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A Study on Virtual Reality Applications

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ABSTRACT

In Current Social IT world, Virtual Reality (VR) has gained popularity in a last few years. All the coverage done by the media has helped it spread its presence. The problems associated with it are only known to a few. In this paper we present the whole historical outlook on virtual reality, all the important classes are listed, and also the various uses in science, work and various areas. A through study of a VR system is done.

Keywords: Virtual reality, Visual perception, Immersion

I. INTRODUCTION

With the introduction of Virtual reality all the fields such as scientists, architects, civil engineers now use this technology as a base to carry out all projects. This not only increases the precision and the quality of the project but also provides clarity on how the project turns out to be. Due to increase in demand, all the prices for these projects have also come down drastically. Thus the need and production of these devices are increasing day by day. Virtual Reality (VR) and Virtual Environments (VE) are the popular terms that are used often in this field. The words are not only limited to these but also extends to a huge amount of terms. Some important words include: Synthetic Experience, Virtual Worlds and Artificial Worlds or Artificial Reality.All these names bear the same meaning.

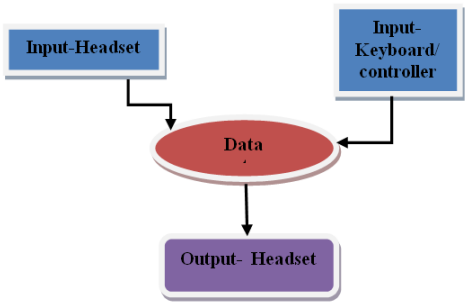

Figure 1. Data flow model

Virtual Reality Systems

Sensory information from the VR device is relayed on to the human senses. The quality of these senses are the key to determine how immersive the environment is.Since there are five senses in a human body, all the sensory information should appeal to all the senses. The second part of the experience is the environment that plays a major role. In reality it is very difficult to achieve this feat. Devices currently present can stimulate only some of the senses but not all .The types of VR systems available are directly proportional to the different quality they can offer:

World on window VR

This uses only the monitor to convey information as the output. No other output or sensory information is supported by this system as shown in Figure 1.1

Figure 1.1. World on window

Fish Tank VR

This can also be categorized as an improved version of VR. Even though this system uses the conventional monitor, it is better as it can support "Head tracking" that increases the user's immersion quality. This system does not support any other sensory output as shown in Figure 1.2

Figure 1.2. Fish tank VR

Immersive systems

This system has an HMD that supports a stereoscopic view of the perception in accordance to the user's orientation. This is known as the superior system in all respects. The functionality can be further enhanced by adding other sensory inputs as shown in Figure 1.3

Figure 1.3. Immersive Systems

Visual perception characterization

The main criteria that determines the quality of the VR is how well we can view the scene, ie the visual information. We have to generate feedback on how this can be perceived and also the extent of human vision. Unfortunately we cannot achieve such levels now. This leads to compromise on the quality of the currently available VR systems as in Figure 1.4

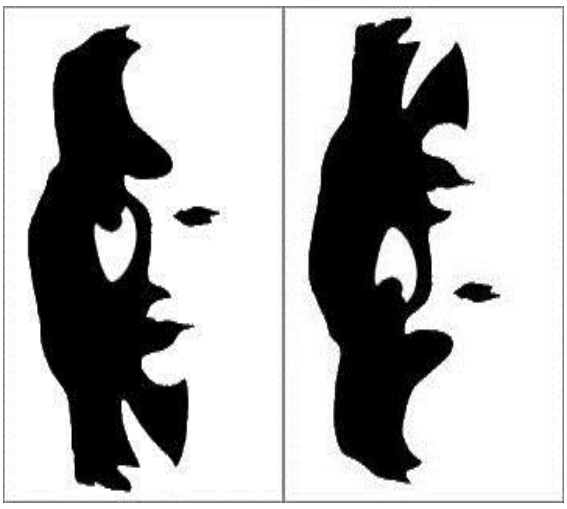

Figure 1.4. Visual perception

Field of View

The field of vision of a normal human eye is usually 180˚ which gives a clue on how to improve the visual quality. The vertical range hindered by cheeks and eyebrows to about 150˚. The horizontal vision is also limited, and equals to 150˚: 60˚ towards the nose and 90˚ to the side. This gives 180˚ of total horizontal viewing range with a 120˚ binocular overlap, when focused at infinity and it is shown in Figure 1.5

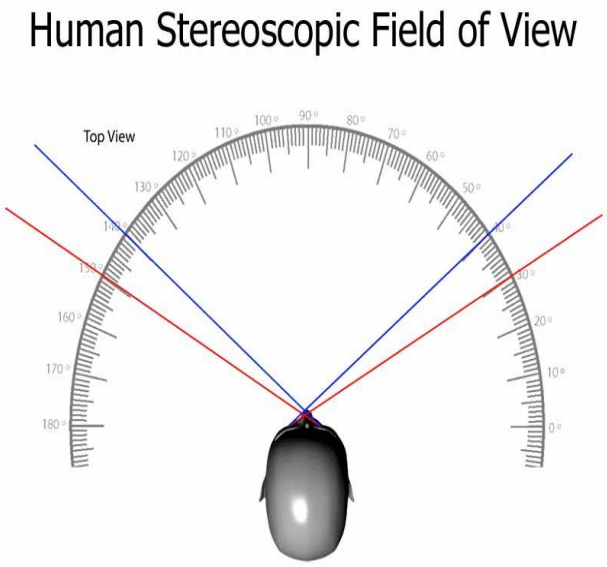

Figure 1.5. Field of view

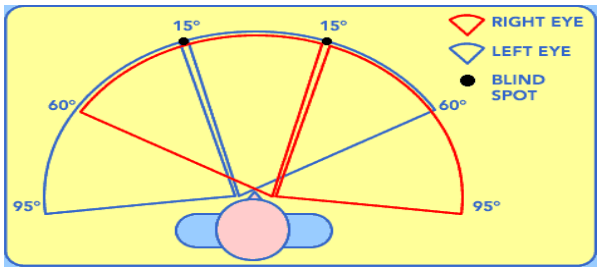

Figure 1.6. Blind spots

Applications

The various applications include:

Training

VR can be used to mimic real world spaces for workplace, safety, health, educational and training purposes. Without the fear of failing the users can learn while utilizing the virtual environment. It has been used in primary education, military Fig-2.1, astronaut training, flight simulators and driver training.

Figure 2.1. Millitary Training

Treating Disorders

The medical field uses include virtual reality exposure therapy (VRET), which is a type of exposure therapy for treating anxiety disorders such as stage fear, post-traumatic stress disorder and phobias. In some cases, patients no longer meet the criteria for PTSD after a series of treatments with VRET.

Figure 2.2. Treating Vertigo

Gaming

This is extensively used in gaming as seen in Fig-1.3.

Figure 2.3. Gaming using VR

VR case study

The sandbox was an event, started with the premise intended to drive a car in those road tracks you made in sandboxes as a kid. The solution-the experience, currently which ran running at Audi's flagship dealership in Oslo, which is also designed to be taken on tour. It invited people to enter a purpose-built sandpit and were free to create a customized track. The depth-sensing camera took the sand area which was then carefully scanned, this was the camera from which a virtual world is rendered. To be able to capture every bump and curve, the sand is bombarded with short bursts of infrared light with over 200,000 measure points captured by the infrared camera. This data is then used to create a 3-D model that informs the virtual environment. Having built the track, drivers then sit in a VR chair and don an

Oculus Rift headset to enter the virtual world they just created. The image is shown in Figure 3.1.

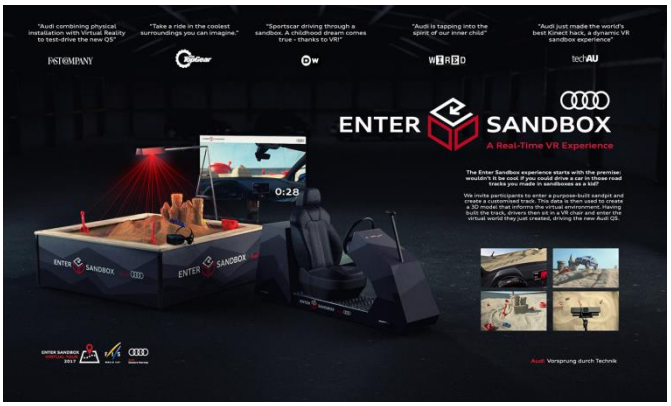

Figure 3.1. Enter the sandbox

II. CONCLUSION

VR has found already an enormous number of Applications in different areas of science It has become the go to reliable tool for designers, physicists, chemists, doctors, surgeons etc. All these practices, however, are not available for average people and therefore virtual reality is becoming some kind of myth, something extremely wonderful.

III. REFERENCES

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