Mixed Reality

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Abstract -The Mixed Reality (MR) is an emerging technology with many of the applications in the field of education, medical, archeology and simulation etc. This technology is the more advanced version of augmented reality and augmented virtuality. Where augmented reality is to blend computerized graphics and real world, this augmented virtuality will take those graphics into the real world. This Mixed Reality technology as the dynamic 3D graphics with the very high graphics rendering rate, so that the 3D design looks very realistic in this real world. This technology will be the new emerging era of graphics, Progressions in sensors and preparing are offering ascend to another territory of PC contribution from conditions. the connection among PCs and conditions is successfully natural comprehension or observation. Development through the physical world can mean development in the advanced world. Limits in the physical world can impact application encounters, for example, game play, in the advanced world. Without natural information, encounters can't mix among physical and advanced real factors.

*KeyWords***:**Mixed Reality (MR), Virtual Reality (VR), Augmented Reality (AR), Augmented Virtuality (AV).

1.INTRODUCTION

The Mixed Reality (MR) is a more complex system with maximum amount of human interaction is to made with this application. The main objective of the technology to make user experience some of the things which are actually very hard or dangerous to do. So using this Mixed Reality technology the ground or a platform is imitated in graphics and rendered it into the real world, so that the user may experience or study without him actually being in that situation [1]. Mixed Reality uses very high end system with high performance CPU power, high performance graphics which will make those graphically created models to render into the real world with pixel perfect resolution [2]. The user will be having a head mounted devices as in virtual reality headsets but with some mechanical changes. This MR device will have transparent head mounted device that will help the user to view the rendered model in the real world [3]. Then the head mounted device will be connected to a high performance computer, then that system will perform the rendering process of the graphical device [4].

The MR components are differently arranged in the different layers of the technology. These system will make the Mixed Reality to work in an effective way [5]. The main impact in the MR application is the human brain. It will make an illusion that what the user sees is what there it renders. With the perfect ray tracing and ray tracking[6]. So that the model will appear for the user as it is a real object. The other major element are voxels. The voxels are equal to to pixel as in 2D world. The voxel is 3D replacement of pixel. The voxels are used to make computer games effective. It will make the volumetric model into the geometric primitives which will make the calculations for the more complex surface rendering process.

2.Literature Survey

Microsoft HoloLens, GoogleGlass 2.0, Meta2 handsets to give some examples. Joining Artificial Intelligence is their following stage towards MR showcase mastery [1]. Mixed Reality can be a valuable tool for research and development in robotics. In this work, we refine the definition of Mixed Reality to accommodate seamless interaction between physical and virtual objects in any number of physical or virtual environments. [2]. The

appearance of Virtual-Reality, Augmented-Reality, and Mixed-Reality advancements is forming another condition where physical and virtual articles are coordinated at various levels [3]. Blended the truth is

still in the beginning times, it is as of now being utilized in numerous businesses for instructive purposes. For instance, airplane producers are utilizing MR as a financially savvy approach to prepare fix experts [4]. The creators express that, as we move to one side of the continuum, there is an expansion in the level of PC produced boosts. The current real factors between these boundaries were named Mixed Reality (MR) situations [5].Enlarged prehistoric studies could be utilized to make this important movement available to a more extensive exhibition hall support. Fit as a fiddle, in planning and creating assorted interfaces, elective projection surfaces and novel multi-modular room-sized gatherings, we appear ready to investigate the plan and innovation associated with broadening archaic exploration into the exhibition hall, for the instructive and interactional advantage of guests, individual or gatherings, youthful or old [6].

3. Implementation and Design

The Mixed Reality design shows the main features of the working of the system. The system will be having the processing unit, encoding unit, Decoding unit and more for the rendering of the system.

a) Processing: MR Models This module will be processing the mixed reality models which will be making the models the projection the real world. These models can be created by unity, blender or any other tool. b) Pre-Processing: The caught video content is pre-handled in this progression earlier to encoding activity. The procedure may incorporate separating, shading amendment, sewing, position change, and so forth

b) Encoding: Compression operation on the pre-processed video is applied in this step for efficient storing or streaming purposes. The state of the art compression standards used in this process.

c) Network: The compressed data is transmitted to the end user through the network to be consumed in the VR devices.

d) Decoding: The end user receives the bitstream through the network on his/her device (e.g. mobile phone) and the transmitted video is decoded using the implemented decoder in the device.

e) Rendering: Display the decoded video content is rendered in this progression and showed in the head mounted showcases. The rendering and showing procedure may incorporate some post-handling activities preceding showing for example post-sifting, sewing, re-examining, and so forth.
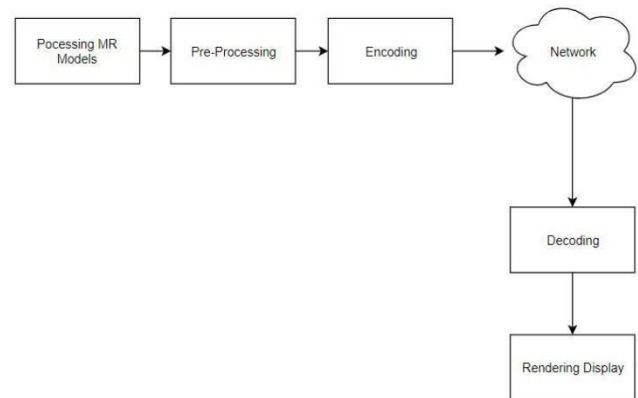

Fig -1: Working of Mixed Reality Device

The Processing MR Models will make the models to be rendered in more accurate way. Then those preprocessing unit will make all the calculations to render the image into the real world [7]. This requires a high end system with more GPU power so make surface rendering and ray tracing very effective. Encoding unit will make the image from volumetric to geometric and then through the network the main data flows.And then those geometric data is converted to volumetric data and then displayed through the head mounted devices. The user can then use the system by using the devices and gadgets to control the Mixed Reality system.

The controls can be done by the having the sensors and the degree of freedom that provided by the mixed reality system. The main objective to provide a really good degree of freedom for the users so that user will not feel the system with glitch or very annoying to use. The user is provided with the sensors for the hand, head, legs and torso. So that the users interaction with the rendered model can be calculated and can give a perfect interaction with the model. Further this technology can

be used to make some emulator by Imitating the behaviour of a machine or person or thing. The user will be needed to work in a limited area where the model is rendered. The major application of this Mixed Reality technology is introduced in the Archeology where the ancient sites and artifacts are made in computer graphics with pixel clear effect so that the user may not feel any distortion in sight [8]. The ancient site which has been damaged can be precisely rebuilt with the help of graphics. Then rendering those images or models into the real world so that the archeologist can make there research into their history and make more progress in the archeological findings. The other application is in the education where teaching can be made very effective where the students can actually see and feel the concepts and theories which can only be explained in regular teaching [9]. The students will observe the history which is made graphically and see the geography in their own eyes so that education will be very effective and very helpful for students to remember what they saw in the lessons and this will help in their exams.

The more advanced level of teachings will be in the medical field where mixed reality will be working in a different and more complex level. The simulation of the whole surgery method will be rendered to the area and the doctors can virtually practice the surgery without any problem in worrying about the patient to cause any effects from a wrong surgery.

Fig -2: Graphically rendered ancient artifacts

The Fig 1 shows the museum with graphically rendered old artifacts with the very accurate ray tracing mechanism. This kind of application will help to save the original artifacts from any damage or human touch.
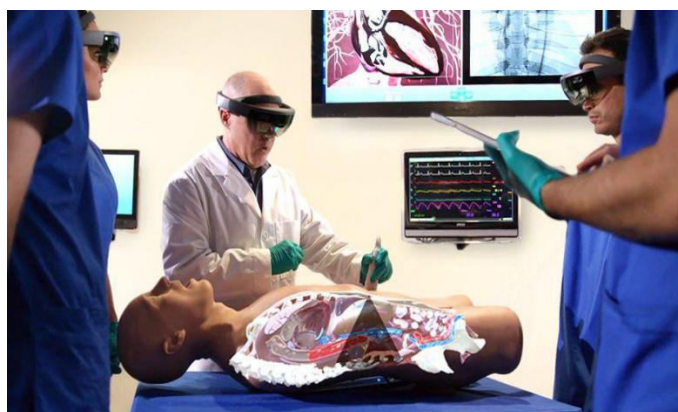
Fig -3: Hololens application for ultra sound training

The Microsoft's Hololens is the very fully fledged Mixed Reality application. They have been making the mixed reality working very effectively. The above image shows the Hololens application for the ultra sound training simulator.

Fig - 4: Automobile engineering mixed reality

An Advantage of this feature is that the Information fetched by the sensors from the users will be used to make the interaction with the model. This information is about the building in which the camera is directed these will be show as a visual rendering of data.

Fig -5: Mixed Reality in Architecture

The Mixed reality as show a wider application in the Architecture area. The above figure shows the Architectural significance of MR technology.

3. CONCLUSIONS

To conclude the topic the application of Mixed Reality will advance in the way that the education system will have very deeper understanding of the lessons, the medical field will be very effective in making surgeries and making advance in their methods using mixed reality. This technology will make the have a certain leap in all the stream of technology [10]. It will give a different perspective for the problems to look after in the solutions.

The Implementation of this application may require a very high performance system but it will make the users to visualize in very peculiar way. The future of graphics will be enormous because of this technology.

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