A REVIEW ON VIRTUAL REALITY AND ITS IMPACT ON MANKIND

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ABSTRACT

This report provides a short survey of the field of virtual reality, highlighting application domains, technological requirements, and currently available solutions. Virtual Reality (VR), sometimes called Virtual Environments (VE) has drawn much attention in the last few years. Extensive media coverage causes this interest to grow rapidly. Very few, people, however, really know what VR is, what its basic principles and its open problems are. In this paper a historical overview of virtual reality is presented, basic terminology and classes, of VR systems are listed, followed by applications of this technology in science, work, and entertainment areas. An insightful study of typical VR systems is done.

Keywords:

Wireless sensor network, task mapping, smart parking, Event detection, Bluetooth, greenhouse monitoring, health Care.

II. INTRODUCTION

Definition:

Virtual reality has been notoriously difficult to define over the years. Many people take "virtual" to mean fake or unreal, and "reality" to refer to the real world. This results in an oxymoron. The actual definition of virtual, however, is "to have the effect of being such without actually being such". The definition of "reality" is "the property of being real", and one of the definitions of "real" is "to have concrete existence".

Virtual reality is the use of computer technology to create the effect of an interactive three-dimensional world in which the objects have a sense of spatial presence.

Virtual reality or virtual realities (VR), which can be referred to as immersive multimedia or computer-simulated reality, replicates an environment that simulates a physical presence in places in the real world or an imagined world, allowing the user to interact in that world. Virtual realities artificially create sensory experiences, which can include sight, hearing, touch, and smell**.** Most up-to-date virtual realities are displayed either on a computer screen or with special stereoscopic displays.

2. What Types of Virtualization Are There?

The main types include application, desktop, user, storage and hardware.

Application virtualization

Allows the user to access the application not from their workstation, but from a remotely located server. The server stores all personal information and other characteristics of the application, but can still run on it is.

Desktop virtualization

Allows the users' OS to be remotely stored on a server in the data center, allowing the user to then access their desktop virtually, from any location.

User virtualization

Is pretty similar to desktop, but allows users the ability to maintain a fully personalized virtual desktop when not on the company network. Users can basically log into their "desktop" from different types of devices like smart phones and tablets.

Storage virtualization

Is the process of grouping the physical storage from multiple network storage devices so that it acts as if it' son one storage device.

Hardware virtualization

Is a form of virtualization that uses one processor to act as if it were several different processors. The user can then run

3. Early attempts at virtual reality

If we focus more strictly on the scope of virtual reality as a means of creating the illusion that we are present somewhere we are not, then the earliest attempt at virtual reality is surely the 360-degree murals From the nineteenth century. These paintings were intended to fill the viewer's entire field of vision, making them feel present at some historical event or scene.

5. Requirements:

The frame rate at which the scene must be re-rendered depends on the application. For applications like the virtual wind tunnel, it turns out that a minimum frame rate of 10 frames per second is enough to support the sense of spatial presence. While motion at this frame rate is clearly discontinuous, if properly done our cognitive systems will interpret the resulting images as three-dimensional objects "out there". The other requirement is that interactive objects in the environment continuously respond to your commands after only a small delay.

The frame rate must be 10 frames per second or greater
Response to user input must occur within 0.1 seconds

6. PERCEPTIONS IN VIRTUAL REALITY

Visual Perception

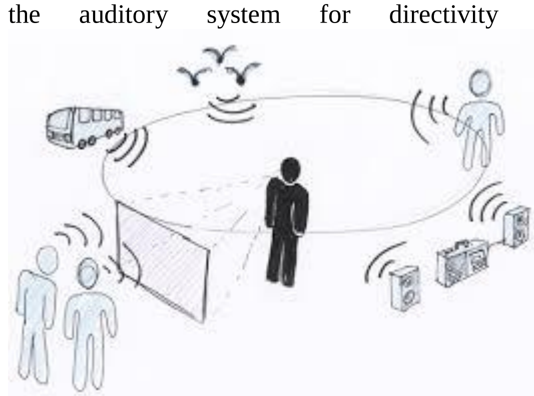
Vision is generally considered the most dominant sense, and there is evidence that human cognition is oriented around vision.

Depth perception

Stereoscopic viewing is a primary human visual mechanism for perceiving depth. However, because human eyes are located only on average 6.3 centimeters apart, the geometric benefits of stereopsis are lost for objects more distant than 30 meters, and it is most effective at much closer distances. Other primary cues (eye convergence and accommodation) and secondary cues (e.g. perspective, motion parallax, size, texture, shading, and shadows) are essential for far objects and of varying importance for near ones;

Sound Perception

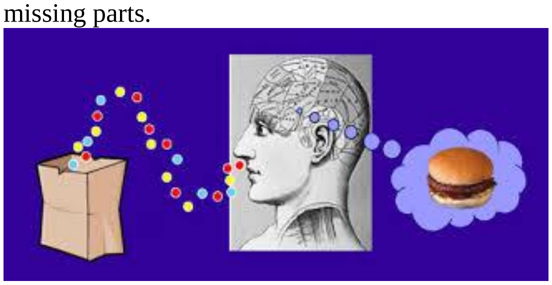
Audio feedback must thus be able to synthesize sound, to position sound sources in 3D space and can be linked to a speech generator for verbal communication with the computer. In humans, the auditory apparatus is most efficient between 1000 and 4000 Hz, with a drop in efficiency as the sound frequency becomes higher or lower. The synthesis of a 3D auditory display typically involves the digital generation of stimuli using location-dependent filters. In humans, spatial hearing is performed by evaluating monaural clues, which are the same for both ears, as well as binaural ones, which differ between the two eardrum signals. In general, the distance between a sound source and the two ears is different for sound sources outside the median plane. This is one reason for intermural time, phase and level differences that can be evaluated by the auditory system for directivity perception.



Olfactory Perception

The training of emergency medical personnel operating in the field should bring them into contact with the odors that would make the simulated environment seem more real and which might provide diagnostic information about the injuries that simulated casualty is supposed to have incurred

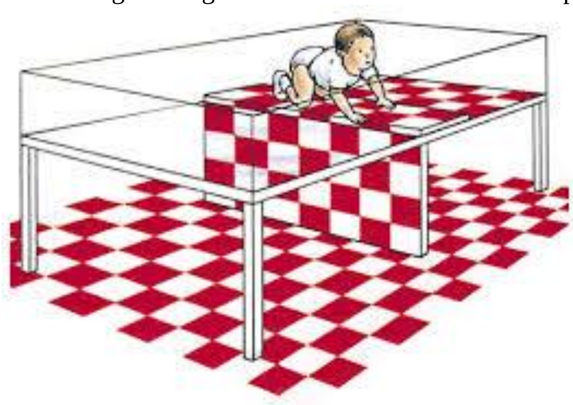
The main problem about simulating the human olfactory system is, indeed, that a number of questions on how it works remain unanswered. It is certain that the stimuli to the brain cortex are originated in the nose when molecules carrying odors are caught by the receptors neurons, but it is still unknown how the brain generates a recognition pattern isolating some scents from others and reconstructing missing parts.



7.0 Enabling Technology: Hardware

Position/Orientation Tracking

Head tracking is the most valuable input for promoting the sense of immersion in a VR system. The types of trackers developed for the head also can be mounted on glove or body suit devices to provide tracking of a user's hand or some other body part. Many different technologies can be used for tracking. Mechanical systems measure change in position by physically connecting the remote object to a point of reference with jointed linkages; they are quite accurate, have low lag and are good for tracking small volumes but are intrusive, due to tethering and subject to mechanical part wear-out. Magnetic systems couple a transmitter producing magnetic fields and a receiver capable to determine the strength and angles of the fields; they are quite inexpensive and accurate and accommodate for larger ranges, the size of a small room, but they are subject to field distortion and electromagnetic interference. Optical systems can use a variety of detectors, from ordinary video cameras to LED's, to detect either ambient light or light emitted under control of the position



Eye Tracking

Eye trackers work somewhat differently: they do not measure head position or orientation but the direction a which the users' eyes are pointed out of the head. This information is used to determine the direction of the user's gaze and to update the visual display accordingly. The approach can be optical, electro ocular, or electromagnetic. The first of these, optical, uses reflections from the eye's surface to determine eye gaze. Most commercially available eye trackers are optical, they usually illuminate the eye with IR LED's, generating corneal reflections. Electro collar approaches use an electro oculi gram (EOG) via skin electrodes that provide measurement of the corner original potential generated within the eyeball by the metabolically active retinal epithelium. Electromagnetic approached determine eye gaze based on measurement of magnetically induced voltage on a coil attached to a lens on the eye. All the commercial products are quite expensive, ranging from approximately 15,000 ECU up to almost 100,000and offer good frequency response (up to 500 hz)

Full Body Motion

There are two kinds of full-body motion to account for: passive motion, and active self-motion. The first is quite feasible to simulate vehicles with current technology. The usual practice is to build a "cabin" that represents the physical vehicle and its controls, mount it on a motion platform, and generate virtual window displays and motion commands in response to the user's operation of the controls. This is typically performed linking the body to a gyroscope, giving a 360o range of motion in pitch, roll and yaw .All these systems are usually quite expensive, from 6,000 ECU to 50,000ECU **8.0 Enabling Technology: Software** The difficulties associated with achieving the key goal of immersion has led the research in virtual environments to concentrate far more on the development of new input and display devices than on higher-level techni quesfor 3D interaction. It is only recently that interaction with synthetic worlds has tried to go beyond straightforward interpretation of physical device data.

11.0 What Benefits Does Virtualization Provide?

Training

The usage of VR in a training perspective is to allow professional conduct training in a virtual environment where they can improve upon their skills without the consequence of failing the operation. VR plays an important role in combat training for the military. It allows the recruits to train under a controlled environment.

Video games

The use of graphics, sound and input technology in video games can be incorporated into VR. Several Virtual Reality head mounted displays (HMD) were released for gaming during the early-mid1990s. These included the Virtual Boy developed by Nintendo, the glasses developed by Virtual I-O, the Cyber maxx developed by Victormaxx and the VFX1 Headgear developed by Forte Technologies

Virtual reality in fiction

Many science fiction books and films have imagined characters being "trapped in virtual reality". A comprehensive and specific fictional model for virtual reality was published in 1935 in the short story Pygmalion's Spectacles by Stanley G. Wean Baum. A more modern work to use this idea was Daniel F. Galouye's novel Simulacron-3, which was made into a German tale play titled *Welt am Draht* ("World on a Wire") in 1973.

Motion pictures

Daniel F. Galouye's novel Simulacron-3, shows a virtual reality
simulation inside a virtual reality simulation In 1983, the Natalie Wood Christopher Walken film *Brainstorm* revolved around the production, use, and misuse of a VR device. *Total Recall*, directed by Paul Verhoeven and based on the Philip K. Dick story "We Can Remember It for You Wholesale"

Benefits for Companies

Virtualization provides several benefits for companies, including:
Greater efficiency and company agility Ability to more-effectively manage resources Increased productivity, as employees access the company network from any location Data stored on one centralized server results in a decrease in risk of lost or stolen data.

Benefits for Data Centers

Not only is it beneficial for companies, but virtualization provides
several benefits for data centers as well, including :Cutting waste and costs associated with maintaining

12.0 The Future of virtual reality

What is real? How do you define real? If you're talk in about what you can hear ,what you can smell, taste and feel, then real is simply electrical signals interpreted by your brain.- Morpheus (The Matri)
Everything we experience in life can be reduced to electrical activity stimulating our brains as our sensory organs deliver information about the external world. This interpretation is what we consider to be "reality." In this sense, the brain *is* reality. Everything you see, hear, feel, taste and smell is an interpretation of what's *outside*, and created entirely *inside* your head. We tend to believe that this interpretation matches very closely to the external world. Nothing could be further from the truth. It is the brain that "sees", and in some important ways what it sees does not reflect the information it derives from sensory input. For this reason, we are all living in our own reality simulations. In order to experience the world in a meaningful way, the brain must act as a filter/interference between us and the "real" world. Words have always been a crude method of relaying intent. VR holds out the promise of allowing us to literally show one another what we mean rather than merely describing it with crude verbal approximations. The limitation of words is that the meaning they convey is only as detailed as the definitions the reader or listener attaches to them. For this reason VR offers the possibility of evolving our communication into a kind of telepathy, ultimately bridging the gap between our discrete imaginations. "This is what virtual reality holds out to us - the possibility of walking into the constructs of the imagination." - Terence McKennaVR is the ultimate medium of syntactical intent; the only way to figuratively "show"someone *exactly* what you mean is to *literally* show them. Words are exceptionally ineffective at conveying meaning, as they are a low-bandwidth, lossy medium of knowledge transference .VR will let us remove the ambiguity that is the discrepancy between our internal dictionaries and bypass communication through symbolism altogether. The result will be perfect understanding, as all parties behold the same information.

III. CONCLUSION

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, tele presence and tele operation, 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 .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. 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, 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, As a conclusion, we can say that given the complexity of VR, the importance of human factors, and the lack of standard solutions, the secret of successfully implementing professional VR applications is to set realistic expectations for the technology.

REFERENCES

[1] Applied virtual reality. In SIGGRAPH Course Notes 14. ACM SIGGRAPH, 1998.

[2] AHLERS, K., AND KRAMER, A. Distributed augmented reality for collaborative design applications. Tech. rep., European Computer Industry Research Center, 1995.

[3] AIREY, J. M., ROHLF, J. H., AND BROOKS, JR., F. P. Towards image realism with interactive update rates in complex virtual building environments. Computer Graphics (1990 Symposium on Interactive 3D Graphics) 24, 2 (Mar. 1990), 41–50.

[4] APPINO, P., LEWIS, J. B., KOVED, L., LING, D. T., RABENHORST, D. A., AND CODELLA, C. F. An architecture for virtual worlds. Presence: Teleoperators and Virtual Environments 1, 1 (1992), 1–17.

[5] BALAGUER, J.-F., AND DE GENNARO, S. VENUS: A virtual reality project at CERN. Computer Graphics 30, 4 (Nov. 1996), 40–48.

[6] BALAGUER, J.-F., AND GOBBETTI, E. i3D: a high-speed 3D Web browser. In 1995 Symposium on the Virtual Reality Modeling Language (VRML ‘95) (Conference held in San Diego, CA, USA, Dec. 1995), ACM Press, pp. 69–76.

[7] BALAGUER, J.-F., AND GOBBETTI, E. i3D: A high speed 3D web browser. In VRML: Bringing Virtual Reality to the Interet, J. R. Vacca, Ed. AP Professional, Boston, MA, USA, 1996.

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