VIRTUAL AND AUGMENTED REALITY IN THE PRESENT SCENARIO

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Abstract - *The world is advancing faster than it has ever before. It is hard to keep up to date with day-to-day technological advancement, so at any given time, there is a surplus of new technologies to keep our eye on. Among all these technologies, immersive technologies are the fastest-growing and most fascinating technologies. Use of Artificial intelligence (AI) in these techniques makes them more interactable. Virtual reality is that type of reality that immerse the user into another environment. These technologies are mainly used for the purpose of training the people to simulate the user into the virtual environment. Also in the amid of COVID-19 both the technologies are being used to shrink the world and save us from this pandemic. This paper presents the major concepts and applications and implementation of augmented reality and virtual reality technologies in the field of education for learning and simulating the student and the teacher in the virtual and augmented reality.*

Key Words: ***Immersive Technology , Augmented Reality, Virtual Reality, Training, Implementation.***

1.INTRODUCTION

Learning is a lifelong process for every person in this dynamic world. Traditional Educational methods rely on knowledge, acquired by books and teachers, which must then be applied to real situations. In this digital era, innovated methods for teaching learning practices using advanced technology are of prime importance. E-learning activities along with software games, simulated laboratories provide an experience through three-dimensional (3-D) VR interfaces[1]. Universities emphasis on implementing Information and Communication Technology (ICT) in classrooms[2].

The education system keeps changing continuously. Presence in a virtual world or environment refers to a user's perception of 'being there'. The concept of educational technology has come into play with the increase in the use of technology for educational environments. The advent of new technologies aids the engineers in developing educational setups to ease learning at all levels.

AR and VR techniques can be used to facilitate collaborative learning, allowing learners to work together on projects regardless of their physical location. For example, engineering students from different parts of the world can collaborate on a project in a VR environment[3].

AR and VR can be used to create interactive content that engages learners and helps them to understand complex concepts. For example, medical students can use AR to view 3D models of organs and body systems, allowing them to better understand the human anatomy.

1.1. IMMERSIVE TECHNOLOGIES

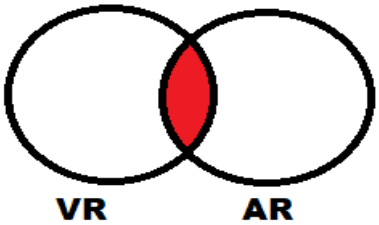

Fig:1 :Immersive Technologies

1.1.1. VIRTUAL REALITY

It is most important technology that aims towards the immersive experience, disconnecting the user from the physical/ real-world experience. VR offers most of the user's perception of the physical world through synthesized 3D objects like graphics and sound. A typical VR system exhibits the following features [3]:

- Creation of virtual space in real-environment.
- Immersion in virtual space.
- User feedback through sensing devices.
- Interactivity in the synthetic world.

1.2.1. AUGMENTED REALITY

To place the digital or the nanoobjects in the real time environment where the user experiences the extended reality. It is also called as the augmented reality[4].

- An amalgamation of real and virtual environments,
- Real-time engagement
- 3D visualization of virtual and real objects.

2. OBJECTIVES

- To generate the environment with scenes and objects that appear to be real, making the user feel they are immersed in that surroundings.
- To hold the interest of students in learning by using this immersive technology.
- To create the 3D objects by using the software and then place that objects in the real world.
- To build the augmented and virtual reality app for the teaching and learning purposes.
- To blend these technologies to achieve the immersive environment.
- To replace the traditional methods of teaching in schools, colleges with AR immersive technology to simulate the student in the digital world for better understanding the concept and to perform some virtual experiments in the virtual labs.
- To impart the education to the physically challenged students.

3.INTEGRATION OF AI WITH AR AND VR

AR and VR are equipped with the AI techniques like object recognition and tracking system to place the digital objects in the real environment. Voice and gesture recognition is also enabled in AR lenses and VR boxes allowing users to interact with AR and VR experiences using natural language and hand gestures[3]. AI can provide a greater level of immersion and interactivity to AR and VR experiences, making them more realistic and responsive to the user's needs [4].

4.Methodologies of VR and AR

Table -1: AR and VR Tools and Techniques

VR and AR Tools and Techniques				
S.NO.	**VR Tools**	**VR Techniques**	**AR Tools**	**AR Techniques**
1	VR Headsets	Game Engines	Smartphone apps	Marker-Based AR
2	Hand-Tracking Controllers	3D Modeling and Animation Software	Head-Mounted Displays (HMDs)	Markerless AR
3	Room-Scale VR	Head-Mounted Display (HMD)	AR software development kit	Tracking

		development kits	(SDK)	
4	VR software development kit (SDK)	Audio tools	AR Marker	Superimposition
5	VR Tracking 6Systems	Motion tracking and input	AR Glasses	3D Modeling
6	Video Stitching Software for 360^0	VR Simulation Software VRED and Autodesk VRED	ARKit(iOS) and AR Core (Android devices)	Lighting and shading
7	Adobe Premiere, Final Cut Pro, and Avid Media Composer	VR testing tools	Vuforia, Unity, Unreal Engine, Meta, Hololens, Magic Leap, XR Development Platforms, Blender	Occlusion
8	3D modeling and animation software	Programming languages	C#, C, java, kotlin, Swift	MS Paint 3D
9	Video Encoding Software		AR SPARK STUDIO	

Fig -2: VR BOX

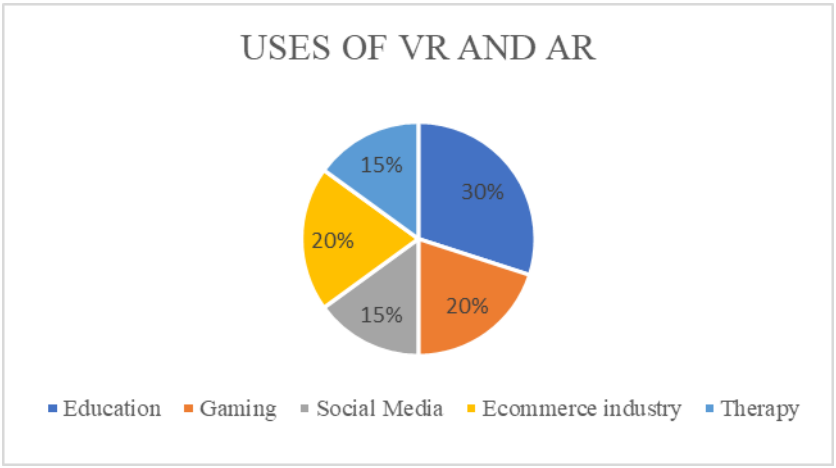

Chart -1: Present Scenario of AR and VR

5. RESEARCH STUDY

Present research is applied to the local school of students to grasp the attention of students for their better and clear understanding of their subject. By this technique students simulate themselves into this real environment [2].

I case:- The virtual reality study is applied to the 35 students of class 5. The 360^0 video was created using Adobe Premiere software, or by connecting the video using stich software. The student saw that video with the help of VR BOX [3]. Students immerse themselves in that 360 degree video environment and learned about the solar planets in a very curios manner as you can see in the Fig. 3. In malls for children or adults in the game section, there is an immersive environment game where tools available like headsets, VR box and handsets seem like flatbed scanners move that handset and headset by 360^0.

Fig.3: Research Study on VR at School

II case:- This study is based on Augmented reality where we can create some 3D objects with the help of blender and paint 3D. The heart is created with labelled diagram in 3D by using blender and scanned with our mobile app which immersed the digital object in the real world[3]. This study using augmented reality is done on students of biology faculty studying in class 11 is done by placing the 4D object in the real world as shown in figure[4],[4], the students are found to be very much interested and engaged viewing the diagram in real environment. This study may provide a better experience and found to be very useful to the students specially physically challenged as well medically unfit or sick students who are unable to attend their physical classrooms and labs. This technique make teaching learning more effective as compared to the traditional way of teaching in which we used only the 2D image as compared to the augmented reality where we use the 3D and 4D objects [4][5][6].

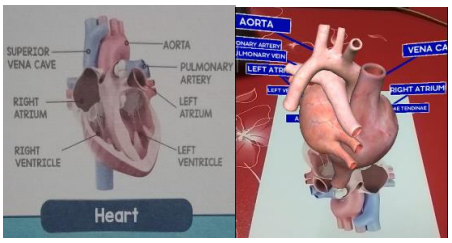

Fig.4: Traditional Method VS Augmented Method

6. FUTURE SCOPE

This technology is very interesting and adventurous which increases it's scope and uses in every field. In future, the whole text books can be designed using AR and VR techniques. Integration of these techniques may also keep the people all the time in the metaverse environment. Virtual Meeting and classes applying the metaverse may also a possibility in near future.

7. CONCLUSION

The present study is found to be useful and interesting to the students increasing their regularity in learning. Physically challenged people and others unable to present physically in class and labs are also benefited by these techniques. It also enhances the techniques of teaching by using and integrating this with ICT Tools.

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