Augmented Reality v/s Virtual Reality

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Abstract—This paper presents an impression of basic aspects of Augmented Reality (AR) and Virtual Reality(VR). It defines the main fields in which Augmented and Virtual Reality is applied nowadays and importance of AR and VR devices. Some differences and similarities of Augmented Reality and Virtual Reality will be discussed and this paper will provide an outline of them. Technology is advancing at a abrupt pace as many things that were not possible a few years ago are possible now. Augmented Reality (AR) and Virtual Reality (VR) are a part of these progressive and innovative forms of technologies that were thought as a part of fiction even a few years ago but now they are an important part of the everyday reality.

Keywords— Augmented Reality, Virtual Reality, AR, VR, AR device, VR device.

I. INTRODUCTION

Augmented and virtual reality: -these are environments provided to the user for the various aspects of living. Augmented reality- this provides the user with a view of physical real world environment which is generated by computer-generated sensory inputs.

From the time of early 90s people were dreaming augmented reality. Many people like L.Frank Baum, Morton Heilig, Ivan Sutherland, Myron Krueger, Steve Mann, Dan Reitan, Douglas George, Robert Morris and many more contributed to the world of augmented reality. But the major contribution was of Thomas Caudell who was the person who coined the term in the year 1990.

There is an application in augmented reality which allows the developer to use the digital information by the involvement of special programming language.

Augmented reality is commonly seen in gaming, medical, military, navigation and education. Nowadays AR can be used to increase user information and knowledge.

Virtual reality - this provides the user with an artificial environment. It has all the properties like touch, smell, and hearing. It is an environment which makes the user to believe in virtuality and when we talk about its history it was from the time of late 90s it was Myron Krueger who coined this term and later this term become common as this was adopted by many novelist and filmmakers.

Virtual reality is commonly used in education and training retail,media, video games,urban design and the main advantage of VR is that it can create a realistic world so that user can explore world.

II. AUGMENTED REALITY

Augmented reality is an encounter of a real world environment whose elements are supplemented by computer-generated sensory inputs such as sound, video, graphics or GPS data. While virtual reality creates a totally artificial environment, augmented reality operates in the already existing environment by just adding a new layer of information on top of it.

Thomas Caudell was the first researcher in 1990 who termed augmented reality, and described how the head-mounted display that electricians used when assembling complicated wiring. It is widely used in apps for smartphones and tablets. It is also used in phone's camera to show the view of the real world in front of the user, then puts a layer of information, including text and/or images, on top of that view.

Its application usually requires a special programming language which allows the developer to combine animation as well as digital information in the computer program.AR applications are mainly used in military for training purposes, education for teaching purposes, etc.

Advantages of Augmented reality
1. It is used for increasing user knowledge and information.
2. It enables people to share experiences with each other over long distances in real time.
3. It provides games to the user which gives more "real" experience.

Disadvantage of Augmented Reality-
1. It usually causes over load of information and supplementing without permission.
2. Data portability usually lacks in augmented reality environment.
3. The use of augmented reality can be inappropriate in some social situations.
4. Spamming can be done easily by using it and it is quite expensive for everyday life.

Application of Augmented Reality-
1. Military -It is usually used for training proposals and it is used for displaying position directing in fighter Pilots view.
2. Gaming-It allows the gamer to experience digital Gameplay in Real world environment.
3. Medical-It helps the surgeon by improving the sensory perception and reduces the risk of an operation.
4. Education-It helps the students to participate interactively with computer generated simulation of history events exploring and learning details of significant area of all event site.

III. VIRTUAL REALITY

It is an artificial environment that is created with the help of software and presented to the user in such a way that the user beliefs that he/ she is in real environment. Virtual realities artificially create sensory experience, such as sight, touch, hearing, and smelling too.

The term "artificial reality", initiated by Myron Krueger, in1970s. In The Judas Mandala, a 1982 science-fiction novel by Damien Broderick "Virtual Reality" word was used first. It was popularized by Jaron Lanier through his company VPL Research. It is also used for education purpose, in retail, in media, etc.

Advantages of virtual reality
1. It creates a realistic world so that user can explore world
2. Virtual reality in education field education more easy and comfort
3. A user can experiment with an artificial environment through virtual reality

Disadvantages of virtual reality
1. Programmers are stuck with how to interact with virtual environments
2. Uses tend to live in the virtual world instead of dealing well with the real one
3. If a user does well with simulated task in a VR environment that person might not do well in the real world

Applications of virtual reality

1. Education and training-The VR application in a training purpose allows professionals to conduct training in a virtual environment where they can improve upon their skills without failing the operation
2. Retail-To give consumers a better idea of how the product will fit into the home or to get a better look at the product from home Lowe's IKEA and Wayfair have developed systems that allows the company's products to be seen in virtual reality.
3. Media-On January 20,2016 VR production company WEVR along with the collaboration of Samsung Gear VR, the 360 degree video series was released
4. Urban design-Urban regeneration and planning and transport projects can also be done by using virtual reality.

IV. SIMILARITIES IN AUGMENTED AND VIRTUAL REALITY

1. Technology-Augmented and virtual reality both has the same types of technology, and both exist to serve the user with an enhanced or improved experience.
2. Entertainment-Augmented and virtual reality both technologies enable experiences that are becoming more commonly expected and required after for entertainment purposes. Leading tech companies are investing and developing new adaptations, improvements, and releasing more and more products and apps that support these technologies for the increasingly understanding users.
3. Science and Medicine-Each augmented and virtual have their own potential in change the medical field by making things such as remote surgeries a real possibility. To treat and heal psychological conditions such as Post Traumatic Stress Disorder (PTSD), these types of technologies have also been used.

V. DIFFERENCES IN AUGMENTED AND VIRTUAL REALITY

Augmented reality add something to the existing environment to make real world easy, whereas virtual reality actually made it entirely new artificial world.

Augmented reality requires the environment so a user uses a camera integrated in our devices such as Smartphone, tablets, PCs. Virtual reality requires the exact opposite, a device which can fully isolate us in virtual world.

Virtual reality is better for videogames and other leisure options whereas augmented reality is having more acceptance in formation and marketing field

VI.   FUTURE DEVELOPMENTS IN AR AND VR

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

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1. Similar to companies like Oculus and HTC, soon screen resolutions will be matching visual brain inputs. This will happen sooner in the next few generations
2. Eye tracking adds both presence and control. Eye tracking and eye interaction technology has been advancing tremendously. Companies like Eyefluence are flagging their way for a new technology interaction model based on user's eyes.
3. Face tracking from head-mounted displays perfectly conveys user's real appearance. Along with eye tracking, face tracking will also be a essential development if AR/VR are going to be widely adopted globally.
4. Augmented reality companies are working hard to replace all "displays and screens". Devices like Magic Leap headset will allow the user to view a virtual TV anywhere, on any wall, or a mobile phone screen.

VII. CONCLUSION

AR and VR appearance has been the core of the technological revolution in recent times. As many industries can be combined with one form of applications, both AR and VR will be the turning point of the future technological evolutions.

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