

Study on Virtual Reality

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Abstract—

Virtual reality combines computer hardware and software to simulate real life experiences by presenting computer-generated graphics and sounds that are responsive to the movements and responses of the individual using the software. When using virtual reality, one wears a helmet that presents a visual field while simultaneously monitoring head movements. Moving one's head to the left, for example, would result in the visual field shifting accordingly. Many virtual reality systems also include gloves to monitor hand movements. In this way the user can pick up objects or move other objects aside while moving through the visual field.

Keyword: Virtual Reality Languages, Application, Advantages and Disadvantages

I. INTRODUCTION

Virtual reality (VR) means experiencing things through our computers that don't really exist. From that simple definition, the idea doesn't sound especially new. When you look at an amazing Canaletto painting, for example, you're experiencing the sites and sounds of Italy as it was about 250 years ago—so that's a kind of virtual reality. In the same way, if you listen to ambient instrumental or classical music with your eyes closed, and start dreaming about things,

isn't that an example of virtual reality—an experience of a world that doesn't really exist? What about losing yourself in a book or a movie? Surely that's a kind of virtual reality?

If we're going to understand why books, movies, paintings, and pieces of music aren't the same thing as virtual reality, we need to define VR fairly clearly

II. TECHNIQUES

Newest handsets in some banner companiesThe first wave of consumer-ready VR and Augmented (AR)headsets are starting to battle for attention. Mobile companyHTC is partnering with Valve, creator of the popular PC gaming platform Steam, for an HTC Vive headset.(Fig.1) WithValve and Steam having a diehard following in PC gaming,this could be an amazing product since it is expected to hitthe shelves in time for the holidays. The result of Oculusspartnership with Samsung mobile phones is expected to hit the market during the fourth quarter.



Fig. 1. HTC Vive headset



Fig. 2. Samsungs Gear VR headsets

Samsungs Gear VR headsets (Fig.2) debuted in 2014 and the second generation was launched in March, along with exclusive compatibility with Samsung smartphones, including the flagship Galaxy S6 and S6 Edge. At Samsungs August press conference, Samsungs co-CEO JK Shin teased that the third generation of the Gear VR will make its way to consumers soon. He did not divulge the launch date or any other details, but it is anticipated that the third-gen Gear VR will be priced similarly to the others, at around \$199.99 MSRP.

Sony's Project Morpheus for the PS4 (Fig.3) console is expected to be released in early 2016. It will supposedly launch with more than 30 games and as the best-selling console, the PS4 has a built-in cadre of loyal gamers and customers. Sony is also aiming to make Project Morpheus social. Beyond solo

Gaming since two sets of images are created for the headset and one for the TV groups can play.

Microsoft announced at E3 a partnership with Rift, where the Rift will be shipping with an Xbox One controller as a means of input. Other announcements included Windows 10 compatibility with Rift, as well as Xbox One compatibility with Valve's Vive. This venture into VR is in addition to Microsoft's AR push with HoloLens.

Virtual reality languages

This is for virtual reality hardcore techies. There are several languages used in virtual reality which include:

VRML (Virtual Reality Modelling Language): this is the earliest VR language for the internet. The Virtual Reality Modeling Language (VRML) was developed by an industry consortium in response to the need for a standardized file format that represented 3D geometry.

X3D: this has since replaced VRML. X3D presents itself as an interesting solution. For instance, such training applications could run on a web browser, making them available anywhere, anytime. It is our understanding that the X3D standard focuses on describing geometric objects and its dynamic characteristics. Although extremely flexible, we also believe that the standard itself is not suitable for developing complete applications which are bound to run in a third party X3D compliant viewer.

3DML: this enables someone to visit a website via a plugin. According to the company (Flatlan) what have announced that 3DML be released, 3DML is a new markup language developed by them and allow both amateur and professional web page builders to create 3-D web sites quickly and easily.

COLLADA (Collaborative Design Activity): this allows file exchanges within 3D programmes. It has been argued that a true virtual reality environment is based upon the use of an HMD (head mounted display) and/or data gloves. An internet-based 3D world does not use any of this and so cannot be considered a virtual environment. But not everyone agrees with this statement.

III. APPLICATIONS

1.VR in Real estate field

Using virtual reality technology to show a full or part of landscape of building becomes an advanced solution for experience building selling and decoration. It uses computer technology to establish a virtual 3D environment with a characteristic of interaction for which it can interact with users. Currently this has become a characteristic or symbol of building quality, scale and strength in current real estate field. Unique advantages of virtual estate are as follows.

1.1The best natural communication mode
By using virtual reality technology developers can estimate characteristics and advantage and disadvantage of each plan through personal feeling to make the best solution. Not only can the wrong decision be avoided, but also potential market value of the estate can be greatly improved, which can improve utilization ratio of land resources and success rate of project development to protect the resources. The virtual reality technology can be used as exhibition tool of big project to build the realistic three-dimensional dynamic model and multi-faceted display outside and inside of structures space and function. It can make the public have an intense interest to participate in. During the estate business, the application of virtual reality technology can make the public participate and feel personally in the 3D virtual environment.

1.2The best convenient design tool
The virtual reality is not only a demonstration media, but also a design tool. It reflects the designer's thought through vision form. For example, before establishing a building, first, think about the building's structure and shape, and then quantify them. Many design drawings are also needed, of course, only the one who knows how can understand those drawings. Virtual reality can change this kind of idea into the visible virtual object and environment. It makes use of the traditional sand table of the past which can be upgraded to digital perfect design patterns, and it greatly improve the quality and efficiency of the design and planning.

1.3The advanced marketing measure
During the estate sales, by using the virtual reality technology, clients can walk freely in the virtual reality system and watch anything. It breaches the no- interaction weakness in three-dimensional animation and also breaches the weakness that can't feel building space from a normal person perspective in sand table model. It brings a hardly match sense of reality and scene feeling, and it can get the purchasing decision rapidly and correctly accelerate the sales speed.

1.4The fastest propagation mode
It propagates widely and rapidly in internet in the form of multimedia and can conveniently and rapidly get the product information. Comparisons between various displaying modes are shown in the following table:

	Performance effect	Regional Instruction	Cost Devoted	Information content	Influence time	Interaction
Plane Figure	Weak	No	Low	Small	Short Term	No
Sand Table	General	Yes	General	General	Disposable	No
Model Room	Strong	Yes	High	Big	Disposable	Yes
Virtual Reality	Strong	No	General	Big	Long Term	Yes

Various indexes of virtual reality solution have distinct advantage. To sum up, because of the characteristic of virtual reality technology and application in the estate, it can greatly improve the quality of project planning, reduce cost and risk, expedite the process of project, and enhance the understanding and management of the relevant department. And it upgrades the brand effect of estate developer and promotes the estate sales. This is a more advanced comprehensive and visual sales mode, and a competitive marketing mode. It must bring a long term benefit. Thus, the application of virtual estate displays a good application foreground for us

2. VR in Military

Military is one of the most important application fields of virtual reality technology and one of the earliest and most widely used virtual reality technologies. The U.S. Department of Defense listed virtual reality technology as one of the seven key technologies that will ensure the dominance of the U.S. forces in the 21st century, bringing changes in concepts and ways to the military field. The application of virtual reality technology in the military field mainly includes virtual training, virtual

battlefield exercises and virtual weapon manufacturing.

2.1 Virtual training

Training simulation is a kind of physical simulation technology. It mainly fosters the combat skills of single-soldier or small-scale combat group by simulating actual vehicle, real soldier or actual combat environment. For example, more driving simulation system is currently used, and multi-purpose Compound laser warfare simulation system. The accuracy and vividness of these simulation systems have been greatly improved, the degree of simulation of the image has also been almost the same with the real, real.

For example, Frasca's equipment for general aviation flight training is designed as a simulator for single- and double-launch navigation with a specific cockpit, high-resolution vision system, Air conditioners, electrical loading controls, digital audio, powertrain, integrated flight deck, electronic flight instrumentation systems, engine indication and crew warning systems, airborne collision avoidance systems, theater airborne alert systems, enhanced ground proximity warning

systems, Manufacturing system, can provide high fidelity simulation, so that trainers in the small danger, low consumption conditions training a strong combat skills.

2.2 Virtual battlefield environment exercises training

Traditional military exercises are long-lasting and costly. If trained with virtual military systems, large-scale theater-of-war exercises and strategic exercises can be carried out at a relatively small cost and in a relatively short period of time. Various exercises or exercises, Discover and solve possible problems in actual combat. Through the establishment of a virtual battlefield, both the warring parties and the warring parties are involved in the "real" confrontation exercise based on various situations and changes in the virtual environment. In such a virtual combat environment, a large number of military units can be involved in the combat simulation without limitation of geographical area, the benefits of battle training can be greatly enhanced, the overall performance of the weapon system can be assessed, and new operational ideas can be inspired.

2.3. Virtual weapon manufacturing

Virtual reality technology has important application value in weapon design, research analysis, Product ion planning, manufacturing and other aspects. In the course of weapon design and development, virtual reality technology is used to provide advance demonstration so that developers and users can enter the virtual combat environment to operate weapon systems at the same time, test the design scheme, tactical and technical performance indexes and operation rationality, integrate

advanced design ideas into weapons The whole process of equipment development, both to speed up the development cycle of the weapon system, but also a reasonable assessment of its operational effectiveness, so as to ensure its overall quality and effectiveness, making it closer to actual combat requirements. Using virtual reality technology to simulate the battlefield environment of the future high tech warfare, the actual and technical performance of weaponry and equipment, and the efficiency of use, it is beneficial to selectively focus on the development of weaponry and equipment systems and optimize their overall quality and operational effectiveness.

F-22 and JSF, the fourth generation fighter of the USAF, realized the integration of 3D digital design and manufacturing due to the adoption of VR technology in the whole process of development, reducing the development cycle by 50% and saving the development cost by over 93%. The aircraft carrier CVN21, with the help of VR during the design phase, was the first aircraft carrier to be fully designed in a virtual environment. Virtual Modeling can reproduce aircraft carrier assembly details at a lower cost and risk. Through the use of virtual reality technology, CV21 development cycle and cost greatly reduced.

IV. CONCLUSION

After reading amount of references and understanding the experiments of virtual reality, I find this kind of technic become more and more. As mentioned briefly before, VR technology has become a primary method for treating post-traumatic stress.

Using VR exposure therapy, a person enters a re-enactment of a traumatic event in an attempt to come to terms with the event and heal. Likewise, it has also been used to treat anxiety, phobias and depression. For example, some patients with anxiety find meditating using VR to be an effective method to manage stress reactivity and boost coping mechanisms. Virtual reality technology can provide a safe environment for patients to come into contact with things they fear, whilst remaining in a controlled and safe environment. This is just one of the ways virtual reality can have a real positive impact on society familiar in our life. At middle of 20th century, the first traces of virtual reality came from the world of science fiction. Stanley G. Weinbaum's "Pygmalion's Spectacles" is recognized as one of the first works of science fiction that explore virtual reality. The short story describes a goggle-based virtual reality system with holographic recording of fictional experiences including smell and touch. Until now, the virtual reality becomes a civilian consumption and without any mystique. As for the VR languages, it also holds a greater alter, what make the VR become easier and easier to be accepted.

The applications in surgery and gaming hold the different aims, as for the surgery training, VR in order to improve the learning curves and concurrent validity of the training, on the other sides, VR in games are in order to enhance the feeling of the users.

A. Advantages and disadvantages of virtual reality

Pros of Virtual Reality

•**Helps with Impressive Visualization** – You can be sure about the greatness of virtual reality. It helps in exploring various facts and can even alternate the level of experience. If you wear a VR headset, you can experience the best quality visualizations. Allows Students to Get Engaged – These days it has become difficult for the teachers to conduct classroom interaction sessions. With the introduction of the Virtual Reality technicality, interaction with the student has become so easy. The students take help of virtual reality to speak about their personal experiences.

•**Creating Interest** – Virtual Reality has made watching more enjoyable than reading. VR technicality is extremely interesting and engaging. VR technology creates enjoyable experiences. This technology motivates the students to learn and know better in life.

•**Improves Educational Value** – The doctors take advantage of the VR technology to know about the new traits of medicine. VR technology also works best in fields of editing and content writing. It helps in locating mistakes in contents. There are preferred software arrangements to make fault detections. VR technology also helps with perfect editing options.

•**Helps to Overcome Language Barriers** – Language barrier is a significant problem in the field of education. In case, if you are not studying in your hometown you need to adopt the dialect of the place where you are considering. With the implementation of Virtual Reality the possible language can be aptly implemented by making use of the suitable software.

Cons of Virtual Reality

•**Lacks Flexibility** – In the classroom you can act with flexibility. You are open to give suggestions and ask questions. This is not possible with virtual reality. With the virtual reality headset, you can make use of the same program in all the sessions. There is no scope for positive interaction.

•**Ineffective Human Connections** – Virtual Reality comes with the set of disadvantages. The conventional education system is mainly based on interpersonal connections and the level of individual human communication. The concept of Virtual Reality is different. It is only about you and the software.

•**Getting Addicted** – Addiction to Virtual Reality is extremely common. The students can get addicted to the virtual world. The section of the population is getting addicted to video games and the rest. In the world of Virtual Reality, one can even get addicted to harmful drugs.

B. Future works

Talking about the future works of the virtual reality, I suppose there are several aspects will have great developments in the following recent years:

1. Education

The Education sector is one of the industries that doesn't shy from adopting new technology. VR will work hand in hand with the existing teaching techniques and improve them. Studies show that students learning using VR retain whatever they've learnt more deeply and for extended periods than those who use conventional learning methods. VR

We live in a generation where learning isn't restricted to prescribed textbooks. Visual learning has taken over and VR can bring the curriculum to life, from elementary school to university level. Kids can be taken to virtual field trips and learn how different concepts work. VR can also be used to prepare college students to face the challenges of the real world. By testing and honing college students' skills in the virtual world, they will be better prepared to handle whatever life gives them. Some businesses have adopted this model for better employment training.

2. Health Care and Medicine

From a potential financial and social impact, pain management and physical therapy represent two of the most significant VR applications in Health Care. Research shows that VR can be effective in pain mitigation. Regarded as a viable alternative to opioids for pain relief, VR will change how medical practitioners think about treating pain. This development could have significant ramifications for other players in the medical industry, notably pharmaceutical companies. Surgery is another field in medicine where VR can be effective. Look at it this way: it's safer and better for trainee surgeons to perfect their skills on things other than real

people who have left their bodies to medical science. VR can provide accurately modelled and fully interactive specimens with different conditions that need surgery to be operated on via a VR interface.

3. **Journalism and Media Discussion:**

VR technology has given rise to a new mode of storytelling that is touted to play a major role in the future of journalism. Immersive content will affect how journalists tell their stories and how readers consume news. In the future, the production and consumption of 3D content will become commonplace in various newsrooms around the world. Some reputable, big-name journalistic outlets like The New York Times and The Guardian are already toying the idea by experimenting with VR content. There is already a Guardian VR app and a NYTVR app, both of which let readers access VR journalistic content. VR will have implications on the type of topics and content readers will be immersed in, to minimizing the editorial control these publications will have.

4. **Virtual Shops and Showrooms:**

VR will absolutely transform the e-commerce industry. Most online shoppers admit that one of the shortcomings of online shopping is lacking the excitement of walking around the store to window shop before deciding what to buy. Luckily, VR can fill this gap. With a VR headset, you can be transported

to a customized shop with a whole aisle full of your personal favorite products from your favorite brands. You can try on different styles and colors of clothing in virtual dressing rooms.

5. **Fashion:**

This may sound crazy and far-fetched, but VR will be integrated into fashion stores in future. In future 3D avatars (virtual humans) will help design clothes and there will be VR software for building virtual fashion stores. Fashion shows will be in the form of 4D holograms and 3D projected models glamming up the runway.

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