# VIRTUAL REALITY: AN AMIABLE TECHNOLOGY

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**Abstract:-** *Real world happenings that humans have to face are distinct from fictional ones. They have to inhabit themselves with the welcoming and unwelcoming experiences of the real world. Hence reality is the product and function of consciousness. Life becomes meaningful, with the purpose, significance, fulfillment and satisfaction. All these factors together bring certain fears and unexpected revulsions in a person's life, those need to be bridled off. The remedy which proved succouring to deal such fears is called Virtual Reality. Virtual experiences are real but not actual. Virtual Reality (VR) is an environment based on computer, designed and shared by individuals to interact in a custom built, simulated world. VR has not only proved its stone in entertainment industry but also in various other fields like in medical world for the treatment of depression, anxiety, phobias, etc. VR is such a remarkable technology which can map the experiences of past, present and future. We can even experience the most intimidating and grueling situations with virtual reality by playing safe and with a learning experience. In this paper, we have deliberated about the VR technology, its chronology and its enactment, to serve humanity.*

**KeyWords:-** *Virtual Reality, Simulated, consciousness, treatment, anxiety.*

## 1. INTRODUCTION

Virtual Reality means feeling the imaginary (virtual) world, rather than the real one. The imaginary world is a simulation running in the computer. Virtual Reality is the term used for computer generated 3D environments that allow users to interact with alternate realities. The definition of 'virtual' is near and 'reality' is what we experience as human beings. In other words, we can explore the uncharted territory of the human imagination with virtual reality.

## 2. HISTORY

In 1950's visionary cinematographer Morton Heilig built a single user console called 'Sensorama'; and modified it in the year 1962. Sensorama enabled the user to watch television in three-dimensional ways. 'Flight Simulators' were also built by US Air force to train student pilots.

In 1968, 'Ivan Sutherland' created the first Head Mount Display (HMD) system for use in immersive simulation applications.

The virtual reality industry mainly provided VR devices for medical, flight simulation, automobile industry design and military training purposes from 1970 to 1990.



**Fig-1: a.** Sensorama (1962)   **b.** Data Glove (1987)

Between 1989 – 1992, Nicole Stenger created 'Angels', the first real time interactive immersive movie, where the interaction was facilitated with a data glove and high-resolution goggles. In 1992, Louis Rosenberg created the Virtual Fixture system using a full upper body exoskeleton, enabling a physically realistic virtual reality in 3D.
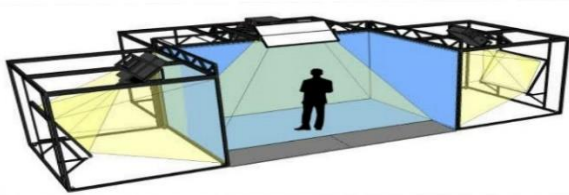
**Fig-2:  a.** VR Fixture System (1992)   **b.** CAVE (1992)

By 1994, 'Sega VR-1' motion simulator arcade attraction was released. It was featured with 3D polygon graphics and head movement tracking. In the year 1995, a console namely 'Virtual Boy' and a PC powered virtual reality headset, 'VFX1' were released.





**Fig-3:  a.** Virtual Boy (1995) b**.** VFX1 (1995)

By 2007, a service called 'Street View' was introduced that shows panoramic views of an increasing number of worldwide positions. In 2010, the first prototype of the 'Oculus Rift' was designed by Palmer Luckey. This design formed the basis for later introduced designs. In 2014, Sony announced Project Morpheus, coded name for Play station VR, a virtual reality headset for the Play station 4 video game console.

In 2015, Google announced 'Cardboard', a do it yourself stereotype viewer for smartphones. In 2016, the first major commercial release of sensor-based tracking, allowing free movement of users within a defined space, HTC Vive Steam VR headset was released. In 2017, 'Raft View VR' was released to get amused by the experience.





**Fig- 4:  a.** Google Street View (2007)   **b.** Cardboard (2015)

## 3. ARCHITECTURE OF VR

**Input Processor:** It controls the devices used to input information to the computer. The objective is to get coordinated data to the rest of the system with minimal lag time. Keyboards, mouse, 3D position trackers, are some examples of input processor.

**Simulation processor:** It is the core of VR system. It takes the user inputs along with any task programmed, into the world and determine the actions that will take place in the virtual world.

**Rendering Processor:** It creates sensations that are output to the user. Separate rendering processes are used for visual, auditory, haptic and other sensory systems. Each renderer takes a description of the world state from the simulation process or derive it from the World Database for each step.

**World Database (World Description Files) :** It stores the objects that inhabit the world and the scripts that describe actions of those objects.
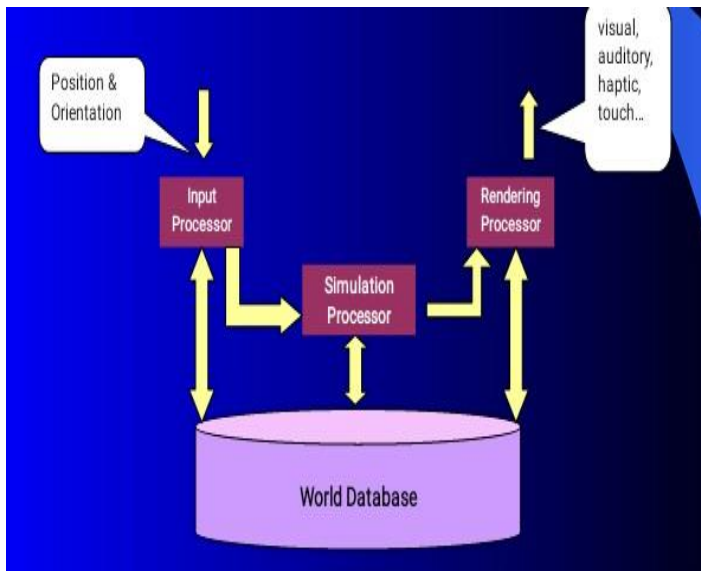
**Fig-5:** Architecture of VR

## 4. TYPES OF VR

### Immersive Virtual Reality:

Immersion into virtual reality is a perception of being physically present in a non-physical world. Immersive VR's are often equipped with head mounted displays. Elements of virtual environment that increases the immersion of the experience are:

    a.   Continuity of surroundings
    b.   Conformance to human vision
    c.   Freedom of movement
    d.   Physical interaction
    e.   Physical feedback

### Window on World (WOW):

It is also known as Desktop VR. It involves displaying a 3D virtual on regular desktop display without the use of any specialized movement tracking environment. It is of low cost and low performance, with less immersion.

### Telepresence:

It is variation of visualizing complete computer generated worlds. Remote sensors are linked with the senses of a human operator and might be located on a robot, that is useful for performing in dangerous environment.

Real time Telepresence: Interactions are reflected to some real world objects.

Delayed Telepresence: Interactions are recorded and later operations are applied to the real world object.

### Augmented reality:

It is also known as mixed reality, which is seamless merging of real space and virtual space. It integrates the computer generated virtual objects into the physical world which become in a sense an equal part of our natural environment.

### Distributed VR:

It is a simulated world which runs on several computers connected over network. With this arrangement people are able to interact in real time, sharing the same virtual world.

## 5. TECHNOLOGIES OF VR

### Head Mounted Display (HMD):

It is a helmet or face mask providing the visual and auditory displays. LCDs or CRT are used to display the stereo images. It may include built in head tracker and stereo headphones.

### Binocular Omni Orientation Monitor (BOOM):

It is a head coupled stereoscopic display device that uses CRT to provide high-resolution display.

### Cave Automatic Virtual Environment (CAVE):

It provides the illusion of immersion by projecting stereo images on the walls and floor of a room-sized cube. A head tracking system continuously adjust the stereo projection to the current position of the leading viewer.

### Softwares:

Multiverse (Freeware)

Virtual Reality Studio

Sense8 World Toolkit

Autodesk Cyberspace Development kit

### Virtual Reality Modelling Language (VRML):

It is standard language used for interactive simulation within the World Wide Web. It allows to create "virtual worlds" networked via internet and hyperlinked with the World Wide Web.

## 6. APPLICATIONS OF VR

**Entertainment:**

360-Degree cameras or VR cameras, that have the ability to record in all directions. The experience allows the users to interact with the characters and the world.



**Fig-6:** Experiencing movie on VR

**Medicine:**

VR can be used to practice performing surgery and even to perform surgery on a remote patient. It teaches new skills in a safe and controlled environment.



**Fig-7:** VR used in medicine

**Games:**

VR incorporates graphics, sound and input technology used in video games and gives feedback through visual, auditory, haptic and other sensory systems.



**Fig-8:** Gaming experience with VR

**Education & Training:**

It provides learners with a Virtual Environment where they can develop their skills without the real world consequences of failing. The fully Immersive training environment allows to train through a wide variety of terrains, situations and scenarios.



**Fig-9:** Use of VR in training

## 7. ADVANTAGES

a. Virtual Reality creates a realistic world.

b. It enables user to explore places

c. Artificial environment can be experienced through VR.

d. Virtual Reality made education easy and comfort to learn.

## 8. DISADVANTAGES

a. Equipments used in Virtual Reality are very expensive.

b. It works on complex technologies.

c. It can cause motion sickness/ simulator sickness. It has low accuracy.

## 9. CONCLUSION

Visualization of complicated large data is helpful for understanding and analysis. VR offers us a new way to interact with computer and real life. VR enabled us to experience the virtual world that is impossible in real world. VR is changing our life, eventually VR will increasingly becomes a part of our life.

## REFERENCES

1. R. L. Anderson, A Real Experiments in Virtual Environments: A Virtual Batting Cage, Vol. 2, No. 1, pp. 16-33 (1993).

2. R. Held, N. Durlach, Telepresence, Vol. 1, No. 1,pp. 109-113 (1993).

3. D. Zeltzer, Autonomy, Interaction, Presence, Vol.1, No. 1, pp. 127-132 (1992).

4. Sutherland, I.E., The Ultimate Display, Proceedings of IFIP 65, Vol. 2,pp. 506-508

5. H. Fuchs, G. Bishop, Research Directions in Virtual Environment NFS Invitational Workshop, Univ. North Carolina (1992).

6. Burdea, G. and P. Coffet, Virtual Reality Technology, Second Edition. Wiley-IEEE Press.

7. C Cruz-Neira, Virtual Reality Overview, SIGGRAPH93 Course, No. 23, pp. 1.1-1.18 (1993).