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An Augmentation and Virtuality of Reality:- An Overview

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Abstract

Disruption has already been taken place in the field of augmented and virtual reality. This paper presents an overview of basic aspects of Augmented Reality (AR) and Virtual Reality(VR). Augmented Reality (AR) and Virtual Reality (VR) are a part of these advanced and innovative forms of technologies that were thought as a part of fiction even a few years ago. Some difference and dynamicity of Augmented Reality and Virtual Reality will be discussed and also its future scope are discussed in this paper

Keywords: *Augmented Reality, Virtual Reality*

1. Introduction

One of the biggest confusions in the world of augmented reality is the difference between augmented reality and virtual reality. Both are earning a lot of media attention and are promising tremendous growth. Both have extreme potential, and this are few of the technology which has not been saturated yet. So what is the difference between virtual reality vs. augmented reality?

Virtual reality (VR) is an artificial, computer-generated simulation or recreation of a real life environment or situation [1]. It immerses the user by making them feel like they are experiencing the simulated reality firsthand, primarily by stimulating their vision and hearing. VR is typically achieved by wearing a headset like Facebook's Oculus equipped with the technology, and is used prominently to create and enhance an imaginary reality for gaming, entertainment, and play (Such as video and computer games, or 3D movies, head mounted display) or to enhance training for real life environments by creating a simulation of reality where people can practice beforehand (Such as flight simulators for pilots) [2]. Virtual reality is possible through a coding language known as VRML (Virtual Reality Modeling Language) which can be used to create a series of images, and specify what types of interactions are possible for them.

Augmented reality (AR) is a technology that layers computer-generated enhancements atop an existing reality in order to make it more meaningful through the ability to interact with it. AR is developed into apps and used on mobile devices to blend digital components into the real world in such a way that they enhance one another, but can also be told apart easily [3]. AR technology is quickly coming into the mainstream. It is used to display score overlays on telecasted sports games and pop out 3D emails, photos or text messages on mobile devices. Leaders of the tech industry are also using AR to do amazing and revolutionary things with holograms and motion activated commands [4].

2. Dynamicity of Virtual Reality

The term "artificial reality", coined by Myron Krueger, has been in use since the 1970s. The term "Virtual Reality" was used in The Judas Mandala, a 1982 science-fiction novel by Damien Broderick. Virtual Reality in 1its modern usage was popularized by Jaron Lanier through his company VPL Research. VPL Research held many of the mid-eighties VR patents, and they developed the first widely used HMD: Eye Phone and Haptic

Input DataGlove [5]. The dynamicity of virtual reality can be seen in various application of VR, the curved point in technology is directly taken into account when viewing the 2D and 3D application of VR. The devices are made dynamic so that it can accommodate any environment of application [6].

2.1 Application of Virtual Reality

Some of the current and future application of virtual reality is again dynamic, and its environment of application is based on the applicability and extends of this technology.

2.1.1. Application of Virtual Reality in Education and Training

The Application of VR in a training purpose is to allow professionals to conduct training in a virtual environment where they can improve upon their skills without failing the operation [7]. The education industry is booming and it has been undergoing a very important revolution using VR.

2.1.2. Application of Virtual Reality in Media

On December 8, 2015, the production company Skybound announced their VR thriller titled, "Gone". In collaboration with the VR production company WEVR, and Samsung Gear VR, the 360 degree video series was released on January 20, 2016 [8].

2.1.3. Application of Virtual Reality in Video Games

The Several Virtual Reality head mounted displays (HMD) were released for gaming during the early- mid 1990s. These included the Virtual Boy developed by Nintendo, the iGlasses developed by Virtual I-O, the Cybermaxx developed by Victormaxx and the VFX1 Headgear developed by Forte Technologies [9].

2.1.4. Application of Virtual Reality in Retail

Lowe's, IKEA, and Wayfair have developed systems that allow these company's products to be seen in virtual reality, to give consumers a better idea of how the product will fit into their home, or to allow the consumer to get a better look at the product from home.

2.1.5. Application of Virtual Reality in Urban design

Now days, virtual reality can be used for urban regeneration and planning and transport projects. The requirement of the urban planning pre-visualization is very important specially while modeling of dam, bridge and heavy building.

2.2 Advantages of Virtual Reality

- One of most important advantage of VR can create a realistic world so that user can explore world.
- Virtual Reality in education field makes education more easily and comfort.
- Through Virtual Reality user can experiment with an artificial environment.

2.3 Disadvantages of Virtual Reality

- VR is becoming much more commonplace but programmers are still stuck with how to interact with virtual environments.
- The idea of escapism is common place among those that use VR environments and people often live in the virtual world instead of dealing with the real one.
- Training with a VR environment does not have the same result as training and working in the real world. This means that even if someone does well with simulated tasks in a VR environment, that person might not do well in the real world [10].

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3. Dynamicity of Augmented Reality

Augmented reality (AR) is a live direct or indirect view of a physical, real-world environment whose elements are augmented by computer-generated sensory input such as sound, video, graphics or GPS data [11]. Unlike virtual reality, which creates a totally artificial environment, augmented reality uses the existing environment and overlays new information on top of it [12]. In 1990, researcher Thomas Caudell coined the term augmented reality, to describe how the headmounted displays that electricians used when assembling complicated wiring. Today, Google glass and heads-up displays in car windshields are perhaps the most well-known consumer AR products, but the technology is used in many industries including healthcare, public safety, gas and oil, tourism and marketing [13]. Augmented reality application are written in special programming language that allow the developer to integrated animation as well as digital information in the computer program. AR applications for Smartphone's typically include global positioning system (GPS) to locate and detect the exact location of user. Some of AR programme used in military for training purpose, which may include object recognition and gesture recognition.

3.1 Application of Augmented Reality

Some of the current and future application of augmented reality is again dynamic, and its environment of application is based on the applicability and extends of this technology.

3.1.1. Application of Augmented Reality in Gaming

Augmented reality allows gamers to experience digital game play in a real world environment. In the last 10 years there have been a lot of improvements of technology, resulting in better movement detection [14].

3.1.2. Application of Augmented Reality in Medical

Augmented reality can reduce the risk of an operation by giving the surgeon improved sensory perception. Medical students use the technology to practice surgery in a controlled environment. This technology can be combined with MRI or X-ray systems and bring everything into a single view for the surgeon [15].

3.1.3. Application of Augmented Reality in Military

The Heads-Up Display (HUD) is the typical example of augmented reality when it comes to military applications of the technology. A transparent display is positioned directly in the fighter pilots view.

3.1.4. Application of Augmented Reality in Navigation

GPS systems are using augmented reality to make it easier to get from one point to another point. Using the phone's camera in combination with the GPS, the users see the selected route over the live view of what is in front of the car.

3.1.5. Application of Augmented Reality in Education

Augmented reality applications can complement a standard curriculum. Text, graphics, video and audio can be superimposed into a student's real time environment. Textbooks, flashcards and other educational reading material ,when scanned by an AR device, produce supplementary information to the student rendered in a multimedia format. Students can participate interactively with computer generated simulations of historical events, exploring and learning details of each significant area of the event site.

3.2 Advantages of Augmented Reality

- Now days augmented reality can be used for increase user knowledge and information.
- People can share experiences with each other in real time over long distances.

 Games that provide an even more "real" experience to the user.

3.3 Disadvantages of Augmented Reality

 Openness: Other people can develop their own layers of content to display. That could cause information overload and augmenting without permission.

 Interoperability : The lack of data portability between AR environments.

 Regarding user experience, socially using Augmented Reality may be inappropriate in some situations.

 Spam as it is easy to imagine that spam could overwhelm the augmented world with unwanted advertising or unwanted information of any kind.

 Price – as the technology is still developing it may be quiet expensive to use it in everyday life and it might be less accessible for small businesses.

4. Similarity between Virtual Reality and Augmented Reality

It is not always virtual reality vs. augmented reality– they do not always operate independently of one another, and in fact are often blended together to generate an even more immersing experience. For example, haptic feedback-which is the vibration and sensation added to interaction with graphics-is considered an augmentation. However, it is commonly used within a virtual reality setting in order to make the experience more lifelike though touch. Virtual reality and augmented reality are great examples of experiences and interactions fueled by the desire to become immersed in a simulated land for entertainment and play, or to add a new dimension of interaction between digital devices and the real world. Alone or blended together, they are undoubtedly opening up worlds-both real and virtual alike.

5. Future work in Augmented and Virtual Reality

In upcoming years, the most exciting, disruptive developments coming in AR and VR.

1. Screen resolution matches visual brain input. This will happen sooner than we think likely in the next few generations of head-mounted display product iterations from companies like Oculus and HTC.

2. Eye tracking adds both presence and control. Eye tracking and eye interaction technology has advanced tremendously. Companies like Eyefluence are paving the way for a new technology interaction model based on our eyes.

3. Face tracking from head-mounted displays perfectly conveys your real appearance. Along with eye tracking, face tracking will be a pivotal development if AR/VR are going to be widely adopted.

4. The End of Displays and Screens Augmented reality companies are working hard to replace all "displays and screens". In success, your Magic Leap headset will allow you to view a virtual TV anywhere, on any wall, or a mobile phone screen.

5. Ease of setup and use: Most existing AR systems require expert users (generally the system designers) to calibrate and operate them. If AR applications are to become commonplace, then the systems must be deployable and operable by non-expert users. This requires more robust systems that avoid or minimize calibration and setup requirements. Photorealistic and advanced rendering: Although many AR applications only need simple graphics such as wireframe outlines and text labels,

the ultimate goal is to render the virtual objects to be indistinguishable from the real ones. This must be done in real time, without the manual intervention of artists or programmers. New techniques in image based rendering must be considered in order to accomplish this task [16].

6. AR in all senses: Researchers have focused primarily on augmenting the visual sense. Eventually, compelling AR environments may require engaging other senses as well (touch, hearing, etc.).

6. Conclusion

We have seen the relation between AR and VR, and there application if combined can change the whole view of technology. We have also seen that both virtual reality and augmented reality are similar in the goal of immersing the user, though both systems do this in different ways. We believe both AR and VR will succeed; AR may have more commercial success, while VR is a new technology and is emerging fast. Both technology is becoming cheaper and more widespread. We can expect to see many more innovative uses for both technology in the future and perhaps a fundamental way in which we communicate and work thanks to the possibilities.

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