AUGMENTED REALITY BASED FURNITURE LAYOUT FOR ROOM DECOR : A SURVEY

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Abstract : This paper is a brief survey in the field of Augmented Reality. In today's world , we believe Immersive Computing is the future of computing. AR and VR make computing more natural and immersive. Interacting with your data in a more natural way is the future. Augmented Reality can be said as a part of Advanced Computer Graphics , but we believe it's more of a part of Immersive Computing. Augmented reality is a technology within which we can see the objects in physical world virtually, thus providing a composite view. It gathers a wide variety of user experiences. This survey paper describes the potentiality of Augmented Reality and its applications and how AR is facilitating people around them. It mentions what problems were faced in developing such applications and what are the possible ways the same work can be made better by overcoming the issues faced.

Index Terms - : Augmented Reality, Object tracking, Virtual Reality, Virtual Environment (VE),Object Tracking.

I. INTRODUCTION

Augmented reality is a technology within which we can see the objects in physical world virtually, thus providing a composite view. It gathers a wide variety of user experiences. We are going to develop a system with augmented reality that lets user to try on virtual furniture in user's real home structure before buying. From this user will be able to choose furniture objects a lot easier. It will not be necessary to go shopping and long searching for the large user need or use a measure tape to find out whether or not the furniture would fit in customer's room or not. The main purpose of this project is to develop an application for various furniture items in furniture stores virtually without using the actual means that is incredibly exhaustive and time consuming activity. By using this application, it will be convenient for the user to do online shopping of furniture items[4].

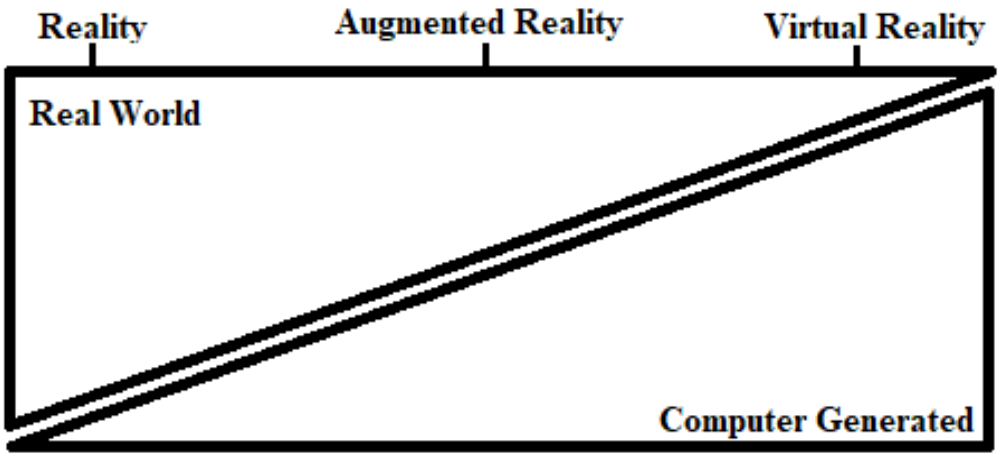

Figure 1: AR vs VR

This will additionally help the user to try out the furniture items in their room and they will be able to see how it will look after placing furniture in it. User can attempt multiple combination of furniture objects virtually without physically moving the

furniture items. Our motivation here is to increase the time efficiency and additionally improve the accessibility of furniture try on by making this layout in augmented reality[7].

A. Definition

The term Augmented Reality is defined in multiple ways the most popular definition still holds to be by Azuma proposed in 1997 that "Augmented reality is a field in which 3D virtual objects are integrated into a 3D real environment in real time." [1].

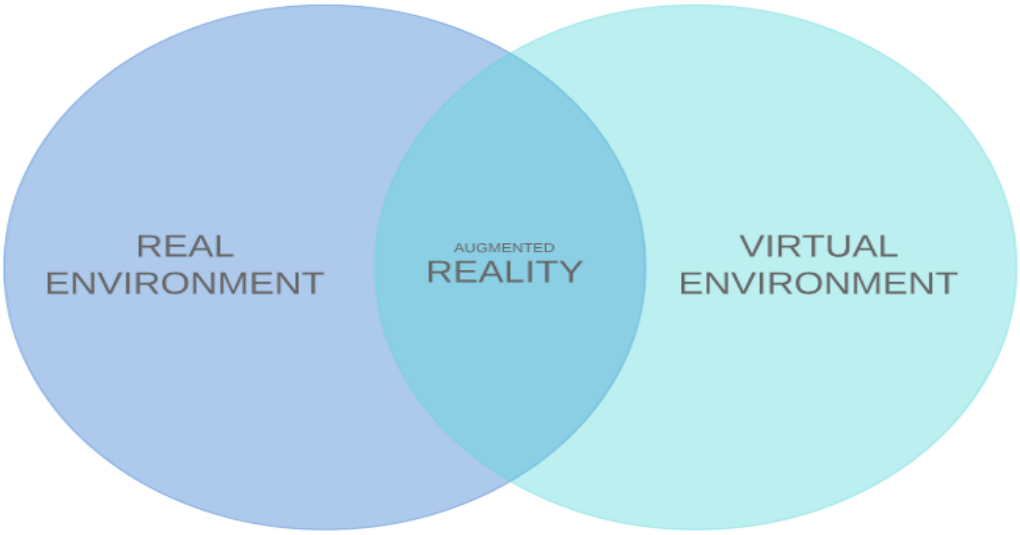

Figure 2: Representation of Augmented Reality

II. Goals

This survey is based on the art of augmented reality , summarizing how it is way different than virtual reality and how it affects various users. It summarizes the trade offs and approaches taken so far to overcome these problems and speculates on future directions that deserve exploration. The survey does not present any new results rather it combines the older significant results and consolidates them according to a new survey writing.

Section 3 describes the actual motive behind this research paper and how we think AR is the next big thing in data visualization and immersive computation. Section 4 describes 4 key applications and their potential , summarizing key points and their potential around users. Section 5 and 6 describes the tradeoffs and the limitations faced till date , by the same concept and why we think Augmented Reality is still in the "experimental phase". Finally, Section 7 we've briefly concluded with the future scope and further work needed and what are the new possible ways companies like Google and Apple have scheduled to completely way off all the limitations of Augmented Reality and bring this feature to mass humans.

III. Motivation

Why AR and VR? We have these powerful smartphones , portable laptops and it's all great , so why go for this concept?

We believe interacting with your data in a more natural way is the future. More we deal data with our natural instincts, more is the knowledge we gain and ultimately our interaction with data is increased [6]. The world becomes a simpler and more sophisticated place. Doing work gets easier, learning gets easier and a whole a lot smarter. "Interacting with your data in a more natural way is the future". - Tom Salter , Google[2].

IV. Applications

Following are some of the applications of augmented reality in various fields[8][4]:

A. Augmented Reality in Healthcare

Some of the applications of AR in healthcare are remote surgery where a surgeon with the help of teleconference it will be able to treat, or we can say interact with the patient. AR allows people to interact truly with the places far away. Sometimes there is loss of lives due to no good surgeon available, as the surgery is specialized skill of modern healthcare the AR overcomes this gap where surgical specialists can treat and examine patients all over the world, without ever stepping onto a plane.

B. Augmented Reality in Gaming

Application of Augmented Reality in technology of video games began in 2000, while traditional(non-augmented reality) video games often place the view of a virtual world to user in a first-person, AR gaming allows users to visualize and interact with gaming environments with the help of AR gaming. The first outdoor AR gaming by Bruce Thomas in 2000 with easily portable devices, AR Quake, was developed. After 2010 the AR gaming expanded towards the smartphones which had a massive gained popularity around the world. Several games like Zombies, DJ Rivals, Run! where the trends in AR gaming. The release of Pokémon GO in 2016 developed by Niantic became a milestone in the history of AR Gaming.

C. Mobile Augmented Reality

Mobile augmented reality has truly changed the world, it brings the digital information onto a real world with the help of a mobile camera. Mobile AR can be used in various applications like navigations in some places or to try out something before buying it(In our Survey we are proposing the furniture system). The best example is the 'Gatwick airport passenger application' which used AR map technology for navigation through there two terminals in airport.

D. Augmented Reality in Industry and Manufacturing.

Some of the applications of AR in industry and manufacturing are:

1. AR for Productivity:

It reduces the time required on a variety of installation, monitoring, and troubleshooting tasks in industry with the help of wearable devices which is deployed with augmented reality.

2. AR for Inspection and Maintenance:

With help of AR it becomes easier to detect failure or faults in huge machines in a industries, it also useful to identify faulty parts requiring repair or replacement using digital enabled overlays.

3. AR in Production Design:

It allows digital features to overlay on the designs, it helps visualizing the product before it undergoes for modelling and manufacturing which reduces the product development cycle cost and time.

V. AUGMENTED REALITY : TRADE OFFS

A. Object Tracking in real time.

One of the most basic problem in developing Augmented Reality is the real time registration problem . The computer object generated must be properly aligned with the original reality. The virtual object must be accurately aligned with the virtual object and that in real time, if this does not happen the coexistence of two worlds will be compromised. More seriously, many applications demand accurate registration. Let's take an example of health care systems . AR needs to be as precise as possible, an error would cost a heavy damage for the operating entity[3].

Registration problems also exist in Virtual Environments, but they are not nearly as serious because they are harder to detect than in Augmented Reality. Since the user only sees virtual objects in VE applications, registration errors result in visual-kinesthetic and visual-proprioceptive conflicts. Such conflicts between different human senses may be a source of motion sickness .

VI. Conclusion

The Augmenting Reality is advancing day by day as advancements are being introduced in Computer Vision, Artificial Intelligence, Machine learning and Virtual Reality. Augmented Reality should be more focused on because it is enhancing user experience and aiding in the process for human learning. Unlike other areas it is being deployed in real world directly i.e. helping doctors and patients in Health Care environment, its making driving experience safer, secure and attention centric. Other than this its use in mobile technology is making Augmented Reality handy for humans on the go weather its shopping, gaming, tourism. In the coming era virtual humans will created which will be autonomous, conscious, and even creative. They will act according to their physiology.

VII. Acknowledgment

We are thankful and would like to express our sincere gratitude towards Assistant Prof. Mrs. Ruchita Tatiya for her continuous guidance, support and encouragement in making this paper possible. Our sincere thanks to all the Lecturers who helped us in our endeavor, gave valuable advices and thus made our journey possible. Last but not the least we would also like to thank our family and friends for their constant support, motivation and belief in us.

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