A SURVEY ON AUGMENTED REALITY

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Abstract: Augmented Reality is a combination of a real and a computer-generated or virtual world. It is achieved by augmenting computer-generated images on real world.AR increases engagement and interaction and provides a richer user experience. Research has shown that AR increases the perceived value of products and brands and industries like Automotive, Consumer/Retail, Education, Financial, Publishing and Tourism/Heritage. In AR, technologies like SLAM (Simultaneous Location and Mapping), Depth Tracking and Image Processing and Projection are used. They both have certain similarities and differences. Augmented Reality has various application in the field of medical, manufacturing, entertainment & games, robotics and education. It can be concluded that how the use of Augmented Reality can be beneficial in our day to day lives. In spite of having many threats to its success, prospected.

I. INTRODUCTION

Augmented Reality has its origin from the word 'Augment' meaning to add or enhance. The term Augmented Reality was given by Boeing Researcher, Tom Caudell. Augmented Reality (AR) is overlapping or augmenting of digital images on real world objects using various AR apps. AR intensifies one's understanding of the real world. AR can be defined as the system in which real and virtual worlds have been combined, there is real time interaction, and the device is registered in 3D. The Augmentation can be done in real time.

AR is a technology in between the real reality and the virtual reality. AR includes graphics, sounds and touch feedback which are then added to the real world. This creates an enriched user experience. All in all, AR helps improve user experience, helps in spreading knowledge, education and health. AR includes the concepts of Computer Vision and Computer Graphics. It needs vision to get a clear understanding of the real world and needs graphics to create false elements to augment it.

II. LITERATURE SURVEY

[1] Riya Aggarwal and Abhishek Singhal – Augmented Reality and its effect on our lives. [1]In this paper, it gives information about Augmented Reality and how it was started. It analyses various types of augmented reality, its applications and its advantages and disadvantages. This paper also gives us knowledge regarding those major threats that augmented reality will face in the near future and about its current and future applications. It gives us a comparison between the two related topics which are Augmented reality and Virtual reality. This paper also helps us know about the effect of Augmented Reality on the human life.

[2] Mekni, Mehdi and Andre Lemieux – Augmented Reality: Applications, challenges and future trends. [2]In this paper, it shows the survey the current state of the art in augmented reality. It describes work performed in different application domains like medicine, military, education, tourism, games etc. It explains the exiting issues encountered when building Augmented Reality applications considering the ergonomic and technical limitations of mobile devices. Future trendsand directions to the areas requiring furtherresearch are introduced and discussed.

[3] Helen Papagiannis – Augmented Reality Joiners.In this paper, it explains the traditionally belonging to Computer Science and Engineering disciplines. Explains that Augmented Reality (AR) is beginning to emerge in the field of Visual Art. The creative possibilities for this new media form are rich and vast extending across and in between disciplines including cinema, photography, and interactive digital media. This will focus on AR Joiner series, which applies 2D planar video to compose novel scenes utilizing multiple adjoined AR markers across both physical and virtual time and space to create new experiences of seeing objects in three dimensional views.

III. TECHNOLOGY INVOLVED

SLAM (Simultaneous Location and Mapping)
It renders virtual images over real world spaces/objects. It works with the help of localizing sensors (like gyroscope or accelerometer) that map the entire physical space or object. A complex AR simulation is conducted by its algorithm

which renders the virtual image in the right dimensions on the space or object. Most of the Augmented Reality APIs and SDKS available today come with built-in SLAM capabilities. Topological maps are a method of environment representation which captures the connectivity of the environment rather than creating a geometrically accurate map. Topological SLAM approaches have been used to enforce global consistency in metric SLAM algorithms. [7]

5.2   Depth Tracking

It is used to measure the distance of the object or surface from the AR device camera sensor. It works the same a camera would work to focus on the desired object and blur out the rest of its surroundings. It consists of three parts which are as follows:

5.2.1   Zone: A zone is a physical space in the form of a frustum constructed from both the field of views and coverage of a depth camera. Every zone has its own local coordinate system. If a human enters a zone, a zone session i.e. tracking session of the humanfor the zone is created and assigned to the human.

5.2.2   Space: A space consists of arbitrary number of zones. The space has its own global coordinate system and tracks 3D locations of people. During a human exists in a space, the zone session is transformed to a space session which contains a global coordinate of the human's location. The mapping between a zone session and a space session will be maintained until the human go out of the space.

IV.   ADVANTAGES

Medical:Augmented Reality is being widely used in healthcare sector where there is a need of visualizing the medical information and the patient within the same physical space. Augmented Reality can be used to perform surgeries and can help surgeons perform real time surgeries without being physically present near the Education:Using Augmented Reality the young learners can now visualize complex spatial relationships and abstract concepts. This technology helps students to engage in phenomena that are not possible in real world. Moreover, the invisible concepts like magnetic field can now be visualized easily using AR. Augmented Reality can open additional ways and methods of making the learning process easier and interesting. There are some AR student apps also. Some of them have been mentioned below: a) AugThat: This app helps boost education process with 360o virtual photos and 3D lessons. b) Elements 4D: This app is for exploring chemistry. It allows students to see how different elements react in reality.

Entertainment and Games:Augmented Reality can be proved to be a game-changer for entertainment and games. Here, it is possible to interact with the real world and reel world using this technology. AR can be used in Television Broadcasting. Many sports channels use AR thus allowing audience to view graphic overlays. AR is widely used in gaming too. Apps such as Ingress and Pokémon Go use augmented reality to let gamers play with virtual characters in real world.

V.   FUTURE SCOPE

Augmented Reality can provide a number of key benefits to brands and organizations. AR increases engagement and interaction and provides a richer user experience. Research has shown that AR increases the perceived value of products and brands. Well implemented AR activity conveys innovation and responsiveness from forward-thinking brands

VI.   CONCLUSION

In conclusion, To add information and meaning to a real object or place. Unlike Virtual reality, augmented reality does not create a simulation of reality, but it augments the reality or mix the Virtual with real. Augmented reality will further blur the line between what's computer- generated by enhancing what we see, hear, feel and smell. The goal is to make a system that will be efficient that the user will not be able to tell the difference between the real world and the virtual augmentation. It has possibilities beyond our imagination and perception. It will have huge applications in almost every field. Throughout this topic we have gained better understanding of augmented reality and how it works. While augmented reality will be of great use to us in the future, it has its drawbacks. Nevertheless, the quality of our lives has improved considerably as a result of augmented reality. The technology of AR still under research and development and is emerging day by day. Many things have been developed recently using this technology. AR is not limited to wearable devices. AR makes passive objects interactive. It is the future of product design. In a nutshell, it can be said that AR has a very bright and promising future in spite of having many threats to its success in the near future.

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