facebook apps to sell online and you can even market or promote your business, brand and products by using paid Facebook ads. Number of active users per month: 1.59 billion approximately

WhatsApp: Despite having been acquired by Facebook in 2014, this instant messaging platform exists as an independent entity. It arrived on the scene much later than Facebook but has been able to capture the imagination of millions of people across the world by giving them the ability to communicate and share instantly with individuals and groups.Number of active users per month: 1 billion approximately

Tencent QQ: Tencent QQ (more popularly known as QQ) is an instant messaging (chat-based) social media platform. It became international (with more than 80 countries using it), after it was launched in China.
It even has a built-in translator to translate your chats. Number of active users per month: 853 million approximately

Tumblr: Having been owned by Yahoo since 2013.Tumblr serves as a social media cum micro blogging platform that can be used to find and follow things that you like. Number of active users per month: 555 million approximately
**Instagram**: Instagram was launched as a unique social networking platform that was completely based on sharing photos and videos. This photo sharing social networking app thus enables you to capture the best moments of your life. Number of active users per month: 400 million approximately

**Twitter**: This social networking site enables you to post short text messages (called tweets), containing a limited number of characters, to convey your message to the world. Number of active users per month: 320 million approximately

**Pinterest**: This is a photo sharing and visual bookmarking social media site or app that enables you to find new ideas for your projects and save them. So, you can do DIY tasks or home improvement projects, plan your travel agenda and so on by using Pinterest. Number of active users per month: 100 million approximately

**LinkedIn**: LinkedIn is one of the most popular professional social networking sites or apps and is available in over 20 languages. It is used across the globe by all types of professionals and serves as an ideal platform to connect with different businesses, locate and hire ideal candidates, and more. It boasts over 400 million members. Number of active users per month: 100 million approximately

**Quora**: Executives can use Quora to demonstrate their industry expertise, build their credibility and elevate their personal brand. Try to answer questions, leave comments and upvote others' answers at least three days a week. Focus on positioning yourself in one niche so people will know what to expect and want to follow you. Gain exposure by asking insightful questions that resonate with people.

**YouTube**: YouTube is the world's largest video-sharing social networking site that enables users to upload and share videos, view them, comment on them and like them. This social network is accessible across the globe and even enables users to create a YouTube channel where they can upload all their personally recorded videos to showcase to their friends and followers. YouTube's platform allows you to create your own channel and post videos to build your personal brand.

**Impact of Social Media on Today's Generation**

**Digital World and Children**

In today’s day a child knows more about the digital world than the parents. They are active on social networking sites, uploading things like videos, pictures or even comments, downloading music and other files, chatting on various messengers and more.

**The Negative Effects of Social Media on Teenagers**

- Cyberbullying
- Sleep Deprivation
- Lower Self Esteem
- Social Isolation
- Poor Concentration
- Decreased activity
- Internet addiction
- Talking about social media use is the best way to protect your child and ensure his/her internet safety.
- Work out how he/she wants to behave and be treated by other people online.
- Understand the risks involved in using social media – for example, risks like being tagged in an embarrassing photo taken at a party.
- Understand the dangers involved in sharing content and personal.
- Learn what to do if people ask for personal details, are mean or abusive online, post embarrassing photos, or share information that links back to child.

**Setting up Social Media Guidelines**

**Using Social Media**

- When it’s OK to use social media and how long your child can spend on social media.
- Whether it’s OK to use social media during homework time, family meals and so on.
- Where it’s OK to use social media – for example, only in family areas of the house, not bedrooms.

**Posting content and comments**

- It’s important for your child to agree to:
- Not uploading or sharing inappropriate messages, images and video or oneself or others.
- Being cautious about the information that child shares
- Being a responsible digital citizen by showing respect in posts and when sharing content – for example, if it’s not OK to say or do something face to face, it’s not OK online.
Looking at Positive Side of Social Media

• Ensures better Engagement
• Enhances Communication Speed
• It Finds Out Connection Between Detachment
• Builds Productive Relationship
• It Helps To Boost The Participation Of The Communities
• It Builds Confidence
• It Helps To Fight Depression
Helps People To Identify Themselves

People Can Realise Potential

Teachers And Students Are Benefitted A Lot From Social Media

One Can Use It for Noble Cause

It Benefits The Mental Health

It Is A Path To Save Lives

According to a 2018 Career Builder Survey[2] : 70% of employers use social media to screen candidates during the hiring process.

43% of employers use social media to check on current employees.

Benefits of a strong personal brand

• Stand out from the crowd: Personal branding allows you to distinguish yourself from everyone else and become more visible.
• Increased credibility: Having a personal brand can really help you boost your credibility and showcase your expertise within your industry. It can set the path for you to become a leader in your field.
• Increase your confidence: The first step in personal branding is to look deeply at yourself and discover your greatest qualities and passion. This can be a real confidence boost.
• Become more connected: By showcasing yourself in a certain light, you’ll be able to reach and connect with likeminded professionals.

Some Successful Stories Personal Branding via Social Media

Sarah Cooper

Sarah Cooper [4] is a former Google employee turned writer/comedian. Before she had a personal website, she had her infamous blog, The Cooper Review, which she syndicates on Medium.

In 2013, her blog post about meetings went viral, which led to a three-book deal:

• How to Be Successful Without Hurting Men’s Feelings
• 100 Tricks to Appear Smart in Meetings
• Draw What Success Looks Like

She built her comedy career in between working for companies like Yahoo! and Google, where she was fed free lunches and lots of material.

Aja Frost

Aja Frost[5] freelance wrote her way through college. Her writing has been featured literally everywhere you can imagine online.

Today, she’s a senior SEO strategist at HubSpot, where she’s worked since graduating a few years ago.

Aja’s site is also simple but impressive because she features logos from very well-known media outlets and brands she’s worked with.

Jasmine Star

Jasmine Star[6] is a photographer, so her photos are high quality, but her highlights don’t just show the facets of her life—they teach, too. Star is also a business strategist, and she offers easy-to-try tips for entrepreneurs through her posts and her bio. She regularly writes captions that are longer than 300 words, and she speaks very deliberately to her audience, which is a critical element of personal branding.

Personal Branding

‘Personal branding’ is simply building a brand around your career and personal name. It’s all about marketing yourself as an expert in your given industry, which is why people should trust you and your opinions.

Everything you do or say online helps to form your very own personal brand. In turn, your personal brand forms the building blocks of your professional reputation – and that’s why you need to take it seriously. We’re all our own brands.

According to Zarkada, Anna [3] Personalbranding is a new marketing concept related to the marketing strategies that a person adopts in order to promote his or her major personal characteristics. Personal branding is heavily used by celebrities’ politicians, and people who look for social integration, support or uniqueness.

The personal branding phenomenon is a relatively new phenomenon for western societies, lately studied by sociologists as well as marketers. As a new social phenomenon and marketing construct, the academic marketing literature examining it is still under-developed. The present paper aim to present a literature review of the popular press and academic marketing perspective and attempts to define the construct and set a research agenda to identify the variables of the personal branding construct.
Steps to build your own personal brand on social media:

- Choose your areas of expertise.
- Think about consistency.
- Post regularly.
- Create your own content.
- Make connections with others.
- Choose your platform
- Who is your target audience?
- Which social media platforms do they use?
- Options include: Blogging, Wordpress, LinkedIn publishing platform, etc.
- Microblogging sites: Twitter, LinkedIn, Facebook, Google+, etc.
- Video & audio sites
- YouTube, podcasting, SlideShare
- Image posting
- Instagram, Pinterest, Twitter

2. CONCLUSION

Personal Branding talks about yourself on the social media. A strong personal brand is not about how long you’ve been building it, but how well you’ve been doing it. Like a great pair of shoes, it must: make you feel powerful and happy, good fit, feel good and tell a story. Today’s generation spends plenty of time on social media, they must utilize it as platform to make a brand for themselves.

REFERENCES


Abstract: Change is the need of hour for endurance in all areas. Climate is the most complicated subject the world is facing. The world has seen much focus on economic progress, the side effects of this, has resulted in climate alteration, environmental harm. The banks can play key role linking economic growth as well as environmental defense. The banking of this type is named as Green Banking. The notion of green banking was developed in the western countries. Green Banking was officially started in 2003 amid a sight to protecting the environment. Then the Equator Principles (EPs) were instigated. These are the financial trade benchmarks for deciding, considering as well as managing environmental as well as social risk in projects. It ways combining technology as well as changing punter habits in banking commerce. Green banking practices will be valuable not merely for environment but also direct to cost cutbacks in banking activities. To lessen the external carbon emissions, bank must finance green know-how as well as pollution reducing projects. Green banking is a part of green initiative taken by stakeholders to save environment. This paper has made an effort to highlight equator principles, opportunities, challenges as well as payback of green banking.

Keywords: Equator Principles, Green Banking, Financial Establishments, Banking Sector, Commerce

1. INTRODUCTION

Today “Go Green” is the mantra of every country to defend the environment as well as conserve the innate resources. Green Banking is any form of banking from that the country as well as nation gets environmentally benefits. A conventional bank becomes a green bank by directing its core operations toward the betterment of environment. The banking zone can play a liaison role between economic growth as well as environment safety by promoting environmentally sustainable as well as socially responsible investment. [1] The Equator Principles (EP) is a framework used by financial establishments to determine access as well as manage environmental and social risk in projects.

Large infrastructure as well as industrial Projects can have adverse blows on people as well as on the environment. As financiers as well as advisors, they work in partnership amid their clients to identify access as well as manage environmental as well as social risks as well as blows in a structured way, on an on-going basis. Such collaboration promotes sustainable environmental as well as social performance as well as can lead to improved financial, environmental as well as social outcomes. Equator Principles Financial Establishments (EPFIs) have accepted the Equator Principles in order to ensure that the Projects we finance as well as advise on are developed in a manner that is socially responsible as well as reflects sound environmental management practices. It recognises the importance of climate change, biodiversity, as well as human rights, as well as believes negative blows on project- affected ecosystems, communities, as well as the climate must be avoided where possible.

The EP’s are accepted as well as applied voluntarily by what’s known as “Equator Principles Financial Establishments”, or EPFIs. More than 100 EPFI’s in 38 countries have officially accepted the EP, covering the bulk of international project finance liability amid in developed as well as appearing markets. The fourth review inform of the Equator Principles was accepted in November 2019. Amendments as well as fresh assurances were made related to human rights, climate change, native people as well as biodiversity. The extent of the EPs has also been extended to capture more project-related transactions.

ING was one of the 10 first accepters of the EP in 2003 as well as was one of the process coordinators for the fourth review update. We acted as chair of the Steering Committee in 2012—2014, where we played a key role in finalizing its second assess update. We actively advocate as well as enforce the EP, as we recognize their ability to positively contribute to society.

2. APPLYING THE EQUATOR PRINCIPLES

As an Equator Principles Financial Establishment (EPFI) we don’t present project finance or project-related corporate loans to clients that are unable to or choose not to comply amid the principles. We also implement the EP in our internal environmental as well as social policies, procedures as well as standards. These are embedded in our ESR Framework, as well as entail involvement of the following three banking areas:
1. Front Office: The departments that originate transactions as well as have direct contact amid clients or sponsors.

2. Risk Managers: The departments that provide control over Front Office activities as well as generally can sign off on the environmental as well as social blows for ‘low-risk’ EP deals.

3. Environmental as well as Social Risk: The dedicated department amid in risk management that assesses environmental as well as social blows associated amid ‘high-risk’ transactions.

4. If these blows are inevitable they must be minimised, mitigated, as well as/or offset.

   • The Equator Principles—a global benchmark for sustainable project finance—were created 15 years ago for this fresh era.

   • They have made it possible for “real bankers to speak together profits as well as social benefits,” says Graham Sinclair, Principal at Sustainable Investment Consulting LLC.

   • The consequences, he believes, have transformed the one-time status quo

   “The Equator Principles have altered the mode the commerce of global project finance is conducted in appearing market. The Equator Principles are the best practice that place environmental, social, as well as governance issues inside every deal.”

   • Their position as financiers affords opportunities to promote responsible environmental stewardship as well as socially responsible development, including fulfilling our responsibility to respect human rights by undertaking due diligence in harmony amid the Equator Principles.

Equator Principles at a Glance

• 2003- Equator principles created.

• 1994- Financial Establishments officially accepted the Equator principles.

• 80% of project finance transactions in appearing economies have accepted Equator principles.

• 2013- Equator Principles are updated to reflect International Finance Corporation Performance standards.

Convincing a Sceptical Audience

• As the Equator Principles have become the most tested as well as applied global target for sustainable project finance, they continue to sway the growth of responsible commerce standards across the globe.

• The Equator Principles have become a pioneering replica for other industry coalitions in developing as well as spreading responsible commerce standards.”

• As for the original target—project financing—94 banks in 37 countries now adhere to the Equator Principles.

• This covers over 80 percent of project-finance transactions in appearing markets.

• In many of these markets, the Equator Principless set the bar above local entitlements as well as standards.

• In fact, groups are now drawing on the experience of the Equator Principles to create similar standards for stock markets as well as capital markets.

3. REVIEW OF EQUATOR PRINCIPLES (EP4) /
SUMMARY OF PROPOSED CHANGES IN EP4 DRAFT

For consultation June-August 2019

This text provides an overview of the main proposed changes between EPIII as well as the draft of EP4 – it is not meant to be a comprehensive review of all of the proposed changes, as well as we invite all stakeholders to read the full EP4 proposed text. Changes have been made in four key areas. The review focuses on four key thematic areas:

a. Scope of applicability of the EPs
b. Applicable standards in designated vs. non-designated countries
c. Human Rights as well as social risk
d. Climate change

1. Scope of Applicability

Overall, the scope of applicability remains amid the Project-related realm. The total threshold or Project-Related Corporate Loans (PRCLs) has reduced to US$50 million, where the total aggregate loan amount as well as the EPFI’s individual assurance (before syndication or sell down) meets the fresh threshold.

Project-related Refinancing as well as Project-related Acquisition Financing is added to the scope of the EPs amid the following criteria:

> The underlying Project was financed in harmony amid the EPs;

> There has been no material change in the scale or scope of the Project;

> The Project is not yet completed.

2. Applicable Standards in Designated vs. Non-Designated Countries

Principle 3 retains the list of “Designated Countries” i.e. high-income OECD countries as a proxy for governance. However, it clarifies that the EPF will assess the specific risks of the Project to determine whether one or more of the IFC Performance Standards could be applied to address those risks,
in addition to host country laws. 3. Human Rights as well as Social Risk

The Preamble states that EPFI’s will fulfill their responsibility to respect Human Rights in line amid the UN Guiding Principles on Commerce as well as Human Rights. Principle 2 strengthens language on human rights, stating that the Environmental as well as Social Blow Assessment (ESIA) included in the Assessment Documentation must include the assessment of potential adverse Human Rights blows. Two options related to ‘Free, Prior as well as Informed Consent’ (FPIC) are presented:

Option 1: For projects amid blows on indigenous peoples as described in IFC Performance standards, clients “are expected to engage in meaningful consultation amid affected Indigenous people, amid the goal of achieving their Free Prior as well as Informed Consent.”

Option 2: For projects amid blows on indigenous peoples as described in IFC Performance standards, clients “must demonstrate to the EPFI’s satisfaction, that the Free, Prior as well as Informed Consent of the indigenous peoples affected by the Project is obtained.”

4. Climate Change

The Preamble recognizes EPFI’s role in the 2015 Paris Climate Change agreement, as well as responsibilities for reporting climate-related information in line amid the TCFD recommendations.

Principle 2 introduces Climate Change Risk Assessment as entailment for certain Projects:

» For Category A as well as appropriate, Category B Projects, the climate change assessment will include consideration of relevant physical risks.

» For all Projects, in all locations, when combined Scope 1 as well as Scope 2 Emissions are expected to be more than 100, 000 tons of CO2 equivalent annually, the climate change assessment will include consideration of relevant transition risks as well as the completion of an alternatives analysis to assess less Greenhouse Gas (GHG) intensive alternatives.

The depth as well as nature of this assessment will depend on the type of Project, as well as the nature of risks, including their materiality as well as severity.

Annexure A entails clients to use the GHG Protocol or national reporting methodologies if they are consistent amid or equivalent to the GHG Protocol; specifies questions that the climate change risk assessment must address including the identification of transition as well as/or physical risks as well as mitigation efforts; as well as specifies that the climate change risk assessment must consider the project’s compatibility amid the country’s most recent relevant climate/energy policies including e.g. Nationally Determined Contributions.

4. BENEFITS OF GREEN BANKING

1. Avoids Paper Work: Paperless banking almost all banks in India are computerized or operate on a core banking solution (CBS). Thus there is ample scope for the banks to accept paperless or less paper for office communication, audit, reporting etc. these banks can change over to electronic correspondence as well as reporting thereby controlling deforestation.

2. Creating Awareness to Commerce People about Environment. [2] Many NGOs as well as environmentalists are propagating environment consciousness among the community in general by arranging attentiveness programs as well as organizing seminars etc. Banks may associate themselves by sponsoring such programs. Besides, many corporate bodies are organizing similar program in their own line of commerce such as “free pollution check program” organized by a car manufacturer. Banks may tie amid such corporate. These will help to brighten the image of the bank.

3. Loans at Comparatively Lesser Rates: Banks can also introduce green bank loans amid financial concessions for atmosphere friendly products as well as projects such as fuel efficient vehicles, green building projects, housing as well as house furnishing loans to fit solar energy system etc.

4. Environmental Standards for Lending: Banks follow environmental standards for lending, is really a fine scheme as well as it will make commerce owners to change their commerce to environmental friendly which is fine for our upcoming generations.

5. METHODS ACCEPTING GREEN BANKING

1. Online Savings Account: Online savings account as well as mobile banking is the easiest way that you can do your part to bank green as well as help the environment. [3] Green banking includes setting up direct deposit to receive your pay checks, receiving electronic statements from your bank as well as by paying bills online. All of these steps can radically reduce the amount of paper produced by your bank. Online banking as well as mobile banking is also highly effective ways to keep path of your finances as well as to avoid late payment fees. Another green banking step you can take is to suggest that the company you work for sign up for a product called “Remote Deposit”. Remote customers have to physically deliver each check to their bank to make a deposit. Remote deposits also allow banks to easily clear checks digitally.

2. Paperless Statements: Sending out bank statements by mail is a big waste of paper. Signing up for online banking at most banks includes an option for customers to obtain their statements electronically through a secure log – in. Copies of banking records as well as statements can then
be stored electronically instead of in a filing cabinet. Receiving statements electronically also reduces the possibility of identity theft.

3. **Use Direct Deposit**: Most employers will give employees the option to receive their pay check electronically. Not only does this speed up the availability of your money as well as save you a voyage to the bank, it saves paper, lots of paper work etc.

6. **GREEN BANKING STRATEGIES**

Indian Banks Can Accept Green Banking As Commerce Model For Sustainable Banking. Some of following strategies little reflected in their banking commerce or must be accepted by banks.

1. **Carbon Credit Commerce**: [4] Under the Kyoto Protocol, all nations must reduce green house gases emission as well as reduce carbon to protect our environment. These emission must be certified by Certified Emission Reductions (CERs), commonly known as carbon credit. The Indian Bank may start this commerce as in London the commerce of carbon credit is about 30 billion Euros.

2. **Green Banking Financial Products**: Banks can develop innovative green based products or may bid green loans on low rate of interest. As Housing and Car loan segments are the main portfolio of all banks so they accept green loans facility. SME loans on the basis of National Environmental Policy as well as its certification

3. **Paperless Banking**: All banks are shifting on CBS or ATM platform, also providing electronic banking products as well as services. So there is ample scope for banks to accept paperless banking. Private as well as foreign banks are using electronics for their office correspondence but still in PSU banks they are using huge paper quantity.

4. **Energy Consciousness**: Banks have to install energy efficient equipments in their office, use CFL as well as avoid wrong utilization of these equipments. Banks have to convert this green banking in Hardware, waste Management in office, Energy efficient Technology products. Banks can Donate Energy Saving Equipments to school, hospitals etc.

5. **Using Mass Transportations Systems**: Banks have to provide common transport for groups of officials posted at one office.

6. **Green Buildings**: Banks have their residential houses, branches or ATMs, so bank may accept green building to protect our environment.

7. **Plantation**: Most of the banks are conducting plantation program in the rainy season to save our environment. They plant trees, grass etc at local gardens, schools or colleges as well as shows that banks are very careful about environment

7. **LIMITATIONS OF GREEN BANKING**

**Banking as well as the Environment:**

**Paper is the Problem**

It might seem that bank products do not directly affect the environment as well as banks are not immense burners of fossil fuels. But banking has historically been a paper-heavy industry in addition to this; pulp as well as paper mills are heavy producers of dimethyl sulfide, one of many toxic pollutants associated amid the industry.

The banking industry is in a challenging, somewhat contradictory situation. [5] Most banks provide electronic platforms for numerous retail as well as wholesale banking activities, yet for security reasons (however misplaced) many of their customers at rest insist on receiving paper records. So many banks continue to provide these services.

However, paperless penetration rates were lower for credit cards, as well as much lower for insurance as well as brokerage. These rates are nonetheless rising, albeit slowly, but banks will clearly be providing customers amid paper records as well as statements for some time to come.

That’s ironic, since customers want their providers to maintain green commerce practices as well as have been shown to be willing to give their commerce to such organizations. But, even given this inconsistency, banks can leverage client preference for hard copies by using only certified paper that is harvested from sustainably managed forests; they can establish a procurement policy that insists on ecologically sound practices from their suppliers as well as providers; as well as they can commit themselves to social as well as economic promotion in the regions as well as countries where paper is produced – all of which demonstrates to clientele a assurance to protecting the environment.

**Paperless Resolutions are the Answer**

Because banking touches virtually all commerce around the globe, banks not only can make their own operations more efficient as well as paper-free but can also provide paperless processing solutions to their clients as well as customers. This not only offers commerce the opportunity to help make their own commerce green as well as to shrink their carbon footprints, but also to improve their operating efficiency, reduce processing costs, improve their cash forecasting, mitigate risk as well as cut down on processing error. Consider, as examples, the effect of a few such paperless solutions:

**Electronic Bill Presentment as well as Payment**

Electronic bill presentment as well as payment (EBPP) is the process of delivering to customers bills as well as invoices in electronic format, either email or short message service (SMS) text, via the biller’s website as well as allows a customer to execute payment electronically. The process eliminates not
only the need for paper bills as well as envelopes but cuts the costs of postage as well as transportation. To give an example, the Natural Resources Defense Council (NRDC) reports that one bank, simply by reducing the mass of its ATM receipts, saved US$500,000 yearly.

Such solutions are easily customizable to a biller’s needs; provide a secure, user-authenticated system; can be used for together one-time as well as recurring payments; as well as can be used together amid credit as well as debit cards as well as amid automated clearing house (ACH) payments.

Document Image Technology

Document image technology replaces paper cheques as well as billing records amid images. It can capture a transaction as it is processed, providing an image of corresponding remittance documents such as invoices, cheque stubs, remittance statements, correspondence, as well as envelopes. These images can then be stored electronically, eliminating the need for paper archiving as well as also for courier as well as overnight delivery service of paper materials. Communications are improved as well as made more rapid as images can be shared via email or fax, as well as document retrieval is greatly enhanced since transaction records can be located via a variety of search options.

Mobile Bill Presentment as well as Payment Acceptance

Increasingly banks are developing technologies that allow customers, via their mobile devices, to pay bills, access banking as well as credit card accounts, receive notices of bills due or payments made or ready to be placed. Mobile devices can also be used as site-of-purchase payment receivers. Along amid the obvious benefits of convenience as well as speed, mobile technology can also serve to generate fresh commerce, particularly in developing nations where the number of mobile phone users far exceeds the number of people amid bank accounts.

8. GOING GREEN IN THE CURRENT ECONOMY

Although banks that develop such paperless, straight-through processing (STP) solutions can then offer them to their customers, the upfront development costs can prove beyond their means in terms of time as well as money for many small as well as mid-size financial establishments; a situation exacerbated by the ongoing financial crisis. In addition, technologies are constantly changing as well as evolving as well as, for a bank amid limited resources, there is the risk of investing in a technology that may be superseded as well as rendered obsolete by another.

At the same time, an inability to take advantage of paperless solutions as well as provide them to clients forfeits a bank’s opportunity for cost savings as well as risks shrinkage of its client base. For such banks a private-label solution, particularly amid a non-competing partner, can reduce the risk as well as cost of investment as well as enable the smaller partner to benefit from inherent efficiencies as well as cost savings, as well as to exceed the benefits along to their customers as well as clients.

While environmentally friendly living is a positive ideal, there are several possible disadvantages of going green.

Initial Costs

Perhaps the greatest disadvantage of going green is that it often entails a large initial cost. For example, installing a fresh roof or fresh insulation to keep heat from escaping your home would be considered a green home progress, but it would cost a large sum of money to get the work done. Similarly, buying a hybrid vehicle that gets fine gas mileage can reduce energy consumption, but hybrid vehicles often cost many thousands of dollars more than similar vehicles amid out hybrid technology. Upfront costs present a large deterrent to going green.

Inadequate Savings

The aim of going green in many cases, such as building an energy-efficient home or purchasing a hybrid vehicle is to reduce environmental blow while saving money in the long term. Green buildings as well as vehicles tend to use less energy, so initial costs can often be recouped over time through energy savings. The difficulty is that the savings generated by going green are often less than expected; they do not make up for the initial cost quickly enough to make them economically viable.

Competition

In the commerce world, going green can be an attractive goal to gain consumer support, but unless green progress is economically viable, it can put commerce at a competitive disadvantage. For illustration, if one company decides to adhere to strict, self-imposed pollution standards which entail the installation of fresh technology as well as workers, while another sets loose standards, the second company will be at an advantage since they will have lower production costs. Even if national standards were imposed to force commerce to go green, this could put them at a competitive disadvantage amid respect to overseas companies.

9. CONCLUSION

Paperless processing solutions as well as other efficient as well as ecologically-friendly commerce practices can increase processing speed, reduce error as well as risk, save money as well as attract customers. They can be made available not only to banks but by banks to their customers, amid apparent as well as measurable benefits to the environment.

There is an urgent need to create awareness as well as follow green banking in today’s commerce world of innovative technologies so as to make our environment human friendly. Green banking if implemented sincerely opens up fresh markets as well as avenues for product differentiation. In India there has not been much initiative in this regard by banks as well as financial establishments. They are not as green as
foreign banks. As initially, these assurances will cause a huge monetary burden for Indian banks.

10. SUGGESTIONS

For effective implementation of green banking, the RBI as well as the Indian government must play major role as well as devise green policy guidelines as well as financial incentive. Some suggestions for the banks to support green banking are:

• Converse through press
• Construct websites as well as spread the news
• Impart learning during E-learning programmers
• Making green banking as element of yearly environment reports
• Training as well as development of relevant skills among bank employees
• Banks may devise innovative financial solutions to incorporate environmental outlook.
• Banks can initiate green funds for customers who would like to spend in environment friendly projects.

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Abstract: This paper gives a brief overview of the 5G-Key Capabilities & Applications. 5G and its inherent technological capabilities leading to larger bandwidth, higher reliability and low latency etc are covered intimately. As investments in 5G R&D and its commercial deployments pick up momentum world over, different use case scenarios, applications, and 5G network deployment scenarios are also discussed in this paper. Currently 5G term is not officially used. In 5G research is being made on development of World Wide Wireless Web (WWW), Dynamic Adhoc Wireless Networks (DAWN) and Real Wireless World. At the end, it was also identified that 5G will provide disruptive capabilities, which will be an economy booster fostering new ways to organize the businesses as well as fostering new business models, supported by advanced ICT.

Keywords: 5G, ICT, 4G, IoT

1. INTRODUCTION

The Internet has turned our existence upside down. It has revolutionized communications, to the extent that it is now our preferred medium of everyday communication. In almost everything we do, we use the Internet.[1] In the field of automation, Internet of Things (IoT) also started gaining limelight. With connectivity and IoT technologies it became possible for a doctor to perform surgery sitting miles away, through a robot, by using internet. Hence the need for faster speed and better connectivity aroused. To meet these needs fourth generation of mobile technology was introduced in 2010.[2] With the entry of new operator(s) within the mobile services using 4G technology, these services expanded quickly particularly in India. Now focus is shifted to 5G (Fifth Generation) technologies. Operators in countries like South Korea, Japan and China are making efforts to start out 5G commercial services soon.[2] This paper is focussed on discussion of 4G and 5G technologies.

Fig. 1. Comparison between 4G and 5G[9]

2. FOURTH GENERATION

4G could also be a loose term for the fourth generation of cellular communications, offering speeds that are about 10 times faster than they’re on current third-generation, or 3G, networks.[3] It has peak download speeds of 100 Mbps and may support uploads at the speed of up to 50 Mbps.

4G is an advance version of 3G and 2G standards. The 3GPP is recently standardized LTE Advanced as future 4G standard.
4G frameworks are expected to supply a secure IP based network with facilities like voice, streamed multimedia and data at much higher rates as compared to previously existing technologies. One common characteristic of the new services facilitated by 4G is their demanding requirements in terms of QoS. Wireless broadband access, Multimedia Messaging Service (MMS), video chat, mobile TV, HDTV and Digital Video Broad-casting (DVB) are being developed within the 4G network.[4]

3. FIFTH GENERATION

5G network is extraordinarily quick and reliable. The concept of hand-held devices goes to be revolutionized with the arrival of 5G. Now all the services and applications are getting to be accessed by single IP as telephony, gaming and lots of other multimedia applications. Since it isn't an unseen thing in market and there are many users who have experienced the wireless services wireless technology, it's tough for them to fiddle using this new 5G network technology. It only has to be made accessible so that a standard man can easily afford the profitable packs offered by the businesses so that 5G network could hold the authentic place. They have got to win the customer trust to create fair future reference to make a reliable position within the telecommunication field. To compete with the preceding wireless technologies within the market 5G network has got to tender something reliable something more pioneering. All the features like telephony, camera, mp3 player, are coming in new mobile models.[5] 5G millimeter wave is the fastest, with actual speeds often being 1–2 Gb/s down. Frequencies are above 24 GHz reaching up to 72 GHz which is above the extremely high frequency band's lower boundary.[6]

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4. 5G NETWORK TECHNOLOGY

Millimeter Waves: Telecom Service Providers (TSPs) make use of frequency spectrum to send and receive data. With the ever increasing number of consumers, more data is being consumed. But this data remains crammed on same frequency bands which would mean less bandwidth for everybody, causing slower service and more dropped connections. To avoid these problems, TSPs are experimenting with transmission of signals on an entire new swath of spectrum of 20–50 GHz. This band, recognised as the mm Wave band, makes use of higher frequencies than the radio waves which have long been used for mobile phones. The mmWave band from 20–50 GHz alone accounts for 10 times more available bandwidth than the whole 4G cellular band. Many manufacturers are fostering components which will be operated within the range of millimeter waves and semiconductor technologies that are suited to work at frequencies up to 90 GHz, especially in V-band (57 to 66 GHz) and E-band (71 to 86 GHz) applications. There's one disadvantage to the usage of mmWaves, i.e. due to such high frequencies of mm Waves, they're unable to travel through buildings or obstacles and may be absorbed by foliage and rain.

Small Cells: Small cells are often placed throughout the cities after every 250 meters approximately. They're portable miniature base stations that need minimal power to work. Thousands of small cells installed within the city, due to the short range of mm Wave signals, form a dense network called the HetNet (Heterogeneous Network) that receives signals from other base stations and send them to the users at different locations, somewhat like a relay. This largely prevents signals from being dropped. The term 'small cell' encompasses picocells, micro cells, femtocells and can comprise of indoor/outdoor systems. Small cells are often like the size of a

![Fig. 2. 5G technology][13]

![Fig. 3. Mobile system generations][10]
shoe-box. Such small cells are often bolted to light poles and the sides of buildings, hence don't require separate towers.

Massive MIMO: MIMO i.e Multiple Input Multiple Output refers to a wireless system that uses two or more transmitters and receivers to send and receive more data directly. Presently, 4G base stations possess a dozen ports for antennas to handle entire cellular traffic. But 5G base stations can support a few hundred ports, which means that an array can accommodate multiple antennas and hence can send to and receive signals from bountiful users directly. This is results in a rise in capacity of mobile networks by an element of twenty-two or more.[2] Below is a list of key technological characteristics of massive MIMO:

1. Fully digital processing: every antenna bear its own RF (Radio Frequency) and digital baseband chain. The signals emitted from all the antennas at each base station (due to MIMO) are processed coherently together. Fully digital processing allows to measure complete channel response on the uplink and also quickly responds to such changes within the channel[2].

2. Computationally inexpensive precoding/decoding: As there are more than a single transmitter and receiver in a MIMO network, there exists one LOS path from each transmitter to each receiver ideally. However there could also be reflection or diffraction from the encompassing atmosphere and therefore the signals could interfere causing a low SNR (Signal to Noise Ratio) at the receiver. Hence the info streams can't be decoded effectively. To avoid this precoding is employed on the transmission side with the goal of equalising the signal reception across multiple receiver antennas.

3. Channel hardening: Because of microscopic changes in environment, the channel gain tends to fluctuate randomly. This is often referred to as channel fading. The channel is said to become hardened when the fluctuations in gain don't impact the transmitted data. Channel Hardening effectively removes the consequences of channel fading. Operationally, each terminal-base station link forms a scalar channel whose gain stabilizes to a deterministic and frequency-independent constant.

4. The reliance on reciprocity of propagation and TDD (Time division Duplex) operation reciprocates the necessity for prior or structural knowledge of the downlink propagation channel since the downlink channels can be estimated from uplink pilots.

5. The array gain offers the link budget improvement and therefore the spatial resolution of the array leads to interference suppression. This facilitates the supply of uniformly good quality of service to all terminals in a cell.[2]

D. Beamforming: Beamforming reduces the interference for nearby users by recognising the foremost efficient data delivery route from cellular base station to a specific user. Beamforming can help massive MIMO arrays for more skilled use of the spectrum around them. Massive MIMO faces a challenge to scale back interference while transmitting information from many antennas directly. At massive MIMO base stations, the finest transmission route is plotted using signal-processing algorithms to send individual data packets in many different directions, bouncing them off buildings and other objects in a precisely coordinated pattern. Beamforming permits exchange of a lot of information between the users and antennas on a huge MIMO arrays by choreographing the packets’ movements and time of arrival. Beamforming and therefore the devices that support beamforming work under the IEEE 802.11ac specification.

![The Evolution of 5G](image-url)

**Fig. 4. Evolution of 5G[11]**
5. NEED OF 5G

The major difference, from a user point of view, between current generations and expected 5G techniques must be something else than increased maximum throughput; other requirements include:

- Lower out age probability; better coverage and high data rates available at cell edge.
- Lower battery consumption.
- Multiple concurrent data transfer paths.
- Around 1Gbps data rate in mobility.
- More secure; better cognitive radio/SDR Security.
- Higher system level spectral efficiency.
- World Wide wireless web (WWWW).
- More applications combined with artificial intelligence (AI) as human life are going to be surrounded by artificial sensors which could be communicating with mobile phones.
- Cheaper traffic fees thanks to low infrastructure deployment costs.[7]

6. KEY CHALLENGES

For any new technology to be of practical use, it must not be prohibitively expensive. The mass adoption of 5G might face some initial roadblocks regarding this. For starters, the initial subscription plans are likely to be costlier than those currently available. The annual investments required for upgrading to 5G might be very high, raising questions over the justifications of truly switching over from 4G to 5G. In addition, carriers also will need to incur heavy expenses for upgrading their existing infrastructure to accommodate the new devices and antennas required by 5G systems. It is going to be a full-blown overhaul, and it's not getting to be cheap. In some countries, regulation and native authority policy have slowed the event of small cells through excessive administrative and financial obligations on operators, thus blocking investment. The allocation and identification of globally harmonized spectrum across a variety of frequencies requires coordination among the worldwide community, regional telecommunication organizations and National Regulatory Authorities (NRAs). This represents one among the most important challenges for NRAs within the successful deployment of 5G networks.[8]

7. FUTURE SCOPE

Nanocore combined with Artificial intelligent (AI) will be able to control an intelligent Robot using a mobile phone. Human life surrounded by artificial sensors could be able to communicate with mobile phones such that Mobile can automatically type the message what one’s brain thinks. Communication with people on other planets could be possible using 5G mobile phones. We might get a circumstance where we don’t require any spectrum for communication.[4]

8. CONCLUSION

Rapid growth in data traffic suggests the necessity of the blending of existing network technologies that allows dynamic switching amongst the available Radio Access Technologies (RATs) and therefore the efficient utilization of bandwidth. For radio resource allocation, the concept of super core must be implemented which will coordinate between RATs. The network management modules got to be more dynamic, cost-effective, and adaptable, making it ideal for the high-bandwidth and dynamic nature of today’s applications, e.g. Software Defined Networks (SDNs).

The evolution path of telecommunication from the first generation to the fifth generation provides distinguished aspects and approaches towards the present state of telecom. The onset of 4G has already revolutionized the field of telecommunication by taking the wireless experience to a different level altogether. Further, 5G is expected to be a milestone development for the success of IoT and M2M communications.

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Assessment of White Label ATMs in India

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Abstract: Banks have played a major role in encouraging ATM adoption and modifying behavioural strategies in the domain of personal banking. The banking space has seen considerable growth through the ATMs, (approximately 87000 ATMs at present) but the same has been restricted principally to the urban/metro areas. Tier III to VI unbanked/under banked areas have not witnessed much ATM presence. There is an abundant scope to deploy more ATMs in the several areas of the country. RBI has reviewed and formulated the policy on ATMs and it has been decided to permit non-banks to set up on their own and also operate ATMs to accelerate their growth. Such ATMs will be in the nature of White Label ATMs (WLA) and would provide ATM services to customers of all banks. This paper gives conceptual framework about White Label ATM in India.

Keywords: ATM, White Label ATMs, banking, non-banking, RBI

1. INTRODUCTION

The Automated Teller Machine (ATM) has been hailed as one of the most innovative and revolutionary technological developments in the history of banking. Though banks initially owned and deployed their own ATMs, over time a major change has been seen, with banks now preferring outsourcing all or many of the activities associated with ATM operations such as maintenance, cash loading and technology upgrading. This has helped them reduce their operational costs and stay focused on their core business. Internationally, in addition to bank-owned and deployed ATMs, Independent ATM Deployers (IADs) and Independent Service Organisations (ISOs) are engaged in the ATM business. Such ATMs are called White-label ATMs (WLAs).

2. OBJECTIVES OF THE STUDY

• To study the accessibility of WLAs
• To study the use of WLAs
• To study the need of WLAs
• To study the region wise deployment of WLAs

3. RESEARCH METHODOLOGY

The research methodology is the descriptive research that is based on secondary data.

4. BENEFITS OF WHITE LABEL ATMS:

The white label automated teller machines(ATM) are likely to benefit customers as well as banks.

• The expansion of ATM network will allow customers to withdraw funds at more varied locations.
• WLA will make personal banking more convenient by facilitating cash withdrawal facilities near to a large number of bank customers.
• Banks support introduction of white label ATMs because these are likely to reduce pre-transaction cost for the banks.
• Due to WLAs, banks will not have to deal with the problems relating to maintaining and running the payment channel.

5. PROBLEMS RELATED TO WHITE LABEL ATMS

For a white label ATM company, biggest challenges are office rent and Security guard. If they want to make profit, every White ATM needs to get at least 75-125 transactions per day which is very unlikely, especially when RBI requires them to setup 2/3rd of the ATMs in semi-urban and rural areas. Even in Bangalore, some of the white-label ATMs are getting barely 2-3 customers every week that is loss making business at the moment. Despite the entry of White Label ATM companies, the regular banks have not slowed down their ATM expansion drive, because branded ATM requires passive advertisement and customer loyalty. ATMs everywhere have too much competition with small players will bleed out just like in aviation business. SBI has the largest ATM network in India (30,000+) economies of scale they’re supposed to be making profit. But this week, even SBI chairman herself has admitted their ATM business is making losses. So, it is unlikely that White label ATM companies will run profitably for a long period of time.

6. WHY DO WE NEED WHITE LABEL ATMS?

1. ATMs offer convenience to customer (Because he doesn’t need to visit Bank branch every time). ATMs are open 24/7, and even on holidays.
2. Convenience to bank, because they don’t have to keep large staff/office (compared to a system without ATMs). It reduces their cost of branch-operation.
3. But in India, ATM penetration has been very low.
7. OBSERVE
Most of the ATMs concentrated in urban areas- that too only at prime locations e.g. near shopping malls and airports- financial inclusion not achieved.

8. SERVICES AVAILABLE AT WLAS
In addition to cash withdrawals, WLAs offer many other services to bank customers. Some of these services may include:
- Account Information
- Mini/Short Statement
- PIN change
- Request for a Cheque Book
- Any customer from belonging to any bank, can use it.
- Every month, Five transactions are free.
- White label ATM users can also withdraw a maximum of 10,000 per transaction.
- open 24/7 and on holidays
- Value added services like mobile recharge, utility bill payments etc.

9. ANALYSIS AND INTERPRETATION

ANNEXURE I: Regionwise deployment of ATMs for the quarter ended December 2019

<table>
<thead>
<tr>
<th>Name of the Bank/ Entity</th>
<th>Metro Centres</th>
<th>Urban Centers</th>
<th>Semi - Urban Centres</th>
<th>Rural Centres</th>
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<td><strong>19</strong></td>
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### Regionwise deployment of ATMs in INDIA

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<th>Name of the Bank/ Entity</th>
<th>Metro Centres</th>
<th>Urban Centers</th>
<th>Semi - Urban Centres</th>
<th>Rural Centres</th>
<th>Total</th>
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<tr>
<td>Total (WLAs)</td>
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<td>45937</td>
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*Source: www.rbi.org.in*
**Interpretation:**

The graph above states the region wise deployment of ATMs in INDIA for the year 2017. Semi-urban region holds the maximum no. of ATMs with a total of 61314 atms, then comes the metro centres with 60643 atms followed by urban centres with a total of 59134 atms, rural centres has 40567 atms out of the total no. of atms in India.

![Graph of ATM deployment in India](http://rbidocs.rbi.org.in)

**Source:** [http://rbidocs.rbi.org.in](http://rbidocs.rbi.org.in)

**Interpretation:**

66% of the total banks are public sector banks, 27% belongs to private sector banks and only 7% of the total ATMs penetration in India belongs to white label ATMs. The data and stats mentioned above is the data for the year 2019.

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<th>White Label ATMs</th>
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<th>Urban centres</th>
<th>Semi urban centres</th>
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<td>Muthoot Finance Ltd</td>
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<td>72</td>
<td>83</td>
<td>25</td>
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</tr>
<tr>
<td>BTI Payments Pvt. Ltd</td>
<td>163</td>
<td>260</td>
<td>1785</td>
<td>2376</td>
<td>4584</td>
</tr>
<tr>
<td>Vakrangee Limited</td>
<td>85</td>
<td>124</td>
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<td>260</td>
<td>601</td>
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<td>Riddhi Siddhi Bullions Limited</td>
<td>9</td>
<td>50</td>
<td>57</td>
<td>12</td>
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<tr>
<td>AGS Transact Technologies Ltd</td>
<td>60</td>
<td>2</td>
<td>61</td>
<td>100</td>
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</tr>
<tr>
<td>SREI</td>
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<td>0</td>
<td>0</td>
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<td>0</td>
</tr>
<tr>
<td><strong>Total (WLAs)</strong></td>
<td>2108</td>
<td>1921</td>
<td>4658</td>
<td>6109</td>
<td>14796</td>
</tr>
</tbody>
</table>

**Interpretation:**

Tata Communications Payment Solutions Ltd. Is the company with the maximum no. of white label ATMs with a total of 8380 with maximum atms in rural centres followed by BTI Payments Pvt. Ltd with 4584 no. of atms and maximum no. of WLAs in rural centres, Hitachi Payment Services Pvt. Ltd and Vakrangee Limited giving a tough competition with 669 and 601 no. of WLAs respectively.
Assessment of White Label ATMs in India

Source: http://rbidocs.rbi.org.in/rdocs

State Wise Deployment of WLAs

Source: www.rbi.org.in
Interpretation:
Out of 14796 no. of White label ATMs in India, Tamil Nadu has maximum no. of WLAs with a total of 3080 atms. The above data shows the state wise deployment of WLAs in India. TCPSL has deployed maximum no. of WLAs all over INDIA. Hence almost 41 per cent of WLAs

10. CONCLUSION
The research study has been undertaken to assess the number of WHITE LABEL ATMs in India and to find out the steps taken by the banks in the area of Financial Inclusion. It has been concluded that though the banks are complying with RBI norms in terms of opening branches, offering no frills account, kisan credit card, simplifying KYC norms, but still a lot of effort is required for financial inclusion progress. Biometric cards should be introduced for security in transactions as well as saving time. Business correspondents should be employed in villages and trained in advance for promoting financial inclusion program. Banks need to open its more branches within rural areas and creating more awareness about banking services among rural people by telling them about the benefits of the banking services. Financial inclusion requires efforts on the parts of three parties- RBI, all the banks as well as general public for its better progress.

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Abstract: WebRTC (Web Real-Time Communication) is a free, open-source project that provides web browsers and mobile applications with real-time communication (RTC) via simple application programming interfaces (APIs). It allows audio and video communication to work inside web pages by allowing direct peer-to-peer communication, eliminating the need to install plugins or download native apps. Supported by Apple, Google, Microsoft, Mozilla, and Opera, WebRTC is being standardized through the World Wide Web Consortium (W3C) and the Internet Engineering Task Force (IETF).

1. INTRODUCTION TO WEBRTC

WebRTC stands for Web Real-Time Communications and lies on the TCP/IP application layer. It is an emergent technology embedded into compatible browsers that leverages a set of plugin-free APIs that can be used in desktop and mobile browsers, to enable real time peer-to-peer multimedia communication over the web. WebRTC internet is to communicate peer-to-peer and for that it needs to know and negotiate several details from the peers to peer's external network IP address, network bandwidth, if there is a video and audio feed and its characteristic, if it is behind a NAT service. Some of these communication details are negotiate by a service call "signalling", that is used to exchange session control messages implemented by Session Description Protocol (SDP), to apply network configurations between peers. Signalling service can be implemented by several ways, like WebSocket, Socket.io and XMPP and SIP protocols. WebRTC implements WebSocket protocol and provides full-duplex real time communication channels over a single TCP connection. SDP provides a standard representation of some proprieties of multimedia session such as media capabilities, transport addresses and other related metadata.

In a network topology with NAT the public IP addresses discovery is a critical task. Interactive Connectivity Establishment (ICE) is used to establish communication between two peers, designated ICE candidates, which provide information about the IP address and port number from where the data is going to be exchanged through NAT. ICE uses two distinct services to establish a link between WebRTC peers:

i) STUN (Session Traversal Utilities for NAT) is a service that respond to a client with his public IP address and port,

ii) TURN (Traversal Using Relays around NAT) is a service that relays communication, so in this case, the communication isn't peer-to-peer.

Classic web architecture is based on HTTP request-reply protocol over a TCP/IP client-server communication. WebRTC extends the classical web architecture, by introducing a peer-to-peer communication paradigm between the client's browsers. Regarding security, WebRTC uses Secure Real-Time Protocol (SRTP) and Datagram Transport Layer Security (DTLS) to establish a secure end-to-end communication.

WebRTC has several JavaScript APIs:

- getUserMedia() - Capture audio and video.
- MediaRecorder() - Record audio and video.
- RTCPeerConnection - Stream audio and video between users.
- RTCDataChannel - Stream data between users.

In other words, with WebRTC you can add real-time communication capabilities to your application that works on top of an open standard. It supports video, voice, and generic data to be sent between peers, allowing developers to build powerful voice- and video-communication solutions. The technology is available on all modern browsers as well as on native clients for all major platforms. The technologies behind WebRTC are implemented as an open web standard and available as regular JavaScript APIs in all major browsers. For native clients, like Android and iOS applications, a library is available that provides the same functionality. The WebRTC project is open-source and supported by Apple, Google, Microsoft and Mozilla, amongst others. This page is maintained by the Google WebRTC team.

2. HISTORY AND EVOLUTION

In May 2010, Google bought Global IP Solutions or GIPS, a VoIP and videoconferencing software company that had developed many components required for RTC, such as codecs and echo cancellation techniques. Google open-sourced the GIPS technology and engaged with relevant standards bodies at the IETF and W3C to ensure industry consensus. In May 2011, Google released an open-source project for browser-based real-time communication known as WebRTC. This has been followed by ongoing work to standardize the relevant protocols in the IETF and browser APIs in the W3C.

In May 2011, Ericsson Labs built the first implementation of WebRTC using a modified WebKit library. In October 2011, the W3C published its first draft for the spec. WebRTC milestones include the first cross-browser video call (February 2013), first cross-browser data transfers (February 2014), and
as of July 2014 Google Hangouts was "kind of" using WebRTC.

The W3C draft API was based on preliminary work done in the WHATWG. It was referred to as the ConnectionPeer API, and a pre-standards concept implementation was created at Ericsson Labs.

3. ARCHITECTURE
The client connects to an HTTP server through a web browser and access to the main HTML page that uses also PHP and CSS. The web page being accessed by the clients implements JavaScript code to enable the connection to the signaling server, which acts as a broker to coordinate the per-to-peer communication between the browsers. After both clients have been connected are been signaled by the signaling server, the communication between both browsers becomes peer-to-peer using a STUN service to establish peer-to-peer connection between both clients.

4. DEVELOPMENT AND WEB INTERFACE
WebRTC API is designed around three main concepts, PeerConnection, MediaStream and DataChannel. The Peer Connection interface represents a WebRTC connection between the local computer and a remote peer. It provides methods to connect to a remote peer, maintain and monitor the connection, and close it once it's no longer needed. The MediaStream is responsible for describing a stream of audio or video data, the methods for working with them, the constraints associated with the type of data, the success and error call backs when using the data asynchronously, and the events that are fired during the process. Finally, the DataChannel interface represents a bi directional data channel between two peers of a connection. The developed application is divided into some distinct but complementary modules.

5. PEER-TO-PEER CONNECTIONS
An RTCPeerConnection instance allows an application to establish peer-to-peer communications with another RTCPeerConnection instance in another browser, or to another endpoint implementing the required protocols. Communications are coordinated by the exchange of control messages (called a signaling protocol) over a signaling channel which is provided by unspecified means, but generally by a script in the page via the server.

6. SIGNALING
Signaling is the process of coordinating communication. In order for a WebRTC application to set up a 'call', its clients need to exchange information:

• Session control messages used to open or close communication.
• Error messages.
• Media metadata such as codecs and codec settings, bandwidth and media types.
• Key data, used to establish secure connections.
• Network data, such as a host's IP address and port as seen by the outside world.

This signaling process needs a way for clients to pass messages back and forth. That mechanism is not implemented by the WebRTC APIs: you need to build it yourself.

REFERENCES
Attend It – Attendance Management Application

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²,³,⁴Student, Maharaja Surajmal Institute

Abstract: Student management is becoming a basic necessity in education in modern-day age. To manage the attendance marking and management issues faced by many major institutions and schools and to reduce the amount of paper being used for marking attendance, an initiative was taken to develop a mobile based application with the objective to ease the marking and management process of the attendance marking. The present paper discusses the design and development of a mobile (android) based application named as AttendIt that helps the faculty to mark, manipulate and oversee attendance of a student either at the end or any time with in the semester. This application is mainly designed for faculty and other staff members who maintain the attendance regularly. Furthermore, it can be used by students to keep track of their attendance and verify the number of classes attended by them.

Keywords: Mobile application, Student attendance management system, Android Based Application, Java Application

1. INTRODUCTION

Nowadays, technology is being used by humans in each field and various initiatives are taken to reduce the amount of paperwork in each and every field. In this era, mobile phones are being used by each and every person and mobile phones contain various applications for performing various tasks.

In today’s competitive word, with increasing working hours and less class room time, teachers needs a tool for marking and managing attendance in a class or lecture. Marking attendance is very essential tasks for the subject teacher to ensure the regularity of students in attending class and to see the students with short attendance. Marking of attendance are traditionally being carried out manually in a log book or attendance registers.

The main drawback of using a manual system is to keep the record of attendance of all previous classes. Keeping records on paper is not an efficient method also a physical location is required to store such logs. Faculties need to calculate the attendance percentage of each student in every month and at the end of semester or year, also a large amount of paper is used to maintain such logs which later on are not of any use once the student passed out the institution. These papers might get recycled but it will be more efficient to reduce the use of paper to maintain a healthy environment. Pen and Paper method consumes more time and adds more workload over the faculty, staff and the authorities.

To overcome the above said issues, a mobile app has been developed which can be installed on a user’s mobile phone. A user can be either a faculty who use this application to mark and manipulate the student’s attendance in a class or a student who uses mobile application to know about his/her attendance status. The proposed application stores student information in the server database, which can be retrieved through the mobile phone whenever needed.

2. LITERATURE REVIEW

This section carries out the survey of the past work and research done by the researchers in this field. Various researchers and developer have developed either a mobile or web based application by using various languages, platform and by using different type of databases. Generally data related to application is stored in a database stored over server for better and dynamic connectivity and retrieval of data.

K. Akhila et al proposed an android application for marking attendance and to increase the reliability and reduce the efforts of the staff and faculty.[¹]

Moreover, AmitaDhale et al presented a survey on “Smart Connect” an android and web based application for college management system. It is developed using SQL server and mainly used to store the details required by institutions.[²]

Location-Based attendance management are also being used so as to provide the authenticity in an institution. Mohammad Salah el al in 2014 presented a mobile based application for attendance system based on location. This application is used to ensure that all the members of an organisation are presented in a same geographical location or not. This application was adopted by organisation to see if the members are presented inside the organisation.[³]

Various wireless technologies are getting popular such as Bluetooth or Wi-fi, these are used to reduce the time for performing a task. RiyaLodha et al developed an android application which uses Bluetooth system to mark attendance of the students. It is very much easier and less time consuming system than any other application.[⁴]

Various other applications are used in organisation to mark the regular attendance of its employees. S.P. Avinaash Ram and J. Albert Mayan presented a similar application used by different
organisation irrespective of the type of industry to mark, update and regularly keep track of the attendance of their employees. This application provide the number of employees working in an organisation and give detailed information about them.[5]

Also, there are various applications on the play store which are used to keep track the attendance of the students, [6] by using the app students can mark their own attendance after uploading their timetable and calculate the attendance percentage. With this they came to know about the number of more classes to be attended to par the attendance criteria. But these types of applications are not used by faculty and staffs as these applications are based on single student or user and are not efficient for maintaining records of large number of students.

So, it has been observed that various mobile and web based applications play a key role in both educational and commercial sectors to keep track of the attendance of students and employees with ease and no overhead workload. Various types of applications were created for a number of functionality using many different languages, technologies and platform. As android is the mostly used and portable platform, maximum numbers of application are based on this so as to provide a global reach of clients. This paper presents a Java-based mobile (android) application for attendance management system in educational sector.

3. PROPOSED WORK

The main aim of the application is to provide a user friendly and efficient environment for the faculty to take and update attendance of the class students and reduce the overall workload. The logfile containing attendance of students will be saved for later use where different type of analysis can be performed.

This application require android level 4.4 (Jelly Bean) or above to run on a mobile phone and also internet access is needed so as to connect to the database dynamically. Amazon Web Services (aws) is used as a server where the database is maintained and php is used to create an api for the application.

This application can be downloaded by both the staff as well as students or may be by any parent. Application is mainly divided into 2 modules: Faculty and Students. The main focus of the application is towards the faculty module where a faculty or subject teacher mark or update the attendance of a class in which he or she is teaching and in student module a students can only see and checks their attendance of each subject or calculate aggregated percentage of all subjects.

There are two registration pages each for modules and a student as well as a teacher must sign up before using the application. Separate login modules have been created to provide the security and to ensure that a student cannot update or alter the attendance. Once the teacher signs in to by using his or her ids a teacher portfolio page is displayed containing the profile information about the faculty.

Faculty have options to do the following task:

a) Attendance Marking: Where a faculty must select the class and section whose attendance is to be mark and the corresponding list of students is presented for the teacher. Now a teacher can mark a student present or absent and press the submit button in last to update the database.

b) Update Attendance: To update the attendance of any student in case wrong value is passed before and changes need to be made by the teacher.

c) Listing and Counting of Present Students - To get the list of all those students present in a particular class and count the total number of students.

d) Download attendance – It creates an excel sheet of the attendance of students which can be stored locally in a system for future references. Further any type of analysis can be performed on it.

A faculty member can only see and manipulate the attendance of only those subjects of those classes whom he/she is teaching a faculty can never update or mark attendance for any other faculty unless the username and password is shared.

The data related to the subjects being taught by a particular teacher teaching a particular class is to be entered prior to begin of semester by an admin to ensure authenticity among teachers and staff as well. Admin can be any one who is responsible for operating the app and is familiar with all its operations.

Second Module of the application is Student Module. First the student needs to sign up into the application by entering various information such as name, enrolment number, semester, course etc. All these data should be correctly entered to check the attendance of the student.

After sign up the student can sign in by entering enrolment number and password. Student module can be used not only by the student but also by the parents to check the attendance of their ward and ensure that their ward is attending lectures.

After signing in the first page shows the details of the student such as course, batch, semester etc. Main page also contains the aggregated percentage of attendance of all subjects in a form of pie chart. By clicking the user portfolio section, a student can access attendance of each subject in the form of progress bar.

Attendance modules show the total number of lectures held and the number of lectures attended by the student.

4. RESULTS

All the modules are working correctly and application is working on each android device without any errors.
There were many challenges faced during the development of the application such as:

a) Multiple Devices: As each student as well as faculty contain different phones it is very important to check the compatibility of the application with every device.

b) Data Intensive App: All the data related to the application cannot be stored in a mobile phone so it is very important to store all the data over a server.

c) Lack of Hardware Integration

Application (AttendIt) was tested and successfully implemented and able to mark attendance and generate report at the end of each month. All the students are able to check attendance using the application at any phase of the semester. Database is able to hold record of many years and store the data locally on the system at the end of year. The screen shots of various modules and functions of Attendance Management System are shown in Figure 1 and 2.

5. CONCLUSION AND FUTURE SCOPE

As Smart Phones are becoming a major part of life it has become necessary to move all the application from computer level to mobile level. The development of application described has given a strong understanding of various challenges associated with design and development of application.

As of now this application is an Android application but soon will be rolling an iOS version. Admin module of the application is very important and more work will be done to make admin module better and user friendly.

This application is only able to mark attendance but soon work will be done on making marks module so as to ensure that teachers or faculties are able to record marks of students in the same application and thus able to reduce the work load.

REFERENCES


MSI Event Management Web Application

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Abstract: MSI event management is a web based application that provides a better way to manage all the different events that are to be conducted by the college, CSI Student Branch, students as individuals or any other organizations. It organizes all the events that are to be conducted at college level or national level. Students will have the privilege to view all those events and register into them with ease. Personalized experience can be experienced by just using the login feature, where students can also have a track record of all the events that they have participated and get suggestions according to their choice. The Web application is designed by using different technologies at different levels. ReactJS is used for front end, NodeJS for backend and MongoDB for the Database. The application has an admin panel which has limited access to the concerned authorities who can publish information about the events and then the application will display all the necessary information about the event, with the registration link and due date timer. Sharing event details will become a lot easier and less data and storage taking than the traditional way of sharing the event details by sharing messages and media documents.

Keywords: Event Management System, ReactJS, NodeJS, MongoDB, Bootstrap, virtual DOM

1. INTRODUCTION

MSI event management Web application is developed to overcome the difficulties that are faced currently while organizing and sharing the event that are being conducted in college or around the nation. A Web Application based on ReactJS for frontend and NodeJS for backend, will provide a common platform for students and organizers to communicate about the different aspects of an event. The application is developed using different technologies like ReactJS, NodeJS, MongoDB, Bootstrap, express.js and other tools used for frontend and backend development.

1.1 Problems with the traditional way of event sharing

- Long descriptive message: whenever there is an event being conducted, the details of the event doesn't get a proper place to be displayed.
- Organizers use long text to describe all the aspects of an event that are interruptive during a normal conversation.
- No proper follow-up: Once a message has been delivered there is no proper follow-up where potential participants can go back and look at the event details. They have to always search for that particular message.
- Amendments need to be shared again: If there is a change in the details of the event, the new text message with new details would be again shared to all the conversation.
- Lack of track record for participants: There is no proper record for the participants from where they can see their registered event or participated events.
- Listing of events: No proper listing of events can be found when we share the event details through text message or mail.

1.2 MSI Event Management App

- A single platform: It will provide a single platform for all kinds of activities related to event management: Registration, Venue, description, date, participant details, poster and many more.
- Sorting: All the listed events can be sorted out into different categories and subcategories. Participants will find it easy to look out for a particular event.
- Sharing: Now event sharing will be easy as there is a common platform open for all and to share the event details one has to just share the URL of that particular event.

Fig. 1. Home page of Event Application, msi-events.now.sh
• No long Text: The description will be displayed in the web app itself hence there is no requirement for any kind of long text message explaining all the aspects of event. Amendment can be also done and there will be no need to send the message again and again.

• Dashboard: Data entry in the Web App will be much easier by using dashboard. The concerned person can login into the dashboard and then add, delete, approve, amend the different information on the web app.

2. SPECIALTIES

Web application is being developed in several stages by dividing the features and achieving it as per the requirements. The different stages are based on the priority of the features.

Stage I

• The web application will provide a single platform for all the event organizers and participants where they can share or register for a particular kind of event as per their own requirements.

A login feature to ensure that the users get the registration process done without filling the form each and every time they would like to register in a new event. The credentials will be asked for only once and then the user can edit it afterwards if they wish to.

Sharing an event will become a lot user by using this application as the set pattern won't make it difficult for people to fetch or feed details about the event.

Fig. 2. All the list of events and details, msi-events.now.sh

Fig. 3. Login page, msi-events.now.sh

Fig. 4. Event card details and information, msi-events.now.sh
Stage II

- A personalized experience will be offered to the user by using different algorithms to analyses the previous experience of the particular user.
- Monthly or Annual report for all kinds of events that has been created or shared.
Fig. 7. Super admin can change the role of users

Fig. 8. Export as .csv button for admin to save the details of users registered locally for offline access of data
KEY POINT

1. The public can only view the events that have been put up for registering into the event user has to login into the application.
2. The records can only be modified by an admin or super admin.
3. The user interface should be consistent so that the user can handle the application with ease.
4. The application should be visually, conceptually clear.

3. TECHNOLOGIES USED

Here we will have a look at the technologies used to develop the web application.

3.1. Frontend

- **ReactJS**: React JS [1] is a declarative, efficient, and flexible JavaScript library for building reusable UI components. It is an open-source, component-based front end library which is responsible only for the view layer of the application. It was initially developed and maintained by Facebook and later used in its products like WhatsApp & Instagram.
- **Bootstrap**: Bootstrap [2] is a front-end framework used to design responsive web pages and web applications. It takes a mobile-first approach to web development. Bootstrap includes pre-built CSS styles and classes, plus some JavaScript functionality.

3.2. Backend

- **NodeJS**: Node.js [3,4,5] is an open source, cross-platform runtime environment for developing server-side and networking applications. Node.js applications are written in JavaScript, and may be run within the Node.js runtime. Node.js also provides a varying range of library of varied JavaScript modules which simplifies the event of web applications using Node.js to a good extent.
- **Redux**: Redux[6] is an open-source JavaScript library for managing application state. It's most ordinarily used with libraries like React or Angular for building user interfaces.
3.3. Database

MongoDB: MongoDB [7,8,9] is an open-source document database and leading NoSQL database. MongoDB is written in C++. MongoDB is object based database and not relation based database. The article based database is quicker compared with the relation based database.

4. BEHIND THE SCENES

4.1. Front end: ReactJS

ReactJS The application supported ReactJS at the frontend delivers the UI which is component based. the full homepage is split into different components which are merged together to make an entire view. Now these components respective DOM contains a virtual DOM that's created only within the React framework of JavaScript. The virtual DOM[7,8] creates a duplicate of the DOM and projects the replica to the user. Using this the modifying of information becomes quick as those objects don't seem to be always sent at the server site to update itself, but as soon because the operation is completed the Virtual DOM is compared with Real DOM and changes are made into it. This protects lots of your time when he/she is surfing the web site.

4.2. Back end NodeJS

Node JS Platform is employed for the rear end of an application. To perform the request of the user the standard method of website development side used the Multi-Threaded stateless mode, while the Node JS doesn't follow Request/Response Multi-Threaded Stateless Model. It follows Single Threaded with Event Loop Model. Node JS Processing model mainly supported Javascript Event based model with Javascript callback mechanism. As Node JS follows this architecture, it can handle more concurrent client requests very easily. The Event loop is essentially the queue of the request that has been made to the server. The queue contains all the requests and one by one it's fetched by the server to be performed. Since Node JS works on one thread hence the request is totally processed when a next request is taken. The request also comes with a callback function which is executed as soon as the request is completed.

4.3. Database MongoDB

For the database we've used the nontraditional method for storing data, that's the article Based Database and not the standard Relation based database. The article[9] based database creates different objects which will be accustomed to store data of any format into it and isn't because the electronic information service where tables are created to store similar reasonable data. MongoDB could be a document based database that's accessible by the JSON object. The database is quicker, easy to keep up as one object can have all reasonably data members in it.

5. REASON FOR USING THESE TECHNOLOGIES

Technologies employed in the event of MSI-event Management Web App are the newest technologies with several unique features that make it better than the most traditional web application.

- React uses the Virtual DOM[10,11,12] that creates the appliance faster than the web site which uses real DOM, because the time taken to amend each component during execution is minimized by the utilization of Virtual DOM.
- React being a Single page application it renders itself that's quicker than the multiple page application as only single page gets downloaded and not the full stack of pages every time we click.
- The complete application is decoupled, both the backend and frontend are separated and performs individually, the appliance consumes API's built by server side developers to read/display data.
- The database is object based and not relation based that creates the storage of information easily.

6. FUTURE SCOPE

The application being built with features like Event sharing, event registration, post sharing and login feature mustn't be seen because of the final product. As there are several more features that are to be added into it at the subsequent stage, like the personalized experience to each individual user by executing the algorithm which is able to show the user events that are kind of like their previous events. We are able to avail more features to the user by providing them the scope to publish more styles of content associated with different events. Monthly reports of all the various events are often generated through the appliance in future.

The future scope of the application can be considered as a single platform for every event management where users can get all the concerned details even an analyzed stats of event according to their history and preferences.

7. CONCLUSION

The MSI-event Management Web App is a full-fledged website to overcome the problems that are being faced in performing event management traditionally. The different aspects and features of the application provides all sorts of ease of access to the user and reduce several difficulties that were faced by them.

The application is based on the latest technologies and is one of the quickest among all other technologies. The future scope of the application is also quite promising as the new innovations will attract more and more users and a change in the perception will be achieved which will improve the field of event management.
REFERENCES

In 2035, Quantum Processors Qubits Will Run Small Applications

Pooja Singh, Ritika Mehra, Shrestha Priyal

Abstract: “Necessity is the mother of invention”, well said by a Greek philosopher, Plato. Computers taking its pace to new areas like Face recognition, sensors, wire-free computing, advanced displays, and upgraded hard-wares. There is one which remains untouched, which is Integrated Circuits in our computer which stores major information.

Recent predictions have revealed that it could be a tight position for the power consumed by the chips and hence, to overcome that problem the sustainable use of quantum processor qubits would come to the rescue.

1. INTRODUCTION

As the use of computer chips is prevalent in the present day. It can be said that if the developers don’t come up with a new way to build computers then the computer chips would require more electricity than what our global energy production can deliver. The prediction could mean that our ability to keep pace with Moore’s law s going to be out of our hands.

On the other hand, in a quantum computer operate with qubits that can with a certain probability be zero and with a certain probability be one. This means that qubits communicate with one another and act in cooperation, and the number of states in a quantum registry increases in correspondence with the number of qubits. Operations can be performed on all these states simultaneously, resulting in combined capability. Moreover, many complex problems can be solved by Quantum computer which may not be solved by fixed 2 state bits of basic computers [4].

2. MOORE’S LAW

Moore's law was an observation that stated that the number of transistors in a dense integrated circuit, doubles after every two years. The observation was named as Moore's law after Gordon Moore, was the CEO of Intel and the co-founder of Fairchild Semiconductor, whose 1965 paper described a doubling within a year for the number of components per integrated circuit, and predicted this rate of growth would continue for at least another decade. In 1975, looking towards the upcoming decade, he revised the forecast to doubling every two years, a compound annual growth rate.

According to Moore's colleague, Intel executive David House, the doubling period was often misquoted as 18 months. In 1975, House noted that Moore's revised law of doubling transistor count every 2 years, meant that computer chip performance would roughly double every 18 months (with no extra consumption of electricity). Moore's law is closely related to MOSFET scaling(MOSFETs, or MOS transistors) are the key driving force behind Moore's law.

Moore's prediction did prove to be accurate for several decades and was in use within the semiconductor industry, for setting targets for long-term planning and for research and development (R&D). Progress in digital electronics is clearly linked to Moore's law: defines the memory capacities, quality-adjusted microprocessor prices, sensors, and even the number or size of pixels in digital cameras. Digital electronics have made a significant contribution to world economic growth in the early twenty-first centuries and late twenties. Moore's law stands with describing a driving force to technological and social change, economic growth and productivity. It is known to be an Empirical Relationship and not a Physical or Natural existing law. Although it was noticed that since 1975 until around 2012, the rate held steady, the rate was seen faster during the first decade. In general, it is not logical to extrapolate from the historical rate to an indefinite future [2].

3. SHOR’S ALGORITHM

Shor's algorithm is a quantum computer's polynomial-time algorithm for integer factorization. It solves the problem: Provided an integer $N$, find the prime factors for $N$. Invented in 1994, by Peter Shor, an American Mathematician. Shor's algorithm runs in polynomial time on a quantum computer, to factor an integer $N$. Specifically, it takes quantum gates of order $O((\log N)^2(\log \log N)(\log \log N))$ sing fast multiplication, thus demonstrating that the integer factorization problem can be efficiently solved within the quantum computer and is subsequently in the complexity of class BQP. It is running almost at an exponential rate than those running at most efficient known classical factoring algorithm, the general number field sieve, which works in sub-exponential time. The efficiency of Shor's algorithm is due to the efficiency of the quantum Fourier transform, and modular exponentiation by repeated squaring [6].

4. NEED FOR QUANTUM COMPUTING

- A quantum computer stands enough to execute Shor's algorithm for big numbers and is one of the primary motivators for advancing in the field of quantum computation. We require Quantum Computing to accessa number of speed-ups for only specific types of programs and problems.
Quantum computers will help in problems related to optimization, which play key roles in everything ranging from defense to financial trading.

Two of the most prominent areas are

1. Quantum Sensing and Metrology, which leverage the extreme sensitivity of qubits to the environment to realize sensing even the classical short-noise limit

2. Quantum Networks and Communications, which may lead to revolutionary ways to share information [5].

5. HOW ARE DEVELOPERS TRYING TO GET IT?

1. Qubits need protection from the environment as the environment can destroy the delicate quantum states needed for the calculation. The longer a qubit survives in its desired state the longer is its “coherence time.” From this perspective, isolation is important.

2. For various algorithms, execution qubits need to be intertwined, shambled around physical architectures, and controllable on demand. The better the operations can be carried out, the higher is their “fidelity.” Balancing the required isolation and interaction is tedious.

3. Superconducting systems, semiconductors, and trapped atomic ions are some of the lead platforms to build quantum computers. There are various types of operational frameworks. Gate-based quantum computing is the best identified. In it, qubits are prepared in initial states and then subjected to a series of “gate operations,” like laser pulse or current depends on qubit type. These gates, the qubits are put to superpositions, tangled, and subjected to logic operations like the AND, OR, and NOT gates of traditional computation. The qubits are then measured and results are obtained.

4. Highly tangled qubits also serve as the starting point. Then, instead of performing change operations on qubits, single qubit measurements are performed, which leaves the targeted single qubit in a definitive state. Based on the result, further functions are carried out on other qubits and eventually a solution is reached.

5. The analog quantum computers or quantum simulators envisioned by Feynman. Quantum simulators can be thought of as a specific purpose quantum computer that can be programmed to model quantum computers. With this ability, they can tackle questions such as how certain chemicals react, or how to design materials with certain properties, or how high-temperature superconductors work [5].

6. HIGH-PERFORMANT CHIPS IN A MULTITUDE

Would we require more powerful computer chips in 10-20 years from now? Today, our phones and computers seem perfectly capable of running any application or game, and for streaming video. The answer is: yes – the need for high-performance computing will continue to increase.

In 2035, we would still be able to produce a humungous amount of data, without deleting the one available. Give thought to pictures and videos posted on social media, in whatever form they are available, the great amount of data is processed by companies such as Google, Facebook, and Amazon. Wearables and Ingestibles continuously monitor our health and combine the data to our genetic imprint. To this a large amount of data generated by emerging technologies like IoT applications such as autonomous cars, smart buildings, cities, and devices. Most of the data will be processed and stored in the cloud. This can only sustain by increasing more performant computing and memory solutions.

It will only be useful for certain applications like, for solving problems that have many variables as their input.

The search could be significantly advanced if a quantum processor could be used such as a building block of the supercomputing systems. Besides material discovery, there are many other useful applications, including weather and climate modeling, space exploration, fundamental science, the modeling of economic or societal, machine learning, and the development of personalized medicine [3].

7. CONCLUSION

- Quantum computers have the ability to revolutionize calculations and computations by making a certain type of classical problems solvable.
- A few advanced companies and small start-ups now have to function non-error-corrected quantum computers composed of several tens of qubits, some of these are even accessible to the public through the cloud.
- Additionally, quantum simulators are making progress in fields varying from molecular energetics to many-body physics.

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Abstract: In network-based learning environments collaboration and communication is the main idea. Many of the current studies, however, focus on collaboration through the computer, or computer-supported collaborative learning (CSCL), facilitated by different network-based collaboration tools. There has been an erratic increase in the use of computer networks in education and training. Although all “e-Learning” or virtual learning environments do not include any systematic collaboration, the ideas of CSCL are gradually increasingly applied in different practical methods of network-supported learning. The communication tools can be based on synchronous media or they can support asynchronous communication. It is an intense development phase where creative ideas on ICT tools as well as new organization of the learning environment and enhanced pedagogical methods are tried out. This editorial paper elaborates on properties of ICT supported collaborative learning, the use of the ICT tools that enhances the teaching learning environment and also the various ICT tools being used in today’s time for collaborative learning along with the emerging trends in CSCL, paper also highlights the changing role of teachers in CSCL.

Keywords: Collaborative learning, ICT, ICT tools, CSCL, e-Learning, Pedagogical methods.

1. INTRODUCTION

CSCL emerged in response to skills that are important in a knowledge-based society. These are skills that were previously associated with deep learning of specialized knowledge, meta-communication, meta-cognition, and task re-conceptualization (Jarvela & Salovaara, 2004). These skills are not easily taught through memorizing and fact finding using textbooks, which are prevailing methods learning basic skills. In fact finding, for example, the goal of the activity is most often invisible to students and the focus tend to be on tasks (Hewitt, 2001). Computer-Supported Collaborative Learning (CSCL) is the field concerned with how Information and Communication Technology (ICT) might support learning in groups (co-located and distributed). It is also about understanding the actions and activities mediated by ICT. Educational applications range from generic collaboration environments (e.g. forums) to tools for developing domain-specific knowledge. Technical advances in computer science have contributed to CSCL in various ways. For example, researchers in Computer Supported Cooperative Work (CSCW) have developed groupware systems that have been adopted for educational purposes (e.g. Stahl, 2006). Groupware provide shared spaces (Bannon & Bødker, 1997) on the www for storing and sharing information (messages, documents, pictures, videos) and engaging the learners in social interaction (Girgensohn & Lee, 2002). When adopted in schools they allow teachers and learners to interact online using a variety of communication and collaboration tools. Examples of shared spaces are BSCL (Stahl, 2006), FLE (Mukkonen et al. 1999), and Knowledge Forum (Scardamalia & Bereiter, 2006).

2. COLLABORATIVE LEARNING IN HIGHER EDUCATION WITH THE INTEGRATION OF ICT

Kaufman et al. (1997) define collaborative learning as a spectrum of instruction that involves small groups of students who have assigned an academic goal; on the other hand, Prince (2004) defines cooperative learning as a structured form of group work where students pursue common goals while being assessed individually. Although some authors (e.g. Kaufman et al., 1997) distinguish between collaborative and cooperative learning as having distinct historical developments, this study will assume the perspective of Panitz (1996) and Prince (2004) that collaborative learning encompasses cooperative learning as, in either interpretation, the core element is the emphasis on student interactions rather than on learning as a solitary activity. The importance of computer supported learning is an emerging branch of the learning sciences concerned with studying how people can learn together with the help of computers. ICT can be beneficial to promote active and collaborative practices is that of fostering the change of a traditional teaching system to adopt and incorporate ICT in teaching and learning.

The stimulating potential of the internet to connect people in inventive ways provided a spur for computer supported collaborative learning research. As ICT developed, unpredicted barriers to design, disseminate and effectively take advantage of innovative educational software became more and more apparent (Stahl et al., 2006). As mentioned in the report made by the International Commission on Education for the Twenty-first Century (1996), this technological revolution obviously constitutes an essential element in the understanding of our modernity, as it creates new forms of socialization and, even,
new definitions of individual and collective identity. ICT have been played an important role in the development of new theoretical approaches on teaching and learning and how important it is to understand technology-based environments that can offer learners with new opportunity for activities which are beneficial for knowledge construction. Developments in ICT offer increasing possibilities for collaborative learning. E.g. technology enhanced learning environments can provide advanced means for the production of knowledge and constructive communication, and interactive and collaborative learning in (and between) classrooms and between teachers and learners.

3. PROPERTIES RELATED TO ICT SUPPORTED COLLABORATIVE LEARNING:

3.1 Computer-supported collaborative learning (CSCL) is the field concerned with how information and communication technology (ICT) might support learning in groups.

3.2 Learning with ICT tools and services, learners enhance their knowledge of and ability to use those technologies, and come to see them not only as necessary to their immediate learning but also (and above all) as a means of furthering their lifelong learning.

3.3 An important skill that must be acquired quickly if cooperation is to be truly effective is that of the mediation/negotiation of ideas and proposals in the group – a willingness to accept others’ proposals when these appear better than one’s own.

3.4 Activities calling on learners to interact and compare enable them to analyse course content not just from their own viewpoint but also from that of other members of the learning group. This often stimulates observations and reflections which would not emerge in individual study.

3.5 This is a very effective way of helping learners grasp the complexity and interdependency of the various knowledge domains.

3.6 Add flexibility of time and space for cooperative/collaborative learning The new workspace is increasingly a virtual one in which work is done by individuals who are distributed in place and time.

3.7 Academic Achievement The results of studies examining cooperative, competitive, and individualistic learning using computers (Johnson & Johnson, 1989; Johnson et al., 1998b; Johnson, Johnson, Stanne, & Garibalde, 1990; Johnson, Johnson, Stanne, Smizak, & Avon, 1987) found that computer-assisted cooperative learning yields higher quantity and quality of daily achievement, greater mastery of factual information, and greater success in problem solving than computer-supported individualistic learning.

4. EMERGING TRENDS IN CSCL

Resources are everywhere like books, blogs, social media like Twitter chats, Voder groups, your PLN, or even conferences, EdCamps and similar professional development opportunities. But even with all of these resources available, it still comes down to taking a risk and trying something new. Here are some helpful and versatile technology tools to easily and quickly integrate into your classroom and get your students in a classroom collaboration mindset.

4.1 Big Data: Services like Edutrends and Knewton are able to anonymously mine data about students and turn that data into usable information for the parents, teachers, the school board, and other stakeholders in the schools. And it isn't just large trends either. For example, the data may reveal that a student having trouble with word problems in math has decent math skills but is having trouble with reading. In the old system, the student would have to practice more math problems, but with the help of Big Data, the teacher would know the students needs a reading tutor. Big Data gives us the ability to dynamically adjust a course along the school year.

4.2 User-generated content: also known as crowd-sourced content, is media generated by one or more often many lay-persons rather than a single expert or group of experts. The best known example of this is Wikipedia. Content generated by Wikipedia is not created or curated by one group of elites. Instead, the content is generated by users and then edited by other users.

4.3 Augmented reality: Virtual reality is something we associate more with oversized headsets and a slight sense of dizziness. Augmented reality is a little more like Google Glass. Using eyewear or holding your device in front of you, you can see the world around you, but you can also see important information overlaid on it. This can be anything from a translation of a foreign sign, the constellations in the night sky or information from every social media and search engine at once.

4.4 Survey Monkey: is a good way to ask a variety of questions, find out what students are thinking, use it for a quick formative assessment, and many other possibilities. I have used it to find out how students prepared for tests, what areas they need help with, and even for voting for club officers and planning trips. You have the results quickly and can provide feedback instantly, to plan your next steps in class. It can be a different way to find out about your students and their needs.

4.5 Blogging: Through blogging, teachers can provide support for students and help them to gain confidence in writing and speaking.

These tools provide ways to get students talking and share their ideas, so that classroom collaboration can even be taken home.

5. CHANGING ROLE OF TEACHERS IN CSCL:

5.1 Technological inventions ranging from smart boards to tablets and softwares like google classroom, Google drive,
Khan’s academy etc. continue to proliferate everyday learning.

5.2 Teachers are now drawn to use technology regularly and in more collaborative ways.

5.3 Technological transformations is witnessing the changing role of the teacher in the classroom.

5.4 Teachers need to harness the power of technology by allowing students to learn at their own pace in a collaborative way.

5.5 Digital learning can enhance collaborative, creative, interactive & research skills in the teachers.

5.6 Technology can also help to enhance effective communication problem-based learning, as the learners already embrace social media digital communication in their everyday lives.

5.7 Face book, twitter, games, mobile phones & apps form a large part of everybody’s lifestyle, teachers can use this reliance to encourage collaborative learning.

5.8 Internet & online tutorials offer a more expansive world to explore compared to traditional lectures.

5.9 Teachers can help to develop 21st century skills like communication, knowledge creation & collaboration in the learners.

6. CONCLUSION

The advances of the learning sciences, combined with the needs of the knowledge society, have heightened the requirements for flexible (time and space) and challenging (problem-solving and knowledge building) learning environments. Many perspectives contribute to the understanding of technology in support of collaborative learning. The last 20 years have been highly productive for CSCL. This might increase not only the level of quality, but also the level of students’ work due to activities pertaining to developing their learning with the help of technology. Also it is essential that teachers need to be involved in collaborative projects and development of intervention change strategies, which include teaching partnerships with ICT as a tool. Teacher perceptions are a major predictor of the use of new technologies in instructional settings. CSCL offers flexibility in learning methods and supports extensive interaction between the learner and teacher. It can manage learning using a software application based on internet technologies that support management and delivery of learning content and services. These trends open new possibilities for the educational process and create a new phenomenon in the field of gradual and lifelong education for the learners. Hence Computer-supported collaborative learning is one of the most promising ideas to improve teaching and learning with the help of modern information and communication technology.

REFERENCES


Abstract: Education systems have evolved over the centuries in response to social, economic and technological innovations, which in turn are impacted by the evolution in education system itself. The basic purpose of education and training is to empower an individual to lead a successful life and contribute best to him, family, society, nation and humanity. Therefore education and training are the most effective tools to achieve a successful life. The World Economic Forum announced the Fourth Industrial Revolution, and predicted 'major shift about the education system and future of jobs. Almost everyone is talking about the 4th Industrial Revolution (4IR). The 4IR wave is so strong that change is inevitable; this makes Education 4.0 the famous buzzword among educators today. So the question comes what is Education 4.0 and quality 4.0? Do educators really understand it or they simply follow what others are doing? Quality 4.0 and Education 4.0 is a response to the needs of IR4.0 where human and technology are aligned to enable new possibilities.

Keywords: Industrial revolution, Quality 4.0, Gen Z learner, learning process, Digitalization.

1. INTRODUCTION

As the world is moving with Industrial revolution 4.0 the existing process of knowledge creation and research must also be changed as per the requirement of time.[1] Upcoming technologies, driven by Industry 4.0 have begun adding more fire to already volatile, uncertain, complex & ambiguous (VUCA) world and impacting our life, our relationship, our work, our environment, our Education and even our future. The brief introduction about the Industrial revolution is as follows:

- The First (real) Industrial Revolution embodied three revolutionary changes: Machine Manufacturing, Steam power and the move to city living, for people who had previously been agriculturalists.
- During the Second Industrial Revolution, the production line and mass manufacturing drastically reduced the cost of consumer and industrial products.
- The Third Industrial Revolution used electronics and Information Technology to automate production at a significantly lower cost.
- The Fourth Industrial Revolution[2] is happening around us right now. Industrial revolution 4.0 focus on Digitalization and personalization in which emphasis is on implementing technologies and cooperation between man and machine. As the fourth revolution takes hold, it will impact everything that we do. It connects people, machines and data in new ways, it democratizes (accessible to everyone) technologies that were previously only accessible to the specialized few.

Education 4.0 leads to Quality 4.0 and Quality 4.0 strategies will be built on the technologies and processes of the still-emerging Industry 4.0. Industry 4.0 is focused on the digitalization.

The aim of the paper is to identify the impact of industrial revolution on Education of Gen Z and hence need of Education 4.0. Section 2 explained the latest technologies trending in 4th Industrial revolution, Section 3 introduces Gen Z learners and learning process and section 4 described the Evolution in Education sector and lastly conclusion has been given.

2. LATEST TECHNOLOGICAL DEVELOPMENT

The critical technology changes includes advances in AI/ ML, Big data, analytics, connectivity, scalability, and collaboration[5]. For providing quality Education, these technologies are important because they enable the transformation of culture, leadership, collaboration, and compliance. Let’s discuss some of the critical technology.

i) Artificial Intelligence /Machine Learning /Deep Learning-

AI, ML and Deep Learning are the main building blocks of 4th Industrial revolution. The major difference in all of these are shown in figure 1:

![Fig. 1. Comparison between AI, ML and Deep learning](image-url)
ii) **Big Data:** Data-driven decisions have been at the heart of quality improvements for decades. The 4 V’s associated with Big data are:

- Volume refer to incredible amount of data generated each second from social media, cellphone, sensors etc.
- Variety is defined as different types of data vary from structured, semi structured and unstructured.
- Veracity is the quality or trustworthiness of the data
- Velocity refers to speed at which vast amounts of data are being generated, collected and analyzed.

Figure 2 show the difference between Traditional Data and Big Data.

![Fig. 2. Difference between Traditional data and Big data](image)

iii) **Augmented Reality:** Augmented reality (AR) is a type of interactive, reality-based display environment that takes the capabilities of computer generated display, sound, text and effects to enhance the user's real-world experience. Some example of Augmented Reality are:

- IKEA Mobile App: IKEA is known in the tech world as one of the first companies to use augmented reality. The retailer began experimenting with augmented reality back in 2012, when shoppers could use the app to see how tables and shelves would look in various places around their house. IKEA is taking it a step further with its IKEA Place app, which now allows you to select anything from the store’s catalog and see how it will look to scale anywhere in your house. This is an extremely helpful tool for people who are wondering if a certain piece of furniture will fit in a tight space, or if the color of their prospective purchase will match the motif of the room.

- Pokemon go App.

- L’Oréal Makeup App: L’Oréal has a mobile app that will allow users to try out various types of makeup.

- Weather and sports programs continue experimenting with augmented reality as a way to improve the television experience for viewers.

iv) **Virtual Reality:** Virtual reality is an artificial environment that is created with software and presented to the user in such a way that the user suspends belief and accepts it as a real environment.

- VR places the user inside an experience. Instead of viewing a screen in front of them, users are immersed and able to interact with 3D worlds.

- Virtual reality helps people to do that task which they can’t do in the real world. Virtual reality is having many importance in different sectors such as education, automobile, finance and many more.

- Virtual reality will be used in medicine, architecture and many other spheres of life. Virtual simulators for training future pilots and operators of Nuclear Power Plant (NPP) have existed for a long time. It gives them an opportunity to test themselves in true to life situations. They can also improve their skills without fear to fail.

- Virtual reality glasses or goggles are a type of eyewear which functions as a display device. They enable the wearer to view a series of computer generated images which they can then interact with.

v) **Analytics:** Analytics unlock the insights captured within data. Analytics fall into four categories namely descriptive (What happened), diagnostic (Why it happened), predictive (What will happen) and perspective (What action to take).

vi) **Connectivity:** “Connectivity” is the connection between Organization, Information technology (IT) and operational technology (OT). It should be ensuring that data, processes, and people all work together to enable effective, data-driven, and bidirectional communication.

vii) **Connectivity:** Broadly stated, “connectivity” is the connection between Organization, Information technology (IT) and operational technology (OT). It should be ensuring that data, processes, and people all work together to enable effective, data-driven, and bidirectional communication.

viii) **App Development:** App development is something everyone can relate to quality– there are apps for everything. Apps are the mechanisms through which Organization fulfill processes, collect and expose data, visualize analytics, and establish collaboration. Mobility and interactive apps fuel quality management system.

ix) **Scalability:** Scalability is the ability to support data volume, users, devices, and analytics on a global scale. Cloud computing is an important contributor to scalability.
Through Cloud, it is easy to provide Software as a Service (SaaS), without the need to acquire, install, and manage the software on premise.

Cloud also provides Infrastructure as a Service (IaaS) by enabling globally accessible and high availability (high uptime) solutions.

Platform as a Solution (PaaS), providing the core software plus an extended ecosystem of partners that all connect to enrich the core software.

3. GENERATION Z LEARNER

The current learners are of Generation Z[3]. Generation Z composed of those born between 1995 and 2010.17% of Gen Z want to start their own business and hire workers; 46% of Gen Z are true ‘digital natives’ and are tech experts by keep themselves connected10+ hours a day, 34% of Gen Z are most concerned about boosting their people management skills. Some of the characteristics of Gen Z learners are:

- Highly Connected and tech-savy.
- A mind-set that technology can solve every problem.
- Seek involvement in learning process but at their own pace.
- Welcome challenges, enjoy group working.
- Time and place agnostic learning; Love freedom
- Engaging them in traditional way is more challenging.

As we know learning is a continuous process but the question originates “how do we learn?” The answer lies in the following lines: I see and I forget; I hear and I remember; I do and I understand; this is what we can see in learning pyramid too shown below in figure 3. It shows how much we learn by using different methods of learning: verbal, visual and Action learning. We learn10% of what we read, 20% of what we hear, 30% of what we see, 40 to 50% of what we watch, 70% through activity, 90% by simulation and 100% by participating in activity.

![Learning Process](image)

Fig. 3. Learning Process

4. EVOLUTION OF EDUCATION

- Education 1.0: Education in the ancient and Middle Ages comprised of personalized education confined to few students, low literacy rates and informal methods of education, which gradually developed into formal schools in later centuries.

- Education 2.0: The invention of the printing press in the mid-15th century completely transformed the education sector and helped increase literacy levels as it enabled rapid dissemination of ideas through books.[4] Socio-economic advances in this period led to Education 2.0, which took several thousand years to transform from traditional Education 1.0.

- Education 3.0: The emergence of internet and IT changed the mode of delivery, providing a technology platform to learn. The instructional theory and foundations are delivered to students across technology-enabled platforms.

The focus of Education 4.0 is around “experiential learning” of the individual by using dynamic technology. A tighter integration with the Industry and society also provide a robust platform for learning from the peers, social interactions and real-world issues. The method and practice of teaching also vary in education 4.0.

- Education 4.0: The changing skill requirements from the industry demand a competency-based learning model rather than a fixed learning structure. In Education 4.0, the learner will always be at the center of the education ecosystem.

Trends related to Education 4.0 which leads to Quality 4.0 are:

- Learning can be taken place anytime anywhere. E-Learning tools shown in figure -4 offer great opportunities for remote, self-paced learning. Flipped classroom approach also plays a huge role as it allows interactive learning to be done in class, while the theoretical parts to be learned outside the class time.

- Learning will be personalized to individual students. They will be introduced to harder tasks only after a certain mastery level is achieved. More practices will be provided if the instructors see a need in it. Positive reinforcements are used to promote positive learning experience and boost students’ confidence about their own academic abilities.

- Students have a choice in determining how they want to learn.[6] Although the learning outcomes of a course are preset by the institutions/bodies in charge of the curriculum, students are still free to choose the learning tools or techniques that they prefer. Among the options that teachers can adopt to enable students to be creative in their learning are blended learning, flipped classroom and BYOD (Bring Your Own Device) approach.

- Students will be exposed to more project-based learning. Students are required to apply their knowledge and skills in
completing a couple of short term projects. By involving in the projects, they are practicing their organizational, collaborative and time management skills which are useful in their future academic careers.

- Students will be exposed to more hands-on learning through field experience such as internships, mentoring projects and collaborative projects. The advancement of the technology enables the learning of certain domains effectively, thus making more room for acquiring skills that involve human knowledge and face-to-face interaction.

- Students will be exposed to data interpretation in which they are required to apply their theoretical knowledge to numbers and use their reasoning skills to make inferences based on logic and trends from given sets of data.

- Students will be assessed differently and the conventional platforms to assess students may become irrelevant or insufficient. Students' factual knowledge can be assessed during the learning process, while the application of the knowledge can be tested when they are working on their projects.

- Students’ opinion will be considered in designing and updating the curriculum. Their inputs help the curriculum designers to maintain curriculum, up-to date and useful.

- Students will become more independent in their own learning, thus forcing teachers to assume a new role as facilitators who will guide the students throughout their learning process. Now trained faculty will play the role of mentor and facilitator both.

- Universities need to equip learners with problem solving and decision making skills
- Develop educational Content in collaboration with industry so as to Inculcate 4Cs into students-Communication, Collaboration, critical Thinking, Creativity[7].
- Make programming or ICT a compulsory Subject and introduce big data analysis, machine learning & block chain technology as mandatory.
- More weightage to skill domain, by implementing competency based curriculum.
- Reform content and the methodology of education and should be on lifelong learning instead of front loaded

5. CONCLUSION

- The changes that take place in Education 4.0 really describe the learning preference of the Gen Z students.
- It is about time for class instructors to consider integrating more current technologies in their teaching methodology.
- The students now have different preferences than students of 10 years ago. Integrating more current technologies will make the instructors more creative in designing their lessons, thus making the learning more interesting.
- Learning can also be more effective as the way it is delivered matches the Gen Z students’ preferences.
- With the addition of new skills in curriculum, student can easily adapt themselves in revolution 4.0.

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Catalyst for Innovation in Higher Learning: ICT and E-learning

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Abstract: ICT and e-learning can enhance the quality of higher education through innovative methods by increasing the student’s enthusiasm, interest and engagement, by facilitating the acquisition of skills and by enhancing teacher training which will sooner or later improve communication and exchange of information. The change in higher education institutions doesn’t depend exclusively on these technologies, but more on the human resources and how they can come close to and use all the new technologies and education system possibilities. Globalization and technological change are one of the main goals of ICT. This paper is an attempt to describe about ICT in general and Education system and also examines the role of ICT in higher education system, its effectiveness so as to deal with the challenges of global competitiveness in developing countries. Hence the study leads to the conclusion that ICT and E-learning are catalyst for innovation in higher learning

Keywords: ICT, Education system, Educational Technology, Globalisation, E-learning

1. INTRODUCTION

ICT is breaking through cultural, economic, political and social barriers of nations (Mugimu, 2006). ICT represents the international system that is shaping most societies today including education system programs. It is a process that is “super charging” the interaction and integration of cultures (Welsh et al, 2003). People around the world are thus required to develop high level of creativity and imaginative skills as well as innovative competencies needed to become competitive in the global economy (Lewin, 2000; Wende, 2002). Through the adoption of low cost ICT and Education system technologies and approaches being promoted in universities education will become more competitive globally. Universities are therefore challenged to become more innovative in preparing and producing individuals that are adequately and sufficiently equipped to function in the rapidly changing demands of the global job market. ICT means bringing the vast world so near. It implies that communication systems become so simplified and advanced to foster rapid development. There is, for instance, a lot of Internet learning around the global across one education system with another. This paper examines the role of ICT in higher education system, its effectiveness so as to deal with the challenges of global competitiveness in developing countries. Higher education of quality could be brought to many more people if only universities in the developing world could get on the bandwagon of advancing ICTs and creatively tap into the current Education system possibilities and innovations (cf. Mugimu, 2006)[33]. He acknowledges that the pursuit of technological transformation in higher education has become widespread in Sub-Saharan Africa with the extensive occurrence of global networks like the Internet and Intranet as institutions take great effort to prepare students for effective participation in the emerging global knowledge economy. Technologically based Education system education is further seen as a way to address the increase in the world demand for tertiary education. Daniel (1998)[12] states that one new education system per week is required to keep pace with world population growth but the resources necessary are not available. For instance, since the time of the overwhelmingly increased student enrolments in many public universities in Uganda from the 1990s and onwards, existing resources and infrastructure have not increased commensurate to the same increase in the student capacity.

Lecture theatres and libraries are flooding and infrastructure and instructional materials and staff are all guarded with the alarmingly increased student populations. For the effective and increased utilization of the public resources Higher education must develop more cost-effective. A lecture theatre in a public education system that sits over 300 students attending an economics class will not be effective if more public address systems are not installed to enable each and every learner benefit from the lecture. Likewise, if a education system lacks internet facility to serve its ever increasing student population then it would be quite hard to make sure quality learning and research. By using technology for teaching, universities can serve the public more cost effectively and in particular can prepare students better for a technologically based society. In view of the growing ICT and transnational exchanges in many fields, scholars like Evans and Nation (1993) indicate that in these circumstances politicians, policy-makers, and citizens should make demands upon education systems to reform. Open learning and distance education are at the forefront of educational responses to the changes that are taking place locally, regionally, nationally and internationally.
2. WHAT IS EDUCATION SYSTEM?

E-learning may mean different things to different people. According to Welsh, Wanberg, Brown and Simmering (2003:246) “Education system can be defined as the use of computer net work technology, primarily over an intranet or through the Internet to deliver information and instruction to individuals” Halkett (2002:46) pointed out that Education system offers a number of new tools to teaching-e-lectures, message boards, chartrooms, interactive assessment marked by computers, and prospects of unlimited access to electronic resources. However, Education system is more than computer and Internet. All electronic devices such as CD ROMs, DVDs, Radios, Television, satellites, mobile phones, etc that could be used to enhance learning through multimedia capabilities and network technologies can be a part of the education system. Network technologies have the potential to deliver timely and appropriate knowledge and skills to the right people, at a suitable time, in a convenient place, which is what Education system/ E training is all about. It allows for personalized, just-in-time, up-to-date, and user-centered educational activities (Haddard & Draxler, 2002: 12). Thus, Education system should and be required to permit ample execution of flexible educational programs to meet the diverse needs of students opting for higher education. For instance, Flood (2002) contends, “Education system can offer a rich choice of learning experiences that fit in with specific needs, aspirations and learning styles, and so it can…facilitate personal growth and professional development”.

Furthermore, the Education system approach could be a powerful tool or means to facilitate association between different learners across the globe (MacDonald & Thompson, 2005). However, Education system could be more than just using technology to deliver the instructional materials but rather in using technology to build learners’ capacity to learn on their own and at their own pace (Flood, 2002). Unfortunately, the capacity and necessary infrastructure and human resources to support and embrace E-learning capabilities may be lacking in universities in developing countries. An important arching question is that; how could universities in developing countries take advantage of Education system innovations in order to make their services easily accessible to more people, regardless of the existing obstacles? Justification of Education system innovation in Universities in Developing countries Information technological transformation in universities, however, has major systemic implications and needs to be carefully managed as Drucker (1998) points out that as soon as an organization takes the first tentative steps from data to information, its decision processes, management structure, and even the way it gets its work done begin to be transformed. Attempts to introduce any significant reform will impact on all of its sub-systems.

The advent of information technology in any big education system will in every respect impact tremendously on the internal and external operations of that education system. It implies that with information technological advancement, universities have to prepare themselves to welcome such crucial developments. It systematically relates to the fact that education system management has to train or hire manpower to operate the technology; and the same universities should change the teaching approaches to cope with the demands of the new information technology. As indicated also by Haddard and Draxler (2002), the benefits associated with E-learning could be many. If only stakeholders become more creative and innovative. Welsh et al (2003) highlighted six benefits of Education system. They say that Education system could: Provide consistent, worldwide training. Reduce delivery cycle time. Increase learner convenience. Reduce information overload. Improve tracking learners’ activities. Lower expenses of educational provision (Low-cost technologies).

Furthermore, Education system could also stimulate students to do independent work, hence promoting students’ ability to develop self-learning skills. Education system could also act as a leverage to improve the day-today administrative and management operations of universities in the Third world. For instance, by making dissemination of information about students’ admissions, registration, assessment, schedules and timetables etc…much easier and in a timely manner. Universities in developing countries could bring knowledge closer to many students even those off-campus and could not otherwise afford to physically attend normal educational programs. Isolated students and professionals in the civil service or private sector could be able to work and study at their own pace, any time, and anywhere via the Internet or intranet (Haddard &Draxler, 2002). Education system could also cultivate online interactions among participants, even when may be many miles apart. Students’ social construction of knowledge in terms of facilitating sharing of ideas in the online discussion groups could be an immense possibility. There are many students today who are pursuing studies in many universities overseas but do not need to leave their mother country to be fulltime students in foreign countries. Instead, the Education system methodology has made it easy for such interaction to be possible because academic promoters can share smoothly with students via emails and with the aid of the online library. Research (MacDonald &Thompson, 2005) shows that Education system combined with instructional strategies and multimedia tend to create positive attitudes of students as well as promoting decent learning outcomes. Thus, stakeholders of universities in the developing world should and ought to become creative and imaginative for their success in embracing Education system.

3. OBSTACLES AND CHALLENGES OF EMBRACING EDUCATION SYSTEM INNOVATION

Some of the obstacles and challenges that could undermine/hinder universities in the developing world to implement and embrace Education system capabilities include:
Majority of education system administrators, teachers and students tend to lack awareness of Education system innovations and its capabilities. Stakeholders are therefore not willing to pay the cost necessary to embrace Education system.

Most universities in developing countries are ill equipped in terms of technical support and administrative staff required to facilitate the integration of Education system with existing programs.

Most students and instructors do not have access to personal computers and ICTs, besides being incompetent in Education system.

Poor/ insufficient connectivity to Internet or intranet, telephone lines, etc is a serious problem.

Inconsistent electric power supply is a critical stumbling block Education system growth in Third world Universities given the fact that Education system equipments run on electricity.

To compound this challenge even further, sources of alternative options for electric power are difficult to find. In addition, given that universities in developing countries are well known for their classroom/lecture room face-to-face delivery strategies such as tutoring, lectures, conferences, etc., Education system may thus be perceived by many as being inferior in terms of academic integrity/rigor (MacDonald &Thompson, 2005). It is not surprising that many stakeholders tend to be reluctant to introduce and accept Education system because of the fear to undermine the reputations of their institutions. Education system demands that teachers in higher education must learn and develop unfamiliar innovative teaching strategies far beyond their normal routines. For instance, teachers’ roles are shifting from being sole providers of knowledge to facilitators of knowledge (Haddard & Draxler, 2002). Students’ roles also are changing from being passive recipients of knowledge to becoming active collaborators of knowledge. Inevitably, the resistance to Education system innovations by stakeholders in many universities in the developing countries is and will remain of serious concern.

The practicability of establishing and embracing E-learning within the universities in developing countries is questionable. It is not surprising that Education system innovations have not yet taken deep roots, as it should be in many universities. With the existing inadequate infrastructure, human resources and financial resources, exploiting technological innovations in ICTs and Education system is still a challenge in most of the mushrooming and traditional universities in the Third World (Naidoo, 2001:34). It is likely that the existing infrastructure may be too old and therefore incompatible to the rapidly changing technology. Universities may therefore be required to carry out expensive/costly major renovations to upgrade or replace existing infrastructures to accommodate the advancing technologies in ICTs and Education system. The dynamics involved in implementing and embracing Education system are somewhat complex and paradoxical. Involving academics in Education system reform in Universities Educational institutions exist to open minds and challenge established doctrine, but at the same time, the manpower that occupies these institutions is extremely resistant to change (Robbins and Barnwell, 1998). Higher education can be described as largely bureaucratic and bureaucracies, by definition, resist change (Tapscott, 1996). I recall an incidence during my education system life when my old professor hated something called a computer and a projector used in teaching. Whenever I told him that my research analysis was based on computer packages he retorted negatively “you are bound to fail research, please use the formulas I gave you in class”. Such an expression and reaction depicts an “old fashioned academic” who is not ready to accept recent global changes in the area of academics in universities, the Internet or even Education system in that matter. Many other students, in recent times, face the same wrath of such unsighted professors. Because of the wide resistance to change in most higher education institutions, Education system innovation has often been implemented as an isolated, top-down initiative of education system managers for efficiency purposes. In this scenario, the wider systems within tertiary education are often not considered and neither affected by the innovation. Technological innovations have also experienced difficulty-taking precedence in top offices in education system education (Pastore, 2005). Higher education, similar to other sectors of society, has often responded to new Education system and ICT applications on the basis of efficiencies rather than the use of more strategic considerations. Some staff have resisted IT advocating remaining in use of the old systems of processing student papers.

They type writer and old record keeping methods are still in use creating managerial inefficiencies in the “transcript office” and at the departmental examinations office. This traditional criterion of record management tends to stifle operational effectiveness. Most changes in education in the twentieth and twenty first centuries respectively had been first order changes, which aimed at improving efficiency and effectiveness of current practices. One of such first order changes is the introduction of the Internet and the computer in management work and teaching methodology. Therefore, attempts to oppose such lucrative developments in any global institution are a path in the wrong direction because technology is here to stay. To ensure ownership of sound educational quality in ICT and Education system, it is important that educators and educational policy drive and direct technological transformation of higher education. Therefore, the structures supporting technology-based education have to ensure an educational focus and pre-eminence of educational principles and policy grounded on administrative desires and attitudinal change. Caladine (2003), who reviewed the literature on non-traditional modes of delivery in higher education using state-of-the-art technologies, indicates that the extensive use of Education system in education poses previously un
encountered problems in pedagogy which are attitudinal. In addition, these problems are primarily to do with conservativeness of those who fear technological change. Technological decisions need to be preceded by policy and educational decisions and highlighting the importance of bottom-up and more organic approaches during technological transformation in higher education in the developing world. Engaging academics to appreciate Education system is a significant management issue in higher educational reform and such reform has to be based on the development of ‘learning communities’. That means that the actual process of reform must engage academics in actual learning of how to use the new technologies and seeing that this technology is further promoted creating self initiative so as to build self-confidence and sharing. In most cases, Education system training should be made compulsory to every academic and don. This requires serious bottom-up approaches to encourage and implement the reforms. Top down attempts to achieve educational reforms in technological outlook have failed and will be doomed to failure until they confront the cultural and pedagogical traditions and beliefs that underlie current practices and organizational arrangements (Goodman, 1995). In technological transformation in higher education, it seems necessary to address the concerns and perceptions of academic staff in the light of the need for changing their attitudes and to ensure ownership by academic staff (Evans and Franz, 2008 April; Taylor, Lopez and Quadrelli, 2006).

Ownership of the technological transformation by academic staff is critical, as it requires major changes in professional roles. This points to the need for specialised roles and the need for academics to gain the skills and knowledge for effective use of the new technologies, and the requirement for extensive training. Education system staff needs to change attitude towards technological advancement and need a more complex training session in how to use such technologies and come to appreciate them.

Mason (1998) asserts that the new technologies in global education point to a new role for the teacher, for the student and for course material. It centres on the construction of knowledge by the student. A lecturer becomes a facilitator and promoter and information becomes something to work with, think with, discuss, negotiate and debate with partners. The specialized skills needed to develop technology based learning materials further point to the rationale for using development teams. Bates (1993) asserts that producing good quality technology based learning materials will require people who can combine good pedagogic practice with an understanding of the strengths and weaknesses of different media and technologies. Garrison (1989) points to course design teams as the accepted model in distance education and that the Open Education system uses course development teams extensively. The predominant course-team model in distance education and the main advantage of this model is that it operates on high professional standards.

4. IMPLEMENTING EDUCATION SYSTEM TECHNOLOGIES AND INNOVATION

In Universities Technological transformation in higher education is based on new approaches to organizational processes. An innovation can be described as an idea or behavior that is new to the organization adopting it (Swanson, 2004). Implementing and adopting something new to a culture requires commitment, patience and acceptance of change. In this way, a bottom-up innovation process in the development of ICT and Education system is important because it fosters the development of the will among members and generates collective participation of lower cadres in decision making leading to consensus building. It is difficult to resist change that comes from the bottom from among the users. The importance of a bottom-up process for a successful innovation aims at spreading leadership. If it does not aim at shared leadership right from the outset, therefore such technology is unlikely to be capable of establishing itself in the education system system. In addition, there is need to ensure strong innovation diffusion into higher education systems. The innovation diffusion theory (Rogers, 1983) provides a general explanation for the manner in which new entities and ideas like IT and technology based education over time, disseminate through social systems, in higher education. The innovation diffusion theory is essentially a bottom-up approach based on individual responses that can be used as a starting point to depict technological transformation in higher education. Initially, there is a takeoff stage during which an innovation is introduced into a social system. An entrepreneurial group called the innovators often then adopts it. During the next phase of maturation the "early adopters", who are change agents or opinion leaders among the social system, will enter the process thereby legitimizing the innovation and opening the potential for adoption to all members of the system. The final saturation stage in an innovation's adoption is characterized by widespread adoption. The innovation saturates the social system and growth tapers off. This process can be plotted as an S-shaped growth curve. Remedies for ensuring successful Education system in Universities in developing countries We have seen that technology cannot be separated from development of the education system because it is transient with ICT and its intentions. Hence, there is need to overcome any resistance from staff and management that hinder technology to take root especially where the computer and internet age is resisted in most main stream teaching, planning and record keeping. In order to cause a vibrant attempt to allowing Education system to take root, there are several policy directions that should be taken first hand and these are:

4.1 To identify the objectives that justifies the need for Education system innovation. Haddard et al (2002: 13) rightly puts it that technology is only a tool: No technology can fix a bad educational philosophy or compensate for bad practice...educational choices have to be made first in terms of objectives, methodologies, and
roles of teachers and students before decisions can be made about appropriate technologies. This is extremely important because if Education system innovations do not make any significant difference in terms of improving quality, access etc. then, their cost is not worth it. Subsequently, the objectives for introducing Education system should focus on improving quality and access of educational provision. In other wards, Education system must be made cost effective.

4.2 The question of what educational provision/programs could be improved is critical. Conducting a needs assessment analysis may be appropriate to inform the stakeholders in terms of identifying potential education programs that could be complemented by the Education system innovations given the current available resources. But of critical importance are targeting areas like registration of students; assessment, research, teaching, and general administration are areas that need critical innovations with Education system technologies in Universities in the developing world.

4.3 It is recommended that the change towards Education system must be gradual because if it is made quick it might be too expensive and unworkable. This means that Universities need also to seek for donor funding in the area of Education system so as to quickly make changes that will bring education system effectiveness.

4.4 Naidoo (2001) suggests that four vital steps that stakeholders should take especially in developing countries during the process of implementing ICTs and Education system. The four steps include: planning, management, education application, and support. Planning entails putting into consideration of the how the innovation could be organized, deciding what types of programs to be offered etc. Strategic planning is crucial. Proper planning is a good basis for the final implementation of Education system innovation (Naidoo, 2001). Management entails administrative and governance of the programs. Management involves planning how to create awareness to stakeholders, etc. Educational application entails focusing on teaching strategies that could facilitate lifelong learning to students to enable them to meet the changing demands of the diverse needs of global job market. Support to the learners entails provisions aimed giving students help to enable them learn how to manage their own learning, as they get exposed to various educational programs via Elearning.

4.5 The better way to start Education system innovations is by starting with current available resources. Given the fact that establishing new systems is extremely costly, it is a smart idea to use and draw on the already existing infrastructure and human resources. Then, upgrade and introduce new systems as you go along. For instance, it could be much easier training staff and students in basic ways to utilize Education system capabilities and innovations such as [accessing Internet, using email based web browsing, downloading materials from the web, etc] rather than expecting them to be able to design fancy Web Pages, multimedia, etc. This kind of training could be carried out through tutoring courses to suit a variety of educational needs and aspirations of stakeholders (O’Neill et al, 2004).

4.6 To promote top-down and bottom-up strategies that promotes Education system development and utilization in universities through innovation diffusion. The level of resources made available to promote ICT usage would not have been possible without senior management and staff support. When typical political problems like irrational resistance to change are encountered, senior management is able to step in and direct matters. Middle management and staff, that is, heads of academic and administrative departments and lecturers, play an important role in controlling resources and running the support.

4.7 Try to grow the Internet technology literacy of the staff in phases, that is primitive phase, medium phase, and advanced phase (Al-Khanjari et al, 2005). According to Al-Khanjari et al (2005) primitive phase-refers to a situation where instructors could use the email facilities reinforce their communication with their students. Medium phase refers to a situation where instructors could use web pages to deliver online course-related information. And advanced phase refers to the situation where instructors could implement more sophisticated pedagogical materials via the net while utilizing computer aided delivery tools (multimedia, etc).

4.8 Identify visionary staff that could act as catalysts in the process of implementing Education system (Schonwald, 2003). Starting with faculties that are more comfortable with technology, and then extend it to other faculties that are less exposed to computers. For example, lecturers teaching computer science and information technology should be comfortable with technology and therefore could be introduced to innovative strategies via Education system capabilities to improve quality and access of educational opportunities.

4.9 The diffusion can be sustained through the use of a distributed implementation structure. A Centre for Education system, for example, should be established to provide central support and to coordinate the progress of the technological promotion project in the universities. Even learning should strictly adapt to these technologies where teaching methodologies should acquire ICT strategies and course work should be conducted using ICT facility.

4.10 Universities should take time to ensure staff ownership of technologies even the most rigid type and conservative staff should see the benefits of Education system and ICT in higher education development. Ensuring ownership by
academic staff is essential in the diffusion of Education system strategies that promote effective teaching and learning.

4.11 In order to ensure ownership of Education system in universities by academic staff, it is important for educators and educational policies to drive the technological transformation. Staff development can be used as an important strategy to advance the transformation of higher education.

4.12 The implementation of educational technology into the curriculum requires the introduction of a very robust technology infrastructure. Every staff should have a Pentium computer, printer or access to a printer, access to the Internet and e-mail with power failures and network shutdowns minimal. The library should also create a technology rich learning environment.

5. CONCLUSION

With the impact of ICT, education in the developing world have become competitive in terms of providing quality and flexible educational services to the diverse students’ communities (Wende, 2002). Therefore, creating an enduring vision and a strategic implementation framework for the effective implementation of technological innovations and Education system seems critical. The demand for skilled workforce equipped with technological skills and competencies to cope with the ever-changing responsibilities at the work place (Lewin, 2000) warrants universities to adjust their teaching strategies beyond face-to-face instruction in the classroom. However, it requires institutional leadership in order to promote technology use in education system education. Berge and Schrum (2008) contends that the most important function of institutional leadership may be to create a shared vision that includes widespread input and support from the faculty and administration, articulates a clear educational purpose, has validity for stakeholders, and reflects the broader mission of the institution. If rural community cannot take advantage of the information revolution and surf this great wave of technological change, they may be crushed by it. Catching this wave will require visionary leadership in most universities on the Continent.

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Challenges and Issues of E-Learning

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Abstract: Providing education and training to the masses on huge scale, for commercial survival and to meet the ever-changing requirements of the society and also to meet the individual’s special requirements and tastes, is not possible through the traditional system of education based on brick-and-mortar schools, colleges and universities. Now a days e-learning is the new form of distance learning with the help of advanced technologies like Internet and World-wide-web. The World-wide-web is being used to recuperate communication, supporting active learning, collaborations, transmission of education in distance learning mode and sharing of resources. E-learning distance education and fundamental Universities may provide the required solution. Distance Education, E-learning and Virtual Universities may provide the desired solution. In recent years, many of the universities and educational institutions worldwide offer online services such as for admissions, virtual (online) learning environments in order to facilitate the lifelong learning and to make this compatible with other educational management activities. Current e-learning research brings together pedagogical, technical and Organisational concerns within a wider set of socio-cultural factors. Understanding issues &challenges in respect of eLearning is of significant importance to the research communities involved in e-learning and will have a significant role in forming future practices. In consulting the INDIA research community, a number of research issues & challenges are required to be addressed to promote more efficient learning techniques. Through this paper, author is trying to focus on various issues and challenges in implementing E-learning system.

Keywords: distance education, e-learning, education, WWW.

1. INTRODUCTION

In the earlier 20th century, we have seen technological advancement in the field of electronic computing and communication, it has changed our lives and perspective of the world in an unimaginable way. The revolution in the field of education and communication has improve quality of life but side by side it has also brought in its wake a number of challenges with it. Now a days the world has become more universal. It has included so many challenges:

- The patterns of exchange, competitions and technological modernization are changing at an ever-increasing rate.
- The growth of knowledge is exponential.
- The general quality of life and freedom of expression.
- Demand for universal access in case of opportunities for the relevant education system for the economic survival.

According to the above-mentioned challenges, if a community and nation want to survive and lead then it is essential that working-age group is provided with means for mass learning/education so that it is well-equipped with latest required skills for the numerous economic and intellectual activities. Providing education and training to the masses on huge scale, for economic survival and to meet the ever-changing requirements of the society and also to meet the individual’s special requirements and tastes, is not possible through the traditional system of education based on old teaching method in colleges and universities. Distance Education, eLearning and Virtual Universities may provide the desired solution. Continuous efforts in the field of communication technologies have resulted in more efficient & cost-effective mode of learning as compared to traditional strategies of learning. Now students & educators have better control on the process of teaching & learning. Now the question arises: What do you mean by e-learning? And Is e-learning the best way to gain knowledge and education? The answer to the first question cannot be given exactly, because it is still a topic of research and discussions are still going on. The concept like e-Learning is relatively a new term and has been evolving over number of previous years. Through this paper, author is trying to focus on various issues and challenges in implementing E-learning system. eLearning is a very broad area of research in terms of education system. Authors have given different definitions on e-learning. According to Rosenberg (2001) the term eLearning as, the use of Internet technologies to deliver a broad array of solutions that enhance knowledge and performance”. e-learning is based on three fundamental criteria. A) Networked for instant updating, distribution, storage/retrieval and sharing of information. B) Content delivery via computer using WWW. C) It focuses on the broadest view of learning and learning solutions. Thus, e-Learning may be taken as the latest form of distance learning with the help of latest technologies like Internet and World-Wide-Web. They must remember that e-Learning is much more than online training or Computer-Based Training (CBT), encompassing knowledge management and electronic performance support, Computer –conferencing enabling group communication, enabled by Internet and WWW is one the key characteristics of e-learning which

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makes it qualitatively much superior to the traditional distance learning paradigm. Longmire (2001) in his research suggest that “e-Learning covers a wide set of applications and processes such as computer-based learning systems, Web-based learning systems, virtual classrooms, and digital collaborative learning GroupWare packages. E-Learning content is mainly delivered via Internet, intranet/extranet, audiotape and videotape; satellite broadcast, interactive TV, DVD and CD-ROM, and the still to emerge wireless application protocols (WAP) Computer - based conferencing that enables group communication, and is itself enabled by Internet and WWW - is one of the key characteristics of e-Learning which makes it qualitatively much superior to the conventional distance learning paradigm. Key attributes of e-Learning are:

a. Many-to-many (i.e. group) communication.
b. Any place (place independence)
c. Any time (a synchronicity, time independence).
d. Text, enhanced by multi-media.
e. Computer-conferencing (i.e., computer mediated messaging)

In order to facilitate learning & education, web is being used as the backbone and we cannot underestimate its value in delivery and promoting effective learning to the people. For about last two decades, the World Wide Web (WWW) is being used to improve communication, collaboration, sharing of resources, promoting active learning, and delivery of education in distance learning mode. The World Wide Web (WWW) helps teachers in planning suitable online delivery structure, sharing goals of learning, and activities for their courses. In recent years, many of the universities and educational institutions worldwide offer online services such as for admissions, virtual (online) learning environments in order to facilitate the lifelong learning and to make this compatible with other educational management activities. For example, a teacher may create a purely Web-based delivery system including online handouts in respect of student’s activities, projects and lists of resources for reference. The students and other learners may access web-based material anytime from anywhere in the world, being connected through Internet.

2. ISSUES & CHALLENGES IN E-LEARNING

Technological Challenges

The e-learning raises significant challenges in the technological research area. For development of e-learning resources that meet the user’s requirement need to be addressed. The technological challenges of e-learning can be considered as key technological research areas. Development of New Forms of Learning community and Interactive Learning in e-learning environments interaction, cooperation and community play an important role to support learning. The developments in the area of e-learning environments provide new forms of interaction for learning experience. It generates new relationships between learner and computer and also form a new learning community. Key issues include:

a. New forms of multimodal interface to support learning.
b. New techniques to understand and support learning communities.
c. The development of systems to support mobile communities of learners.
d. Personalization techniques that meet user personal needs and current activity.
e. Techniques to promote and support interaction.
f. Discovery of new learning communities.
g. Support for time to time assessment services.

3. DEVELOPING NEW KNOWLEDGE FACILITIES FOR E-LEARNING

E-learning environment needs to support the rapid increase in the size and variety of data by appropriate semantic services. The semantic services generate a surrounding semantic context for learning support. Research that needs to work on:

a. Development of learning and reasoning theories for uncertain and incomplete knowledge.
b. Support for the development of large-scale learning facilities.
c. Support for a dynamic learning process.
d. Support for information sharing across different learning facilities.
e. Developments of lightweight knowledge capture technique for promotion of lifelong learning.

4. RESEARCH ISSUES FOR E-LEARNING

Current e-learning research brings together pedagogical, technical and Organisational concerns within a wider set of socio-cultural factors. These factors influence the research agenda in e-learning system. Understanding these broader social and cultural issues is of significant importance to the research communities involved in e-learning and will have a significant role in informing future practices. In INDIA number of research issues emerged:

i) Interdisciplinary, and the notion of multiple voices, is a defining characteristic of the area. How do different research perspectives influence the overall area? How do problems in the practice of different disciplines differ in the adoption and use of learning technologies?

ii) Access and inclusion, includes issues around the widening participation agenda. What are the barriers to inclusion and what are the issues surrounding the extent of the digital divide?
iii) Change, and its relationship to learning technologies. How does change impact upon motivational issues? What are the drivers and rationales for change? What are appropriate strategies for managing changes and mechanisms for their implementation?

iv) Convergences and Interoperability, in terms of exploration of different forms of convergences (Organizational, technological, pedagogical, sectoral and institutional etc.) How well do they understand issues of globalization and scalability standards to support interoperability?

5. ANALYSIS & RECOMMENDATIONS

According to the study, learning contents and learning communities got the highest priority in e-learning research. In these areas, lots of development has to be made. As technology is growing day by day, learner interest in e-Learning increases very rapidly. Now researcher has begun to work on the designing new e-learning methodologies that can work according to learners’ interest and preference. For predicting learner interest, they have to study learner behavior, learning style by their online activities and search criteria. Experts in the field believe that some of the most promising features of modern e-learning platforms will be Web with intelligence, i.e., an intelligent web. Applications will work intelligently with the efficient use of Human-Computer interaction (HCI) and intelligence. Different Artificial Intelligence (AI) based tools & techniques (such as, roughsets, fuzzy sets, neural networks, machine learning etc.) can be integrated with the e-learning applications to support intelligence. In support of e-learning on the web, a new version of World Wide Web called Web 3.0 has been proposed as a possible future consisting of the integration of high-powered graphics (Scalable Vector Graphics or SVG) and semantic data. There have also been discussions around 3-D social networking systems and immersive 3-D internet environments that will take the best of virtual worlds (such as Second Life) and gaming environments and merge them with the Web. Web 3.0 based e-learning services will be having constructive impact on education. Web 3.0 technologies offer benefits of 3Dwikis, 3D Labs; Intelligent Agent based search engines, Virtual environments like Avatar, Semantic Digital Libraries that may result in added advantage in delivery of effective eLearning to the mass.

Semantic web is another promising technology for realization of e-learning requirement. In the simplest terms, we can define Semantic Web as a relationship between things, described in a manner which makes people and machines able to understand [9]. One of the objectives of Semantic Web is to identify, recognize and extract the exact required data that matches the keywords provided by the user. Semantic web facilitates flexible and personalized access to the learning material. Semantic web is suitable platform for implementation of e-learning environment because it provides ontology-based annotation of learning materials, ontology development and proactive delivery of the learning materials through e-learning systems [11]. e-Learning is a complex system with multiple forms and different level of interest of learner. To make e-learning system to more interactive for learner, researchers need to take decision at every level of learning cycle. A Decision Support System (DSS) is an interactive information system that provides models, data manipulation tools and information. DSS helps to make decisions in semi-structured and unstructured situation [12]. By offering such approach, education system could play much better for student centric operation towards positive improvement of his performance.

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Progression of Collaborative Learning and Its Importance for Critical Thinking

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Abstract: For many years, theories of collaborative learning tended to focus on the functioning of individuals in a group. More recently the orientation has changed, so that the group itself has become the unit of analysis. In terms of empirical research, the original objective was to find out if and under what circumstances collaborative learning was more effective than learning alone.

Researchers controlled several independent variables (size of the group, group composition, nature of the task, communication, etc.). However, these variables interacted with each other in a way that almost made it impossible to establish causal links between the conditions and the collaboration effects and critical thinking.

1. INTRODUCTION
For many years, joint learning theories have focused on how units operate in a group. This reflected a dominant position in cognitive psychology and artificial intelligence in the 70s and 70s in the early 1980s, when cognition was seen as a product of individual information processors and the context of social interaction was seen more as fund for individual activities and not as an object of research itself. More lately, the group itself became a unit of analysis in which it focused shifted to more emergent and socially constructed interaction properties.

Defining cooperation by division of labor is not avoidable ambiguity. Miyake showed that there can be a spontaneous division of labor they collaborate: "A person who has more to say about electricity the subject assumes the role of principal and the other becomes an observer, monitoring the situation.

Collaborative learning is a pedagogical approach to teaching and learning that involves groups of students working together to solve a problem, complete a task, or create a product. This review article describes the benefits of learning in the style of collaboration, begins with the concept of the term and continues with the benefits created by collaborative methods. This document outlines the main benefits of collaborative learning in four categories of; social, psychological, academic and evaluation benefits. Each of them is subdivided into more specific subjects.

Collaboration is a philosophy of interaction and staff lifestyle where individuals are responsible for their actions and included learning and respecting the skills and contributions of their peers. In all situations where people meet in a group, offer a way of dealing with people who respect and enhance the individual group skills and contributions of members. There is an exchange of authority and an acceptance of responsibility between the group- members for group actions. The underpinning of collaborative learning is based in the south on the search for consensus.

CL (Collaborative Learning) professionals apply this philosophy in the classroom, at committee meetings, with community groups, their families and, in general, as a way of life and of relationships with others. The term "Collaborative learning" refers to a teaching method in which the different levels of performance work together in small groups towards a common goal. Students are responsible for the learning of others, as well as their clean. Therefore, one student's success helps other students succeed. Supporters of collaborative learning argue that the active exchange of ideas in small groups not only increases the interest of participants, it also promotes critical thinking. There is compelling evidence that cooperative teams are reaching levels thought and kept information longer than students who work in silence the details. Shared learning gives students the opportunity to debate, take responsibility for their own learning and, therefore, become critical thinkers. Despite these advantages, most collaborative research studies, the learning was carried out at the primary and secondary levels. So far there is little empirical evidence of its effectiveness at the university level. However, the need for uncompetitive collaborative group work is widely emphasized by higher education literature.

2. PURPOSE OF THE STUDY
This study examined the effectiveness of individual learning compared to Collaborative learning to improve training and practice skills and critical thinking skills. The theme was series and parallel DC circuits.

3. RESEARCH QUESTIONS
The research questions examined in this study were:
1. Will there be a significant difference in performance in a test?
2. Will there be a significant difference in performance in a test? (Made up of elements of "critical thinking" among students learning individually and students learn collaboratively?)
4. DEFINITION OF TERMS

Collaborative learning: an educational method in which students work groups towards a common academic goal.

Individual learning: a teaching method in which students work individually at their own level and assess towards an academic goal.

Elements of critical thinking: elements that involve analysis, synthesis and concept evaluation.

The independent variable in this study was the teaching method, a variable with two categories: individual learning and collaborative learning. The dependent variable was the post-test score. The subsequent test consisted of elements of "peroration and practice" and elements of "critical thinking".

5. AGENDA

The population of this study was composed of undergraduate students in industrial technology, enrolled in ITI, Delhi border. The sample consisted of students enrolled in 271 Basic electronic course in spring 2018. The author gave a joint conference to the two treatment groups. The reading occurred simultaneously to both groups to avoid the effect of any stranger variables such as time of day, day of the week, room lighting and more.

The conference lasted 50 minutes. It was based on DC circuits in series and in parallel-DC circuits, then; a section was randomly assigned to "individual learning group" while the other section was assigned to "collaborative learning group". The two sections worked in separate classrooms.

Individual learning

In individual learning, the academic task was first explained to students. The students then worked alone on the worksheet. We gave them 30 minutes to work on it. Final 30 minutes, students received a sheet with the answers to the questions worksheet In case of a problem, the solution sheet shows how the problem was resolved. The students had 15 minutes to compare their own answers with those on the solution sheet and find out how the problems would be solved. Then, participants received a subsequent test that included both exercises and critical thinking exercises.

Collaborative learning

When implementing collaborative learning, the first step was specifying the academic task so; the collaborative learning structure was explained to the students. An instruction sheet that highlighted the key elements of the collaborative process has been distributed. Students were encouraged to discuss the "why" they thought of made regarding solutions to problems. They were also invited to listen carefully review the comments of each group member and be prepared to reconsider their own judgments and opinions. As experience shows, the group decision making can be easily dominated by the loudest voice or by the student who talks more Therefore, it was emphasized that each member of the group should be an opportunity to share your ideas. After that, the group devises a solution about-

- Group and size selection
- Groups can be formed by self-selection, random assignment or criteria based selection.

This study used self-selection, where students chose your own group members. Choosing group size implies difficult commitments. According to Rau and Heyl (1990), smaller groups (of three) contain less the diversity; and may lack divergent thinking styles and a varied experience that helps lead collective decision making. On the contrary, in large groups, it is difficult to guarantee the participation of all members. This study used a group size of four. There were 24 students in the collaborative learning processing group. Therefore, there were six groups of four students each.

According to Slavin (1989), for effective collaborative learning, they must be "group objectives" and "individual responsibility". When group homework is to make sure that each member of the group has learned something, is in the interest of each group member to spend time explaining concepts Research has always found that students who earn more cooperative work are those that give and receive detailed explanations (Webb, 1985). Therefore, this study incorporated both "group objectives" and "Individual responsibility". The post-test qualification consisted of two parts. Fifty the percentage of the test score was based on how this particular group performed the test. The test points of all group members were combined and fifty percentages of each student's individual score was based on the average score.

The remaining fifty percent of each student's grade was individual and explained to the students before they start working collaboratively.

Research design

A non-equivalent control group model was used in this study. The level of Significance (alpha) was set at 0.05. A previous test was administered to all subjects before treatment The preliminary test was useful to evaluate the student's history knowledge of DC circuits and also to test the initial equivalence between the groups.

A subsequent test was administered to measure the effects of the treatment. It lasted 95 minutes. To prevent students from becoming "At the test level," the previous and subsequent tests were not parallel forms of the same results. A total of 48 subjects participated in this study. A nine point questionnaire’s was developed to collect descriptive data about the participants. Results of questionnaire found that the average age of the participants was 22.55 years with a range of 19 to 35. The average weighted average was 2.89 in a scale, with a range of 2.02 to 3.67. The questionnaire also revealed that eight participants were women and 40 were men. Nineteen students were currently classified in the second year and 29
were juniors. Forty-five participants indicated that they did not have education or work experience in DC circuits in high school or university. Three students said they had some experience working in electronics, but formal education

**Discussion - Result**

After performing a statistical analysis of the test results, it was discovered that all who participated in collaborative learning achieved significant results, better in the critical thinking test than students who have studied individually. It was also discovered that the two groups performed equally well in the drilling and handling test. This result is in agreement with the learning theories proposed by the promoters.

**REFERENCES**

Abstract: All devices, tools and resources digital in form which are used for realizing the goals of teaching learning, enhancing access to resources, building capacities as well as management of education system are included under Information and Communication Technology or ICT.

There are various ICT based approaches which can be adopted to make teaching learning more effective and bring about quality improvement in the pedagogies being used by teachers. Two major ICT based approaches for teaching are discussed in this paper. These include Individualized instruction and Collaborative learning approaches.

2. INDIVIDUALIZED INSTRUCTION USING ICT

Individualized learning or instruction is a teaching method where the course content, the technology of instruction and the pace of learning take into account the abilities and interests of each learner. It is based on the philosophy that each student is unique and their special needs should be catered. Computer assisted instruction (CAI) is an individualized instruction method to provide instruction to individual learners using computer. The paper discusses the various modes through which computer assisted instruction can be provided for the benefit of individual learners. This is followed by a discussion on collaborative learning approach using ICT. The major technology tools used for collaborative learning includes social networking services, wikis and blogs.

Keywords: Information and Communication Technology, individualized and collaborative learning

1. INTRODUCTION

As per National Policy on Information and Communication Technology in school education 2009 ICT can be defined as' All devices, tools, content, resources, forums and services, digital and those that can be converted into or delivered through digital forms, which can be deployed for realizing the goals of teaching learning, enhancing access to and reach of resources, building of capacities as well as management of the education system’ The major challenges to education in India are accessibility and reach of education to marginalized sections of the society as well as to remote areas. Information and Communication Technology has the potential to make education accessible to remote areas as well as reach out to the learners from marginalized sections of the society. This can be done through integrating ICT in alternate modes of education like open system of schooling, continuing education for adults and educational programs on television. ICT should also be introduced into the formal schooling system to improve the quality of education.

There are various ICT based approaches which can be adopted to make teaching learning more effective and bring about quality improvement in the pedagogies being used by teachers. Two major ICT based approaches for teaching are discussed in this paper. These include Individualized instruction and Collaborative learning approaches.

1. Drill and practice

The computer presents a series of exercises to which the learner responds. The learner is then provided feedback on the responses by the computer. A computer can provide endless drill and practice till mastery is achieved by the learner.

2. Tutorial mode

A tutorial begins with an Introduction which provides information to the student regarding the aim and nature of the lesson. This is followed by presentation of the content in small units. This is followed by some questions to which the students respond and the computer provides feedback. The learner proceeds to the next unit, if his answer is correct. He/ She may be directed to an alternate pathway in case of wrong answer. Thus, learners proceed at their own pace. Online tutorials maybe interactive or recorded. Khan Academy provides tutorials on various subjects. It has more than 3400 videos on various topics.

3. Simulation mode

Simulation is a technique that teaches about some aspect of the world by imitating it. Students interact with the program in a manner similar to the way they would react in real situations. For example, students can study chemical change and effects...
of increasing or decreasing the quantity of a reactant in a chemical reaction. This might be dangerous in real life but online it is quite safe. Some online simulation sites for education include PhET for physics phenomena, Explore learning for science and mathematics and brainpop for topics from Elementary and Middle School.

4. Gaming mode

Instructional game is somewhat similar in nature to simulation. But a game does not necessarily imitate reality. Rather it throws up challenges. There is a set of rules that defines how the game will be played. Teaching is imparted to the students in play-way mode. Various types of educational games available on the internet include brain games, adventure games, puzzle games, quiz games, interactive diagram games, flowchart games and vocabulary games. Some free online educational games sites include National Geographic kids, Poptropica, PBS Kids games and Sheppard software.

3. COLLABORATIVE LEARNING

The second major approach where teachers can integrate computers into teaching learning is Collaborative learning. In this approach, learners work together in groups to complete a task, perform an activity or solve a problem to achieve common learning goals. Researches have shown many benefits of collaborative learning. Active participation of students in small groups promotes critical thinking, increases academic achievement as well as improves social relations among the students working in a group. ICT has immense potential to allow learners from any place in the world to collaborate with each other on some project or any other activity. Also learners can work at any time suitable to them. The Australian German report has listed the following technology tools which can be used for collaborative learning:

1. Social networking services- Nowadays social networking is very popular among the students. Users at distant places can collaborate on projects and activities using social networking sites to share photos, information, videos and presentations with their group members.

2. Microblogs- Group members sitting at distant places can use microblogs like Twitter to update other members about the activities they have conducted or the information they have gathered.

3. Wikis- These provide immense scope for collaborative creation of the project report or group activity report as each member can edit and add information on the common Wiki.

4. Virtual worlds where the users take up an online persona and play online games with other users (in an online environment) can also be used for collaborative learning.

Educational Resources available on the internet can be used to curate and critique information regarding the project by the group members. Video conferencing and audio conferencing can also be used to discuss the topics or problems being explored by the group.

4. ICT BASED PROCESS ORIENTED GUIDED INQUIRY LEARNING TECHNIQUE (POGIL)

In POGIL, the students are divided into small groups of 3 to 4 who work together on a specifically designed problem or task. Students discuss and analyze the problems in their groups. They are provided sufficient data to be able to develop the desired concepts. This is followed by some guiding questions to build upon their prior knowledge, recognize relationships, explore, inquire and reach valid conclusions. The students develop process skills like critical thinking and information processing while working on the problems. The instructor acts as a facilitator and guides them in the right direction.

Current researches are directed towards implementing process oriented guided inquiry learning in a purely online environment. A trial course has been started at Griffith University which follows an online POGIL format. The online platform consisted of a Wiki, a series of student blogs and a Facebook group. Students were divided into groups of ten members. Learning management system was used to provide content material online. This online content included links to YouTube videos, instructions and lecture slides. Each individual student had to answer a series of questions to the given process oriented tasks. The other students in the group had to comment on the posts of their group members. Thus the group members collaboratively contributed to the blogs. The assessment by peers and comments posted initiated critical thinking and reflection and led to modification of the original blogs. Wiki was the central navigation which monitored and kept track of the progress of all the students. Facebook was used as a forum for class discussion on the given tasks. Students responded much in the same way as in face to face environment. Therefore the trial was successful in creating a collaborative online learning environment.

REFERENCES


A Study on United States Trade Deficit

Arti

Maharaja Surajmal Institute

Abstract: China is the fastest growing economy in the world. The growing number of imports by the US from China has brought a trade deficit between import and export from China in the US. China has a comparative advantage from the US in the context of cheap Labour and fastest technology and good practices of trade and relation with their neighbouring countries. This paper compares China with U.S. on factors like GDP, export and import & dollar after taking data from World Bank records.

Keywords: GDP, FDI, Import, Export, trade deficit

1. INTRODUCTION

China is a socialist and market-based economy. Now China is the second largest economy in the world as per World Bank survey. Its 13th Five-year plan for the period 2016-2020 address the environmental issue for reducing pollution, to improve education and social protection. Now China is inviting people from other countries so that people of China can learn new technology. China is growing in technology. It is giving competition to other countries especially to the US. Due to fear of competition from China, the president of the US has imposed various tariffs on Chinese goods. But in retaliation, China stopped the import of Soybean from US which has affected the US economy.

2. REVIEW OF LITERATURE

Zhang Yuhan (2018)

This paper tries to focus on current status of US trade war with China. Trade balances can not be done with trade war with China. US has a surplus of capital account. US should try to reduce the capital account surplus by allowing foreign banks to accumulate a synthetic currency.

Scissors Derek (2016)

This paper give focus on that trade deficit with China does not cause US employment. Dollar-Yuan exchange rates have no affect on employment in US. The US should not try to balance the trade deficit through putting restriction on China trade and try to find out other ways to handle US trade deficit.US should try to make American workers and firms more competitive.

Lawrence Z. Robert (2014)

There is deficit in U.S. petroleum trade. Trade deficit in oil was almost 55% of overall trade deficit in goods and services in U.S. If U.S. becomes self-sufficient in oil, they can reduce their trade deficiency to some extent.

Scopelliti Demetrio(2013)

Trade deficit with US has increased more since 2000. The author focuses on the fact that we should focus on trade data related to value addition, not on the data of finished products. Value added approach represents a different analysis of trade interdependence than a commonly used finished-product approach.

Gallagher, K., & Porzecanski, R. (2008)

The objective of this paper is to find out the economic relationship between China and America and Caribbean. America and Caribbean is threatened by Chinese exports in global market.LAC imports and more than export.LAC countries are importing primary commodities from China due to which dependence on China is increasing.


The current deficit will increase in U.S. Volume of exports from Asia will increase due to price advantage. The increase in exports will be more in comparison of decrease in dollar prices. Bailout packages given to some Asian economies will not increase their capacity to enhance import from America. The author conclude that current account deficit is a false alarm which may or may not happen.

Chevaléris Hippe (1998)

The political and economic factors are responsible for trade deficit between China and U.S. There was a difference between the statistical figures of trades given by U.S. and China which proved that American statistics overestimates the value of imports of goods from China and underestimate the export to China.

Feldstein Martin (1987)

This paper focuses on trade deficit in US which is increasing and there is need to balance that. One of reason of trade imbalance is rise in dollar. Due to increase in dollar value, the export from US has become costly and there is decline and there is increase in import which is one of the factors of trade imbalance in US. International debt crisis, budget deficit are also reasons of trade deficit in US.
3. RESEARCH METHODOLOGY

The research paper is based on the secondary source of data collection i.e. reports of World Bank, reports from the census. The comparative analysis of China vs. The US is analyzed through charts and graphs. The analysis is based on the following reports:

- Gross domestic product annual growth rate
- Export of goods and services
- Import of goods and services
- High technology exports
- US trade deficit with China
- Control on US dollar

4. DATA ANALYSIS & INTERPRETATION

**GDP Growth Annual (%)**

<table>
<thead>
<tr>
<th></th>
<th>2013</th>
<th>2014</th>
<th>(%) (change)</th>
<th>2015</th>
<th>(%) (change)</th>
<th>2016</th>
<th>(%) (change)</th>
<th>2017</th>
<th>(%) (change)</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>7.8</td>
<td>7.3</td>
<td>-6.410256</td>
<td>6.9</td>
<td>-5.479452055</td>
<td>6.7</td>
<td>-2.89855</td>
<td>6.9</td>
<td>-2.985074627</td>
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<tr>
<td>China</td>
<td>1.7</td>
<td>2.6</td>
<td>52.941176</td>
<td>2.9</td>
<td>11.53846154</td>
<td>1.5</td>
<td>51.72414</td>
<td>2.3</td>
<td>53.33333333</td>
</tr>
</tbody>
</table>

**Export of goods and services (% of GDP)**

<table>
<thead>
<tr>
<th></th>
<th>2013</th>
<th>2014</th>
<th>(%) (change)</th>
<th>2015</th>
<th>(%) (change)</th>
<th>2016</th>
<th>(%) (change)</th>
<th>2017</th>
<th>(%) (change)</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>13.6</td>
<td>13.6</td>
<td>0</td>
<td>12.5</td>
<td>-8.088235294</td>
<td>11.9</td>
<td>-4.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>China</td>
<td>24.5</td>
<td>23.5</td>
<td>-4.081633</td>
<td>21.3</td>
<td>-9.361702128</td>
<td>19.7</td>
<td>-7.51174</td>
<td>19.8</td>
<td>0.507614213</td>
</tr>
</tbody>
</table>

Source: https://databank.worldbank.org

The China GDP is growing in comparison to other countries if we look from the above report, there is a major fall in GDP in the US than China
There is an increase in exports from China in 2007 to other countries in percentage than by the US.

**Import of goods and services (% of GDP)**

<table>
<thead>
<tr>
<th></th>
<th>2013</th>
<th>2014</th>
<th>% (change)</th>
<th>2015</th>
<th>% (change)</th>
<th>2016</th>
<th>% (change)</th>
<th>2017</th>
<th>% (change)</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>16.6</td>
<td>16.5</td>
<td>-0.60</td>
<td>15.4</td>
<td>-6.67</td>
<td>14.7</td>
<td>-4.55</td>
<td>14.7</td>
<td>-3.87</td>
</tr>
<tr>
<td>China</td>
<td>22.1</td>
<td>21.4</td>
<td>-3.17</td>
<td>18.1</td>
<td>-15.42</td>
<td>17.4</td>
<td>-3.87</td>
<td>18</td>
<td>3.45</td>
</tr>
</tbody>
</table>

*Source: https://databank.worldbank.org*
A company which is more export-oriented got more progress than which is import oriented. China's import to other country have increased in comparison to the US.

**High-technology exports (% of Manufactured Exports)**

<table>
<thead>
<tr>
<th></th>
<th>2013</th>
<th>2014</th>
<th>% (change)</th>
<th>2015</th>
<th>% (change)</th>
<th>2016</th>
<th>% (change)</th>
<th>2017</th>
<th>% (change)</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>17.8</td>
<td>18.2</td>
<td>2.25</td>
<td>19</td>
<td>4.40</td>
<td>20</td>
<td>5.26</td>
<td>13.8</td>
<td>-31.00</td>
</tr>
<tr>
<td>China</td>
<td>27</td>
<td>25.4</td>
<td>-5.93</td>
<td>25.6</td>
<td>0.79</td>
<td>25.2</td>
<td>-1.56</td>
<td>23.8</td>
<td>-5.56</td>
</tr>
</tbody>
</table>

**U.S. trade with China**

<table>
<thead>
<tr>
<th>Year</th>
<th>Export</th>
<th>Import</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>121746</td>
<td>440430</td>
<td>-318684</td>
</tr>
<tr>
<td>2014</td>
<td>123657</td>
<td>468475</td>
<td>-344818</td>
</tr>
<tr>
<td>2015</td>
<td>115873</td>
<td>483202</td>
<td>-367328</td>
</tr>
<tr>
<td>2016</td>
<td>115546</td>
<td>462542</td>
<td>-346997</td>
</tr>
<tr>
<td>2017</td>
<td>129894</td>
<td>505470</td>
<td>-375576</td>
</tr>
<tr>
<td>2018</td>
<td>120341</td>
<td>539503</td>
<td>-419162</td>
</tr>
</tbody>
</table>

*Source: https://databank.worldbank.org*

US technology exports to other countries are more but the percentage of growth in China is more than the US.
There is a large trade deficit in the US. There is an increase in imports than exports to China. The reason for this is that most companies in the US send China raw material related to computers and accessories to assemble because of cheap labour and later on they buy assembled product from China at a high price. It brings a trade deficit between China and the US.

**Control on US dollar**

On October 23, 2018, the US Dollar was worth 6.94 Yuan. It means China’s central bank guarantees it will pay 6.94 Yuan against one dollar. China uses a fixed rate system to manage its currency against the US dollar so that its exporters get a good return. China’s communist party has direct control in the management of currency but in the case of the US, the govt can only regulate the exchange rate but management is not in hand of government. China takes the dollar in return of export and save that in the form of reserves and buy US treasury from that, it can affect the interest rate the US or dollar value the US.

5. CONCLUSION

The United States is growing but if we look up at the growth of China, they are moving toward growth. Now China is the number two country in growth in the world after the US. China always tries to make a strong relationship with its neighbouring countries. China is good at doing trade with other countries. China has cost competitive advantage in comparison to other countries which helps in the growth of China. China is moving towards a growing economy after launching One Belt One Road programme to facilitate trade between Asia, Africa and beyond these countries. The US imposed tariffs on Chinese goods worth $ 250 bn. In retaliation, China strategically stopped the import of Soybean from the US which could easily available from other markets. US is taking these steps for the growth of the US economy. China thinks that the US is trying to stop its growth. But in nutshell, China is growing fast in comparison to other countries.

REFERENCES


Challenges and Opportunities for MOOCs in Indian Higher Education

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Abstract: This paper examines the role of Massive online open courses (MOOCs) in Indian higher education. MOOCs have a major role to play in increasing Gross Enrolment Ratio (GER) in Higher Education. One of the biggest problems that Indian higher education is facing is lack of applicability for the industry. Most of the MOOCs offered are closely related to industry demand and needs. Also in India, the major part of population resides in rural areas and people can’t afford to get quality education. Massive Open Online Courses (MOOCs) are cost effective way of learning. MOOCs are becoming very popular, however they also suffer from some challenges. Addressing to these problems will decide how successful MOOCs will remain in future. The spread of MOOCs may be restricted by few barriers like high dropout rate, financial sustainability, and dependence on availability of internet facilities, language barriers and limitations in comparison to face to face mode of learning. However, MOOCs have great future because they are an economic alternative to formal set up of education without compromising on the quality of education.

Keywords: Gross Enrolment Ratio (GER), Massive Online Open Courses (MOOCs), fourth industrial revolution

1. INTRODUCTION

Higher Education is of utmost importance for the economic development of country. Its role in developing countries like India is even more. In the era of fourth industrial revolution, battles between nations are not fought with weapons but with knowledge. This new era has brought it with immense opportunities along with immense challenges. Old jobs are being depleted and new jobs are being created. These new kind of jobs require new skills. Reskilling, upskilling and lifelong learning are some key words which have become more relevant than ever.

The quality of and access to reskilling, upskilling and retraining support will determine how three billion people already in the world’s workforce will fare in the transition underway and engage with new opportunities in the labour market. The kind of jobs, the kind of skills that will be relevant in future is highly uncertain. Thus, the only way of survival is adaptability to changing situations and learning new skills relevant. Agile, portable and sustainable safety nets can provide short- and long-term benefits and services, as well as income security. They can also help connect workers to retraining and re-deployment opportunities, minimizing both the social cost of labour market disruptions and the waste of previous investments into people’s skills through prolonged non-use. Governments, insurers, non-profits, unions, and other organizations will need to work together to determine the appropriate mix, reach and financing models. (World Economic Forum 2018).

In India, Gross Enrolment Ratio (GER) in Higher education has increased from 24.5% in 2015-16 to 25.8% in 2017-18 which is calculated for 18-23 years of age group. GER for male population is 26.3% and for females, it is 25.4%. For Scheduled Castes, it is 21.8% and for Scheduled Tribes, it is 15.9% as compared to the national GER of 25.8%. (AISHE, 2018). Though there is slight improvement in GER but it is clearly not enough. Access of Education needs to be increased in order to increase GER. Massive online open courses (MOOCs) has come up as a solution to the issue of quantity and access. MOOCs have made it possible for anyone to pursue a course from any university in the world through internet.

MOOCs have become increasingly more useful for societal change and supporting the idea of inclusive education. MOOCs are more flexible than formal higher education courses as there are no formal requirements for entry, no formal requirements of distance, any no. of students can participate and the fees is generally not there for the course and only for the certificate.

This paper examines the Challenges and opportunities of Massive online open courses (MOOCs) in Indian higher education.

2. REVIEW OF RELATED LITERATURE

Malik, Sumeet(2015)[2] in his paper ‘Indian MOOCs (Massive Open Online Courses): Need of the hour’ discusses the concept, features and role that MOOCs can play in Indian context and already existing popularity in terms of participation by Indian students in MOOCs over famous platforms such as Coursera, EdX and Udacity. The participation by Indians has been overwhelming in the major platforms such as Coursera, edX and Udacity. Indian MOOCs may also have subject topics that have not been explored yet, such as Classical Indian Music, Indian History, Yoga, etc.
They can also be used to provide high quality education to remote parts with subjects that require intensive graphics and visual illustrations.

Devgun, P (2013) [3] in her paper ‘Prospects for Success of MOOC in Higher Education in India’ proposes a framework for the success of MOOC’s in India to revolutionize the current education sector. If accurately implemented, the massive and economic nature of MOOC’s can provide a solution to the problems of the youth. Author provides an insight to the enthusiasm behind the MOOC woven into blanket of MOOC for Indian youth providing them jobs from the industry.

Chauhan, Jyoti. (2017) [4] in her paper ‘An Overview of MOOC in India’ discusses theoretical and technical background of the platforms available in India. Currently, NPTEL, moodKIT, IITBX, and SWAYAM are the platforms used in India for offering courses. In recent years, the enrolment in Massive Open Online Course (MOOC) has increased tremendously. India after US is dominating the global growth in enrolments. Seeing the growth of enrolment from the country and satisfy their need of education, India has started various projects for offering MOOC courses. There are some challenges that are faced in implementing MOOC in India. With the launch of SWAYAM, some of these issues are already addressed.

Trehan.S, Sanzgiri.J, Li.C, Wang. R, Joshi.RM. (2017) [5] in their paper ‘Critical discussions on the Massive Open Online Course (MOOC) in India and China’ situates the discourse around MOOCs from the unique perspectives of India and China with three broad objectives of sharing MOOC development in these countries, conducting a high-level discussion of the potential value of MOOCs for their HE systems and critiquing current issues with MOOC development there. This discussion is timely, since MOOC discourse in the international literature has swung between trumpeting MOOCs as “disruptive” technologies to warning of the “MOOC delusion”. We find that the concept and practice of MOOC in India and China are emerging. From the supply side, there is a need to focus on sound design, quality and accessible delivery, multi-lingual facilitation and efficient regulation of MOOC-credits, besides development of critical literacies for MOOCs in learners to realize the potential and promise of the MOOC.

Nath.A, Karmakar.A, Karmakar.T (2014) [6] in their paper ‘MOOCs Impact in Higher Education Institution: A Pilot Study in Indian Context.’ Examined MOOCs methods and its impact on higher education institution. According to authors, following changes are almost unavoidable in Higher educational Institutions (HEI) such as (i) Globalization and the increased momentum for internationalization in HEI, (ii) Worldwide increased demand for access to HEI with a projection that there will be 120 million students worldwide by 2020 which means MOOCs will be one alternative to cater these needs. The time is not very far when MOOCs will be one alternative method for implementing green computing in HEI and giving degrees, diplomas to learners those who are situated in a remote place. There is a lot of scope in India to introduce MOOCs to make more sustainable and financially viable education policy. The reputed universities in India should come forward to start MOOCs in coming years to solve 100% literacy program and also to spread HEI.

Buhl, M., &Andreasen, L. B. (2018) [7] in their work ‘Learning potentials and educational challenges of massive open online courses (MOOCs) in lifelong learning.’ discusses about benefits and challenges of MOOCs. According to the authors, recent developments of MOOCs seem to be driven by commercial interests rather than by pedagogical concerns. MOOC providers are creating new business models which are gradually connecting the educational activities of MOOCs with various degrees of payment. As an educational newcomer, the MOOC phenomenon prompts optimism as well as scepticism mostly because it is being considered within the discourses it disrupts. As often happens when a new technology emerges, hopes rise that the ultimate education formula has finally arrived. The “massiveness” and the “openness” are intriguing thought patterns in a world with ever more inhabitants, ever more need for education, and an ever-growing need for new solutions for societal and environmental issues. But an exaggerated confidence that e.g. self-directed learners follow learning patterns from well-known constellations by themselves or take up a new constellation – albeit on their own – may lead to misunderstandings of the ways in which “massiveness” and “openness” work for users.

3. BACKGROUND OF MOOCS

Oxford dictionary defines MOOCs as “A course of study made available over the Internet without charge to a very large number of people.”[8] specifies the essential elements behind each acronym of MOOC. Common in these definitions are the following aspects to give meaning to the elements of a MOOC:

- Massive: designed for in theory unlimited number of participants. This means that the course is designed such that the efforts of all services does not increase significantly as the number of participants increases.
- Open: access to the course is free without entry qualifications.
- Online: the full course is available through the internet.
- Course: the offering is a course, meaning that it offers a complete learning experience, i.e. structured around a set of learning goals in a defined area of study and includes the course materials, quizzes, feedback, examination and certificate of completion.

MOOCs were first started in 2008, created by George Siemens and Stephen Downs, and was called “Connectivism and Connective Knowledge/2008” or CCK08. It was created as a
credit course for the University of Manitoba. CCK08 had 25 students who had paid fees for the course and around 2200 learners who took the course for free. MOOCs really took off in 2012, when Professors Sebastian Thrun and Peter Norvig of Stanford University offered the online course called “Introduction to Artificial Intelligence”. This course had approximately 1, 600, 000 students participating from 190 countries. After the success of Intro to Artificial Intelligence, Thrun and Norvig started Udacity, a business model for online knowledge sharing. There are also a few other MOOCs providers, include Coursera and EdX. [9]. Since then MOOCs have experienced huge growth in number of registered users. According to a MOOC report by Class Central, an online website that keep watch on MOOC trends Around 23 million new learners signed up for their first MOOC in 2017, taking the total number of learners to 81 million. This is similar to the 23 million learners added in 2016. The top two MOOC providers in the world (by registered users) added similar numbers of learners in 2017 as they did in 2016. [10]

Top five MOOC providers by registered users are:
1. Coursera – 30 million
2. edX – 14 million
3. XuetangX – 9.3 million
4. Udacity – 8 million
5. FutureLearn – 7.1 million

MOOCs continue to rapidly evolve. The MOOC movement now has many different faces and is far more complex and nuanced than simply being a platform where traditional elite universities offer free online courses to help promote their international brands. Indeed, with the emergence of the third wave or generation of MOOC, and more specifically new global alliances and flexible credit earning pathways contributing to micro-credentials and even full degree programmes, many governments, policy-makers and institutional leaders would benefit from deeper appreciation and understanding of the evolution of the MOOC. Recent developments illustrate how the MOOC is starting to influence thinking about the nature of traditional campus-based education and through new alliances opening up opportunities for more flexible credit earning models of continuing professional development and life-long learning. It follows that we can expect the MOOC movement will continue to evolve.

[11]

4. MOOCS IN INDIA

Learning through Massive Open Online Courses will enable in all Indians who want to learn, earn, teach or innovate, the capability to realize their true potential and transform our country. [12]

One of the biggest problems that Indian higher education is facing is lack of applicability for the industry. There is a huge gap between the demand of the industry and what is being taught in educational institutions. In the fourth industrial revolution, where skills are becoming increasingly obsolete, new technology must be learned and new skill must be developed to survive in the competition. Most of the MOOCs offered are closely related to industry demand and needs. Also, it is abundantly clear that in India there is a need to significantly expand opportunities for post-secondary education in a big way. This comes at a time when there has already been a very significant expansion in the last decade. The anticipated expansion should happen while we simultaneously and significantly improve the quality of instruction. Given that faculty is in short supply (itself an understatement), we must resort to technology enabled learning to help fill existing gaps in access & quality as also grow opportunities for post-secondary education. [12]

Also in India, the major part of population resides in rural areas and people can’t afford to get quality education, Massive Open Online Courses (MOOCs) can definitely considered as a game changer. This cost effective way of learning through online medium definitely possess a bright future in India as Government doesn’t have to spend money on the construction of schools and colleges, students do not have to travel up to long distances. One only needs to get a laptop or desktop and an internet connection.[13]

5. CHALLENGES AND OPPORTUNITIES OF MOOCS

MOOCs have the potential to drastically change the Indian Higher Education.Problem of lack of faculty and resource crunch

A new model built around massive open online courses (MOOCs) that are developed locally and combined with those provided by top universities abroad could deliver higher education on a scale and at a quality not possible before. University enrolment in India is huge and growing. It surpassed the U.S.’s enrolment in 2010 and became second only to China that year. Every day in India 5, 000 students enrol at a university and 10 new institutions open their doors. At more than 3 percent of the country’s GDP, India’s spending on higher education is one of the highest in the world. Yet per-student spending is among the lowest. While recent expansion has widened access to universities, it has further reduced per-student spending and motivated already acute faculty shortages. As a result, quality has declined. India must continue to expand access to higher education while preserving quality and reducing costs. This situation is not unique to India, but given its enormous size and unique position, India’s challenges are formidable. Digital technologies, particularly the extensive use of MOOCs, could help. India has experimented with online classes before, but their impact has been marginal. A decade ago the country began using the Internet to distribute video and Web-based courses under a government-funded program, the National Program on Technology Enhanced Learning. Developers created more than 900 courses, focused mainly on science and engineering, with about 40 hours of instruction each. With limited interactivity
and uneven quality, these courses failed to attract a large body of students. MOOCs have given Indian academics a better sense of how a lecture could be restructured into short, self-contained segments with high interactivity to engage students more effectively. [6]

Challenges of MOOCs:

One of the biggest challenges of MOOCs is its completion rate.

- **The drop-out rate is very high in MOOC courses:** [14] reported that completing MOOCs takes too much time. Time is a significant factor, which may prevent students from completing the course requirements. Many students pointed out that watching online lectures and completing homework assignments and quizzes was simply too much to incorporate into their schedules [15]. Generally, the students are working and have very tight schedules. Thus, it becomes difficult for them to stick to timelines and thus they drop out. This challenge can be overcome by making MOOC courses more flexible in terms of time schedules. MOOCs should be made self-paced and have student-centric approach.

- **Accessibility:** In a country like India where digital divide is still very high, MOOC courses are not available or accessible to a large number of people. Digital inequality or digital divide is causing a challenge for MOOC courses to increase their access. MOOC courses are generally seen as a tool to promote inclusive education but that purpose is unachievable until there is increase in access of technology. Remote areas where access to internet is limited, MOOC courses can’t be used to increase access.

- **Financial sustainability:** The cost of creating good courses is very high. Private sector driven by profit motive may not participate fully in creating access through MOOC courses. In absence of any fees from students, the model may be sustainable only if MOOC creators are able to arrange funds from other sources. The role of Government will be significant in providing funds for creating and offering good courses.

- **Student’s assignment and accreditation:** It is difficult to keep track of assignments and control the cheating aspect since they are web-based. Various technology-based solutions should be thought of to improve quality of learning.

- **Language barrier:** In a country like India where majority of population is still Hindi-speaking, MOOC courses using English as a medium of instruction are restricted in their reach.

- **MOOC courses cannot replace the experience of real classroom learning and physical presence of a teacher. Interaction with teacher and other students is essential for overall development of personality and development of attitude.**

**Opportunities of MOOCs**

- **Lifelong learning:** In the fourth industrial revolution, lifelong learning has become extremely important and relevant. MOOC courses have huge scope because of ever increasing demand for developing new skills among people. Learning is now not restricted to any age or profession. Because of the ever increasing demand, MOOCs have huge scope in future.

- **Increasing access to education:** The idea of increasing access to education has taken a central stage in government policy and all welfare programmes. MOOC courses are an important way to improve access and thus they will receive funds and huge support from government. Thus MOOC courses as an instrument to improve access has great opportunity ahead.

- **Demand for improving skills from the industry:** Due to increasing demand of reskilling, upskilling among professionals, MOOC courses have wide scope in future.

6. **CONCLUSION**

MOOC cannot replace the conventional system of education and learning but it has a huge role in bridging the gap between know and know nots. MOOC courses have wide scope in future majorly because it not only provides scope for lifelong learning, it supports the goal of improving GER of the country. Negligible or no fees has improved the access of courses from good university across gender, economic or social divide. However, the spread of MOOCs may be restricted by few barriers like high dropout rate, financial sustainability, and dependence on availability of internet facilities, language barriers and limitations in comparison to face to face mode of learning. However, MOOCs have great future because they are an economic alternative to formal set up of education without compromising on the quality of education. Also, in the era of fourth industrial revolution, where individuals need to reskill or upskill themselves continuously, MOOCs is a great solution.

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Challenges and Opportunities for MOOCs in Indian Higher Education


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Role of ICT in Education

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Abstract: The ICT (Information and Communication Technology) has been essential requirement in educational institution for learning and teaching in the present day digital environment. The learners are using, accessing, capturing videos lectures, digital notes through electronic gadgets and researchers, teachers uploading their article, videos, class lectures through ICT tools and techniques. Similarly, educational institutions also adopting the ICT tools and techniques for better teaching, administration and management in the campus. This paper highlights the importance and major challenges faced by ICT in education sector.

Keywords: Communication, Technology, Education, Learning

1. INTRODUCTION TO ICT

Information and communications technology (ICT) is an extensional term for information technology (IT) that stresses the role of unified communications and the integration of telecommunications (telephone lines and wireless signals) and computers, as well as necessary enterprise software, middleware, storage, and audiovisual systems, that enable users to access, store, transmit, and manipulate information.

The term ICT is also used to refer to the convergence of audiovisual and telephone networks with computer networks through a single cabling or link system. There are large economic incentives to merge the telephone network with the computer network system using a single unified system of cabling, signal distribution, and management. ICT is an umbrella term that includes any communication device, encompassing radio, television, cell phones, computer and network hardware, satellite systems and so on, as well as the various services and appliance with them such as video conferencing and distance learning.

ICT is a broad subject and the concepts are evolving. It covers any product that will store, retrieve, manipulate, transmit, or receive information electronically in a digital form (e.g., personal computers, digital television, email, or robots). Theoretical differences between interpersonal-communication technologies and mass-communication technologies have been identified by the philosopher Piyush Mathur. Skills Framework for the Information Age is one of many models for describing and managing competencies for ICT professionals for the 21st century.

2. OBJECTIVES OF ICT

The aims of ICT in Education can be classified under four headings:

a) The utilitarian aims of ICT in education are:

i. to help the students become skilled and sure clients of ICT who can make proficient, successful and imaginative utilization of essential application programming in their regular exercises; and,

ii. to urge the students to become basic and intelligent clients of ICT who can assess the abilities and confines of the innovation and of social, specialized, political, moral, authoritative and prudent standards related with its utilization; and,

iii. to set up the students for the general public of tomorrow by making them versatile clients of ICT who have the essential transparency and adaptability of brain to have the option to acclimate to future changes in the innovation.

b) The social aims of ICT in education are:

i. to urge the students to build up the proper social abilities that are basic for co-usable and synergistic learning based around ICT; and,

ii. to engage ICT burdened students by guaranteeing adequate access for those students who have minimal out-of-school chances to utilize the innovation; and,

iii. to encourage better correspondence between the students in this way advancing more prominent social comprehension and congruity; and,

iv. to guarantee value between all students by giving suitable subjective and quantitative chances to conquer social and learning detriments.

c) The cultural aims of ICT in education are:

i. to help the students value the wealth of our social legacy by encouraging access to all parts of our one of a kind culture; and.

ii. to help the students become refined residents of the cutting edge world by encouraging the disclosure and valuation for the social legacy of different nations around the globe.
d) The personal aims of ICT in education are:
   i. to urge the students to build up the proper individual aptitudes that are basic for autonomous learning based around ICT; and,
   
   ii. to help the students to build up their capability to their fullest by encouraging the securing of information; by helping the student focus on higher request intellectual undertakings as opposed to on lower request routine assignments and by emphatically influencing the disposition of the student towards further learning; and,
   
   iii. to help the students with unique needs coordinate themselves inside school and society by expanding their freedom and by building up their capacities and interests.

3. **ROLE OF ICT IN EDUCATION SECTOR**

The job of ICT in achieving changes in learning have been recognized as far as the perspectives, which have been expressed as follows:

1. Management Education: In the board training, the primary factors that have been considered are, enhancements in learning accomplishment; putting accentuation upon grown-up lack of education and disposing of female absence of education; extension upon the arrangements of essential instruction and aptitudes improvement programs among the people and increment in the securing of training by the people and their families, basically as far as information, aptitudes and capacities, which are required for the sustenance of the living conditions. So as to give satisfactory consideration on these variables, it is essential for the people to expand their insight and comprehension as far as ICT. The job of ICT has been completely perceived being developed of aptitudes and capacities among the people, so they can meet their employment openings (Desai, 2010).

2. Supporting Distance Learning: In higher instructive organizations, separation learning is normal (Desai, 2010). Separation learning is the realizing, when the educators and understudies are inhabiting a good ways from one another. At the point when they are inhabiting a separation, at that point innovation is respected to be of most extreme hugeness in encouraging learning. The understudies and teachers speak with one another through messages, the understudies send their assignments and reports and get input. They gather and scatter instructive data and bolster the expansion of innovation proficiency. Right now learning, understudies for the most part obtain a productive comprehension of scholarly ideas through web. Class addresses are not sorted out and this is one of the significant inconveniences of separation learning.

3. Student Centered Learning: With the assistance of ICT, it is conceivable to advance changes inside the arrangement of training. It is crucial for the instructors to incorporate, the educating learning techniques and instructional methodologies in such a way, that they end up being favorable to the understudies. The ICT can advance understudy focused learning by utilizing web on a thorough scale. Aside from the utilization of web, the understudies typically utilize MS Word to get ready assignments, undertakings and reports. MS Power Point is utilized to get ready introductions and MS Excel is utilized to get ready spreadsheets. Thus, these are utilized, contingent on the instructive necessities of the understudies.

4. Supporting Knowledge Construction: The rise of ICTs as the learning innovation has rendered a compelling commitment in the extension of information, yet additionally development of information. It is the activity obligation of the educators to guarantee that they are giving an acceptable comprehension of the scholastic ideas to the understudies. They have to guarantee that they are decidedly ready and have sufficient information and data as far as the subjects. Besides, they ought to have the capacities to take care of the issues and answer the questions that are advanced by the understudies. The instructors set themselves up through understanding books, articles and different materials. Be that as it may, the utilization of innovation has obtained conspicuousness in effectively getting ready themselves so they can meet their activity necessities in an efficient way.

5. Supporting Basic Education: In India, there are number of people, who have encountered difficulties and have experienced number of obstructions inside the course of securing of training. At the point when the people have dropped out of schools, even before their instructive abilities are sharpened or have not been taken a crack at schools previously and try to secure training later, at that point ICT is expressed to render a noteworthy commitment in helping them to sharpen their aptitudes. There have been foundation of instructive establishments and preparing focuses in rustic networks. The people get took a crack at them to upgrade their specialized aptitudes. As they are very much aware that using innovation and web, they can create data as far as different angles, speak with others and get occupied with relaxation and recreational exercises.

6. Supporting Constructivist Learning: Constructivism is the worldview of discovering that accept that learning is, where people develop meaning and new information, which depends on their earlier information and experience. The educationists allude to it as the rising teaching method rather than the long existing behaviorism perspective on learning. The utilization of ICT in training contributes more to constructivist learning. Right now, perceive their duties and are progressively committed towards learning. There is an expansion in the inclusion of
understudies towards usage of their assignments, utilizing PCs, cell phones and web. Right now, is a decrease in the job of educators towards prompting or managing understudies. Besides, the instructors feel happy with the exhibition of understudies (Mikre, 2011).

7. Promoting Active Learning: ICT upgraded learning prepares apparatuses for assessment, investigation and estimation of data. The principle objective is to make arrangement of stage for the understudies to increase their learning capacities by getting required into powerful correspondence forms and taking part in errands and capacities effectively. Sometimes, when instructors are showing a thing or two arrangement, they will in general actualize certain techniques and systems to excite enthusiasm among understudies and invigorate their mentalities towards learning. One of the most efficacious strategies is pretend. In pretends, understudies are solicited to expect jobs from characters and afterward showcase the plays. Through this strategy, they are not just ready to secure an effective comprehension of the ideas, yet in addition enjoy learning. Subsequently, it very well may be expressed that to advance dynamic learning, it is essential for the instructors and understudies to have information as far as strong educating learning strategies.

8. Promoting Creative Learning: The ICT is fundamentally utilized to advance inventive learning. The significance of the term inventive is keen, imaginative, clever and creative. This implies, when advancements and web is utilized to expand instructing learning strategies, at that point innovativeness is engaged upon. At the point when the educators are giving information and data to the understudies regarding the ideas, at that point they utilize current and inventive techniques. Then again, when understudies are procuring a comprehension of the ideas, at that point they can teach the qualities of ingenuity, cleverness and good faith. At the point when the understudies are required to set up a venture, at that point separated from recording ideas and data, they may improve their undertakings by utilizing pictures from the web. Subsequently, right now, and web is utilized to advance inventive learning.

9. Promoting Integrative Learning: ICT upgraded learning advances a topical integrative way to deal with the educating and learning forms. This methodology dispenses with the fake detachment between discrete orders and among hypothesis and practice, which describes conventional methodology (Mikre, 2011). In basic terms, when one is utilizing innovation in improving learning, at that point the people not exclusively can obtain proficient comprehension with respect to rehearse, yet they are likewise ready to create mindfulness regarding different viewpoints. For example, when people are taking a shot at an exploration venture, at that point they utilize web to procure information and comprehension regarding different subjects and ideas. In increases, they utilize MS word in composing data. Consequently, it tends to be expressed that ICT is utilized to advance integrative learning.

10. Transforming Curriculum and Course Content: Through the utilization of the web, the people can procure a proficient comprehension as far as number of ideas and subjects. For example, when instructors are giving information to the understudies as far as profound quality and morals, at that point using the web, they can acquire various models and contextual investigations, which would encourage the comprehension of ethical quality and morals among understudies. Inside reading material, sometimes, the data that is given regarding ideas is brief. In this way, instructors utilize web in achieving changes inside the educational plan and course content. At the point when educators are showing math ideas, at that point as well, they urge their understudies to utilize web to get access to models and issues that would encourage their comprehension.

4. CHALLENGES OF ICT IN EDUCATION SECTOR

Although valuable lessons may be learned from best practices around the world, there is no one formula for determining the optimal level of ICTs integration in the education system. The concerns such as who will manage this process of ICTs integration in education develop policy guidelines and strategies. There are significant challenges in integrating ICTs use in education rising from environmental, cultural and educational faced by policymakers and organizers before any ICT usage in training to painstakingly think about the accompanying:

1) Environmental challenges: Individuals are relied upon to have the option to work, learn, and study at whatever point and any place they need to; this in developing world this still unrealistic. A nation's instructive innovation framework sits over national media communications and data innovation foundations. There is a restricted local foundation for the full ICT incorporation in instruction. It is significant for policy makers and organizers before any ICT usage in training to painstakingly think about the accompanying:

- Appropriate rooms or structures accessible to house the innovation. In nations where they are numerous old structures, guarantee legitimate electrically wiring, warming/cooling and ventilation and furthermore security and wellbeing will be required.
- Availability of power and communication in most creating nations where there still huge territories without a dependable inventory of power and the closest phones are miles away.
O Policymakers ought to likewise take a gander at the pervasiveness of various kinds of ICT in the nation as a rule and in the instructive framework specifically.

2) Cultural difficulties: Diversities of culture in various piece of the world are likewise difficulties in presenting ICT in instruction. English is the prevailing language of the web. Research has demonstrated that an estimation of 80% of on the web content is in English. A huge extent of instructive programming created on the planet advertise is in English too. In many nations where English isn't the primary language this speaks to a genuine hindrance in incorporating ICTs use in training framework. Utilizing the case of India and Pakistan, the lion's share all the sites on the planet are in English. This circumstance restricts the data access for certain individuals who have need or no capacity in English language. Like the circumstance in South Africa, where understudy's multilingualism foundation causes a significant test in the job of ICTs in South African advanced education framework.

3) Educational challenges: One of the greatest challenges in ICT integration in education is balancing educational goals with economic realities. ICTs in training require enormous capital investment. Because of budgetary troubles, government in some part of the world uncommonly developing nations need is the restoration of school structures and educator welfare. ICT for instruction then again has not yet been viewed as a need. In term of HR, the requirements are because of the absence of prepared showing labor and absence of inspiration among instructors to embrace and incorporate ICT as a device into their instructing or instructive educational plan. Additional exertion and time include in the utilization of ICTs in training. In some piece of the world because of instructive foundation by and large there is need readiness for understudies entering advanced education in the information and abilities required for the fundamental utilization of advances. Still in instructive, learning difficulties emerge in the conveyance strategies for utilizing ICTs (online-based, mixed and so forth.), content not adjusted to the innovation and setting, restricted collaboration among understudies and teachers. By and large, incorporating ICTs use in training requires foundation of infrastructural offices, obtaining of advances and their intermittent refreshing, the board and expert help administrations.

5. CONCLUSION

The utilization of ICT has rendered a critical commitment in achieving enhancements in the arrangement of training from various perspectives. The individuals from the instructive foundations are not just ready to upgrade their insight and comprehension as far as number of perspectives, yet in addition can do the errands and exercises in an employable way. At the end of the day, with the ownership of aptitudes and capacities, the execution of undertakings and exercises become progressively sensible. The advantages of ICT in training are perceived as far as different angles. These are, instructing learning procedures, quality and openness of training, learning condition, learning inspiration and educational execution. At the point when the individuals from the instructive establishments are well-prepared as far as utilization of innovation, at that point they can realize upgrades in instructing learning procedures, quality and openness of training, learning natural conditions and educational execution. Besides, understudies become spurred towards learning and work viably towards accomplishment of scholastic objectives. The job of ICT in realizing changes in learning are as far as the angles and these are, the executives instruction, supporting separation learning, understudy focused picking up, supporting information development, supporting essential training, supporting constructivist getting the hang of, advancing dynamic picking up, advancing inventive getting the hang of, advancing integrative learning and changing educational plan and course content. In the field of training, these are a portion of the angles as far as which changes have been achieved through ICT. In the wake of obtaining a viable comprehension as far as these viewpoints, one can comprehend that ICT has been rendering an imperative commitment in enlarging the general arrangement of instruction. At the point when people have advanced their comprehension regarding ICT, at that point they can sharpen their relational abilities. Right now, are even ready to send their reports and records to their educators and individual understudies. At long last, it very well may be expressed that utilization of ICT is vital in encouraging instruction and learning among understudies.

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Technology Integration in Planning Lessons in Pre Service Teacher Education Programme

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Abstract: Technology Integration has been the focus of various plans and policies of our government and the need has been reiterated in NPE 2019. In order to prepare our learners to face the challenges of 21st century, we have to invariably equip them to be technology proficient. In order to meet this objective, ICT plays a critical role. The teachers, therefore, need to prepare the lesson plans that utilize technology such as NTeQ and 5 E Lesson Plan. Pre Service teacher education programmes across country are yet making behaviourist lesson plans. This paper attempts to integrate technology in lesson planning by giving examples of NTeQ and 5E Lesson plans. By taking small steps, teachers can begin to reap the benefits that technology can bring to their teaching and to student learning.

The classrooms across India are witnessing a transformation with Smartboards, net savvy teachers and digital learners; and an emphasis on student centered approaches. This unprecedented situation has posed new challenges in front of the teachers who need to evolve their methods and strategies to meet the demands of the changing times.

Technology Integration has been the focus of national plans and policies with a compulsory component of ICT in the pre service teacher education programmes across country. The New Education Policy 2019 reiterates the critical role of ICT in assuring quality education on global standards. The objective of technology integration in NPE 2019 states, “Appropriate integration of technology into all levels of education - to support teacher preparation and development; improve teaching, learning and evaluation processes; enhance educational access to disadvantaged groups; and streamline educational planning, administration and management.”

Technology today impacts all the areas of teaching learning viz. teaching, learning and evaluation. The rapid development and need of technology demands preparedness on the part of the schools as well as teacher education institutions. In order to expedite the aforesaid need, NETF National Education Technology Forum is being set up with an aim to facilitate decision making on the induction, deployment and use of technology, and to share best practices with each other.

Thus, to prepare the prospective teachers, teacher education institutions will leverage technology based resources, MOOCs and assistive technologies for inclusion. Along with this, many in-service programmes for upgrading the knowledge of existing faculty through online courses has been emphasized by NPE, 2019.

The first step in the inclusion of technology is to accept and understand that technology cannot replace teachers. Since it’s clear that tech integration is here to stay, it is not a question of whether teachers integrate technology into their classrooms, but rather how to do it best. By taking small steps, teachers can begin to reap the benefits that technology can bring to their teaching and to student learning. This can be achieved with a careful planning in the form of technology integrated lesson planning.

Two major ways of Lesson Planning to Integrate Technology are:
1. NTeQ Model
2. 5E Model

1. NTEQ LESSON PLAN

NTeQ Model: NTeQ Lesson Plan is a ten step process for integrating technology into problem-based, inquiry-based, or project-based learning. The NTeQ model is a student-centered approach to lesson planning that focuses on the use of technology as a learning tool, rather than an instructional delivery or drill and practice tool. The ten steps comprises of:
1. Specify Objectives
2. Computer Functions
3. Specify Problems
4. Research and Analysis
5. Result Preparation
6. Activities during Computer Use
7. Activities before Computer Use
8. Activities after Computer Use
9. Supporting Activities
10. Assessment

The use of computers is an integral part of this model. Technology is utilized in research and analysis and in support activities and assessment too.
An NTeQ Lesson Plan

Lesson Title: Maps as Teaching Aids

Subject Area: Teaching of Social Science

Grade Levels: B.Ed.

Lesson Summary: Students will read and research the importance and usefulness of maps in teaching Social Sciences particularly History and Geography.

Learning Objectives:

By the end of the lesson, the students will:

• Develop skills as active, critical readers
• Develop map reading skills
• Increase their understanding of how to use maps as teaching aids
• Become familiar with importance of maps in teaching learning of Social Science
• Become familiar with Microsoft Word
• Research via the Internet

Materials:

• Access to the Internet
• Maps of various kinds
• Paper and Writing Material

Computer Functions and Data Manipulation:

Computer Function       Computer Application

Internet Searches       Use the internet to search for information on

Importance of maps

Word Processing         Use Microsoft Word to print final copy of their research

Specify Problem:

What are the uses of maps? How important are the maps as a teaching aid in the teaching of History?

Results Presentation:

When the students complete their projects, they will share them with their classmates. They will also use these and their new computer knowledge to teach and share the use and importance of maps to their classes.

Lesson Introduction:

Students will be introduced to the use of maps as teaching Social Sciences lessons with a number of examples. Students will also provide inputs on where and how they have their own understanding of concepts got better due to use of maps in order to build background knowledge and to make connections to their upcoming projects.

Computer Activities:

Use the Internet to research the types of maps.

• Get the printouts of maps of all the types they know about.
• Prepare a report on the use of each type of map using a Word Document.
• The students will be discussing and brainstorming the different ways the maps can be used while teaching learning History and Geography and how can the maps make the understanding of the events better. The ideas generated will be noted down.
• The students will be divided into six equal groups. Each group will be required to prepare a presentation on one kind of map category explaining its use and importance on any one suitable content of Social Science. The students will be given access to the internet for researching. The teacher will provide necessary direction.
• Create a Word/powerpoint presentation of their final copy of their project.

Prior to going to the computer:

1. Participate in brainstorming session to generate ideas various topics of Social Science having scope of map as teaching aids.
2. Discussions related to usefulness and importance of maps as teaching aids.
3. Forming groups of six.
4. Independently research about the types of maps and their respective importance.
5. Outline their main topics and details gathered from the book.
6. Use their knowledge to prepare few points that would form the basis of further research using internet.

At the computer:

1. Use the Internet to research more information.
2. Using template, create a presentation/report.
3. Getting printouts of all the types they have researched about.
4. Using word/powerpoint to prepare final project to present before class.

After going to the computer:

1. Discuss the project/presentation with the teacher.
2. Modify on the basis of suggestions of teacher.
3. Make oral presentations to peers.
4. Take feedback and adapt, if needed.

5. The students will submit a final presentation. Supporting Activities

Supporting Activities:
1. Use Internet to research about the utility of maps as teaching aids.
2. Using word document to note down ideas during brainstorming session.
3. Answer the discussion questions both at the beginning of project and while getting the feedback from teacher and peers.
4. Prior to presenting the presentation to the class, a peer review will be done to check for errors and/or make suggestions to help finalize the presentations.

Culminating Activity/Assessment:
1. The students will now present their final projects.
2. It is their opportunity to demonstrate their application of the information and to present their findings or conclusions to others.
3. Now the project is submitted for evaluation and completing the project or assignment.

2. 5E LESSON PLAN

Title: Continuous and Comprehensive Evaluation (CCE)

Grade Focus: 8, 9, 10

Subject: History

Recommended time to Completion: 5-6 days

Context of the lesson: The functioning of CCE. Its effectiveness over the earlier evaluation system.

Materials:
- Access to the Internet
- CCE Booklet-CBSE
- Newspaper Reports
- Paper and Writing Material

Pre-requisites

Evaluation Rubric

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Unsatisfactory</th>
<th>Needs Improvement</th>
<th>Satisfactory</th>
<th>Exemplary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research</td>
<td>Limited research, from limited sources</td>
<td>Somewhat well researched from somewhat varied sources.</td>
<td>Well researched, from various sources</td>
<td>Thorough research from varied sources presenting different points of view</td>
</tr>
<tr>
<td>Storyboard / planning</td>
<td>Limited planning evident</td>
<td>Some planning evident</td>
<td>Planning evident</td>
<td>Thorough planning evident</td>
</tr>
<tr>
<td>Content</td>
<td>Lacks detail</td>
<td>Some detail</td>
<td>Good detail</td>
<td>Excellent detail</td>
</tr>
</tbody>
</table>
Write a self-evaluation reflective journal about what you have learned. What did you contribute to your class? What could you have done better? What else would you still like to learn about the content?

These are the two examples of the technology integrated Lesson Plans that the teachers can utilize in order to actively engage the learners and providing learner centered, participatory learning experiences. The NCF-2005 requires the teacher to be the facilitator of student’s learning in a way that the student is helped to construct knowledge for himself/herself. In this endeavour, technology is the savior for both teachers and learners alike. 21st Century skills demand a learning community that is well equipped with technology skills to cater to the challenges of future. For this well trained teachers at the pre service stage itself will go a long way in catering to the challenges and aims and objectives of education.

REFERENCES
Technology Integration in Planning Lessons in Pre Service Teacher Education Programme


[8] https://www.youtube.com/watch?v=XTe4OvQGxml


Towards the Intention Method Engineering from Function Method Engineering

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Abstract: Method Development Life Cycle (MDLC) consists of three phases: a) Requirement Engineering b) Design Engineering c) Construction Engineering. The last two phases has already been explored in FME and assumes that the first stage is already done. But actually, the first phase is at highest level of abstraction. In this paper, we work upon the first phase of MDLC. This phase is based on the Requirement Engineering techniques like interviews, brainstorming etc. But, we consider the intention in this phase. Objective of this phase is to filter out intentionally similar methods and supply to the next phase (Design Engineering) of MDLC. This paper also contains the problem faced in FME and need to move towards IME.

Keywords: MDLC, Method, Method Intention, Method Engineering, SME;

1. INTRODUCTION

Methods can be used in diverse areas of computer science & engineering (information system development, software engineering, databases etc.), as well as in the business world (e.g., business process reengineering, business process management, knowledge management). Multiple application domains, system analysis & design techniques, programming languages, development paradigms and project planning & strategies can vary over different ranges. In spite of this plurality, there is a need to customize methods that match organization/ projects specific needs of different organizations/ projects.

Early method design was ad hoc and methods were developed based on the experience of their designers. As the number of methods increased, the need for a systematic discipline for engineering methods was felt and area of Method Engineering is developed.

ME is an “Engineering discipline to design, construct and adapt methods, technique and tools for the development of information systems”. Initially, it was thought that a universal method that was capable of addressing the needs of all ISD projects could be defined. However, this view was rejected. To overcome this problem, the area of Situational Method Engineering (SME) was developed. This idea was based on a “situation”. Actually situation is a non functional parameter of the method that leads to the successful use of a method. The situation can be conceptualized in many ways like it can me the contingency factors, project characteristics, environment, etc [1].

SME was developed to build methods for specific development situations. SME assumes the existence of a method base from which method components can be retrieved and assembled to form the desired method. This choice of method from the method base is base on a situation. For example, an object chart schema has been derived from two other models, i.e., object model and state chart that were in method base repository.

Although SME was a solution to the problem mentioned above, but there was a requirement for a better solution. The problem that was faced in SME is that it only considers the non-functional parameter that could not fulfill the need of selecting a “good” method from the method base. Therefore, functional situation was introduced that determine functional and non-functional characteristics of the method. The technique that uses functional situation as its base is Functional Method Engineering (FME) [3].

The purpose FME [3] is to break the method engineering task into stages. Each phase has a dual purpose (a) to select a ‘good’ method for reuse and (b) to evaluate whether one is any closer to the desired method or not, which would be beneficial to get an assurance that we are proceeding in a right direction. The selection of a method is driven by the intention to be achieved, which is at the highest level of abstraction.

Then the second phase i.e., Design Engineering phase is reached where the matching for functionally similar methods is carried out. The matching is carried out by determining if the components and component inter-relationships of the selected method have relevance to the desired method. Once this is determined, the third phase, the Construction Engineering is reached. Here the features of the selected method are examined to see the extent to which they fit the desired method.

As mentioned that the first stage is at the highest level of abstraction, therefore we can say that FME is based on the assumption that the first stage is already implemented. Now there is a need to remove this assumption and move towards the more precise solution where we get greater and greater confidence that we are indeed likely to produce the desired method.
Towards the Intention Method Engineering from Function Method Engineering

Proposed Work:

In situational method engineering, methods selection is based on the non-functional characteristics of method. This short coming is resolved with the functional method engineering. Functional method engineering has considered the method selection based on the functional and non-functional characteristics. But, functional characteristics can’t achieve until unless, we identified the method intention. So, method intention is a major issue during the method development to apply functional method engineering. So, we have done experiments on the paper and build the sufficient confidence that without the clarity of method intention, we can’t apply functional method engineering. We have identified the method intention during requirement engineering stage which is indicated in Fig.1.

2. METHOD INTENTION

The method intention is basically the goal that the method fulfills. It is at the highest level of abstraction. The figure below contains the meta-model for the method intention. Here, method intention has three attributes i.e., input, output and Goal. Three inputs are required in the method intention.

The explanation of the inputs and outputs of the method intention is as follows:

- **Goal**- It represents the aim that is to be achieved.
- **Input1: Set of nouns**- These represent the subjects about which the method has to be carried out.
- **Input2: Set of verbs**- These represent the work that is being carried out.

The combination of the verbs and nouns represents the method name (verb, noun). For example, the method name Admit Patient, gives an idea that the method is about the Patient (noun) to admit (verb) him in the hospital.

- **The output** of method intention will be the method name/s that is intentionally similar to the method to be.

Ones that contain no sub method intentions, i.e., they cannot be broken further into sub parts. As the figure above shows that the method intention can be of three types: Complex, Abstract and atomic. Complex method intentions represents that there are sub method intentions also that are contained in the main method intention. This contains the “is part of” relationship. The Abstract method intention is the generalization or specialization of the other method intention. The atomic method intentions are the simplest

An Example for the method intention meta-model:

The example in the above figure 3 contains the intention of conducting the exam. The exam can of offline and online. Therefore these two methods are the specialization of the main method, i.e., ConductExam. Here it shows the abstract feature of the method discussed in the previous section. Now the method ConductExam can be broken into three sub methods i.e., RegisterStudent, PrepareQuesPaper and DeclareResult.
These make the ConductExam a complex method. These methods themselves are the atomic ones that cannot be broken further.

3. INTENTION METHOD ENGINEERING

Now, we added the notion of method intention in method engineering and treated as Intention Method Engineering (IME).

It is based on the Method Development Life Cycle [3] and shown in Table 1. In this life cycle, discovery and representation of method intentions is in the requirement’s engineering phase, definition of the functional method is in the design phase, and finally development of method implementation is in the construction phase. IME starts with method intentions and is therefore located in the Requirement Engineering. Next, two phases of proposed life cycle covered and explained in FME [1].

INTENTION MATCHING PROCESS

Intention matching process is shown in Fig 4. Firstly, it asks for method name and then search in its repository. If this method exists in the repository then display method’s intention. Otherwise, it will check synonyms based on synonyms defined in the repository during the development of new method. Now, there are two possibilities, first, it may find the synonyms then display the entire method list. We can pick one by one individual method and apply our matching operations of method intention. It can meet method requirement then display the method intention. Otherwise pick another method till all method traced. If user requirement is not meet then build new method intention and store in a repository for future use. The second possibility is that it may not find any synonym and therefore build a new method’s intention.

5. CONCLUSION

In this paper we have concentrated on the first stage of the method development lifecycle i.e., the requirement engineering phase in which the intention of the method to be is matched with the various other method that exist in the method repository. The paper also contains the flow chart of the intention phase of IME that will be helpful while implementing the tool for the same. The output of the intention phase will be the intentionally similar methods to reduce the method engineer/application engineer’s effort.

In the future, we will explore IME towards Business Process, Robotics etc. The IME will be applicable to multiple domains.

REFERENCES

Abstract: In the contemporary world, development of the human resources is vital for the development of Indian economy. It is these human resources who can transform the panorama of India through these e-learning platforms by incorporating computing technologies in the service sector. But the lack of knowledge among human resources makes it difficult for the education sector to grow. Therefore, E-learning platforms such as Internet, Video-learning, Social Media learning etc. are addressing various benefits thereby enhancing the quality of education. Therefore, the aim of the study is to augment the skills of human resources by providing not only e-learning platforms but also suggesting measures to reconcile them with traditional learning techniques. This would transform Indian education landscape in a better way.

Keywords: Computing Technologies, E-Learning, Education, Transformation, Reconciliation etc.

1. INTRODUCTION

In the contemporary era, there has been a significant importance of service sector in the Indian economy as it majorly contributes to GDP. It is specifically mentioned sector getting influenced by latest computing technologies known as ICT (Information and communication Technologies). But the major issue concerning this is the improper knowledge of these technologies impacting the human resource of the Indian economy. These human resources should be provided education in terms of training programmes so that they develop themselves with the fast changing updating environment. This will help them to adapt the emerging e-learning methods thereby enhancing the quality of education and in turn transform India into the best in proving certain services. These personalized learning outcomes would ultimately satisfy the expectations of major stakeholders, investors, financial institutions etc. and make our human resources more valuable.

E-Learning refers to the use of electronic media, educational technology and information and communication technologies (ICT) in education (Pavel, Fruth et al 2014) [6]. This is basically widening the spectrum of education and excelling beyond classroom horizons. A digital revolution is gaining importance by accessing various ICT (Information and Communication Technologies), for example: Internet, Audio, Video-Conferencing, satellite systems, cell phones and other medium of communication.

It has been observed in the past few decades that these technologies have shown their importance not only in the urban areas but also covering rural areas. A majority of population indulge themselves in communicating with others in different countries through instant messaging and video call through whatsapp, maintaining networks through Facebook and also using social networking sites to run their business all over globe like Instagram etc.

Therefore, there is a need for incorporating these technologies via e-learning platforms which would augment the skills of human resources of our country.

2. THEORETICAL FRAMEWORK

In the traditional framework of education, students are generally pushed forward where they are assessed on the basis of tests. These tests are not sufficient to judge their excellence as learning gaps are being found out for the students not performing well. After identifying the learning gaps, the practice teachers generally follow is to proceed with the curriculum. This is actually accumulating learning gaps in the field of school education. Same scenario is usually witnessed in the university education where there is a need for extra tuition to cover up the syllabus.

Thus, there is a massive requirement in India to invest resources for online platforms. This would urge students to learn at their own pace and assess their performance themselves. As per Raghav Gupta, Director, India and APAC, Coursera, the quality of higher education in India is not matching with International Standards. This arises a situation in India to supplement physical classrooms by digital classrooms. As a result, job skills which are not prominent in our industrial workers would amplify by adapting with the new technologies and reskilling themselves. MOOCS (Massive Open Online Courses) is one of the finest platforms to develop digital learning in employees having tie-ups at international level for skill-based course content.

According to a report by KPMG, the Indian Online Education Industry would grow from 1.6 million users in 2016 to 9.6 million users by 2021.
E-Learning is actually transforming the traditional methods of learning i.e. classroom teaching, formulating questions, monitoring discussions, solving lengthy questions etc. and heading towards learning virtually such as interactive whiteboards, role playing, simple modelling etc. In the 21st century, E-learning is equipped with certain devices where they are far better opportunities for new generation learners than old-generation learners. This is represented in figure 1.1. (Vivekananda, Ruvan, 2017) [10]

Fig. 1.1. Devices for E-learning in the 21st Century

It can be said that e-learning is considered as a blessing for the people of the 21st century as an e-learner can gain significant knowledge with this full-blown technological implementation over traditional learning such as teacher-student learning. Thus, a future requirement is the need to prepare students in the information society where the most crucial factor is “knowledge” positively impacting the social and economic development of an Indian economy. (Spathis, 2004)

In view of the above, the major controversial question arises regarding the transformation of India through e-learning platforms leaving behind traditional learning aspects.

3. LITERATURE REVIEW

Cullen et al. (2004) [2] did a real case study where research is done using questionnaire and students give effectiveness to this method which would develop their research skills and should be included while teaching accounting problems. Omara and Salameh (2012) [1] explained the Jorden analysis regarding difference between traditional and modern learning which revealed that e-learning is more relevant and enhances the skills and scores of the students. Li, Wang et al. (2014) reviewed the changes in the 21st century demonstrating dynamic changes covering certain aspects in individual’s lives such as social interaction, dissemination of knowledge, media, health, education etc. Sethughes. (2012) [7] demonstrated the importance of traditional learning over e-learning. Former is better than latter as it involves face to face interaction, discussion with the teachers personally thereby improving inter-personal skills and resulted in better communication. Saini, K., Wahid, D. A. et al (2014) reviewed the advancement in the modern technologies which can enhance their practical and analytical skills. Dr., S. S. (2015) [3] reviewed the importance of traditional learning over e-learning emphasizing motivation through physical presence of the teachers and feedback is attained immediately. Wong, W. K., & Ng, P. K. (2016) [9] described the benefits of e-learning over traditional learning in the requirement of technical knowledge whose cost would be low and convenience rate is high. Vaona, Banzi et al (2018) [8] found that e-learning is better than traditional learning as it allows the learners to modify the content and pace according to the individual needs thereby diminishing the cost, increasing the availability of data to the learners which is quite impossible in traditional learning because of bearing huge cost of material.

From the above literature review, it can be said that most of the studies are confronting between traditional and modern e-learning. Thus, a major question concerning the transformation of an India through these e-learning platforms is to be taken into consideration and solving this issue by comparing both methods and judging their effectiveness which would show which method is more prominent for an Indian economy to rise and shine.

4. OBJECTIVES OF THE STUDY

In this study, certain aspects are analyzed showing the relevance of e-learning over traditional learning. But something has been lacking in understanding the effectiveness of e-learning platforms via ICT because of improper channel of communication between people across countries. E-learning is necessary for developing the nation as a whole but for better efficiency, traditional learning cannot be overlooked. Therefore, the major objective of the study is to ascertain the platforms in which e-learning is relevant and the secondary objective is to analyse the trends thereby distinguishing between traditional and virtual learning to understand the effectiveness of these methods.

5. METHODOLOGY, ANALYSIS AND FINDINGS

Indian e-learning industry is competing with the out-dated curriculum, involving cost of education, quality of teachers and lack of infrastructure. There are certain institutes offering quality education on one side reflecting our renowned position in the world such as Indian Institute of Management (IIM), Indian Institute of Technology (IIT), AIIMS etc. but on the other side, the system has been widened to offer online education or e-learning. The spectrum has widened beyond secondary, pot secondary and tertiary education which involve building professional skills, modules for competitive exams and other non-academic matters.
There are certain categories of e-learning shown in table 1.1

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary and secondary Education</td>
<td>Supplement to School Learning for students enrolled in primary and secondary classes in school</td>
</tr>
<tr>
<td>Higher Education</td>
<td>Alternative to traditional higher education courses</td>
</tr>
<tr>
<td>Test Preparation</td>
<td>Objective is to coach students in preparation for competitive exams</td>
</tr>
<tr>
<td>Reskilling and Online Certification Market</td>
<td>Certain courses assist users in skill enhancements which may result in certifications</td>
</tr>
<tr>
<td>Language and Casual Learning</td>
<td>Learning of different languages like French and playing guitar</td>
</tr>
</tbody>
</table>

It is mainly Information and Communication technologies (ICT) in education which aids in quality education by bridging the gap between teachers and students in traditional learning. Various types of technologies have been emerged in this industry which enhances the skills of students and thereby improving position of various Institutes.

**Methodology:** Descriptive Statistics has been used to see the impact of online education in India over traditional learning. A wide variety of e-learning platforms are available for e-learning which is represented in Figure 1.2:

![Fig. 1.2. Indicators or E-Learning Platforms](image)

**Analysis and Findings**

Vivekananda and Ruvn (2017) [10] explained the growth rates showing the adoption of e-learning country-wise. From the figure 1.3, it can be said that India is the one adopting self-paced learning in year 2015 at 55 per cent and the least growth rate of around 20 per cent attained by Colombia and Ukraine.

![Figure 1.3: Growth rate](image)

Different technological trends have been witnessed which provide good learning techniques to a particular person surpassing traditional learning:

**INTERNET:** India has attained second position with vast number of internet users who are majorly found in urban areas. 455 million users are connected as a whole. The benefit of this platform is the updating feature which helps the user to track updates by the system.

**SMART PHONES and PDAs:**

India is contributing well not only in terms of Internet users but also with respect to mobile phone users. As per KPMG Research Analysis Report 2017, there are nearly 290 million mobile users. The monthly consumption on an average is 8.3 GB data by Indian mobile users. The report 'Digital India - Technology to Transform a Connection Nation' by McKinsey Global Institute said that Reliance Jio strategy to bundle free smartphones with subscription to its mobile service has spurred innovation and competitive pricing across the sector. The advantages related to mobile learning includes: mass reach, convenient to use, cheap, etc.

**VIDEO-BASED LEARNING**

This medium is the most democratic as an education medium. This plays a pivotal role in driving engagement, participation and involvement. 2019 is the year in which video-based learning proved its worth. This platform serves the best learning experience to a learner as it gives information in less time.
**MICRO LEARNING**

This is a technological technique where bit-sized videos are shown to learners with useful information. Short busts make them learn quickly and resulted in good outcomes.

**GAMIFICATION** This is one of the new practices used for applying game mechanics of fun, collaboration, competition and rewards in non-game situations. It is adopted world-wide for enhancing the skills of learners across stages of education. Globally, it is expected to reach USD 10 billion by 2020. The growth of gamified e-learning is represented in figure 1.4 where there is a relationship shown between level of engagement and knowledge acquired. It can be said that the level of engagement is the highest in case of gamification.

![Engagement-learning matrix of different education methods](image)

Fig. 1.4. Source: KPMG Research Analysis Report, 2017

One can take advantage of different e-learning platforms which reduces cost and time with regard to new information and communication technologies.

**Challenges**

Pande, Wadhai (2016) [5] pointed that though India is making a progress towards adopting e-learning platforms for making our human resource more valuable but economy is still lacking in making it available to the rural areas. The social implication is another factor which is considered important for the success of e-learning. That basically comprises gender, religion, lifestyle, literacy level etc. Cultural factor also influence e-learning through computing technologies which contains matter, style of content writing, usage of defined material and style of management. Some may find the content advantageous whereas some may view the same disadvantageous to them. Thus, these challenges should be handled with care so that e-learning platforms transform our Indian economy and thereby rising through all obstacles.

6. **POLICY IMPLICATIONS**

Though E-learning platforms are considered a boom to our society and considered valuable for future generation as this generation can utilize these e-learning portals, websites etc. for easy access to provide them good learning opportunities and thereby gaining benefits financially. Online education in India is likely to progress making a compound annual growth rate of around 52% in 2021 from 2016. This is represented in figure 1.5 where online education increases from USD 0.25 billion in 2016 to USD 1.96 billion in Predicted 2021.

![Future of on-line education in India 2021](image)

Fig. 1.5. Future of on-line education in India 2021. Source: KPMG Research Analysis Report, 2017

There are certain proactive measures initiated by the government for the growth of e-learning platforms in India.

- 5G enabled technologies expected to transform telecom sector of the Indian Economy. It is likely expected that the global investment in 5G would be around US$ 3.5 trillion over 2020-2035.
- Internet Users in India is likely to rise by 40 per cent and smartphone users would double by 2023.

Though there is no doubt that e-learning platforms would improve the panorama of Indian economy through incorporating computing technologies but undoubtedly it is posing great challenges to the government, human resource, learners, stakeholders etc. Thus, for the proper development of the service sector of India, e-learning alone cannot bring a substantial change. This can be possible if traditional learning would be integrated with e-learning for proper technological growth. Therefore, curriculum traditional techniques should reconcile with e-learning to make Indian economy more investment-oriented thereby expecting good returns.

7. **CONCLUSION**

The purpose of this study is to educate human resources of the Indian economy about computing technologies through certain e-learning platforms which in turn develop India's panorama.
in an effective way. It has been found that certain ex-post studies focussed on explaining the advantages of e-learning over traditional learning but failed to explain the synchronization of both traditional learning and e-learning required in making our human resources more valuable. This implies that e-learning alone cannot give a new dimension to the education space. Therefore, government is taking proactive measures in bringing a technological revolution thereby reconciling both traditional learning and e-learning. This would ultimately lead to a major shift in the India’s service sector.

REFERENCES


Abstract: The pattern of human driven frameworks in the form of manual system are decreasing from corporate sector which used to be once very popular in older times as information and communication technology is inevitable in modern times. It is indispensable part of commercial transactions in competitive world where there is need of timely and accurate disbursement of quality information for necessary decision making. Growing role of governance, informed investors, policy formulation etc. calls for modern computerized technologies to capture, store and transmit material information to end users. Information and communication technology help in proper collection, storage, distribution and evaluation of important information belonging to corporate sector. The study recommends use of better technological infrastructure so as to improve financial standards and disclosure of information.

Keywords: Financial Reporting, Financial management, Information and communication Technology (ICT)

1. INTRODUCTION

IT has evolved over time. It is one of the major growing sectors amongst all other industries as it uses has now become pervasive. Even the smallest form of organization is using computerized and automated technology for ease of business. Over past few decades the role of ICT has substantially increased and completely redesigned the way we perform our daily routine. Such impact can also be witnessed in business usage of information technology. Business houses being an open system is dynamic which calls for adaptation of changes in external environment by keeping a close eye on it. Such ever changing phenomenon of business has resulted into survival of business without information technology as simply impossible. Information technology helps in exercising control over resources which results in its effective utilization and management. Information and communication technology acts as a double-edged sword as it is the one of the major factor which makes the business environment dynamic but on the other hand it also helps the corporate world in fighting with it. Thus, companies should make the best use of updated technologies for strategic decision making. Use of ICT enhances the credibility of financial activities of corporate sector in the form of better financial reporting (John and Akhaiyea, 2013 [3]).

The advancement in technological environment has affected the business processes and standards of financial information. It escalates the reliability, timeliness, accuracy, reliability and interpretation of financial reports of companies (John and Akhaiyea, 2013 [3]). Though ICT is used extensively been used the effect may vary from country to country as it is contingent upon the level of technological development and infrastructure. Use of ICT has witnessed resistance in adaptation particularly in public sector where employees majorly belongs to old generation and are thus not very willing to transform or learn (Gyaase et al., 2013 [7]). It is essential to effectively integrate information and communication technology (ICT) in all spheres of working environment of business to compete in global market. Information technology plays a major role in how reporting is being done nowadays. It has raised the standards and expectations of content in it by making it effective and efficient.

2. THEORETICAL FRAMEWORK

Financial management is all about planning, organizing and managing financial activities with a view to maximize shareholders wealth. It is mainly related with attainment and adequate utilization of funds. The finance department is a subset of firms’ internal environment and is interlinked with other departments of organization. Thus, there is a need to work efficiently to act as a integrated whole. Financial management and planning performs various functions such as estimating funds requirement, procurement of funds from different sources such as debt and equity, effective utilization of funds so attained with the help of working capital and capital budgeting analysis, fund control via cash management, funding expansion and growth requirement via retention of profit by taking dividend decisions etc. Each aspects of its various functions performed requires bundle of decisions based on relevant information which can only be possible with the help of information and communication technology.

Large companies are required to publish and submit their financial reports depicting financial conditions of a company...
on mandatory basis. Such reports needs to provide timely, adequate and accurate all material information which can affect the decision making of interested parties. Large companies have bulk of information can only be summarized with the help of advanced computerized technology.

3. REVIEW OF LITERATURE

Earliest studies pertaining to impact of information technology related to finance and accounting aimed at studying the effects of IT on accountants in context of threats and opportunities out oft. Once it has become integral part of system now the shift is to study its benefits in terms of contribution in improving information content to end users.

Xiao et. al (1996) [10] studied the impact of information technology on financial reporting of companies using a theoretical model with the help of contingency framework which explains such relationship. The degree of influence of information technology on reporting of companies is attributed by factors like environment, managerial and organizational characteristics.

Ramaswamyet. al (2010) [5] described that information technology lead to the automation of purchase procedures by company.

John and Akhaiyea (2013) [3] tested the relationship between information technology and financial reporting in Nigerian banking sector with the help of questionnaire on a scale of Five point. The result confirmed that information technology positively affects financial reporting in banking sector of Nigeria by enhancing its credibility and interpretation.

Aldalayeen et al. (2013)[11] concluded that financial performance of companies are significantly impacted by several variables of information technology. Information technology enables processing of information and data in short time span (Tokgoz and Erdogan, 2016[6]). ICT enables end users of financial information and report to evaluate and judge qualitative information (Wilson & Sangster, 1992 [9]).

4. OBJECTIVES OF THE STUDY

The major objectives of the study are:

- To analyse the importance of ICT in financial management and reporting of companies.
- To describe the current and emerging trends in the field of ICT.

5. ROLE OF ICT IN FINANCIAL MANAGEMENT

- Estimating requirements of funds: The first step in management of funds is estimating the need and requirement of funds before procuring them. Funds are required for meeting long term and short term commitments of business. This can be estimated with the help of various budgeting and planning software.

- Funds attainment: Funds can be raised through different sources which are broadly divided into owners’ funds (equity) and outsiders’ funds (borrowed funds).

a) Owners’ funds: Comprises of Equity share capital, preference share capital and retained earnings.

b) Borrowed funds: Includes debentures, loans from banks and financial institutions.

IT helps in deciding the source of raising fund and also in raising of funds. With the help of computerized technology company can calculate cost of raising funds from different sources and select the cheapest. Credit scores and ratings helps the company in raising fund.

- Investment decisions: Funds so raised can be invested in short term and long term assets. The former is known as working capital decision and latter is called capital budgeting decisions.

Capital budgeting decision requires evaluation of long term investment proposal on the basis of various techniques like NPV, ARR, Payback Period, Internal Rate of Return (IRR). Such analysis can be easily done with the help of various applications and softwares.

- Working capital management: It refers to management of current assets and liabilities of a firm. It consist of management of various aspects such as:

  a) Cash Management: Involves ideal cash holding, cash budgets etc.

  b) Debtor management: Management of credit customers of company. This involves selecting optimum credit policy, receiving timely payments, follow up of customers.

  c) Inventory Management: It deals with the questions of what, when and how much to purchase?.

Such functions require adequate information which can only be provided by information and communication technology.

- Coordination: Finance department has inter-linkages with all other departments of organisation as it deals with funds. All departments work in harmony to achieve organisational objectives. ICT enables proper communication and thus coordination between different departments via different communication tools.

- Meetings: A Joint stock company operates in large scale with members dispersed across the globe. ICT helps in bridging this gap and enables communication amongst members with the help of various technological advancements such web conferencing etc.

- Financial and non-financial reporting: With increase in stakeholder awareness, there is increased pressure over company to report accurate, adequate and timely information to various interested groups particularly external parties. There is also a shift in voluntary to mandatory non-financial disclosure to investors in India.
Such bulk information can be managed only with the help of ICT by keeping proper records of data, preparation of reports and publishing of the same on company’s website. ICT helps in presenting correct picture of financial health of companies.

- **Miscellaneous uses:** ICT can also be used for several other uses such as calculation and payment of taxes, performing audit functions, fund transfers, computerised accounting software such as Tally etc.

6. **CURRENT AND EMERGING TRENDS IN ICT**

ICT has evolved overtime. It is immensely used in organization from small scale businesses to large scale. Almost every operation is automated and contributed to the emergence of the new concept of knowledge management. There are considerable amount of practices which are in trend in the era of ICT which help in innovation and data management for companies. Few are the new and emerging trends are taking lead in market. Some of them are shown below in the diagram:

![CURRENT TRENDS]
- Cloud Computing
- Mobile banking
- Mobile Wallet
- Automation

![EMERGING TRENDS]
- Artificial Intelligence
- Blockchain
- Internet of Things
- Cyber Security
- Virtual Reality
- Augmented Reality
- Machine Learning
- Robotic Process Automation

7. **CONCLUSION**

The success and growth of business is now contingent upon how smartly it uses and integrate the smart technology in its operations. It can help a business to achieve competitive edge, save time and money, paperless records, manage its large data, maintain confidentiality, accurate and timely information, decision making and quality reporting to interested groups. Effective financial management and credible reporting is impossible without using ICT as it makes recording, tracking and fast processing of financial transactions easy. Developing economies still have a broader room for improvement of usage of updated technology for successful operations of business. The reason could also be attributed as resistance to change by old generation employees of organisation. Efforts must be made to overcome such resistance or any hurdles in the integration of ICT in overall business workings.

8. **FUTURE SCOPE**

It would be interesting to see that which factors play important role in between (contingent factors) in studying the impact of ICT on financial aspects of company.

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Internet and Tertiary Education in India

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Abstract: Internet has brought novel progress in the traditional education system. Now, the education or knowledge will not remain limited to some people or places where they are stored or available as it can now be shared and also be assessed from distant places through internet. There are plenty of methods which can be used for this purpose. Search engines like Google, Yahoo etc. are providing great help to the students who want to explore knowledge. This paper makes an attempt to understand the use of internet in tertiary education system along with the structure, autonomy and accountability of Tertiary education system in India.

Keywords: Tertiary education, Internet, Autonomy, Accountability

1. INTRODUCTION

Internet has brought radical progress in the traditional education system. Now, the education or knowledge will not remain limited to some people or places where they are stored or available as it can now be shared and also be assessed from distant places through internet. There are plenty of methods which can be used for this purpose. Search engines like Google, Yahoo etc. are providing great help to the students who want to explore knowledge.

2. OBJECTIVE OF THE STUDY

The objective of this paper is to understand the use of internet in tertiary education system along with the structure, autonomy and accountability of Tertiary education system in India.

3. RESEARCH METHODOLOGY

This paper is based on the secondary data collected through internet.

4. INTERNET AND TERTIARY EDUCATION

Internet is a powerful tool to listen, communicate and share ideas among the professors and the students at ease. [1]Wikis, blogs, and podcasts can be of great help for this purpose. Blogs are either a website in itself or a part of a website where something like an interactive journal is being used; a person can write about anything they wish, link or show images, and decide whether other people can comment on the blog entry. Wikis are websites or web pages dedicated to providing information about a topic and can be edited by either the members of that site. Podcasts are digital files in the form of audio, video, or both that can be downloaded online onto computers, MP3 players, certain phones, and many more devices. Wikis, blogs, and podcasts could positively alter the educational format of lectures for students. [2]There are many benefits of use of internet in tertiary education viz, it provides eminence education at low cost by removing the barriers related to distance etc., it also allows the direct interaction between the mentors and mentees through video calling and e-mails etc., teaching can be made more interesting by explaining the concept through animations and power point slides, teachers can provide the recorded lectures which will be considered better than reading books. All these novel progress result in the up and about tertiary education system.

Today, Tertiary education in India can be categorized in three broad Categories as University, College and Stand-Alone Institutions. There are 799 Universities, 39071 colleges and 11923 Stand Alone Institutions, privately managed Universities are 277. Indian Tertiary Education System is very Complex as comprising of the following

- Central University
- State University
- Deemed to be University
- Unitary and Affiliating University
- Institutes of National Importance
- Research Institutes
- Inter-university Centers
- Under Graduate and Post Graduate Colleges
- Public and Private Universities and colleges
- General Institutions of Tertiary Education
- Minority Institutions
- Conventional Universities
- Open Universities
- Institutions meant for certain groups such as women

5. SUPPORTING TERTIARY EDUCATION

Government of India and the state governments provide support to Public universities, while private universities are mostly supported by various bodies and societies. [3] The
types of universities controlled by the UGC, which draws its power from the University Grants Commission Act, 1956, include Central universities, State universities, Deemed universities and Private universities. In addition to these universities, other institutions are granted the permission to autonomously award degrees, and while not called "university" by name, act as such. They usually fall under the administrative control of the Department of Tertiary Education. In official documents they are called "autonomous bodies", "university-level institutions", or even simply "other central institutions".

**Autonomy and Accountability in Tertiary Education: Kinds of Autonomy**

- The autonomy in education is of three kinds as Academic autonomy, Administrative autonomy and financial autonomy.
- Academic autonomy is the freedom to decide academic issues like curriculum, instructional material, pedagogy, techniques of students’ evaluation.
- Administrative autonomy is the freedom to institution to manage its own affairs with regard to administration.
- Financial autonomy is the freedom to utilize the financial resources at its disposal in a prudent way keeping in view its priorities.

**6. ISSUES AFFECTING AUTONOMY**

Many Governing bodies like Senate, Syndicate, Academic Council etc. and Government control on opening of new colleges or grant of affiliation to new colleges. [4] Wide powers are vested in the Chancellor, which position is vested with Governor in State Universities, who find it unwieldy to exercise, due to preoccupation with other responsibilities. In the case of private universities, most of the issues are with regard to setting up the university, scope for expansion (geographical as well as mode of academic delivery) and sources of funding. [5] As per the current UGC guidelines, a private university can be set up only through a State Private University Act and has to be unitary in nature, thereby limiting the scope for expansion. A study of the Private Universities Acts of various states reveals the difference in governing mechanisms as well as operational guidelines, including admission of students. Besides, restriction on jurisdiction of the state, there are regulatory restrictions with regard to mode of delivery, like distance education. [6] Restrictions on type of sponsoring institutions constraints the sources of funding. Need for compliance to guidelines of multiple regulatory bodies (Central and State government) affects governance.

**7. WHAT IS ACCOUNTABILITY?**

Broadly speaking, accountability exists when Institutions and their functionaries are subject to information or justification for their actions. Therefore, the concept of accountability involves two distinct stages: answerability and enforcement.

**8. CURRENT LEVELS OF ACCOUNTABILITY**

- Currently, neither public nor private Tertiary Education Institutions in India are required to develop strategy plans, although a few individual institutions do so voluntarily.
- All public and private Tertiary Education Institutions are regularly expected to update performance, though most of them do not comply.
- Most allocations to public Tertiary Education Institutions are for recurrent expenditure, which constitute about 90% of the Major issues fall under two categories – restrictions and limitations as per the regulations (University Acts and Regulatory/Guidelines from UGC) and operational decision making. [7] They affect both government funded and private universities, though in different ways and to different degrees. In government funded universities, major issues include government’s influence on vital aspects like appointment of Vice Chancellor. Functioning funds. These funds are subject to external auditing.
- There are currently no mechanisms to allocate money on the basis of performance, for either public or private institutions.
- NIRF- A step of HRD in this regard

Hence, over a period of time, there is a tendency not to focus on predefined outcomes, unless driven by market forces.

On 20th March, 2018 UGC has approved the full autonomy for 62 tertiary educational institutions of India. Five central universities, 21 state universities and 26 private universities have been given this status. Eight colleges have also been given autonomous status under the autonomous colleges’ regulation. These eminence institutions will get complete autonomy by which they can start:

- novel courses
- novel departments
- novel programmes
- off campuses
- skill courses
- research parks
- appoint foreign faculty
- take foreign students
- offer variable incentive packages
- Introduce online distance learning
- institutes are also going to get into the academic collaboration with the world’s top five hundred universities
- admission procedure
• fees structure and curriculum
• Central Universities with Autonomous Status
• The central universities include
  • Jawaharlal Nehru University (JNU)
  • Aligarh Muslim University (AMU)
  • Banaras Hindu University (BHU)
• University of Hyderabad and English and Foreign Languages University, Telangana.

Autonomous status to State Universities

The state varsities include
• Jadhavpur University
• Andhra University
• Algappa University
• National University of Law
• Utkal University
• Kurukshetra University
• Osmania University
• Guru Nanak Dev University
• University of Jammu,
• University of Mysore
• Anna University
• Punjab University and
• University of Madras among others.

9. CONCLUSION

Internet in the form of Wikis, blogs, and podcasts can are providing great help for enhancement and upgradation of tertiary education in India. Tertiary education in India can be categorized in three broad Categories as University, College and Stand-Alone Institutions. Government of India and the state governments provide support to Public universities, while private universities are mostly supported by various bodies and societies. The types of universities controlled by the UGC, which draws its power from the University Grants Commission Act, 1956, include Central universities, State universities, Deemed universities and Private universities. The autonomy in education is of three kinds as Academic autonomy, Administrative autonomy and financial autonomy. Major issues affecting autonomy fall under two categories — restrictions and limitations as per the regulations (University Acts and Regulatory/ Guidelines from UGC) and operational decision making. On 20th March, 2018 UGC has approved the full autonomy for 62 tertiary educational institutions of India. Five central universities, 21 state universities and 26 private universities have been given this status. Eight colleges have also been given autonomous status under the autonomous colleges’ regulation.

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Role of Information Technology and Media in Environment Awareness

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Abstract: The basic tenet of environmental education and media is using all available technology resource in a systematic manner to find viable solution to environmental problems. Though, the technologies change and newer ones replaces the old and existing ones. This dynamic and ever-changing nature of discipline needs to be understood. Given the fact that environment education problems are diverse, taking care of the environment is the most significant concern of new millennium. The study explores fundamental questions in this connection keeping in mind the role of future teachers in environmental awareness. Information Technology can enhance the compassion towards environment issues. Media and IT reinforces the people to inculcate positive attitude and perception towards environmental causes is undertaken in the study. The millennium prospects lies in identifying and solving environmental problems and addressing them through technological intervention. With the help of information technology effort should be directed towards betterment of environmental conditions.

Keywords: Information Technology, Environmental Awareness, Media for environmental awareness and teacher trainees.

1. INTRODUCTION

Information technology, environment awareness, Integration, Information and communication technology (ICT) and environmental awareness.

Information Technology

The comprehensive uses of computers and other electronic devices to store, retrieve, transmit, and manipulate data or information is called Information technology (IT). According to Information Technology Trends in 2019: “Information technology in simply refers to anything related to computing technology. The Internet, for example, comes under the umbrella term IT. So does computer hardware, software, and networking.” Information technology (IT) is popularly used for information processing, decision making, to support shared information through decentralized computing and innovation. IT comes with multiple benefits and can be used for bringing various purposes like nature, social issues, education, health and research. Same way its application in environmental issues may lead to benefits suitable for our own conditions.

Environmental Awareness

Environmental awareness means being aware of the natural environment and making choices that benefit the earth, rather than hurt it. Some of the ways to practice environmental awareness include: using safe and non-toxic building supplies, conserving energy and water, recycling, activism, and others. For the better future of upcoming generations it is mandatory to be an environmental steward Promoting environmental awareness.

Being a teacher educator there is a strong feeling that environmental awareness make us realize the pressing need to take immediate action to stop harming the environment and start restoring the damage we have done to it. Unless there is awareness, there is no action or at least no proper action. And this action must start from the individual level and spread through the people and organizations around the community. The approach foe environmental awareness and protection relies on the local to global approach rather one can say a GLOCAL approach fits better into the situation.

Once one have a thorough understanding of the environmental issues such as deforestation, environmental pollution, water crisis, global warming and climate change, loss of biodiversity etc. Every one of our actions will come out of a place of concern for our surroundings, out of love for Mother Nature, out of the willingness to contribute towards sustainable development and make a positive change in the wor

Integration of information technology and environmental awareness

In the last decades different technologies have assisted the masses in environmental protection and environmental conservation. Today because of technological advancement paper-less office have become a reality which directly bears a fruit for environment as it lessened the number of trees cut for making paper. Integration of information technology in the area of environmental awareness plays a pivotal role in the field of environment education and dissemination of information leading to promoting environment conservation in present times. Green technology is the application of environment science for sustainable development. An environmental
technology promotes sustainable models of development necessary for protection and promotion of human existence.

2. MEDIA AND ENVIRONMENTAL AWARENESS

Media utilized in a proper manner is responsible for the advancement of people to become eco friendly and also develops a positive perception. It also acts as a risk communicator and as a advocate of facts, information and fine practices helping people to establish cause effect relationship responsible for environmental up gradation and degradation. Mass Media plays an important role for creating environment awareness among people. Use of different digital platforms and use of internet based approach is viable keeping in mind the expansion of technology in human lives. Text documents, pictures, videos etc can be circulated instantly in a cost effective manner to a wide population. Digital educational platforms like edu-blogs, wiki, forums, google forms gives a virtual space for exchange of ideas and information without any liability of physical presence of persons everywhere. Electronic mediums and platforms covers e-museums and visual environment that gives the user an opportunity to navigate and interact with range of issues.

In India, Newspaper, Radio and television has a major role to play in environmental awareness as they are most widely used modern mass media.

TYPES OF MEDIA FOR ENVIRONMENTAL AWARENESS

Newspapers, radio, television and even internet is providing comprehensive understanding of geographical knowledge to people. What is happening in the world today, which place has been ignored and the relevant representations made through different forms of media produces deep effects on the people. Currently human beings are building an artificial man made environment by over utilizing the natural resources in the name of economic and social development. Programs on guidance about conversion of waste and garbage into compost by households to save environment is an illuminating illustration. Media can report and educate people about certain forces and activities that adversely affect our environment. Electronic media and print media are a major medium of spreading information about environment among the population. Media educate people about various environmental concerns and ways to address them. Media create awareness among people and enlightens them about different problems of society. Media educates people about their roles in changing society through certain events and programs. Helps to know how people can contribute towards environmental protection and sustainability and build healthy environment.

Radio- Mass media like radio and television have been used in a sporadic fashion for long time. Radio happens to be the cheapest and easily accessible. The signals and frequencies of radio are covering almost the whole country. Thus it can be used as a significant medium of creating environmental awareness. AIR Vigyan Vidhi programme to disseminate

scientific information to students and teachers. The latest drive of radio channel FM 93.5 “MOUNT GHAZIPUR” has created awareness among Delhites regarding the hazards of culminating waste on our environment. The Radio magazine Living Planet shares environment stories from around the world, digging deeper into issues that touch our lives every day.

• Television:- Television is another very good mode to communicate environmental issues among the society. In 1975-76, SITE satellite instructional television experiment was one of the earliest large scale systematic effort in this direction. Site promoted innovations in devising and deploying suitable hardware and original software. Certain television channels like Discovery, National Geographic, animal planet extra Channels broadcast exclusively on species who are in danger of extinction, wild life and sea and water life. Doordarshan Channel is being telecast all over India and has regular programs on Environment. “Earth Matters” focuses on one special environmental problem. It works for providing information on the sources illuminating the consequences of the crisis and gives solution by altering individual behavior. ECO COMPANY, SESAME STREET, etc are some green TV shows for children.

• Print Media- Print media is a powerful ally in educating the public on environmental matters. Newspapers, journals, magazines, etc. play a key role in providing relevant information with required facts and pictures to the community. Articles and analyses explore the environmental awareness in the common man about environmental problems. Sometimes separate column is there for environmental issues.

• Social Media- Today’s young generation makes ample of use of social media and internet platforms. They have emerged altogether as a new form of media. Facebook, Twitter, WhatsApp are connecting today’s generation. Certain global environmental issues can be discussed on these platforms continuously. Government agencies and industries are also utilising social media as a preferred tool of communication with the mass. Green on Facebook; One Page for Eco Resources, Adopt a Tiger Through the World Wildlife Fund, etc are some facebook pages on environment.

3. ROLE OF INFORMATION TECHNOLOGY IN ENVIRONMENTAL CONSCIOUSNESS

Information technology has remarkable possibility in the field of research related to environment education, medical and health sector. Development of internet facilities, Geographic Information System (GIS) and information through satellites has generated a wealth of up-to-date information on various aspects of environment and health. A number of software have been developed for environment and health studies which are

used friendly and can help an early learner in knowing and understanding the subject.

Database on Environment System: Database is that the collection of interrelated data on various subjects. It's usually in computerized form and may be retrieved whenever required. Within the computer, the data of database may be very quickly retrieved. The excellent database includes wildlife database, conservation database, forest cover database, etc. Database is additionally available for diseases like HIV/AIDS, Malaria, Fluorosis, etc.

National Management data system (NMIS): NMIS of the Department of Science and Technology has compiled a database on Research and Development Projects together with information about research scientists and personnel involved. Environmental data system (ENVIS): The Ministry of Environment and Forests, Government of India has created an data system called Environmental data system (ENVIS). With its headquarters in Delhi, it functions in 25 different centres everywhere the country. The ENVIS centres work for generating a network of database in areas like pollution control, clean technologies, remote sensing, coastal ecology, biodiversity, western Ghats, and eastern environmental management, media associated with environment, renewable energy, desertification, mangroves, wildlife, Himalayan ecology, mining, etc.

Remote Sensing and Geographical data system (GIS): Satellite imageries provide us actual information about various physical and biological resources and also to some extent about their state of degradation during a digital form through remote sensing. Satellite imageries provide us actual information about various physical and biological resources. We are able to gather digital information on environment aspects like water logging, desertification, deforestation, populated area, river and canal network, mineral and energy reserves then on.

Geographical data system (GIS): GIS has proved to be a really effective tool in environmental management. GIS could be a technique of superimposing various thematic maps using digital data on an oversized number of inter-related or inter-dependent aspects. Several useful softwares are developed for working within the field of GIS. GIS also helps in identifying some deadly and chronic diseases that come from the infested areas which are significantly at risk of vector-borne diseases like schistosomiasis, malaria, etc. supported the geographical map of that area. There are some distribution information centers (DICs) in India that are interrelated with one another and with the central information network getting its access to the international database.

The World Wide Web (WWW): With the accessibility of assets on each angle, things like class and formal setup exercises, computerized records of photographs, web-works out, liveliness, PowerPoint address introductions, and competition test and quizzes have end up being increasingly useful for both the teacher and the taught who are in process of studying environmental studies.

4. LATEST RESEARCHES IN INFORMATION TECHNOLOGY AND MEDIA FOR ENVIRONMENTAL AWARENESS

1. Water Productivity Open-Access Portal (WaPOR)

The WaPOR screens and reports on farming water profitability over Africa and the Near East. The database utilizes satellite information to assist ranchers with accomplishing increasingly solid rural yields. This apparatus gives open access to the water database over basic maps - the device permits querying of information; time arrangement examinations, territory measurements identified with water and land use evaluations. The database look through satellite information and its calculation concentrated computations are controlled by Google Earth Engine.


2. SWALIM Flood Risk Management System (FRRMIS)

The FRRMIS is an electronic data scattering and sharing stage that unites the basic data on floods under a solitary client interface. The framework depends on GIS Major flood a long time in Somalia and web innovation and contains different sorts of flood data. It advances flood readiness and possibility arranging, just as salvage and reaction activities


3. CHINA and China Agricultural University - Case Study on ICT Application for Rural Groundwater Management

The contextual investigation centers around the utilization of ICards in groundwater water system the board in China. This is against an issue be confronting China – a nation with rare per capita freshwater assets. This exploration concentrated on four townships in Sanhe City, Hebei Province, China as research destinations and led hands on work contemplating groundwater the executives in six towns utilizing the ICard and two towns without ICard use. The exploration recommended that Information and Communication Technology (ICT) is promising with critical financial advantages when applied in the administration of rustic groundwater.


4. Nano Ganesh – a progressive ICT apparatus for ranch water system

Nano Ganesh is an electronic current straightforward and ease arrangement in e-water system that engages ranchers to control water siphons with the assistance of a cell phone. "Subsequent to introducing the Nano Ganesh unit at the siphon end, a farmer can turn it on or off with the assistance of a cell phone from any separation. His telephone likewise shows the
accessibility of the force supply at the siphon end just as on/off status. Subsequently, farmers need not turn it on physically and thus saves them from visiting dangerous pump sites.

5. PRESENT STUDY

Objective of the study: The study aimed at examining trainee teachers’ perceptions about how environmental issues can be addressed through the use of ICT. For this purpose a few fundamental questions were considered for measuring the perception of trainee teachers.

Population of the study: Teacher trainees pursuing regular B.Ed programme in the capital territory Delhi.

Test of the investigation: 68 pupil teachers from two B.Ed offering self financing institutions of Delhi. The investigation populace was centered around second-year pupil teachers pursuing a Bachelors of Education degree at two establishments under the aegis of Guru Gobind Singh Indraprastha University in the 2018-20 batch. The division of population in terms of gender represents, 94.3% of them are female and 5.7% are male. This is widely evident as there is always a majority of females pursuing teacher training courses. Majority of sample is undergraduate and a few of them have also post graduate degree. The age group under study is somewhere in the range of 22 to 39 years of age.

Technique for study: For the present research study, methodological analysis was followed that broke down discernment on ecological mindfulness of pupil teachers. Under the study, inquiry about the teacher trainees perception has been completed from a quantitative standpoint on perception scale, with the qualitative analysis and point of unfurling the truth with collected testable information. This quantitative methodology has permitted evaluating of pupils’ answers in a numerical manner. Moreover, measurement clear qualities, an examination among gatherings, and the connection among information and mentality factors have been set up through qualitative analysis.

Research questions: In parallel, according to the aims of the study, the following questions for the research were posed:

- What is the attitude of trainee teachers towards Role of Information Technology and media in Environment awareness?
- What are the ways of creating awareness about environment using information technology?
- What are the major concerns about environment being addressed by media?
- Is there any significant difference in the environmental attitudes in respect to gender?

6. DATA ANALYSIS

The analysis of environmental attitudes was performed by applying a self made questionare; that is, the perception scale for trainee teachers towards the environmental awareness. This scale consists of 40 items, grouped into 5 subscales, that respond using a 4-point Likert format (1 = Never, 2 = sometimes, 3 = many a times, 4 = always).

This study analysed a total of 40 items, corresponding to the subscales and Each subscale refers to different aspects of perception ranging from environmental attitude, knowledge of role of information technology, ways of creating awareness, concerns addressed by media in relation to their gender. The analysis of trainee teacher perception reflects that there is a high level of environmental attitude in teacher trainees and they have awareness on role of media and information technology. There is positive interdependence among teachers’ knowledge and attitude for information technology and media role in environment awareness.

Result analysis on types of Media: The findings suggest that among all available types of media, the trainee teachers considers the role of T.V. and Radio most significant. At the same time they also admits the value of newspaper and social media for those who are competent in reading and using different platforms of social media. The positive impact of these media is correlated with teachers awareness of Radia shows like Mount ghazi and T.V shows like Earth matters.

Result analysis on role of media for environmental awareness: Newspapers, radio, television and internet is providing comprehensive understanding of geographical knowledge to people. Trainee teachers are aware that human beings are degrading environment by over utilising the natural resources in the name of economic and social development. They considers that Media can report and educate people about the activities that adversely affect our environment and for conservation of natural resources. Trainee teachers also accepts that Recent programs on guidance about conversion of waste and garbage into compost by households to save environment should be promoted through various means. Media have a positive role in spreading awareness and civic responsibility among all the residents.

Result analysis on Role of information technology in environmental consciousness:

Trainee teachers positively perceive the role of comprehensive database on environment including wildlife database, conservation database, forest cover database etc. These database are comparatively less awarded on role of national management information system and research on development projects. Above 83% of the sample population are aware that the Ministry of Environment and Forests, Government of India has made a data System called Environmental Information System (ENVIS) having its home office in Delhi, it works in 25 distinct focuses everywhere throughout the nation. Teacher trainees concede the job of remote Sensing and Geographical Information System (GIS) on perspectives like deforestation, water logging, urban breakdown, stream and trench system, mineral and vitality holds, etc. Regardless of the gender
orientation, all the respondents acknowledge the job of World Wide Web with the accessibility of assets on each angle, things like study hall exercises, advanced documents of photographs, web-works out, movements, PowerPoint address introductions, and educational quizzes. Web assets are viewed as generally noteworthy for both the understudies just as the educators who seek after ecological examinations.

7. CONCLUSION

The perception scale has allowed the researcher to analyse the environmental attitudes of trainee teachers towards the environmental issues that can be addressed through the use of ICT and media. Results reveal a positive predisposition towards the role of ICT and media in environment awareness, which suggests that trainee teachers are aware of global challenges caused by environmental condition and the role played by ICT and media. Overall, trainee teachers show positive perception in relation to environmental attitudes towards environmental issues and role of ICT and media. This fact is very important as the environmental education is key to responding to current environmental issues through sensitization of present generations keeping in mind the futuristic goals teacher trainees are expected to fulfill. Further, there is no significant differences is found in environmental attitudes based on gender. This is evident from the findings that trainee teachers with high positive perception and environmental attitude perceived the role of media and ICT much significant. All the individuals should be sensitized for being an active participant in solving environmental problems. It is of great significance to conduct this research study on future teachers given the fact that future environment preservation and conservation is in hands of these teachers.

8. LIMITATION

It is more than sufficient for a first-example study, and it mirrors a piece of the truth that trainee teachers have a positive perception for the role of media and technology in environmental awareness. The future direction of research if all things considered, will be fitting for future examinations to incorporate other scholastic years, correlation of samples who are pursuing degrees and or after completion of degree. At last, the fate of condition is in the hands of new age learners. So research direction needs to revolve round the coverage of environmental education of trainee teachers and regular teachers.

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Abstract: In this era of advanced technology we have to keep a deep knowledge of everything. This research paper will discuss on importance of E-learning as an Emerging tool of ICT in education sector. The use of ICT in education adds value to teaching and learning by enhancing the effectiveness of learning. It added the dimensions that are not previously available as students found E-learning as more stimulating and engaging than traditional classroom environment. The finding indicated that the educator and students do make use of ICT in their teaching learning process which is a necessity in this fast changing world. Therefore integrating ICT in education field will be very effective but the main concern here to bridge the differences among the students, parents and teachers leading to an effective interaction and transparency between the three. ICT has enhanced distance learning. The teaching community is in a position to succeed in remote areas and learners are able to access qualitative learning anytime & anywhere.

Keywords: E-learning, ICT, Education

1. INTRODUCTION OF ICT

Information and technology (ICT) refersto any or all the technology accustomed handle telecommunications, broadcast media, intelligent building management systems, audiovisual processing and transmission systems, network-based control and monitoring functions. Although ICT is commonly considered an extended synonym for information technology (IT), its scope is broader.

Converging technologies that exemplify ICT include the merging of audiovisual, telephone and computer networks through a typical cabling system. Internet service providers (ISPs) commonly provide internet, phone and TV services to homes and businesses through one optical cable. The elimination of the phone networks has provided huge economic incentives to implement this convergence, which eliminates many of the prices related to cabling, signal distribution, user installation, servicing and maintenance costs.

Introducing ICT as a tool to support the education sector has initiated substantial discussions. Since the late 1990s.[1] During the previous few years an increasing number of international development agencies have embraced the potential of ICT to support the education sector. The widely subscribed Dakar Framework for Action recognizes that, ‘these technologies (ICTs) have great potential for knowledge dissemination, effective learning and therefore the development of more efficient education services.

Objectives of the Study

• To study the concept of ICT
• To evaluate the challenges and opportunities in ICT in Education sector.
• To furnish information for further research work on ICT.
• To understand the scope of E-learning in Education sector.

2. ICT AND EDUCATION SECTOR

Worldwide research has shown that ICT has improved student learning and better teaching methods. Smart technology” is that the familiar terminology that's widely being employed in every being’s life. Smart phones, tablets, gadgets, smart televisions, etc., are the products of smart technology that have made human life easier and accessible. Smart technology has not only enhanced the way of living but also became an integrated part of everyone’s life. The knowledge and Communication technology to be precise has become a thrust behind economic process and a developmental tool moreover.

ICT could be an extended term for Information technology which is a technological source to create information available at the proper time, right place within the right form to the proper user. Earlier, one had to attend for the newspapers to urge the knowledge across the globe. Now with the smarter technology, information will be accessed from anywhere using smart phones and gadgets. All this is often made possible with the assistance of data and Communication Technology. Information technology has been influencing our lives within the recent years within the fields of education, healthcare, and business. Going an additional mile, Information and communication technology in schools has had a significant impact.

Information and communication technology in schools are often used as a faculty communication tool to enhance student learning and better teaching techniques. Now a days School are adopting new emerging technology in education. During this technological era, ICT in education has compelled many collegestos induce acquainted with smart technology.

Computer-based learning is one in every of the modules of faculty communication tool that helps students to
reinforce their learning skills through computer aided education. It imparts computer knowledge in students and enables them to get large amounts of data from various websites. After 20 years of introducing computers to varsities, education has been revolutionized ever since then. It reduces time spent on mechanical tasks like rewriting, producing graphs and increases the scope of searching.

Internet tools like Email, social networks, newsgroups and video transmission have connected the globe like never before. Students can now communicate using emails and social networking groups that provide knowledge based information.

Distance learning, online learning is additionally enabled through the net. Students can learn online and also confer with experts online. Notes, readings, tutorials, assignments are often received by students from anywhere. The net provides major information in texts, audios, videos and graphics which may be accessed by the individual. Online learning allows students to interact with one another and college to interact with students classroom Learning.

With the introduction of ICT in education, classroom learning is one attribute that produces learning experiential and experimental to students. Students can hear the trainer or teacher, receive visual cues through PowerPoint images, handouts or whiteboard lists and participate actively. This helps in immediate interaction and students have opportunities to ask questions and participate in live discussions. This school communication software module further benefits in building and maintaining personal and professional relationships as classrooms offer greater personal contact with other students and teachers.

Video conferencing can be yet one more medium of communication wherein students can communicate with other students or instructors online. It enables students to become active participants in their own learning. Video Conferencing could be a powerful communication tool that has the potential to alter the way we deliver information to students. It's only one of the today's integrative technologies that empower students to arrange for a higher future.[2]

The characteristics which make ICT in education a prominent school communication tool are as follows:-

- It offers the wide variety of services.
- It is reliable and provides interactive learning experiences.
- It is flexible and provides comfortable learning.
- It motivates students to learn.
- It facilitates communication and promotes creativity.
- It also provides access to the digital library where information can be retrieved and stored beyond textbooks.

The use of ICT in education adds value to teaching and learning, by enhancing the effectiveness of learning. It added a dimension to learning that wasn't previously available. After the inception of ICT in schools, students found learning in an exceedingly technology-enhanced environment more stimulating and interesting than in an exceedingly traditional classroom environment. My Classboard is yet one more school communication tool that bridges the gap between teachers, parents, and students by using its school messenger module. Parents and teachers can interact with one another using this module emphasizing on transparency between the duo.

ICT improves teaching and learning and its importance for teachers in performing their role of creators of pedagogical environment [3]. ICT helps of an instructor to present his teaching attractively and ready to learn for the learners at any level of educational Programme.

3. ICT IN E-LEARNING

E-Learning is learning utilizing electronic technologies to access educational curriculum outside of a standard classroom. In most cases, it refers to a course, program or degree delivered completely online. We define eLearning as courses that are specifically delivered via the web to somewhere apart from the classroom where the professor is teaching. It's not a course delivered via a DVD or CD-ROM, video tape or over a channel. It's interactive therein you'll also communicate along with your teachers, professors or other students in your class. Sometimes it's delivered live, where you'll “electronically” raise your hand and interact in real time and sometimes it's a lecture that has been prerecorded. There's always a lecturer or professor interacting / communicating with you and grading your participation, your assignments and your tests.[4]

4. METHODS OF E-LEARNING USED IN EDUCATION:

Current eLearning models

Online learning approaches can be implemented in a variety of ways within the context of higher education. Some of the more common models include:[5]

- **Blended or hybrid learning.** In a blended approach, traditional face to face instruction is merged with online instruction. This combination allows educators to derive the best elements of each approach

- **The flipped classroom.** This approach, which is a type of blended learning, allows students to watch lectures at home and complete typical “homework” assignments in class. By doing so, students can focus on collaboration, class discussion, and other high-value activities.

- **Self-paced online courses.** These are courses delivered entirely over the Web but with a timeline.

- **Blended online courses.** These are courses that are primarily delivered online but have a smaller physical instruction component.
• **Massive Open Online Courses (MOOCs).** This is an online course taken to enormous scale. An essentially unlimited number of students can participate over the Internet, though these courses are not for credit. Many of the most prominent universities have some form of MOOC offering.

• **Blended MOOCs.** While not nearly as popular as standard MOOCs, blended MOOCs allow students to meet in a physical location for further discussion.

These various models provide a good cross-section of how eLearning concepts are being implemented at today’s higher learning institutions. As online learning continues to mature, these models will continue to be refined, and new models will be developed.

**Benefits of eLearning**

The advantages of electronic learning are not restricted to the students. Educators and institutions can also realize profound benefits from the successful adoption and maintenance of eLearning programs.

Some of the more important eLearning benefits include:

• Better educational outcomes for college students. Studies have shown that students perform better when online learning is incorporated into the tutorial mix.

• It lowers costs in post-secondary education. Research has shown that eLearning offers efficiencies that can’t be replicated with conventional face to face education. For example, the employment of eLearning can lower staffing costs, while also lowering costs related to the physical production of books and other materials.

• It deepens student engagement. Many students find that the standard model of observing a lecture in an exceedingly physical space doesn’t allow room for collaboration or fast feedback. Today’s students are acclimated to performing on mobile devices and other digital tools. By incorporating technology into classroom instruction, educators present material in an exceedingly context that’s familiar to students.

• It offers much greater accessibility. By making eLearning a part of the tutorial mix, higher learning institutions offer students greater flexibility to figure on material when and where it’s convenient for them. It also extends educational opportunities to those that may have difficulty meeting at a central location.

• It can theoretically provide a world-class education to anyone equipped with a broadband connection. The prices related to teaching still surge, making affordability and access serious concerns. The appearance of MOOCs and other online learning offerings could herald a brand new age where learning opportunities will be affordably scaled to students who might otherwise never have an opportunity at a high-quality education.

• It opens an alternate revenue stream for teaching institutions. Not only students have the benefit of the lower cost of instruction, but institutions also reach students across the world at low costs, allowing them to enroll within the courses from their locations.

5. **POTENTIAL DRAWBACKS-CUM-CHALLENGES TO USING ICT IN EDUCATION**

While using ICTs in education has some obvious benefits, ICT also bring challenges. First is that the high cost of acquiring, installing, operating, maintaining and replacing ICTs. While potentially of great importance, the mixing of ICTs into teaching continues to be in its infancy. ICT systems for teaching in developing countries contains a particularly Introducing high cost because installing them is sometimes costlier in absolute terms than in industrialized countries whereas, in contrast, alternative investments (e.g. buildings) are relatively more cost effective (UNESCO, 2009).[6] The four most typical mistakes in introducing ICTs into teaching are

i) installing learning technology without reviewing student needs and content availability;

ii) imposing technological systems from the highest down without involving faculty and students; [7]

iii) using inappropriate content from other regions of the globe without customizing it appropriately; and

iv) Producing quality content that has poor instructional design and isn't adapted to the technology in use (UNESCO, 2009).

Although ICT offers many advantages there are some risks of using ICT in education which should be mitigated proper mechanisms.

It may create a digital divide within class as students who are more conversant in ICT will reap more benefits and learn faster than those that don’t seem to be as technology savvy.

• It may shift the eye from the first goal of the training process to developing ICT skills, which is that the secondary goal.

• It can affect the bonding process between the teachers and also the student as ICT becomes a communication tool instead of face to face conversation and thus the transactional distance is increased.

• Also since not all teachers are experts with ICT they will be lax in updating the course content online which might prevent the training among students.

• The potential of plagiarism is high as student can copy information instead of learning and developing their own skills.
• There may be a need for training all stakeholders in ICT.
• The cost of hardware and software may be very high.

6. CONCLUSION

The increasing use of data and communication technologies (ICTs) has brought changes in teaching and learning at all levels of upper education systems resulting in quality enhancements. Traditional kinds of teaching and learning are increasingly being converted to online and virtual environments.[8] There are endless possibilities with the combination of ICT within the education system. The employment of ICT in education not only improves classroom teaching learning process, but also provides the ability of e-learning. ICT has enhanced distance learning. The teaching community is in a position to succeed in remote areas and learners are able to access a qualitative learning environment from anywhere and at anytime. It’s important that teachers or trainers should adopt technology in their teaching styles to supply pedagogical and academic gains to the learners. Successful implementation of ICT to steer change is more about influencing and empowering teachers and supporting them in their engagement with students in learning instead of acquiring computer skills and obtaining software and equipment. ICT enabled education will ultimately cause the democratization of education.[9]

REFERENCES
Role of ICT in Enhancing the Efficiency of Human Resource Management

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Abstract: The aim of this study is to look at the impact of Information and Communication Technology on the efficiency of Human Resource Management. This paper is to research how the utilization of ICT affects the human resources management practices including Human resource planning, recruitment and selection training and development, compensation, performance appraisal and others. This conceptual study is based on the knowledge gathered through secondary sources like research papers, e-journals, online data bases etc. The results highlights the utilization of ICT as an efficient tool in Human resource management of enterprises. HR IT tools can enhance the proper interactions between Human Resource Management and the different departments which could lead to smooth functioning of the organization and upgrading status and productivity of them.

Keywords: Information and Communication Technology, Human Resource Management, HR Practices, Career Development, Human Capital

1. INTRODUCCION

Nowadays, corporate and other companies have acknowledged value of information technology (IT) tools for reaching business targets. It not only helps achieve the business goals but also optimizes the work processes. Human Resource Management (HRM) includes activities like recruiting, training, developing and rewarding people within the organization. HRM must aim at achieving competitiveness within the field of HR by providing constant educational and training programs for the private and professional development of the workers of the organization.

It has been conventionally proved that Information and Communication Technology (ICT), like the web, mobile communication, new media, and such in HR can greatly contribute to the fulfillment of personnel policies of the organization. Technological advancement can have an enormous impact on the HR department of a corporation. It allows the corporate to enhance its internal processes, core competencies, relevant markets and organizational structure as an entire.

Human Resource must mainly be focused on the strategic objectives of the organization. These strategies must be led to include an IT strategic plan for the organization. These are activities associated with any development within the technological systems of the entity, like product design (research and development) and IT systems. Technology development is a crucial activity for the innovation process within the business, and should include acquired knowledge. Within the context, all activities may have some technical content, and leads to greater technological advancement.

Information Technology may have a greater impact on organizations that exist during a dynamic environment, this may cause greater efficiency and effectiveness of the Human Resources. Hence, utilizing IT application for management and advances recruitment system will increase the efficiency of the business. Introduction of ICT in HR field have ensured the all round success of Human resource Management. The effect of technology has enhanced the competitiveness of the HR department. ICT in HRM has captured all the field starting from paperless office to time attendance, databanks, automating work practices, transaction processing, reporting and tracking applications, E-recruiting, using internet for staffing, employee development using internet.

HR managers face many challenges in present business scenario like Globalization, workforce diversity, technological advances, changes in political and legal environment and change in information technology. These challenges increase the pressure on HR managers to attract, retain and nurture talented employee. HR professional can’t ignore these challenges rather they need to be line to style and execute innovative mechanisms of developing skills and competencies of human resources to organize them to simply accept the emerging challenges.

2. LITERATURE REVIEW

Human resources management (HRM) was recently re-defined by Armstrong (2009) as a “strategic, integrated and coherent approach to the utilization, development and well-being of the people working in organizations... it covers activities like strategic human resources management, human capital management, corporate social responsibility, knowledge management, organization development, resourcing (human resource planning, recruitment and selection, also as talent management), performance management, learning and development, reward management, employee relations, employee well-being and health and safety and therefore the provision of employee services”.

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According to Valverde et al. (2006), Human Resource function is “all managerial action administered at any level regarding the organization of labor and therefore the entry, development and exit of individuals within the organization so as that their competencies are used at their best in order to realize corporate objectives”. It includes the actors also as their relevant responsibilities and tasks.

The relationship between HRM and productivity of industries are extensively investigated. Mathur (2009) did financial analysis of ICT industry. He attempted to quantify the technical efficiency of the ICT in 52 countries. The proportions of the productivity growth thanks to efficiency and technical change due to ICT were also quantified. The study found that the productivity growth within the ICT sector is developing and newly industrialized countries is slightly less than the expansion in developed and transition countries, suggesting a catching-up for developing and newly industrialized countries. The most limitation of this study was that the info collected from all the countries wasn't firm level data to work out how ICT affects the HR performance but most of the info was country level data.

In the same light with Mathur (2009), Zwick (2003) studied the impact of ICT investment on productivity for an outsized and representative German establishment panel data set. Those establishments without ICT capital were also included within the data set to match the results with those having ICT capital. The info set of his study involved information on about 1400 German establishments. The cross sectional multivariate analysis of the info indicated that ICT investment substantially increases the typical productivity of German establishments. The restrictions of the study was that the corresponding size of the ICT investment wasn't known, the sole thing known was an institution invested in ICT.

Using an equivalent approach, Saleem et al. (2011); attempted to identify Impact of ICT on Organizational Productivity (Efficiency and Effectiveness); which results in Organizational Performance (Cost, Time, and Quality) using IRA (ICT role and adoption model). Barriers in ICT Adoption and impact of ICT Literate human capital on organizational productivity were also explored.

The target population included computer professionals, administrative staff and school members of upper Education Institutes from various geographic locations of Pakistan, including Islamabad, Lahore, Rawalpindi, Peshawar, and Multan, DG Khan and Faisalabad and a few other cities. The study found significant relations of ICT adoption on the effectiveness; nonetheless ICT adoption is insignificant on efficiency; however the connection between them is positive. The barriers to adoption were found to be less evident. The study has some limitations too which include the sample is simply from those members who were IT literate not from other areas. The measurement was just supported correlation analysis.

3. Objectives
1) To understand the impact of ICT on improving the efficiency of Human Resource Management
2) To knowledge innovation in Human Resource Management can manifest itself?
3) To explore the simplest HR IT tools which will be employed by companies
4) To understand the essentials of HR IT tools.

4. Research Methodology

The research design of this study is descriptive in nature and relies on secondary sources of knowledge obtained from research paper of reputed scholars, e-journals, online journals, newspapers, articles published online etc.

5. Discussion

It has been usually proved that Information and Communication Technology (ICT), like the web, mobile communication and journalism in HR can greatly contribute to the fulfillment of human resource policies of the organization. Technological development can have a massive blow on the HR department of a corporation. It allows the corporate to enhance its internal processes, core competencies, pertinent markets and organizational structure as an entire.

Human Resource must primarily be focused on the strategic objectives of the organization. These strategies must be incorporated in an IT strategic plan for the organization. These are activities associated with any advancement within the technological systems of the entity, like product design (research and development) and IT systems. Technology development is a crucial activity for the innovation process within the business, and should include acquired knowledge.

Information Technology may have a greater impact on organizations that exist during a dynamic environment, this may cause greater efficiency and effectiveness of the Human Resources. Hence, utilizing IT application for management and advances recruitment system will increase the efficiency of the business.

Fig. 1. Manifestation of Innovation in Human Resource Management

Innovation in Human Resource Management can manifest itself in a number of ways:
These innovations are supplemented with Information Technology to provide a positive impact in HR. Rosabeth Moss Kanter, one among the leading management theorists of her time, argued that the success of business organizations will depend on innovation, introducing new services, entrepreneurship and inclusive management (encouraging all employees to participate in making decisions about work).

Information and Communication Technology (ICT) impacts the Human Resource Management in following ways:

![Image of infographic showing the impact of ICT on Human Resource Management]

**Fig. 2. Impact of ICT on Human Resource Management**

The human resource’s main function is to support the workforce needs of the organization. Strategic planning is required to satisfy the demand of talented and competent personnel and to make future leaders which may fill the vacant positions and may help a corporation to become a brand icon and employer of choice. Further training and developing the road managers in IT tools will, therefore, prepare the road managers for variety of leadership tasks.

Human Resource IT tools which will supplement management and enhance efficiency and effectiveness, which may cause the success of the organization as an entire. for instance, currently, Success Factors Solutions has developed an HR IT tool of talent management for Hilton Worldwide, which had a worldwide operational capacity. Organizations across the planet are driving to enhance organizational performance no matter the dimensions of the organization or the industry. Today is an era of e-recruitment and most of the businesses are now using job portals to look the simplest candidates. Internet has made it easier for the all the candidates to use for any job in any country. Currently, Envoy has developed Asana, an IT tool for recruiting that analyzes details right down to where a possible candidate’s high priority values are.
The HR IT tools not only help hire the simplest potential but also retain it. ICT in HRM has increased the efficiency of workers and has made data management very easy. Employee’s performance data are often critically analyzed by the HR IT tools more often if it’s online and becomes readily accessible to everyone. As an example, Zenefits has recently developed an HR IT tool, which has made Passport completely paperless. Thus company’s are using HR ICT tools to supply a universal set of products, to diversify the business by providing improved products and services, to supply inexpensive access to global market, to satisfy customer demand at correct time, to make sure better quality of labor, to reinforce organizational performance etc.

The career websites and career planning tool are serving as a knowledge based system that help corporate to manage their personal development and career paths along side those of their employees. HR IT tool database help a corporation to gauge employee performance and rewarding high performing employees who are striving towards accomplishing organizational goals. Human Resource Development core process tool is resulting in endless development of the employee’s career. the good advantage of this tool is that data once entered into the system is stored within the database and may be attained within the future. This results in considerable cost saving also. Recently, Standard Life Group provided HR resource cost optimization tool to Oracle Human Capital Management Solutions. it's further contributing to the strategic transformation of the corporate by building the empowered workforce.

According to the survey of 37 companies in Turkey applying IT in HRM, the workers expressed that their business environment satisfies them and that they work efficiently. The survey confirms that these companies use HR IT tools and will contain all HR processes which can sustain all parts of HR it means from” Recruit to Retire” functions within the corporate. The advancement of technology like automation of HR processes in HR field has enabled companies to use the newest innovations, like machine learning to screen resumes and augmented reality to onboard new employees.
Breezy HR

Breezy HR is another HR management tool aimed toward small, medium, and enormous businesses. one among the most important selling points of Breezy is that the incontroversible fact that it integrates together with your existing hr tools seamlessly. There’s no got to worry about data loss during migration and integration. Breezy takes care of it all automatically. It isn’t limited to recruitment, you'll also keep track of current employees and streamline communication. additionally, it also connects seamlessly to LinkedIn and Angel List to seek out quality candidates.

ADP

ADP may be a cloud-based HR tool. it's an all-in-one solution that unites HR, payroll, talent, time, and tax and benefits administration.

Zoho People

Zoho People may be a cloud-based HR management software wont to help organizations manage and organize employee data. Designed with small and medium businesses in mind, it also can cater to enterprise businesses also. There’s variety of tools on the platform, letting you track leaves, manage timesheets, create custom forms, manage performance appraisals, and more.

iCIMS Talent Acquisition

This is an employee on boarding software that gives variety of dynamic features including a customizable career portal that lets candidates look for career opportunities. For businesses curious about useful HR tool, this will go an extended way in accelerating and simplifying the talent acquisition process. iCIMS Talent Acquisition is definitely among one among the foremost competitive within the market. It’s one among the most important Software-as-a-Service (SaaS) providers of talent acquisition and management solutions. The software is employed by almost 3,200 organizations round the world.

6. FINDINGS

1) The transition to a digital working environment enables modern HR specialists to perform certain tasks during a faster way and thus, pay more attention to such issues because the satisfaction of the workers, optimization of the recruiting and on boarding processes, employee motivation, etc.
2) ICT/ Internet granted HR specialists a chance to look for candidates worldwide.
3) Website branding and style, presence on major marketplaces and online communication – of these factors promote direct interaction between a candidate or employee and a corporation.
4) HR specialists are using advanced tools (i.e. Artificial Intelligence) to screen the resumes and concentrate only to those profiles that strictly match the wants. This greatly accelerates the search process and helps to seek out the foremost suitable candidates.
5) Platforms became the key source of data, and candidates are presumably to look for a corporation on LinkedIn than through traditional sources. Hence, companies should consider what quite image they might wish to build and what values and messages they need to transfer to the users.
6) Finally, Information Technology granted HR specialists access to stylish analytics, taking their work to a replacement level. Previously, HR specialists had to believe guesswork and intuition when evaluating the workers, their level of motivation and satisfaction, and therefore the efficiency of HR processes. Now, they will believe the info and see all the processes and work results reflected in numbers.

7. CONCLUSION

Results of this study shows that ICT features a noteworthy positive effect on the effectiveness of human resource management. This study have contributed to literature by extending research on impact of ICT on organizational performance to verify impact of ICT on efficiency of HRM. Extending this research to other sectors so on verify the divergence are going to be very interesting. The findings therefore suggest that regular Information and Communication Technology training and development should be enhanced so on allow proper interactions between Human Resource Management and therefore the different departments which could lead on to the organizational efficiency.

8. LIMITATIONS OF THE STUDY

1) This study is predicated on secondary resources only therefore the results could also be unrealistic.
2) Access to information wasn’t that easy.
3) Self-report measures my equally portray potential personal bias.

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Abstract: The Right to Education Act was implemented in India from 1 April 2010. Under this, provision of free and compulsory education for children from 6 to 14 years was made. Provision was made to reserve 25% seats for socially and economically backward children in private schools. During that time private schools opposed the reservation and the matter went ahead in the legal battle, but finally the reservation of 25 percent seats was recognized. It is a special thing that for such children studying in private school, the government pays money on its own behalf and this expenditure is more than the expenditure on children studying in government school. Since the implementation of the Right to Education Act, the question of quality of education was raised by academics on priority. He says that ensuring attendance of children in a government school is not enough. If children are coming to school, it should also be sure that they are learning. Last year, reports of several schools were published that children do not know to read, they were having difficulty in counting. This issue is related to the quality of education and children’s learning. If a child is spending an important part of his daily life in schools, then it should have some consequences. That is, the purpose and purpose with which the schools have been opened… those objectives should be fulfilled.

1. INTRODUCTION

Source - https://www.reddit.com/r/IndiaSpeaks/comments/acv8zx/school_dropout_rates_for_individual_indian_states/

2. RUCKUS OVER THE QUESTION OF QUALITY TEACHING

At present, many confusions or prejudices related to the quality of education have been established. The first private schools provide good quality education. Government schools do not have good education. Children of the same families go to government schools that have no choice. That is, alternative schools are becoming private schools. One fact to be noted here is that trained teachers are selected in government
Elementary Education: Quality Teaching is Base of Technical Education

Schools. Even after selection, training and training sessions of these teachers are organized from time to time. But an interesting aspect of training is to be noted here that in the context of government schools, many training programs are taken as a mere formality, requiring only attendance. In such a situation, there is a tendency to send such teachers in these training programs those have less work and low interest in school work and teaching pupil. Because the school teaching is affected by the departure of teachers. In this way the process of training goes on and the school continues to operate on its old pattern. Generally, all the paper work is done on time by government schools; the process of change in other areas is very slow. Or at least it is such that it does not have any special effect. The activities conducted there are conducted mechanically. Order started, order ends, activity stopped. What is the impact of this on the children or not, it does not concern the teachers or the officers who are investigating the schools, who should spend enough time in the field. It is difficult to break this trend of government schools. No headmistress would like the idea of sending responsible people for training by relieving them of responsibility. His simple answer would be, if they leave then it will be difficult to handle the children. Hey, send it to them; at least their daily work will not be affected by their departure. "Such concerns can be understood in such language and terminology. Children training required

Secondly, quality is directly related to children... But our government schools do not have the tradition of training children to read, write and see things from the right perspective. In private schools, this issue is given considerable attention. Such opportunities are provided to children so that their cognitive development can be improved. In the context of government schools, this work is deferred to the teachers. Teachers are also responsible for household and family in day-to-day engagements. In such a situation, they do not have time to read books and update themselves with changing times. The problem with women teachers is even more serious. After school, they have to take care of all the responsibilities of the house and also take care of their children... years pass in such a way. Their own development stops and they also try to convince the children to teach and calm their curiosities according to their understanding.

But in such a situation, the teacher loses the ability to see things in accordance with the children's curiosities and misses the understanding that children are facing this kind of situation for the first time in their lives. The main aim of the education should be, to prepare them for future challenges. There is a need to help find a way to solve problems and to motivate them to solve problems. Such fear-free environment, instructions such as not failing in examinations, serves to increase the confusion of teachers. Children feel that we have to pass, that is why they stop studying. They feel that when they have to pass, then why take the pain of studies? It is difficult to explain to children at a young age. Therefore, the board examinations in Rajasthan are returning at the primary and upper-primary level so that children can be motivated to study. In this way, it was decided that from next session there will be a board examination in classes three, five and eighth. Board examinations will be conducted at school level in class three, district level in five and division level in class VIII."

3. HOW RIGHT TO EDUCATION IS THE STRATEGY TO IMPROVE QUALITY EDUCATION:

Many academicians consider this decision against the basic feeling of right to education which opposes the feeling of imposing pass-fail on children. Rajasthan teachers have long been demanding that the board exams should be resumed so that the standard of education can be improved again. The reasoning of the teachers behind this is that when there are board examinations, all the teachers will teach their subject seriously, their accountability will be fixed and the child will also be motivated (or forced) to study. The standard of education will increase in this way. The pressure of teaching only on teachers will not increase the standard of education. Another reason behind this was that if the student has not attained the first grade learning level then he should be given the opportunity to study again in the first grade so that his foundation can be strengthened and he should not be left behind in further studies because every child the speed of learning varies. Education psychology also recognizes the fact that individual variation is found in children's learning speed, and every child adapts, understands and learns things at his/her own pace.

But of all the arguments mental stress in children due to further examinations is being seen very commonly here. There should be an initiative to change the exam environment so that the child is not afraid of examinations and based on the results, she does not feel inferior in comparison to the other children. By taking the examination of the children of the third grade, a reality check will be made that what the child comes to at this level, what level of support is needed. But it is more than likely that the whole process will remain as an exercise to retrench the children and the emphasis of the teachers should be on rote the facts by teaching, explaining and developing their understanding to the children. The evaluation of written tests has its own limitations.

A teacher is well aware of the fact that it is difficult for any child to write a line or to write it down. In such a situation, it would be necessary to work towards improving the written expression of children. They should be given opportunities to write. Be encouraged to write. But the whole process of writing cannot be seen by identifying the letters, developing the understanding of quantities, reading the words apart. Therefore it can be said that solving things with a simple solution will open the way to a better result, it will be just a fantasy. In order to get real results, there is a need to understand things from the perspective of children so that their examination-related fears are understood in their context, lest the old tradition of scaring children be returned to the question of quality and children start getting harassed at school and home for rote facts and getting low numbers.
4. PRIMARY EDUCATION ITS TRIBULATIONS AND TREATMENTS

Whatever the level of education, its existence cannot be imagined without a teacher. The importance of teacher in primary education is immense. After the parents, the child comes directly into contact with the primary teacher. In such a situation, the school has to adjust to the circumstances of the family, which is a very difficult task. Taking advantage of the domestic environment, curbing evils, arousing interest in the child to study, bring continuity in his activities, organize and regularize the routine and generate attraction for the school. The labor done for education of a child who falls behind in it is wasted. Gradually, the mood of the parents also becomes the same. They stop explaining to children. Here children take shelter of many mishaps in school time itself. Many types of participants start participating in anti-social activities. The only question that arises is how to not let them deteriorate? These should be controlled at the primary level only. Understanding their situation as required, guidance is given to them. The biggest responsibility for reforms rests with the teacher. He not only has to discharge such responsibilities but also has to do many administrative-cruises, community-counting etc. Sometimes the problem becomes more complicated due to lack of adequate teachers or teachers in the school. The teacher is only able to surround the classrooms. Looking at five or five classrooms alone, supervising their work and assigning home work, syllabus pressure etc. are the aspects, due to which the lone teacher can only open the school, cannot run well nor in any way in the children Can improve.

Apart from this, due to the presence of sound amplifiers in the maximum impact area near the main gate of the school, being located in crowded places etc., the teacher not only attracts the attention. Their concentration is always disturbed by outdoor activities. Even if the body is in the school premises, the mind-brain keeps on running in the street, market, fairs etc. Not only this, the intervention of the people of the area is more in primary school. In the classrooms running in schools, every day there is a conversation with the children in front of their teachers every day, sometimes there is a mess.

Therefore, primary teachers are not able to leave their influence on children and neither are children affected. Similarly, teachers buried with extra work and burden also do not give more time to children. While primary education is the backbone of the entire education system, teachers are the most important factor. In various classes of education, if a child has the greatest influence, then he is the primary teacher. The child receives his first education after mother, mostly from the teacher of primary education. It is the responsibility of this teacher to decorate children completely for life, grooming, beating and preparing them. Today some people may be underestimating the responsibilities of primary teacher, but their importance is more today than ever before. Because of the limited foreign invasions of ancient time, today primary teacher is under attack from all the sectors of society to stop their progress. Today, many types of attacks are happening in front of him, neighborhood, circle of friends, environment, and not only family but also audio-visual media. Sometimes those who try to make it big at a young age, or they themselves try to become like them by being influenced by them. It is necessary that the children of soft intellect do not inadvertently get caught up in the imaginary acts of Shaktimaan, Superman or Kamics, but the age-old society should make proper development based on the circumstances of the country. In such a situation, if someone is performing his responsibility with the highest loyalty - faith and honesty, then he is the primary teacher. The more experience he has from his life and work, the more he is skilled in work; his influence can be clearly seen on children. His work is like that of a skilled potter who makes a raw pitcher strong by beating his hands from the inside and leaving them to cook in the fire. In the same way, the primary teacher sends the child to the next classes to cook like a pitcher. The key is not to cook, but to give it a certain shape. Initially, when the child comes to school, his world is different. Every child comes in crying, screaming and screaming.

Holding a pen, writing, scolding when necessary, then calling, singing, laughing, laughing at him, making him laugh, creating a home for him at home, bringing him to regular school, molding him according to school, getting up and sitting, speaking, walking, Teaching etiquette, etc. is the primary teacher. If the teacher of the primary school is treated like a gardener, a skilled builder, then there will be no exaggeration. The attractive tree standing in the garden cannot be imagined if its skilled builder does not prick the gardener from time to time, do not weed it, nor water it from time to time. In exactly the same way, the teacher gives the child an attractive look, gets scolded, beaten and sometimes cuddles and laughs and plays with him on the right path. However, some teachers in primary education are not discharging their duties with full loyalty and honesty.

The school is considering a time pass or a place to handle household tasks, but not all are like this. Most are discharging their duties according to the needs of the country and society. In some cases, even after external intervention, children are being successful in the overall development. If they see any appropriate effect on the all-round development of children, then they are putting it. In the field of science, technology, communication, industry, trade, etc. In the field of development, the field of primary teachers' responsibilities is also becoming wider. They have to keep discharging their duties keeping all these things in mind. Therefore, governments should also continue to refine and change the facilities of teaching and training over time and governments and their organs should be avoided as far as possible from unnecessary interference. The society should not only consider itself as a great servant but should be considered as the creator of children, the social worker, and the creator of future. Many parents are not supporting the teacher in the development of their wards.
5. EDUCATIONAL PROVISIONS IN INDIAN CONSTITUTION

1. Education is placed in the concurrent list -

   The Constitution of the Republic of India has three different lists -

   (i) Union List The central government has the power to make laws in this list.

   (ii) State or provincial list State governments have the right to make laws in this list.

   (iii) Concurrent List In this list, both the Center and the State Government have the right to make laws.

Initially education was in the provincial or state list. Education was included in the Concurrent List by the 42nd Constitution Amendment in 1976. Since then, it has been the responsibility of both the central and provincial governments to arrange education.

2. Provision for care and education of children from birth to 6 years

   In 2002, there was 86th amendment to the constitution in which Article 45 was amended - the state will provide childcare and education until all children are attained 6 years of age.

3. Provision for compulsory and free education for children between 6 to 14 years of age.

   According to the 86th Constitution Amendment Act of 2002, Article 21A was added, in which - the state will make compulsory and free system of primary education of children in the age group of 6 to 14. Also, an amendment has been made that it is the duty of every citizen to provide education opportunities to his children or dependents in the age group of 6 to 14 as a mother drank or mentor. The Right to Education Act 2009 is also important in this direction which we will read in our next post.
4. Equal right of entry into educational institutions
   Article 29 (2) of the constitution provided that - No citizen shall be denied entry into any educational institution, funded by the state or aided by state funds, on the basis of religion, descent or caste.

5. Special arrangement for female education
   Article 15 (3) of the Constitution made this arrangement - Nothing in this article will hinder the state from making any provision for women and children.

6. Special arrangements for education of weaker sections of the society like Scheduled Castes and Scheduled Tribes.
   According to Article 344 (1) of the Constitution declares 15 languages were added by the Constitution Amendment. Thus, at this time the number of languages of national importance is 22.

6. CONCLUSION
   Primary education is the foundation of all human development. The primary teacher alone does not have the sole responsibility to perform. Along with the teacher, the parents of the child, members of the family, and the society also have to give such conditions to the teacher so that the teacher can perform his duty towards the development of the children with a healthy mind. Teacher is a source of inspiration. The child wants to be carried forward in every situation, environment. But it is up to her parents to fill her life force. As long as parents and other family members give enough time, pampering, try to calm their problems, curiosities by understanding them, then the teachers have no difficulty in becoming the driving force for the children, but rather their obligations They also feel proud to discharge.

In the end, it can be said that primary education is the most important education, in that education, primary teacher has the highest responsibility. He is ready every moment to fulfill his responsibility, but his inspirational power can take meaningful form and give meaningful results only if the household, family and society fulfill the responsibility of filling the life force of the children with full loyalty and honesty. If you consider it as a lamp, then pour oil in the lamp itself.

The phase required to change the quality of education in India does not require much policy change or a new education policy. Till now, no steps have been taken on these because a visible crisis is pushing us to act. India should regularly participate in international assessments like international mathematics and science studies and program set goals for international student assessment and trends such as benchmark its performance and progress. The quality of national assessments should be improved, and third-party assessments should be encouraged to provide periodic feedback, like the situation on the annual education report, and educational initiatives.

The biggest problem in the education system today is a severe lack of capacity. Continuous and Comprehensive Evaluation (CCE) and Teacher Eligibility Test (TET) - Two initiatives need to be considered. Some people do not agree that these initiatives are based on sound principles and good ideas. Nevertheless, many cannot say the most noble-minded views people achieve because of their goals not having the necessary skills throughout the system.

Since independence, we have made considerable progress in the field of primary education. The constitution is a major challenge as guided by the achievement of the goal of free and compulsory education at the primary level. It is seen that the objective of universalisation of primary education is thus gradually being achieved. But the rate of achievement in relation to various aspects like prerequisites, the increase in
enrollment of students in primary and upper primary schools, retention of students and also increase their level of achievement in different classes like necessary condition to provide target for primary education is improving gradually.

A lot of effort is being made for qualitative improvement in primary education in our country. Efforts have been made by both the state and the Center to set up various agencies to improve the quality of primary education. These organizations play a pivotal role in the plan to increase the quality of primary education across the country. Various organization's roles for qualitative improvement in primary education are discussed below.

The language of fun, laughter and delight always clicks with the primary age group children, as primary school education in India should be made more enjoyable. To make primary school education more interesting, the school should be properly organized activity rooms that encourage children to explore various knowledge based areas. There should also be enough scope for greater digital learning in this era, so that students can understand poems, stories, animation and more easily, especially app based educational games.

REFERENCES