

Virtual Reality

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Abstract: *Virtual Reality is a computer – based technology which incorporates specialized input and output devices to allow the user to interact with and experience an artificial environment as if it were the real world. A VR system permits the user to explore a three dimensional virtual –or artificial – environment and to interact with lifelike elements created by the designer .In the virtual world, the user can work out such things as a routine. In this review paper, we were discussing about the Desktop Virtual Reality Tools, the different VR operating system, VR operating Shells, VR Displays, System Requirements, Application and key features of VR.*

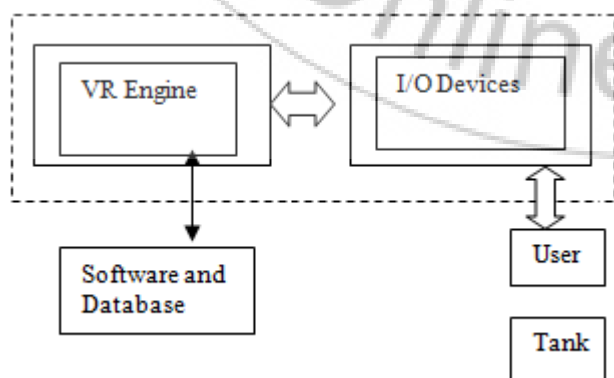
Keywords: Virtual reality, System requirement, key features, Application

1. Introduction

Virtual Reality is a computer – based technology which incorporates specialized input and output devices to allow the user to interact with and experience an artificial environment as if it were the real world .VR can range from simple environments presented on desktop computer to fully immersive multi-sensory environments experienced through complex headgear and bodysuits. VR is basically a way of simulating or replicating an environment and giving the user a sense of being there, take control, and personally interacting with that environment with his/her own body. VR originated in the second half of the 1960s with the head-mounted display (HMD) as the first device that provided immersive experiences with computer –generated images. After extensive development at NASA and the Department of Defence, HMD technology becomes commercially available 20 years later in 1989.

2. System Architecture

The virtual world is hosted on a computer in the form of the database. The database resides in the memory of the computer .It consists of space as well as textures. Vertices may be connected to form planes, generally referred as polygon. Each polygon consist of at least 3 vertices .The polygon could have a specific color, and the color could be shaded, or the polygon have a texture on it. A virtual object will have position (x, y, z) an orientation (pitch, roll) also attributes (gravity or elasticity) .VR provides the experience of oerception and interaction through the use of sensors and effectors in a simulated environment.



VR System Architecture

3. Key Features of VR

a) VR is experimental

A multi sensory environment can be inhibited with the help of VR. We experienced the environment as if it were real, while still fully aware that it is computer generated. Text, Oral and screen based presentation s address subsets of human capacity .In contrast, the VR learning environment provides a context that includes the multiple nature of human intelligence : spatial, auditory, logical, verbal etc.

b) VR allows intuitive human-computer interaction

The technology is designed to fit human architecture. A virtual world empower us to move, talk, gesture, and manipulate objects and systems in a natural way : to move an object, you reach out your hand and pick it up ; to see what you hear going on behind you, you turn around and look . The skilled needed functions within a virtual world are the same.

c) VR is Shared Experience

A personal computer is designed for solitary operation; there is one keyboard, one mouse, and one, display. Virtual worlds can be both individual and have social contexts. Networked VR allows multiple participants to interact simultaneously in the same audio-visual environment, sharing control naturally while conversing with argued capability.

d) VR allows entirely new capabilities and experiences:

Time, scale and physical laws can be controlled by Participants have unique capabilities, such as the ability to fly through the virtual world, to occupy any object as a virtual body, to observe the environment from many perspectives.

4. Application of VR in Various Fields

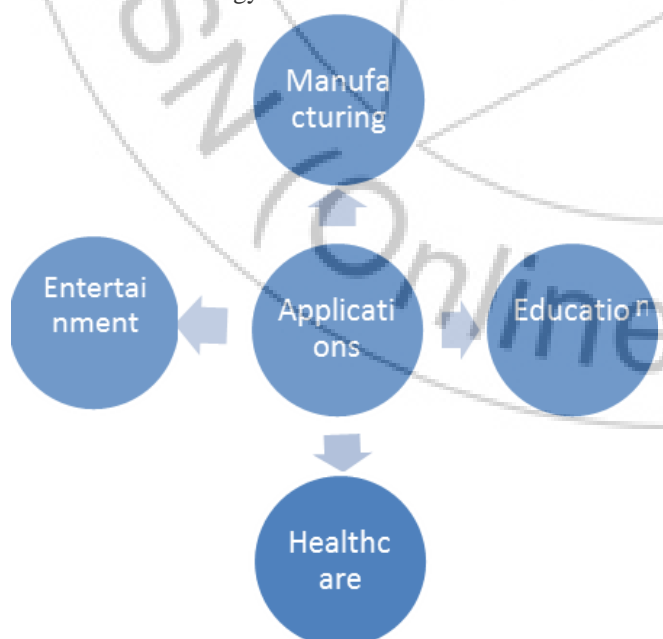
There are numerous applications in the domains of health care, education and lifelong learning, manufacturing, and other areas where this technology shows great promise for improving productivity. Early results show an increase in productivity and reduction in cost and resources. Examples of current use include: searching of networked databases and libraries; manipulation of molecules for development of nanotechnology devices and chemical systems; shared

surgical inventions; modelling, simulation, and analyses; scientific and technical visualization applications; prototyping and planning; and training for and monitoring of complex human-computer tasks.

5. Conclusion

Virtual environment technology has been developing over a long period, and offering presence simulation to users as an interface metaphor to a synthesized world has become the research agenda for a growing community of researchers and industries. Considerable achievements have been obtained in the last few years, and we can finally say that virtual reality is here, and is here to stay. More and more research has demonstrated its usefulness both from the evolutionary perspective of providing a better user interface and from the revolutionary perspective of enabling previously impossible applications. Examples of applications areas that have benefited from VR technology are virtual prototyping, simulation and training, telepresence and teleoperation, and augmented reality. Virtual reality has thus finally begun to shift away from the purely theoretical and towards the practical. Nonetheless, writing professional virtual reality applications remains an inevitably complex task, since it involves the creation of a software system with strict quality and timing constraints dictated by human factors. Given the goals of virtual reality, this complexity will probably be always there. The marketing situation of VR is very fluid. This means that the technology while being ready for professional applications is not at the stage of settling definite standards and definite reference points in all perspectives, including possible leading manufacturers, compatibility specifications, performance levels, economical costs and human expertise.

This uncertainty should not be confused with lack of confidence on the promising outcomes of the technology, but instead with the rapid mutation and evolution that characterizes the field, perhaps even more than for other information technology markets.



From the hardware point of view, while full fidelity of sensory cues is still not achievable even with the most

advanced and expensive devices, there exists now a variety of research and commercial solutions successfully useable for practical applications. For a large number of application domains, the major limitation is now provided by software since, at the current state of the art, no single system supports satisfactorily all the aspects of creation of a virtual reality application. Most of the time, different packages have to be combined, and ad-hoc solutions implemented to integrate them in a working application. In particular, the creation of appropriate time-critical multimodal VR architecture is an open research topic. In addition to further research and development on actual hardware and software issues, all the areas of VR technology would benefit from research aimed at better understanding the role of sensory cues and human perceptual issues. This improved understanding not only is required to know how sensory cues can be delivered or simulated, but when and how they should be used.

6. Future Scope

Today VR technology is still in its infancy, and there are damaging flaws. Graphics, no matter how impressive, are not lifelike. Time lags are far too long. Optic and auditory hardware are not 100% realistic. Users can walk into walls or pick up an object without feeling a thing. The equipment is still far too expensive for everyday use. But each and every one of these drawbacks is the subject of intense research and work; the problems are being overcome, and VR is poised for its major breakthrough.

Reference

- [1] <http://www.google.com>
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