Emerging Trends in Information and Communication Technology

Mukesh Kumar[1]

Abstract

Today is the age of Information Technology. It has changed the lifestyle of the people. There is hardly any field of human life that is not affected by the Information Technology. Various Technological trends like Cloud Computing, Mobile Computing, Social media, Ubiquitous computing are growing very fast. Cloud computing enable us to share hardware and software resources as a service over the internet on the pay per use basis with any user over the globe. Mobile computing help us to access and process data on handheld mobile devices like smart phones, iPads etc. Social media like Facebook, twitter, Whatsapp, YouTube, LinkedIn help peoples to interact with each other around the world. Social media is also contributing to make this world a better place to live by raising issues of social importance. Internet of Things (IoT), a network of large amount of objects, computing devices embedded with microchips, sensors, actuators making this world a smart place to live. In this paper we will discuss about the various trends of information and communication technology like Cloud computing, Mobile computing, Social media and Internet of Things (IoT) that is evolving very rapidly and also discuss their role in professional and social life.

Keywords— Information Technology, Cloud Computing, Mobile Computing, Social Media, Internet of Things (IoT)

I. INTRODUCTION

Information Technology has affected the human being almost in all sphere of life whether it is education, healthcare, business, communication or our day to day tasks. Information Technology helps us to gather, handle and interconnect large volume of data and information. Various technologies in IT is growing very fast like cloud computing, mobile computing, social media etc which is changing the way of doing the jobs. With the help of cloud computing we are able to get hardware and software resources virtually on pay per demand basis. This helps an individual as well as organizations to avoid installing heavy and costly software on their systems. Through cloud computing we are able to get applications, platforms as well as infrastructure over the internet. Mobile computing enables human beings to access and process data on their mobile devices as with the speed of personal computer. Social media helps to interact with the peoples over the globe in a very user friendly manner. Wireless devices are becoming very popular these days. Ubiquitous computing or Internet of Things (IoT) is making almost every object IT enabled that can sense, process as well as transmit data among different objects in real time over the existing networks. This helps us to control the objects remotely and thus saving our time. Ubiquitous computing is the major area of research these days and in the coming years number of objects that are embedded with computing device will increase very fast.

II. CLOUD COMPUTING

Cloud Computing is a recent advancement in information technology that is emerging very rapidly. It is a pool of shared resources which includes server, storage, networks, services and applications that can be shared with individuals as well as with organization on pay per use basis in a cost efficient manner. Cloud computing services are usually owned and managed by the third party providers who deliver the services to the user on pay per-use basis.

Fig 1: Cloud Computing [2]

A. *Cloud Computing Services*

Software as a Service (SaaS): SaaS is the very familiar type of cloud service to the customers. Software as a Service is the topmost layer of cloud computing architecture which offers complete application to the customer over the internet. Among the most familiar software as a Service (SaaS) applications for businesses are CRM application like Salesforce, storage solutions like Google Drive, Drop box and productivity applications suit like Google apps.

Platform as a Service (PaaS): Platform as a Service is the middle layer of cloud computing architecture which offers execution environment as a service for the software without any need of downloading software or installation of software for the developers or end users. Examples of PaaS are Microsoft Azure and Google App Engine.

Infrastructure as a Service (IaaS): Infrastructure as a Service is the bottom layer of cloud computing architecture which offers sharing of the hardware resources through virtualization for executing services. The main motive is to make resources such as storage, network and servers readily available and accessible by the operating systems. It provides on demand and pay on per use basis services. Examples of IaaS are Amazon EC2, S3.

B. *Types of Cloud Computing*

Public Cloud: In this type of Cloud Computing no restrictions on access of services are applied and no authentication or authorization techniques are implemented in this model. These clouds provide the facility of long term data storage. Examples of public cloud are Google App Engine and Microsoft Azure. `

Private Cloud: This type of Cloud Computing is implemented within the firewall of the organization. This cloud is designed to provide same services and features as that of public cloud but remove problems related to security issues. Private cloud provides more control over the organization's data which ensures security.

Community Cloud: This type of Cloud Computing provides the facility of sharing computing infrastructure among the organizations of same communities. For Example: Different branches of same company over geographically different location can work on a same project by sharing the project on the community cloud.

Hybrid Cloud: It is the combination of one or more above types of cloud deployment models. It ensures that an immediate increase in the requirement of computing resources can be handled efficiently and gracefully.

C. *Examples of Cloud Computing*

E-mail: E-mail is the major service that is provided by the cloud through which people can communicate with each other while living at any place in the world. This service is constantly becoming reliable and faster. We can access our web based e-mail account anytime and anywhere. Examples of E-mail providers are Gmail, Hotmail, Yahoo mail, Rediff mail etc.

Google Drive: This is the major cloud computing service where all the data and information storage found online so that it can support cloud apps like Google Docs, Google Slides and Google Sheets etc. Drive is also available for mobile devices like smart phones, iPads and there are different apps like drive, sheets, slides are available on the Google play store. Some other services provided by Google are also considered cloud computing services like Gmail, Google Maps, and Google Calendar etc.

Virtual Office: Through cloud we can create and access office documents online without any need to install heavy software on our computer system. Google Docs, Microsoft Office Live is the example of virtual office.

Google App: Google App engine is a Public cloud and is a Platform as a service that provides services to build products ranges from simple websites to complex applications. [4]

Dropbox: Dropbox is an internet based file hosting service [5] which allows the users to store data and files over the cloud and share it with any user across the world. Dropbox also provides the facility of file synchronization through which data stored in our computer can be accessed on any device through the cloud.

III. MOBILE COMPUTING

Mobile Computing technology allows transmission of data, audio-video, voice through any wired or wireless network enabled device without having to connect to a particular physical location. With the increase of the portable computing devices and desire to continuously connectivity to the internet without having to connect to a fixed location has increased the popularity of the mobile computing. Recent advances in mobile computing like GPS, GPRS, Long Term Evolution (LTE), 3G, 4G and Wi-Max are becoming very popular.

A. Mobile Computing Devices

Smart Phones: Smart Phone is a mobile device that provides interactive touch screen user interface to access various applications.

Personal Digital Assistance (PDAs): Personal Digital Assistance (PDA) is a handheld mobile device which works like personal information manager. It provides the facilities like computing, synchronization, telephone, internet access etc. PDA also has the facility of audio capability which makes it portable media player.

Laptops: Laptops are portable computers attached with keyboard and display. It is used for variety of tasks such as for playing multimedia, running programs, word processor, connect to the internet etc.

Wearable Devices: Wearable Devices are small sized digital computers which are usually used in behavioral modeling and health monitoring system. These devices are usually carried or worn on the body. Google Glass, Apple smart watch, head mounted display are some examples of wearable devices.

Fig 2: Mobile Computing Devices

B. Advantages of Mobile Computing

Increased Productivity: Users can do their work in a place where they feel comfortable in an effective and efficient manner. This helps to enhance productivity of their work.

Saves time: The time consumed by travelling from one location to other is reduced as now we are able to access any document from anywhere and anytime on our network enabled devices.

Flexibility: Users are not restricted to work in a fixed location. We can get our job done from any location.

Entertainment: Mobile devices are used for a variety of entertainment purposes like watching movies and songs online, listening music, playing games and much more. We can also access various entertainment resources from the internet.

C. *Disadvantages of Mobile Computing*

Security Issues: Users are usually dependent upon the Virtual Private Network (VPN) while working with mobile devices. These networks are not very secure and can be hacked by some intruder.

Connectivity: Internet connection is required for mobile computing. Before starting of any task it is very necessary to check that whether internet with appropriate speed is working or not.

IV. SOCIAL MEDIA

In many countries media is also considered as fourth estate or fourth pillar of the democracy [9] [10]. These days this fourth estate of media is supported by social media. Social media become a common place to discuss all issues existed in society today. Social media is playing a major role in integrating the world. Social media is also doing their contribution to make this world a better place to live by raising issues of social importance. Advances in information technology changing all aspects of doing things and social media platforms become major tools in the growth of business marketing. The widespread use of these social media platforms by the consumers and businesses all over the world motivate the business people to market their products on social media platforms. Social media is a powerful tool for advertisement and marketing. Almost all business organizations are using social media to connect with their customers and serving in a better way. Social media also help customers to give reviews and feedback regarding some products which helps to the new customers to know about the product and also help the company to know the views of the customers regarding some product. Social media has emerged from being cyber world geek buzz to a massive platform for professionals, entrepreneurs, businesses and organizations that seek greater identification and recognition at a very low price.[9][11]

A. *Characteristics of Social Media*

- Social media is easily accessible and is a common place of meeting of today's internet audience.
- Social media provides direct access to clients without any third party intervention.
- Social media is less costly as compared with traditional media.

▪ Social media also helps in search engine optimization and increase in the ranking of any organization's website. [11]

B. *Benefits of Social Media*

Online Advertisement and Marketing: Social media helps businesses to do online advertisement and marketing of their products free of cost across the globe. Through advertisement over social media one can easily reach to the target customers in the world.

No Geographical Boundaries: Social media is free from the limitations of geographical boundaries. Social media can be targeted to any customer over the globe that has online presence.

Two way communication: Traditional marketing techniques followed by small businesses are generally one way communication for marketing like delivering marketing messages in mail boxes, promotion on television, radio etc. In these technique customers have no opportunity to provide their feedback. Only business houses are promoting their products but by following social media strategy there is a two way communication between businesses and customers. Now customers are able to provide feedback about the product or can dialogue with the company's representative over the social media like Facebook. Efforts on Social media platform also give organizations a digital personality, global presence and effective branding technique. [11]

Fig 3: Social Media

V. INTERNET OF THINGS (IoT)

The Internet of Things (IoT) is a network of interrelated physical computing devices, digital and mechanical machines, animals, objects, or people that are assigned with unique identifiers and the ability to exchange data over the network without any human to computer or human to human interaction. A thing in the internet of things (IoT) refers to large amount of computing devices that can be a biochip transponder in a farm animal, automobile with built-in sensor to alert the driver about some problematic situation and a person with heart monitor implant. These types of devices are capable to collect data through sensors and exchange this data between devices over the network anonymously. When IoT is augmented with actuators and sensors the technology become more powerful and can handle variety of tasks. Applications of IoT include building management, energy management, healthcare management, transportation management, environment management etc. [14] [15]

VI. CONCLUSION

This paper presents an overview about the various recent advances in information and communication technology that is growing very rapidly. In this paper technology like cloud computing, mobile computing, social media and Internet of things are discussed. Cloud Computing provides us the way of sharing hardware and software resources as a service over the internet. Mobile computing enables people to access data and information anytime and at any place without any need to connect to a particular physical location. Social media is providing new means to connect to the people all over the world and making this world a very small place to know each other. Social media providing a new trends to do marketing and advertising as compared with traditional medial and almost all type of businesses are making their presence over the social media to connect with their customers. Internet of Things (IoT) enables computing devices, chips to embed with various types of real life objects and transfer data among these objects through existed network infrastructure.

REFERENCES

[1] Harnal,S.; Bagga,D," Cloud Computing: An Overview" International Journal of Advanced Research in Computer Science and Software Engineering vol 3 Issue 7, July 2013, pp 373-378 ISSN:2277-128X

[2] http://en.wikipedia.org/wiki/Cloud_computing

[3] Ahmad,M,O.;Khan ,R,Z,"The Cloud Computing : A Systemetic Review" International Journal of Innovative Research in Computer Science and Communication Engineering vol 3 Issue 5, May 2015 ISSN (Print): 2320-9798

[4] http://cloud.google.com

[5] http://en.wikipedia.org/wiki/Dropbox_(service)

[6] Kumarat, T.; Sharma, P, K.; Sumantha, P.; Paswan, A.;" Moblile Computing- An Introduction with Ad-hoc Network" International Journal of Advanced Research in Computer Science and Software Engineering vol 3 Issue 2, February 2013 ISSN:2277-128X

[7] http://en.wikipedia.org/wiki/mobile-computing

[8] Sharma,A.; Vatta,S," Cloud Computing: Taxonomy and Architecture" International Journal of Advanced Research in Computer Science and Software Engineering vol 3 Issue 5, May 2013, pp 1410-1417 ISSN:2277-128X

[9] https://4technews.net/role-social-media-modern-world/

[10]http://en.wikipedia.org/wiki/Fourth_Estate

[11]http://inspirationfeed.com/articles/social-media-articles/importance-and-benefits-of-social-media-in-todays-world/

[12]Vijayran,S.; Dr,Mulge,Y" Introduction to Cloud Computing: A Review" International Journal of Advanced Research in Computer Science and Software Engineering vol 5 Issue 5, May 2015, pp 1695-1698 ISSN:2277-128X

[13]Bali,P," Pillars of Cloud Computing: A Review" International Journal of Advanced Research in Computer Science and Software Engineering vol 5 Issue 6, June 2015, pp 182-187 ISSN:2277-128X

[14]http://internetofthingsagenda.techtarget.com/definition/Internet-of-Things-IoT

[15]https://en.m.wikipedia.org/wiki/Internet_of_things

[16]Devi,P.; Gaba,T," Cloud Computing" International Journal of Advanced Research in Computer Science and Software Engineering vol 3 Issue 5, May 2013, pp 1246-1251 ISSN:2277-128X

[17]http://www.tutorialspoint.com/mobile_computing/mobile_computing_overview.htm Goswami,D;" Moblile Computing" International Journal of Advanced Research in Computer Science and Software Engineering vol 3 Issue 9, September 2013 ISSN:2277-128X