“Trends in Mixed Reality”

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***Abstract*— The paper presents a survey on the topic of Mixed Reality aimed at envisioning the emerging trends.In today's era of Information Technology, it is high time the people need to move away from physical reality. Mixed Reality, a hybrid implementation of Augmented Reality and Virtual Reality, is rapidly becoming one of the major technological progressions. This paper focuses on the applications of Mixed Reality in different sectors. It explores the characteristics and benefits of using interactive virtual technologies viz. a viz. Augmented Reality and Virtual Reality from a simple household to military operations.**

***Keywords*—augmented reality, virtual reality, augmented virtuality, mixed reality, latest technology, virtual world**

I. INTRODUCTION

Mixed Reality is a term that has been used to refer to the entire spectrum of situations that span the continuum between virtual reality and actual reality. Mixed reality includes augmented reality, virtual reality, and other mixed configurations.

It can also be said as "real with virtual asset augmentation, or virtual with real-world augmentation".In mixed reality environments, users seamlessly navigate through the real world while being connected to the virtual world at the same time. It can also be described as making virtual world alive by making the users live in virtual world but the digital stuff being experienced by them is driven from the real world. Instead of residing in an entirely virtual world (i.e. virtual reality), virtual objects are anchored into a user’s real world space and augment their real world environment, making virtual interactions appear to be “real.” These interactions mimic natural human behavior of interaction, such as objects getting bigger as you get closer and the changing of perspectives as you move around an object.

The following are the technologies to be considered while learning Mixed Reality:

A. Augmented Reality

Augmented Reality is the technique of overlaying digital or virtual information onto the actual physical world. The camera detects a target image and configures out that how close or apart and at what angle is the image from the camera using sensors. It then projects digital information onto that target image, thus creating augmented reality. The easiest example here is a "see through" head-mounted display (HMD) in a car that uses contextually driven information (e.g., speed, direction) to orient a person to their surroundings.

Fig. 1: View of a book using Augmented Reality

B. Virtual Reality

Virtual Reality is an environment in which the participant/observer is totally immersed in, and able to interact with, a completely synthetic world. This often refers to a completely computer-generated graphic environment that attempts to recreate a real or imagined environment. One well-known example is Second Life.

Fig.2: Headset view of aVirtual Reality scene

C. Augmented Virtuality

Augmented virtuality describes the environment in which real objects are inserted into computer-generated virtual environments. It is best described as the inverse of augmented reality, where real world objects are layered over virtual environments.By

utilizing augmented virtuality technology, a person could visualize and interact with virtual world and easily manipulate different layouts, in a digital representation of physical as well as virtual reality.

Fig.3: Replacing the gamers in a virtual game with real persons

Mixed Realitymerges both real and virtual worlds to produce a new environment wherein physical *and* digital objects co-exist and interact in real time.

II. APPLICATIONS

A. Education

Mixed Reality can virtually take students to any part of universe thus promoting remote learning. Using such interactive technology also motivates the students and thus the students pay more attention towards understanding the concepts. For example, taking the students in the solar system (virtually) catches their attention which makes the subject matter look more interesting to them.

B. Aviation Sector

Mixed reality is nowadays used in both commercial as well as military aviation sectors. It can be used in training not just pilots, but flight attendants and ground crew, as well. Also, Augmented Reality can be used in assisting pilot through aero glass.

C. Business

Team members located around the world could meet in a virtual conference room, pointing and gesturing and using natural body language to communicate by sharing real-world virtual workspace. Moreover, the language barrier is also overcome by using Mixed Reality tools.

D. Real Time Shopping

Using Mixed Reality, the customer can simply try the products virtually before buying them. For example, Mixed Reality can take away the guesswork of furniture size for a room or look-how of a dress.

E. Construction

Advanced computer simulations can create amazingly convincing environments where workers can have the feeling of operating real power tools and other equipment. What's more, the simulation can present the kinds of split-second decisions and unexpected situations that were previously difficult or impossible to recreate, such as what to do if a ladder or scaffolding collapses.

F. Healthcare

With the use of a head-mounted display and haptic gloves, a surgeon could virtually transport himself to an operating room thousands of miles away, able to use his natural skills and senses to save lives. For example, creating a virtual operating theatre to be used for teaching future surgeons the necessary procedures and helping them familiarize themselves with the equipment.

G. Communication

The device users siting in geographically separate locations can interact with each other at the same valuable experience as a communication taken place in same room in the real world. Such technique is known asHoloportation.

III. CONCLUSION

Mixed reality brings about many benefits to today's world which is highly connected to information technology.Also, future MR research could consider larger scale, more general applications, and thus allowing an easier implementation onto consumer hand-held devices. Today's mobile phones are ubiquitous and already embed considerable computational capabilities - initial exploration suggests that they may have great potential for MR. The relationship between digital content and physical space could then become less tight in terms of resolution, but more stringent in terms of relevance in the direction of location-based services and applications. A trend towards application.Industrial applications are directed towards training and support tasks and educational applications are directed towardssimulation based motivational learning and global educational support. The fact that projects are becoming more application-oriented may indicate that MR technologies are becoming more mature. While early MR systems were mostly single-user, more recent applications are collaborative, both for co-located and net-based use.

2017 will be the start of an era that will bring some of the biggest digital advancements we have ever seen on the face of the earth for all of mankind. Through Mixed Reality we will all be able to share, experience and understand the world with a whole new set of eyes: a smarter more connected and magical set of eyes!

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