

International Journal of Computer Science and Mobile Computing

A Monthly Journal of Computer Science and Information Technology

ISSN 2320-088X

IJCSMC, Vol. 3, Issue. 3, March 2014, pg.894 – 899

RESEARCH ARTICLE



Importance of Virtual Reality in Current World

Shiny Mathew¹

¹Department of Multimedia Technology, Karunya University, Coimbatore-641114, India

E-mail: Shiny Mathew: shiny.its@gmail.com

Abstract

Virtual reality (VR) is considered as important technology, giving scope for a great leap for adverse fields. Virtual reality is sometimes referred to as immersive multimedia, is a computer-simulated environment that can simulate physical presence in places in the real world or imagined worlds. This paper brushes the importance of this stimulated reality stating how VR has gone through advancements giving us a cutting edge technology. It correlates an in-depth detail about origin and history of early VR and elaborates the current stand of this technology in the society. It illustrates the technology misconceptions with its aspects of being fully developed and how we can overcome it. People rivet on VR mainly for entertainment but their real impacts are in arts, business, communication, design, education, engineering, medicine and many other fields.

Key words- *Virtual reality (VR); Technology; Simulation; Network; Sensation fields*

I. INTRODUCTION

VR origin can be traced from the concepts introduced by Ivan Sutherland who defines concepts of immersion, usage of feedback input and output devices which are used in the area of research. Sutherland defines a challenge “the screen is a window through which one sees a virtual world”. The challenge is to make that the world looks like real, act real, sound real and feel real [1]. The “Virtual reality” term is defined by Jaron Lanier who coined it in 1989 to explain the his challenges he went through when using latest generation goggles, gloves and other related technologies [2]. VR is an alternate world filled with computer generated images that respond to change in motion based upon the human present in that environment. These computer generated simulated environments are usually experienced with the help of an expensive data interfaces, which features stereophonic video goggles and fiber-optic data gloves [2].

Sutherland’s faced disputes which can be summarized as offering presence simulation to users as an interface metaphor to the simulated space of VR that had led to an increase in the community of researchers and industrialists. This is a motivation

for the researchers which has increased two folds [3]. VR is considered as a way to trounce limitations of ordinary human computer interfaces. Thereby this technology cumulates the use of complex and highly integrated interfaces to yield solutions to new applications

II. ORIGIN OF VR

Last decades have led to the development of user friendly interfaces which has simplified the work of computers, making it easy to learn and use [3]. One of the most successful user interfaces produced so far was Xerox Parc desktop popularized by Macintosh. Graphical user interfaces based upon desktop are limited to virtual environment which simplifies the user interaction thereby providing the users an illusion manage and alter real, physical objects on a desktop [3].

There arises a problem in which only limited information is known about three-dimensional world which often provides lesser feedback to the user in virtual domain. This problem can be removed by including additional depth information which can be induced by forming a prototype model of heterogeneous instance, thereby making it more complex [4]. New interfaces and devices enable users to work in such environment.

III. CHANGING THE PAST OF VR

Morton Heilig, Douglas Engelbart, Myron Krueger, Ivan Sutherland, Thomas Furness, Frederick Brooks and Jaron Lanier are some of the scientist, researchers and entrepreneurs who have made considerable contributions in the VR world. The first VR devices ever developed was the Sensorama patented in 1962 by Morton Heilig. This device is used for motion picture which creates a visual display; it also generate sounds, smells, haptic sensation and even a breeze to simulate movement [2]. Almost at this time Douglas Engelbart who was a former navy radar specialist was making his ways to the development of human computer interface (HCI) [2], simultaneously Ivan Sutherland was working on a new computing technology which was later to be called as computer assisted drawing (CAD) [2].

Engelbart's Augmentation Research Center at Stanford Research Laboratory also lead to the growth of many inventions like the mouse in 1965 and multiple tiled windows in 1968 these are some of the necessary tools for the graphical user interfaces (GUIs) [5]. Sutherland's Sketchpad in 1963 was popular which allowed to use light pen to sketch and manage images [2].

Later Sutherland lead to the development of first head mounted computer display (HMD) at the university of Utah but due to the inability to provide user support because of the weight lead the device to be suspended from the ceiling [2]. Myron Krueger attempted to solve this problem so he took up an alternative approach and created the video projection technology in which the user could immerse which was named "cave".

Next milestone lead to the development of the data glove in 1981 by Tom Zimmerman unlike the primitive user devices which provided interface to receive information, the data glove helped in entering the data naturally [1]. Zimmerman collaborated with Jaron lanier for the VPL research which lead to the generation of hardware devices like Data Glove Eye Phones and Full body suit [2].

Recent VR developments include the generation of VR worlds or massively multiplayer online world (MMOW) which is computer-based simulated environment [2]. There exist many massively multiplayer online games that depict a number of virtual worlds which are based upon many themes depending on the user requirements. Most common form of such games are fantasy worlds whereas those based on the real world are relatively rare. Most MMORPGs have real-time actions and communication [2]. Players create a character that travels between buildings, towns and worlds to carry out business or entertainment. Interaction is usually textual; real time voice can also be included which thereby increases the virtual world to be more like the real world [10].

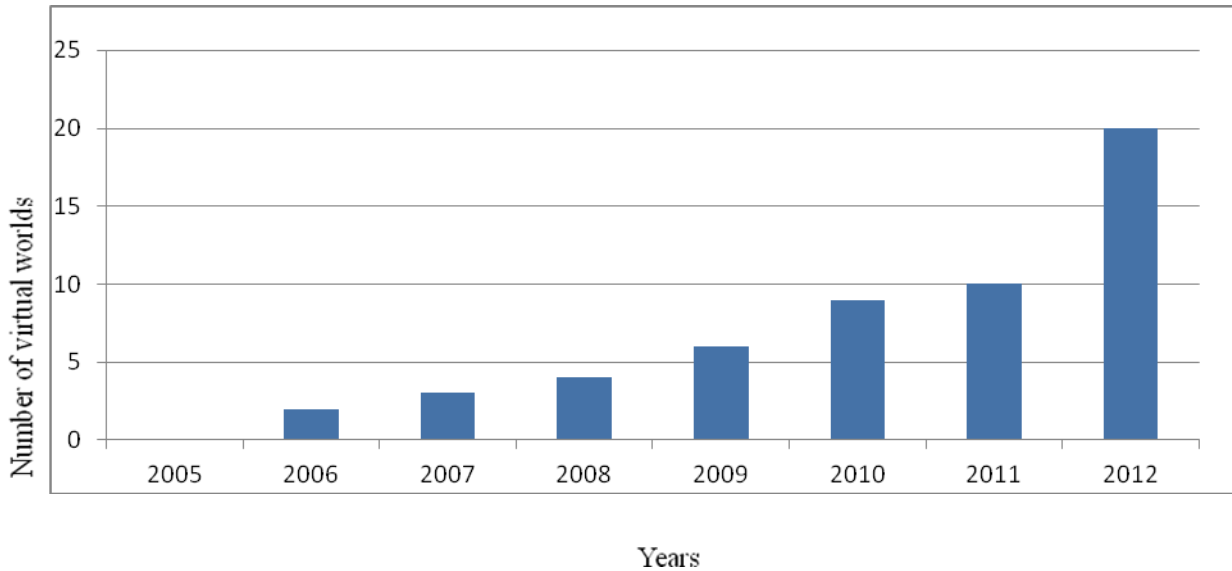


Fig 1: Graph depicts an increase in virtual worlds

Statistics from global forecasts (Fig 1) for the virtual worlds defines that there is rapid increase in the number of virtual worlds through which users interact with the simulated environment like Habbo, Second life which was introduced in 2006. In 2007, second life had major attention. In 2008, growth was in many segments and mirror worlds came into the picture. Graph depicts that by the end of this year, the forecast numbers will be doubled. A rapid increase is observed after 2010, driven largely by media sector companies creating IP-driven platforms for the toys, TV programmes, films and other properties.

IV. PRESENT FIELD OF VR

First of all, VR gives us an environment that allows us to modify our mental or emotional state. Secondly, it helps us to manipulate our physical environment. Concepts of VR has induced various imaginations of the people from a diverse set of cultural diversions be it from cyberpunk toward military worlds [6].

V. VR APPLICATIONS

So far, VR had its breakthrough with innovative applications like its high technology system which correlates with the display technology, simulation technology, network technology, sensor technology artificial functions as well as computer graphic technologies [5]. Various lists of its applications are shown in Table 1. Developed computer interfaces was used to incorporates and integrates virtual environments, wireless networking with user interface components to amplify the productivity and creativity of people.

Table 1: Diverse applications of VR in a variety of fields.

Military Application	Air Forces VR research program at Wright-Patterson AFB that lead to the development of heads up displays (HUDs) for flight simulators. "shoot-em-up" arcade games.	[2, 6]
Commercial Applications	Virtual tour can be induced for building which are still in the process using their architectural design. Elizabeth Weiss envisions The cyber gym; Virtual reality in the health club.	[2, 6]
Virtual Sets	National Association of Broadcasters' Convention in Las Vegas, Nevada by the Silicon Graphics company enacted many virtual sets.	[2]
Text-Based VR	Construction of virtual worlds with readily available materials-a computer keyboard. Text-based MUDs have evolved to become object-oriented MOOs (MUD, Object-Oriented), moving closer to the concept of VR.	[2]
Medicine	They help in the docking of molecules using visual and auditory displays.	[6]
Marketing	Draws people to their exhibits and involves them with a product much more than standard displays. Cabletron, a cable network company in Rochester, has customers travel through their network virtually.	[6]
Entertainment	Includes video arcades with be a VR centre, home based virtual reality systems.	[2]

Table 1: Diverse applications of VR in a variety of fields.

VI. TYPES OF VR

There are various types of virtual realities based on different differentiating properties. They are described in Fig 2. Key features for VR system is that it produces an environment which enables users to become active participants in artificial spaces created by the computer.

A. Desktop based VR:

Desktop based VR can be seen in typical computer games because its 3D suitability on a regular computer screen [5]. Characters can be manipulated settings with ease in desktop based VR games.

B. Avatar based VR:

Avatar based VR environments can be found online or it can be purchased. It involves the creation of virtual model of themselves thereby interacting with environment using sensitive model via avatar. Example is second life [5].

C. Simulation based VR:

This kind of VR is used in maneuvering an actual event in a stimulated machine which can be used in training areas such as aviation school [5].

D. Projector based VR:

Projector based VR can be found when a person is immersed into a virtual world via large volume displays which projects the virtual world. California Adventure's Soarin' Over is one the virtual California ride which uses a projection based virtual environment because individuals are flying over real places [5].

VII. ADVANTAGES OF VR

- A. **Advanced training:** Realistic environment is induced by VR to provide training for the service members. VR takes into consideration of tasks at the beginner level progressively moves up to professional level [7]. It contributes toward helping leaders when they must make a quick decision and can provide appropriate responses based upon good and bad decision making [7].
- B. **Better operational awareness:** Commanders make use of virtual workbenches which coordinates the system to allow the army on the area to indicate their precise location onto a map back at headquarters where the commander can make decision which is based upon accurate real time information from the battlefield [7].
- C. **Cost savings:** VR is a tedious to implement and manage with the current scenarios but the advances in processing capabilities and graphics display will continue to drive down the cost of these [7].
- D. **Safety:** The main benefits of VR in military field are to save lives. Many injuries are induced while training before soldiers in the training environment [7]. VR can stimulate scenarios like parachuting, shooting and urban combat can greatly reduce the risks to soldiers [7].

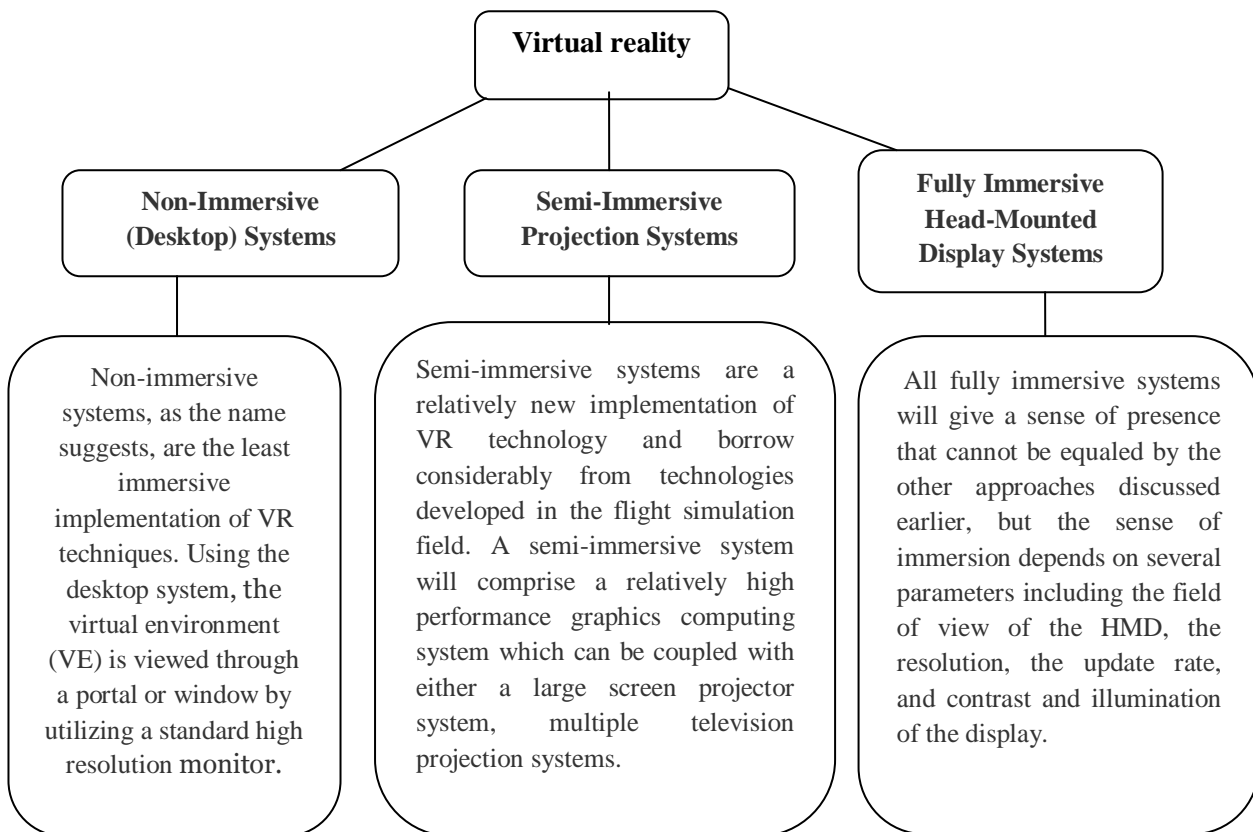


Fig 2: Various types of VR with their differentiating properties.

VIII. BARRIERS AGAINST VR

VR is now a complete functional system that is involved in numerous magazines, newspaper articles, TV shows, TV ads and other social media impulse but in reality it is contradictory to this. Present VR visualizations are often in poor quality and less realistic [6]. Some of the presented images will not be smooth and also might not respond quickly to our movements due to the time lag. Few systems allow for tactile feedback sense of touch. Some people may even question the physiological

and psychological safety of this simulated world especially in the stream of entertainment [6]. However, future of VR is not deniable. Now, it's in a very early and rudimentary form. Its state of development has been likened to the space program in 1950's or microcomputers in 1970's. We are just beginning to see the potential of virtual reality [6].

IX. CONCLUSIONS

We can conclude that given the complexity of VR, the importance of human requirements and lack of standard solutions, the secret of successful implementation of professional VR applications is to set realistic expectations for the technology [8]. It is common to have misconceptions on what VR can have an impact on the society and to have negative reactions when noticing that VR is not the reality. Taking into consideration for an emphasized and complex technology such as VR, it is important to choose appropriate applications with well-defined functionality objectives. Also, to compare the abilities of VR with competing technologies for reaching those objectives and to ensure that VR solution can be integrated with standard business empowerments by choosing the appropriate techniques.

ACKNOWLEDGMENT

I would like to express my gratitude towards my college Karunya University for giving me opportunity for making its facilities available to me. I take this opportunity to express my sincere thanks to Mohammed Faheem and Shilu Mathew for their support and help in tuning this paper.

Abbreviations

HCI: Human computer interface, HMD: Mounted computer display, MMOW: Massively multiplayer online world, VR: Virtual reality

REFERENCES

- [1]. Sutherland IE: **The ultimate display**. In *Proceedings of IFIPS Congress 1965*, 2:506–508.
- [2]. Ebersole S: **A BRIEF HISTORY OF VIRTUAL REALITY AND ITS SOCIAL APPLICATIONS**. In. Colorado: University of Southern Colorado; 1997.
- [3]. Scateni EGaR: **Virtual reality: Past, present, and Future**. In: *Virtual Environments in Clinical Psychology and Neuroscience: Methods and Techniques in Advanced Patient-Therapist Interaction*. Edited by G. Riva BKW, and E. Molinari. Amsterdam, The Netherlands: IOS; 1998: 3-20.
- [4]. Herndon KP, Zeleznik, R.C., Robbins, D.C., Conner, D.B., Snibbe, S.S. and van Dam, A.,: **Interactive shadows**. *Proceedings of UIST '92, ACM SIGGRAPH 1992*:1-6.
- [5]. **Software and Virtual Reality** [<http://edel518spring2011.wikispaces.com/Software+%26+Virtual+Reality>]
- [6]. Naggie S: **Management of hepatitis C virus infection: the basics**. *Topics in antiviral medicine* 2012, 20(5):154-161.
- [7]. **Virtual Reality Past, Present, and Future: Part 1**
- [8]. Leston J, Ring, K., and Kyril, E: **Virtual Reality: Business Applications, Markets and Opportunities**. *Ovum* 1996.