Virtual Reality: A Different World

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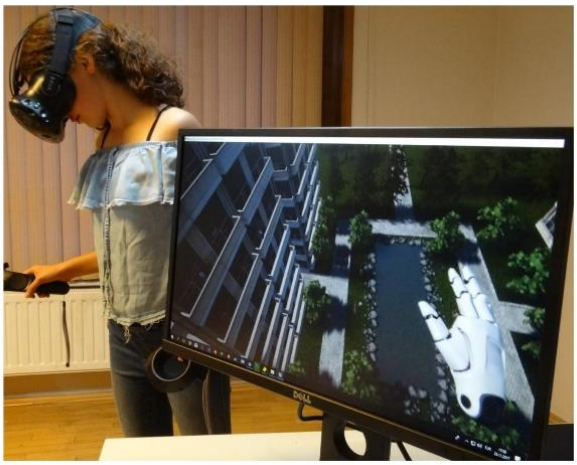
Abstract:

In this paper we have we have explained the meaning of virtual reality, its potential and its rise in the recent years. Applications of Virtual reality, its technical aspects and what challenges and difficulties it faces.

Keywords: Virtual reality, Virtual Worlds, VR communication, Realistic Graphics



I. INTRODUCTION

Virtual Reality (VR) technology is the immerging aid in the area of computer graphics. It is something which can show the real world dynamic with the help of computer software, hardware and also virtual world integration technology. These technologies depend upon the reaction of people's form, their language and so on. Immediately after this communication between virtual world and people is formed and this is known as real time communication. Virtual Reality puts us in a virtual world and lets us interact with it through our actions and gives us simulation of interacting with real world objects with the help of computer modelling. This interaction with the virtual world can be enabled with the help of sensors, headsets, controllers etc.

II. RISE OF VIRTUAL REALITY

The idea of virtual world and interaction with it was thought on as early as in the 1950s. Morton Heilig's Sensorama built in 1950 gave rise to the thought of crude concept of virtual reality. The idea predated the technology by many years and attempts to build a virtual world continued throughout the decades. The development of technology has finally enabled us to make it almost interactive. VR has seen the rise and enhancements with the help of gaming industries where virtual reality is the next generation of interactive gaming.

III. NECESSITY OF VIRTUAL REALITY

The demand for VR is increasing and this has made tech giants more interested in VR, thus enhancing its application and broadening its horizon.

We can simulate buildings and environment around it to get more precise information about its structural integrity. Like telecommunication reduce the feeling of distance between people seating oceans a far. VR takes it to a next step by taking us to places oceans apart as we stand stationary. You can kind of experience thrilling adventures in the safe and sound environment of your home.

Fig.: Virtual reality is the future [2]

IV. WORKING PRINCIPLE OF VR

VR works on the basis of instructions as explained below:

- Firstly, it tracks all the movements that are done physically within the real world and then computer come into access, it calls the virtual world notice all the moments. All the updates of virtual world are sent to the real world.[1]
- Then the output is sent to a display where we can see existence of all the functions, objects as if we are present in that virtual world. It seems as if it is real.

Fig.: The potential of virtual experience [3]

V. APPLICATIONS OF VR

VR has a multitude of applications. A wide range of applications of VR are used. Some of the important applications are:-

- Gaming industry
- Business
- Training
- Defence industry
- Mobile applications
- Education
- Conference
- Entertainment
- Maintenance and planning
- Designing
- Engineering
- Medical science
- Virtual prototyping
- Architecture design
- Data visualization
- Sports application

VI. DEVICES USED FOR VR TECHNOLOGIES

There are various devices that are used for virtual reality are:

- Gloves:
  Pinch gloves are used for interactions with objects. Hand signals are used for executing the actions.
- 3D mouse:
  A 3D mouse consists of two parts i.e. horizontal & vertical. Each part consists of buttons. We can produce different positions with the help of these buttons in 3D environment.
- Head Mounted Display (HMD):
  HMD is a device that can be consider as a helmet or a face mask. It consist of two parts i.e. display screen and optical system. This provides a comfort zone to the user to move around freely through the virtual surrounding.
- Full body suits
- Biological sensors
- Voice recognition
- Video camera

VII. TECHNICAL ASPECTS OF VR

- SOFTWARE:
  The development virtual world was first enabled in 1994 with the creation of VRML. Further, web 3D was developed in 1997 which became an industry standard for creation of web based virtual environment. The core of VRML later evolved to x3D which supported internet based 3D programming. Web VR is another a lot common web development tool which is a java script API. It is supported by most of the standard platforms like oculus rift, HTC vive, Google cardboard.[5]
- HARDWARE:
  Interaction with the virtual world requires a wide array of hardware working in a union, all of which communicates with each other and the user through a software application. Firstly, the display headset needs to high resolution display screen working in synchronous to get the feeling of immersion. It also needs a gyroscopic sensor to feed

in the moment and tilting inputs. More advanced headsets like the vive use the gyro sensor along with four proximity sensors to input the little forward and backward movement of the users. The movement of the hands are captured with the controllers fitted with their own gyro sensors. All these things are connected to a very capable processing unit, often a gaming PC or a console handling all the processing and graphical duties.

VIII. CONCERNS AND CHALLENGES

- One of the major concerns that come with the persistent usage of VR is the damage it can cause to an individual's health. The headset display this close to your eyes can cause eye fatigue and potential vision loss.
- VR sickness has symptoms similar to motion sickness which occurs when a user is exposed to a virtual environment.
- The combination of multiple sensors that a VR service user can be easily used for mask surveillance invading a user's privacy.
- There have been arguments that developments in VR can lead to development of techniques that can influence mass behaviour, human cognition.

IX. FUTURE SCOPE OF VR

VR is a budding technology, the ideas here are old yet the implementations of the technology is new we have much left to explore in this field. As the possibilities are explored we shall see a lot more in terms of what this topic has to offer. We shall see new discoveries and breakthroughs in long range communication. We will achieve new application of the joint scope of AR, VR and Mixed Reality. The communication shall improve, we will be able to imitate real life scenarios by implementation of realistic physics in the virtual worlds. The convenience of being able to somewhat experience events and adventures will get better as the technology improves, better graphical capabilities will result in more realistic looking worlds with better feel, improving overall experience of VR.

Fig.: VR in medical science [4]

X. CONCLUSIONS

VR is raw but seems to have an infinite potential. The end users are getting more and more interested in what VR has to offer. This very interest is making the company interested in its development further expanding what it can do. The VR industry is growing rapidly and has a huge potential in front of it. This development in VR co-dependant on development of better and faster computers as the graphic unit gets better. We are bound to see realistic virtual reality environment. Extensive research is necessary for giving us a better UI and making previously impossible things seem possible.

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