

Multimedia Technologies: An Integration of Precedent, Existing & Inevitable Systems

Shamneesh Sharma¹, Sheetal Charbathia²

¹IT-Head & Assistant Professor, ²Assistant Professor

^{1,2}Department of Computer Science & Engineering, School of Technology & Sciences
A P Goyal Shimla University, Shimla (H.P.) India

Abstract:

This paper presents the evolution of multimedia technologies in the society. The evolution started from the invention of a printing press in 1450 and today is at a stage of interactive multimedia systems. Nowadays, computers have capabilities to perform countless number of computations accurately with superiority results; hence there is volatile growth of multimedia computing operations, communications and applications during last decades. Multimedia technologies are enthralling complex challenges but also imparting interesting areas with software and hardware by emerging at expeditious swiftness. This paper presents the evolution of multimedia from the beginning, its present state and how it can be used in future for the betterment of society.

Keywords: Multimedia, Simulations, Virtual Reality, Smart Phones, ULSI and Electronic Devices.

I. INTRODUCTION

Multimedia [1] is the technology which is a combination of contents, applications and people. When two or more media are inculcated in an integrated manner on a single platform, it forms a multimedia; based on this we can say that multimedia is any combination of text, graphic art, sound, animation and video that is delivered by computer driven machine. The multimedia technology can be used in many forms which can vary from watching news on our television set to the use of animation in virtual surgical system using any expert system. The advancements in the various fields like Programming Platforms (From DOS to Windows, from Cupcake 1.5 to Marshmallow 6.0 & from iPhone OS 1 to iOS 9), Hardware Platforms (From Apollo Guidance Computer to ULSI/NANO Technology) and Network Platforms (From US Military Networks to 5th Generation of Networks) has brought tremendous twists in multimedia technologies and system. Today multimedia technologies have spread its roots in all the important sectors of our busy life like internet, movies, videos, online training and E-business etc. The entertainment sector includes multimedia and the biggest communicative media like mobiles phones also use that software which are related to multimedia.

II. PAST SCENARIO

From the ancient time the multimedia is playing an important role; even in the history of the world its role can be seen. Some of the examples can be taken from the world history which has started with the invention of printing press in 1450 in Germany; it was a historical turning point in the field of print media because movable type of printing was possible due to this. If we see the Roman calendar we can find the example of print media from 59 BC which was the year of invention of News paper. Acta Diurna was the first newspaper which was the daily account of senate preceding, published for the citizens which could be read by anyone on a payment of minimal amount.

The real progress on multimedia technology can be considered from the invention of the computing machines as the philosophy of inculcation of multiple media was not possible without a computing machine, started in 18th century with a remarkable progress. The past of the multimedia can be seen from 18th century to the late 19th century.

From 1800 to 1869 (Beyond the Multimedia Technology) [2]: This tenure of multimedia has been counted as the beginning of the multimedia because the human mind started thinking of a computing machine with following inventions:

Year	Invention	Inventor	Description
1833	Proposal of General purpose Computing Machine with an Analytical Engine	Charles Babbage	This model was considered as a model of first mechanical computer, Lady Ada Lovelace wrote programs for the machine.
1839	Daguerreotype	Louis Daguerre	The first user- friendly photography was processed by a French inventor. The photographs were produced by using a paper negative.
1844	Telegraph	Samuel Morse	In the ancient time the communication or signal were sent through smoke signals, beacons or reflected light. Morse sent his first telegraph message, from Washington to Maryland.
1854	Binary Language	George Boole	A binary language was a mathematical language of 0's and 1's. This mathematical language is now known as Boolean algebra.

1866	Dedicated Telegraph Line	-----	A telegraph line had been laid across the Atlantic Ocean from the U.S. to Europe.
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From 1870 to 1929 (First Generation of Multimedia Technology) [3]: This tenure of multimedia has been counted as the processing phase of the multimedia as so many inventions came into picture simultaneously along with following inventions:

Year	Invention	Inventor	Description
1875	Manual Typewriter	Remington	The first practical commercial manual typewriter was developed by the corresponding inventor which was engineered by two great mechanics from his sewing machine division.
1876	Telephone	Alexander Graham Bell	The telephone was a device through which the voice could be transmitted & received over an electric transmission device called transceiver.
1882	Mechanical Computing Machine	Charles Babbage	This machine was made-up with different engine, which used the decimal number system and powered by cranking a handle.
1886	Burroughs	William Seward Burroughs	The corresponding inventor received a patent for an adding machine which is usually specialized for book keeping calculations.
1887	Radio Transmitter	Heinrich Hertz	A German physicist invented radio transmitters which produced radio wave with the help of an antenna.
1888	Mood Music for Film	-----	Musical scores sent along for organ accompaniment were made. In this sequential photographs with sprockets manually pulled through a projector.
1890	Tabulating Machine	Herman Hollerith	The corresponding inventor invented a Tabulating Machine for the U.S. Government using punch cards. The tabulating machine later became IBM.
1890	Phonograph	William S. Arnold	The corresponding inventor invented the phonograph, later it was also called gramophone or record player. Through this device the music was heard by one of listening tubes.
1920	Commercial Radio	Pittsburgh	A radio was an instrument which produced the radio wave named as KDKA.
1925	Sound Discs	-----	Electronically recorded sound discs at AT& T's Bell Laboratories allowed recording of whole symphonies.
1927	Talkies & Juke Box	-----	The first commercial talkie film using optical sound recording was invented. During this time Automatic Music Instrument Company launched a coin operated phonograph on Juke box.
1927	Operational Telephone Lines	-----	Telephone also became operational between London and New York in this era.
1928	Animated Projection	Charles-Emile Reynaud	A French science teacher created first animation projection. "Steamboat Willie" first cartoon with a fully synchronized soundtrack by Walt Disney this year.
1928	Black & White Film	Walt Disney	A black and white cartoon film was a debut of Mickey Mouse and his girl friend Minnie.

From 1930 to 1969 (Second Generation of Multimedia Technology) [4]: This tenure of multimedia has been counted as the progressive phase of the multimedia systems and technologies as so many inventions related to the electronic market came into picture which has started with following inventions:

Year	Invention	Inventor	Description
1931	Calculator	Conrad Zuse	Basic and complex operations could be performed on a small portable device known as calculator.
1932	Magnetic Tape	-----	BASF introduced magnetic tape recording. Magnetic tape is a medium for magnetic recording, made of a thin magnet sable coating on a long, narrow strip of plastic film.
1933	Vocoder	Dudley	The inventor made a voice coder which could analyze system, used to reproduce human speech.
1936	Turing Machine	Allen Turing	"Turing's Machine" was defined as capable machine of computing any calculable function by Alan Turing. A Turing machine is a hypothetical device which could manipulate symbols on a strip of tape according to a table

			of rules.
1939	Digital Computer	John Atanasoff and Clifford Berry	The inventors designed a prototype of the ABC computer which was the first automated digital computer. All digital computers were depended upon the 0's and 1's.
1940	Colour Television	-----	First colour television was released that gave of picture and the video image information on the coloured pattern.
1946	Electronic Numerator Integrator and Calculator (ENIAC)	-----	The first successful high speed digital computer was invented in this year. It was named as ENIAC that was based on the concept of ABC computer.
1951	UNIVAC	Eckert-Mauchly Computer Corporation	UNIVAC was invented which was a computer that used magnetic tape for buffer memory. UNIVAC is the name of a line of electronic digital stored-program computers starting with the products of the corresponding corporation.
1952	IBM 701	IBM	First electronic stored computer that used vacuum tubes, RAM, punch cards and was the size of a piano. It was also known as Defense Calculator.
1953	Electric typewriter	-----	An electric typewriter was invented on the basis of the manual one.
1958	CRAY	CDC 1604 for Control Data Corporation	Texas Instruments developed the first Integrated Circuit which could solve the problems of speed, size and wiring.
1959	Second Generation Computers	IBM	IBM introduced second generation computer with the use transistors instead of vacuum tubes.
1960	Removable disks	Paul Barans	The inventor saw a communications network different than the traditional point to point links. He envisioned a "fishnet network" which was based on removable disks. It was a type of removable disk
1963	CAD (Computer Aided Design)	-----	A system was invented with sketchpad which used the first light pen. The system was combination of hardware and software.
1964	Third Generation of Computers	-----	An integrated circuit was developed and emerged in third generation computers. It included the photo printing of conductive circuit boards to eliminate wiring.
1969	Hypertext	-----	Hypertext systems were particularly useful for organizing and browsing through large databases that consisted of disparate types of information.

From 1970 to 2004 (Third Generation of Multimedia Technology) [5]: This generation of the multimedia technology was the era of its continuous growth. This is the era of the fourth generation of the computers which started in 1970s with the VLSI designs [6]. VLSI Technology came up with the microprocessor which became the root of the multilayered design of the processors in the computer systems.

Year	Invention	Inventor	Description
1972	Video Game	-----	First commercial video game was developed and was named PONG which was an electronic game that involved human interaction with a user interface to generate visual feedback on a video device.
1973	Ethernet & Internet	Metcalf	During this period, Kahn & Cerf presented the ideas for structure of the internet.
1974	Microprocessor	Intel	8080 microprocessor was invented which was to be used in computers. Intel manufactured the second 8 bit microprocessor.
1975	Microsoft	Bill Gates	Microsoft Corporation came into existence in this year.
1975	VCR	SONY	SONY Betamax introduced VCR with a one hour, ½ inch video cassette tape.
1977	Apple Computers	Steve Jobs	Apple was founded by Steve Jobs and Steve Wozniak which was a multinational corporation that created consumer electronics, personal computers, computer software & commercial servers.
1978	Cell Phone	Simens	The first commercially used cell phone was available in market.
1979	Portable Cassette Player	SONY	Company introduced a portable audio cassette player which was called Walkman.

1980	Word Processing Machine	-----	A single purpose machine with limited storage on magnetic material was introduced as word processing machine.
1981	MD- DOS	Microsoft	Microsoft Disk Operating System was introduced by Microsoft.
1981	Work Stations	Adam Osborne	The inventor completed the first portable computer and Apollo Computer unveiled the first work station.
1982	Desktop Publishing	Apple Computers	Aldus PageMaker for the Macintosh was invented.
1983	CD ROM	NFSNET	CD-ROMs evolved from CDs on which music was recorded.
1989	3D Graphics	Pixar Graphics	3D graphical supercomputers were invented. Pixar's "Tin Toy" was the first computer-animated film to win an Academy Award.
1990	Hand Writing Recognition	-----	Handwriting recognition was introduced by grid with a touch sensitive pad on laptop PCs.
1990	ARCHIE & HTML	-----	The World Wide Website made a place in the Website segment and Tim Berners-Lee, developed HTML (Hyper Text Mark-up Language).
1991	Multimedia Platforms Specifications	IBM	At the AT &T Labs Tandy and others announced the hardware specifications for multimedia platforms.
1994	Interactive Designing	-----	Internet goes interactive in this year which came up with shopping, banking, live concerts, radio broadcasting and spamming.

After 1994 the Internet has played a vital role in the multimedia applications; till the end of 2002, the Private ISPs has taken over the internet business. The big brands like Airtel, Reliance and other telecom companies have taken over this business by taking care of second and third generation of the networks.

III. PRESENT SCENARIO

The present era of the multimedia is application based. Multimedia can be found in various fields including business, marketing, management, education, training, entertainment, manufacturing and design, and many more. Major applications of multimedia can be found in the following areas:

A. Simulations

Simulation [7] has made possible for us to determine the behaviour of a model of any real world object. Today, the prospect of teaching a medical student about heart surgery without having direct hands on to real life experiments or the learning about the particle motion by a physics student is possible just due to the evolution of simulation methods.

All this has been made possible by the use of multimedia, which offers the use of a wide range of media altogether under a single platform. Computer software simulation including system and network simulators is also used to train IT professionals to get the actual view of the system in order to make the learning process easy. Simulators are also used by researchers to simulate their proposed methodologies.

B. Virtual Reality [8]

In 2007, "Street View" was introduced by Google. It was capable of showing panoramic view of a number of worldwide regions. Virtual reality has various applications in military, education, entertainment, healthcare, business, fashion, media and telecommunications. By exploring the depths of multimedia it has been possible to create a visual environment which can treat psychiatric disorders in patients [9]. It also has other clinical applications to assess and treat anxiety, eating disorders and also stress disorders. It can also enhance student learning capabilities. Pilots are trained using flight simulators. Also the gaming dimension has a breakthrough from simple video games to 3D interactive gaming. It has also reduced the cost factor of development and production of a variety of goods and services. In order to bring virtual reality among the masses, devices like Oculus Rift and Samsung Gear VR have been designed. The idea of "Surface Computing" has made possible to interact with multimedia content on any ordinary surface.

C. Smart Phones & Tablets

Smart phones & tablets offer a way of combining the personal computer with the basic features of a mobile phone and adding a variety of more features. The first Smart Phone which was made available to the masses was released in 1999 by NTT DoCoMo within Japan. Smart Phones have shown a significant growth and advancement in terms of quality and features with integration of advanced multimedia. It offers a world of apps which can be used according to the user's requirements. Various sensors have been integrated to offer a large number of functions and exploit multimedia to even greater extent.

D. Interactive Website Designing and Learning

In 2013, Google launched web designer, which could be used for building interactive HTML5 sites and Ads. Interactive learning can enhance the learning and retention capabilities of the learners. 3D content can be created using the power of

CSS3. Animations can be integrated in websites, which are made available on PC as well as mobile devices. Interactive online courses [10] are made available to students, teachers and professors through MOOCs. Smart boards are used in schools and colleges to engage and attract the learners.

E. Digital Devices

The first digital device which came into existence a hundreds of years ago was a telegraph. With advancement of technology and multimedia, modern digital devices [11] such as Kindle, Oculus Rift, Samsung Gear, 3D Projectors and Google glasses have been designed. Due to the advancements in the graphics technology the phones and cameras are coming with more picture & video qualities these days which has increase the use of digital devices these days. The integration of multimedia with digital technology increased the portability of all in one machines by replacing the number of individual devices.

IV. FUTURE SCENARIO

Innovations in both Windows and the Macintosh operating systems paved the way for the lightning-fast developments in multimedia in the present era of multimedia systems, technology and applications. Since both the operating systems can handle graphics and sound simultaneously so their role in this field is remarkable. Another company, without whose presence the multimedia cannot be imagined is Macromedia (formerly called Macromind). The future of multimedia is to integrate it with other technologies and use its applications in accordance to the society. The following are some recommended future guidelines and stratagems that would help to improve integration by of multimedia with other technologies:

- a. The integration of the multimedia technology along with the image processing techniques with wireless sensor networks can be a decent approach to keep an eye on our borders (Line of Control) where the survival of the human beings is almost impossible under critical conditions.
- b. The integration of the multimedia technology to the sixth sense technology [11] can come up with a revolution to the society.
- c. Electronic databases and search engines have replaced card catalogues and Power Point is commonly used in lectures. Nowadays the online education has become an integral aspect, where we need to focus on the shortcomings and have to work on other aspects like its lack of concrete foundation, online education for disabled and many more.
- d. Integration of multimedia technology with the artificial intelligent systems.
- e. The printing in all dimension of any object in the space.
- f. Use of multimedia in the science fiction projects.
- g. Multimedia in the travelling concepts & convections; a person sitting in his room can travel all over the world using fiction projections.
- h. Integration of multimedia with the expert systems that can be used in various segments of society.

There are so many other areas where we will see the multimedia giving its contribution and making the live projections in the virtual world.

V. CONCLUSION

This paper is projecting the past, present and future scenarios on the multimedia technology and systems. The integration of the multimedia technologies on various systems has brought a remarkable change to the society and the future is even brighter. The use of multimedia in almost every field these days is making it the common need of society. We can see multimedia on a screen from a big cinema hall to the smart phone in the pocket. It has made our life easier. The past was full of research on this technology and future is also full of the imagination. Today, in a networked scenario the multimedia technologies such as video conferencing and real-time image communication are the key for the success in this field and the integration of these will come with a progressive approach to the society where we will be using it for a better future.

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