International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 09 Issue: 08 | Aug 2022 www.irjet.net p-ISSN: 2395-0072

# Virtual Reality and Augmented reality: A Study on their Applications

**Saynee Paul, Koushik Pal, Suniket Pradhan, Snehasish Bera**

*Department of Electronics & Communication Engineering, Guru Nanak Institute of Technology, Kolkata, India*

---

**Abstract -** *Since, in the 1860s scientists has started working on the field of Virtual Reality and in 1992s scientists has started working on Augmented Reality as well. After using the V.R and A.R technology the entertainment world increase their level. Not only has the entertainment world these technologies have a huge contribution in had various fielded such as education, tourism, and museum. One very important implementation of V.R technology is in surgeries like plastic surgery, orthopedic surgery, as well as A.R technology gives a perfect idea to the user about a new building or land. V.R technology is basically an animated formation of a real look, with the help of hardware and software the artificial environment are created in Virtual Reality. Whereas, Augmented Reality is a mixture of real and digital worlds. It's helps the user to enhance their experience in the real world. Augmented Reality is such a biggest invention for the world.*

***Key Words***: Virtual Reality, Augmented Reality, Plastic Surgery, Educational Field, Artificial Environment.

## 1. INTRODUCTION

With the Advancement of Technology, We Humans are able to work efficiently and faster. From communication to entertainment. Virtual reality (VR) and augmented reality (AR) are two technologies that are changing the way we use screens, creating new and exciting interactive experiences. Virtual reality uses a headset to place you in a computer-generated world that you can explore. While Augmented reality takes digital images and layers them on the real world around you through the use of either a clear visor or smartphone. According to the recent survey in 2020, there are around 50.2 million VR users and 83.7 million AR users in the U.S. There were an estimated 171 million VR users worldwide in 2018. As of 2020, the VR gaming industry is estimated to be worth $1.1 billion. 25- to 34-year-olds account for 23% of VR/AR device users.

As of 2019, Sony holds the largest percentage of the VR market at 36.7%. Now we can discuss about the types of A.R and V.R

### 1.1. AUGMENTED REALITY

The AUGMENTED REALITY is a combination of elements of virtual world with the users thought towards the actual or real world.In early of 1990s A.R was invented for the very first time, that time it was only provided mixture of immersive with real experience to the users. In 1992 the devilment of virtual fixtures system at Armstrong Laboratory in U.S Air Force, then time by time it were introduced in gaming and entertainment world and by the time the application of A.R have extend over many subjects like education, medicine , communication.

### 1.2. VIRTUAL REALITY

The VIRTUAL REALITY's reference was coming from the concept of science fiction, but the first attempt was not successful maybe because of it is idea to formulated an annotation of an alternative presence. In 1860s the important contain of virtual reality was invented**.** Antonin Artaud was realized that illusion is equivalent to the reality. with the help of the technology in 20th century there were a huge invention of V.R field like in 1962, Morton Heilig made a Sensorama which is basically displayed a film while all senses (sound, touch, sight and smell) . In the year 1968,Ivan Sutherland and Bod Sproull his student they both had created the first head-mounted. There was lots of invention on the V.R field. In between [1970-1990**]** David Em was became the first inventor of producing navigable data. In 1985 there was a company named VPL Research was manufactured many V.R devices like Data-Glove, Eye-Phone, Audio-Sphere .In the year 1991, Sega reviled the headset for the Mega Drive for home purposes like LCD screens, Stereo headphones. E .T.C.

## 2. VIRTUAL REALITY vs AUGMENTED REALITY

In terms of VIRTUAL REALITY the user thought of real-things are fully depends on virtual data. Whereas in terms of AUGMENTED REALITY the user is also get more data which is generated by computer and it will help to increase their thoughts of reality. For an example, in architecture field ,using the V.R technology a person can go-through and assume the indoor view of the building. And other side using A.R technology a person can show the structure of the building and able to understand the allover systems as well on a basics of real view.

V.R technology can be classify. The classifications are given below:

1. Non-immersive Virtual Reality.
2. Fully Immersive Virtual Reality.
3. Semi-Immersive Virtual Reality.
4. Augmented Reality.
5. Collaborative VR.

As well as A.R also can be classify. The classifications are ;

1. AR based on markers.
2. AR without markers.
3. Location-based AR.
4. Projection –based AR.
5. Overlay AR.
6. Controlled –based AR

Using V.R technology in a working field is so advantageous like;

Virtual reality can create such a realistic world which can easily connect to the users.

The help of Virtual Reality a person can be able to experiment with an unnatural or artificial environment.

In educational field Virtual Reality have a huge role, like education get easier and comfortable as well as learning process increases day by day.

Using the Virtual Reality the medical fields also increase as with the help of this technology doctors can determine the uses as well as side-effects

Some drawbacks or disadvantages of V.R technology are;

Although V.R can provide an amazing experience but it's not affordable for everyone as it is not available in the market in low price.

The methodology which is use in V.R is complicated.

Anyone can be addicted with a thing if they get involve with this for such a long time, this is also happening in the case of V.R. so the obsession of playing game for long time can effected.

*A.R technologies also have so many advantages like:*

Augmented Reality can help to increases experience. Except using A.R technology it can't be even possible to go to the depth of any project like a building or a landmark, and the user can easily able to determine the position and also the different angles of this building.

A.R is very easy to handle for the users for an example, if you want to buy a spectacles via online which is perfect according to your face then you can install the app and capture a full face picture then easily from the app you will get the spectacles which is suitable for your face

*Some drawbacks in A. R. are:*

- Augmented Reality is not affordable.
- Augmented Reality is not providing strong security and privacy.
- The apps which are based on Augmented Reality can be the addition towards the user. This addiction id named as 'smartphone fever'

## 3. Literature Survey:

In the article 1: V.R in plastic surgery ;V.R was introduced in medical field such as surgical field in the year 1990s.with the help of using V.R it will become easy to visualize complicated medical issues during surgery time. Basically with the help of advance A.R technologies new opportunities are introduced in reconstruction of plastic and aesthetic surgery. In this article some lack of specific products related to plastic surgery they are also research on orthopedic and neurosurgery. Such terms like "virtual reality" "maxillofacial" "surgery" "training" and "haptic" are the combination which we used in the methods of plastic surgery. Although with the help of advance technology till V.R cannot completely able 5senses of humans', but yes scientist are trying to overcome this issue near future. This paper was published on 2007 at Korea Institute of Science and Technology institutional program by Youngjun Kim, Hannah Kim, Yong Oock Kim.

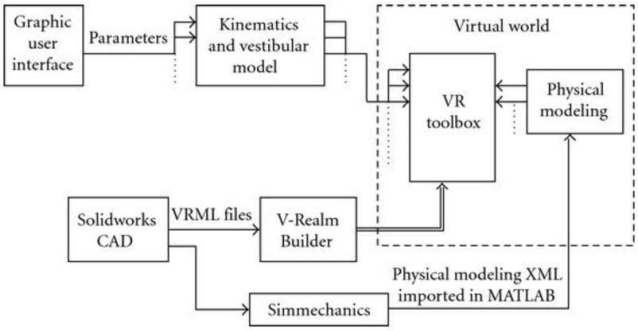


Fig.1: Block diagram of V.R in plastic surgery

In this fig 1. The block diagram explain how virtual reality is controlled and created. CAD software is used here to create VRML files.

The Simmechanics module permits that to represent of the modeling. Virtual Reality tool box is used to imported data in MATLAB/Simulink model. Kinematics of the simulation and the Vestibular Model are controlled by The Simulink File.

In the article 2: State of art using V.R, The last 3 years virtual reality gave us a huge amount of displays and devices. Some new ideas of taking care of the problems in hardware as well as software are always being introduced. the development of hardware and software is mainly conduct by those who are interested in this particular domain, who makes use of the newly available technologies. some examples like either

cable-based or mobile other devices like haptic devices, controllers, as well as optical scanners for gesture-based interaction are gaining importance in the field of commodity of VR field . most of the new technologies like motion to photon latency and low persistence displays are discussed as the common issues which is solved in this field. The solutions of the above issues will affect in the market in future. A taxonomy categorizing the current developments with the chosen implementation approaches will be given. This paper was published on 2016 IEEE Aerospace Conference on 05-12 of March 2016 at Big Sky of MT in USA.

In the article 3: Mobile Augmented Reality, Tobias Hollerer, Steve Feiner published a paper in the year 2004 at computing and services. Augmented reality (AR) introduces a powerful user interface (UI) to context-aware computing environments. The virtual informations are integrated using AR Systems into a person's physical environment so that he or she will perceive that information as existing in their surroundings. Mobile augmented reality systems (MARS) provide this service without constraining the individual's whereabouts to a specially equipped area. Ideally, they work virtually anywhere, adding a palpable layer of information to any environment whenever desired. By doing so, they hold the potential to revolutionize the way in which information is presented to people. Computer-presented material is directly integrated with the real world surrounding the freely roaming person, who can interact with it to display related information, to pose and resolve queries, and to collaborate with other people. The world becomes the user interface.

In the article 4: Enhance the tourism experience with the help of Augmented Reality, Chris D Kounavis ,Anna E Kasimati, Efpraxia D Zamani published a paper on 4th October 2021 at International Journal of Engineering Business Management Where they explained that Augmented Reality (AR) describes the technology's evolution from pilot applications into commercial mobile applications. We address the technical aspects of mobile AR application development, emphasizing the technologies that render the delivery of augmented reality content possible and experientially superior. We examine the state of the art, providing an analysis concerning the development and the objectives of each application. Acknowledging the various technological limitations hindering AR's substantial end-user adoption, the paper proposes a model for developing AR mobile applications for the field of tourism, aiming to release AR's full potential within the field.

## 3. CONCLUSION

V.R and A.R technologies gives a huge contribution on communication to entertainment, not only this field with help of these two technology like medical such as surgeries, education, tourism, mobile technology and many more. Future of V.R technology is more accurate and effective as whereas There have some drawbacks specially in A.R field, like configuration, concept and mostly lack of research so in future to overcome all those drawbacks engineers have to focus on this. May be in future all drawbacks will be modified in V.R and A.R technology. After review these past and present implementation during A.R and V.R field we can say that there will be a large scope in future.

## REFERENCES

[1] Youngjun Kim, Hannah Kim, Yong Oock Kim's paper was published on 2007 at Korea Institute of Science and Technology.

[2] The conference regarding this paper was held on 05-12th, march, 2016 at IEEE Aerospace Conference. State of the art of virtual reality technology (V.R) in the past three years, the so-called second wave of Virtual Reality (VR) has brought us a vast amount of new displays and input devices,

[3] Mobile Augmented Reality, Tobias Hollerer, Steve Feiner, in 2004.

[4] Enhance the tourism experience with the help of Augmented Reality, Chris D Kounavis ,Anna E Kasimati, Efpraxia D Zamani published a paper on 4th October 2021 at International Journal of Engineering Business Management.