

GLOBAL JOURNAL OF ENGINEERING SCIENCE AND RESEARCHES

AUGMENTED REALITY

Deepu A.^{*1} & Vedha Shree A G.²

^{*1&2}St.Claret College, Department Of Computer Science (2nd year), Bangalore, India.

ABSTRACT

Video games have been entertaining us for nearly 30 years. Computer graphics have become much more sophisticated since then. And soon, game graphics will seem all too real. In the next decade, researchers plan to pull graphics out of your television screen or computer display and integrate them into real world environments. This new technology is called as Augmented Reality, which will further blur the line between what is real and what is computer generated data. Augmented reality is a combination of real scene viewed by a user and virtual scene generated by a computer that augments the scene with additional information. Its goal is to enhance the person's performances and perceptions of the world. Ultimate goal is to create a system such that a user cannot tell the difference between real world and the virtual augmentation of it. It works with Tracking Position, Computing, and Displaying Objects. It uses Head Mounted Display, Tracking System [GPS], Mobile Computing Cover. Augmented reality is implemented in Medical, Entertainment Field, Military Training, Engineering Designing, etc.

This is a distinction that will fade as the technology improves and virtual elements in the scene become less distinguishable from the real one. These enhances will be refreshed continually to reflect the moments of your head. Eventually, possibly by the end of this decade we will see the first mass marketed Augmented Reality system which can be described as "The Walkman of the 21st century". It truly changes the way we view the world

Keywords- *Augmented Reality, Virtual Reality, Tracking position, computing, Head mounted display, mobile computing cover.*

I. INTRODUCTION

Augmented reality augments the real world with the synthetic electronic data. It is the live direct or indirect view of a physical, real world environment whose elements are augmented (or supplemented) by computer generated sensory inputs such as sounds, videos, graphics or GPS data. It is related to a more general concept called mixed reality. Virtual reality replaces the real world with a simulated one. Augmentation is conventionally in real time and in semantic context with environmental elements such as sports scores on TV during a match. With the help of advanced AR Technology the information about the surrounding real world of the user becomes interactive and digitally manipulable. Information about the environment and its objects is overlaid on the real world, in which a view of reality is modified by a computer.

Augmented reality is a field which as originated from the field of virtual reality. Augmented Reality concerns with integration of electronic information back to the real world. Through augmented reality applications, particular spaces can be recognized and through the use of computationally enhanced viewing screens, new images(virtual) are super-imposed into real space.

II. SO WHAT IS AR....??

- It's a way of superimposing computer generated material on real world surroundings and enables you to interact with the computer generated material.
- AR opens up a whole new world of possibilities.
- A combination of real scene viewed by a user and a virtual scene generated by a computer that augments the scene with additional information.



Characteristics

- Combines real and virtual objects in a real environment.
- Is interactive in real time.
- Registers(aligned) real and virtual objects with each other



Here is an **example** of AG.



Current Uses Of Ar

- **HUD (Head Up Display):** used in commercial aircraft, automobiles and other applications. It presents the data without requiring the user to look away from his or her usual viewpoint.
- **Life clipper:** It is a wearable AR system being used in Switzerland. When walking around a culturally interesting area, the user will feel as though they are watching a film.
- **Wikitude(AR travel guide):** Mobile travel guide Forthe android platform. Plan a trip or find About Current surroundings in real time.

III. DIFFERENCE BETWEEN

- The main difference between augmented reality and virtual reality is Augmented reality System augments the real world scene whereas virtual reality have totally immersive environment.

- Augmented reality User maintains a sense of presence in real world whereas virtual reality Visual senses are under control of system.
- Augmented reality needs a mechanism to combine virtual and real worlds.
- Virtual reality is based upon a complete simulation of a real world environment. Virtual users completely immerse themselves in this fictional world.
- With augmented reality, you see the real world but with the addition of computer generated images which are overlaid on various objects within the real world.
- In other words, virtual reality replaces the real world with the artificial whereas augmented reality enhances real life with artificial constructs.

IV. HOW AR WORKS

- Pick a real world scene.
- Add your virtual objects in it.
- Delete real world objects.
- Not virtual reality since environment is real.
- To make it more simple here is an example::

This is a virtual object which is a robot,



This is the real world environment where a woman is standing and holding the bottle here, it is the augmented reality where the virtual object(the robot) and the real world object(the woman) is replaced with the virtual object(robot) where the environment is the same but only the virtual object is replaced with the real one





V. COMPONENTS USED

Head Mounted Display[HMD]

A display device paired to a headset – harness or helmet. Modern HMD's employ sensors for six degrees of freedom. HMD is a display device worn on the head or as part of a helmet and that places both images of the real and virtual environment over the user's view of the world. HMD can either be video-see-through or optical see-through and can have a monocular or binocular display optic. Video-see-through systems are more demanding than optical-see-through systems as they require the user to wear two cameras on his head and require the processing of both cameras to provide both the "real part" of the augmented scene and the virtual objects with unmatched resolution, while the optical-see-through employs a half-silver mirror technology to allow views of physical world to pass through the lens and graphically overlay information to be reflected in the user's eyes.

Tracking system.

Tracking devices consists of digital cameras and/or other optical sensors, GPS, accelerometers, solid state compasses, wireless sensors, etc. Each of these technologies has different level of accuracy and depends greatly on the type of system being developed. The general tracking technology for augmented reality to be: mechanical, magnetic sensing, GPS, ultrasonic, inertia, and optics.

Mobile computing power

AR systems require powerful CPU and considerable amount of RAM to process camera images. So far, mobile computing systems employ a laptop in a backpack configuration, but with the rise of smart-phones technology and iPad, we can hope to see this backpack configuration replaced by a lighter and more sophisticated looking system. Stationary systems can use a traditional workstation with a powerful graphics card.

VI. APPLICATIONS

Augmented reality is implemented in Medical, Entertainment Field, Military, Training, Engineering Designing, etc.,

While there are many possibilities for using augmented reality in an innovative way, we have cornered four types of applications that are most often being used for AR research: Advertising and Commercial, Entertainment and Education, Medical and Mobile Application for iPhones.

Entertainment field

AR gaming applications present many advantages other physical board with, for example, the ability to introduce animations and other multimedia presentations. The ability to introduce animations provides excitement to the gaming world.

AR allows video game players to experience digital game play in real world entertainment.

Examples for gaming app with AR function is ‘Piclings’

Which is an IOS game that uses i-phone’s camera to create layouts for game. The game recognizes images taken by camera, redefines them digitally, incorporates into game world.

Education field

AR application is a back bone of education industry. AR Apps are being developed which are embedded text,images,videos as well as real-world circumstances.

Students can participate interactively with computer generated simulations of historical events,explaining and learning details of each significant area of the event site.

Mobile apps using augmentedreality are emerging in the classroom.

Medical field

There have been really interesting advances in medical application of augmented reality. Medical students use the technology to practice surgery in a controlled environment.AR can reduce the risk of an operation by giving the surgeon improved surgery preparations. This technology can be combined with MRI or X-ray systems and bring everything into a single view for the surgeons.The ability to image the brain in 3D on top of the patient’s actual autonomy is very powerful for the surgeon.

Navigation

AR is very effective on navigation devices. Information can be displayed on mobile phones indicating destination direction and meter, weather, traffic information etc.

Construction and Architecture

With the continual improvements to GPS accountancy,business are able to use AR to visualize building models, sites. AR is applied to personal new projects, to solve on-site construction challenges and enhance materials,industrial workers are able to visual constructions,real-time alerts and 3D mapping.

Military and defense service

The HUD is typical example for this field. It is used by ground troops, Critical data such as enemy location can be presented to the soldier with in their line of sight. This technology is also used for simulations for training purposes.

VII. LIMITATIONS OF AR

- Desktop is the primary interface right now it should be improved.
- In reality, only a few of the possible channels and captured.
- All gestures and voice come in second to position.
- The HMD’s used are very heavy in weight which is usually uncomfortable for the users.
- Because of using AR hardware’s it imposes a serious health issue on the user.

VIII. FUTURE TECHNOLOGY

The AR projects a new age of AR had brought the technology from the level in the lab to a level that could be used in our daily life.AR is promising technology for fields such as medicine, welfare, architecture and urban planning, education and training, entertainment industry also shows greater interest in augmented reality.

The augmented reality can be used as a sixth sense technology for those people who are having missing sense so that it will be more innovative and useful for them in their day today life.

IX. CONCLUSION

This paper presents evidence to support the promotion that AR Systems improve task performance and can relieve assembly tasks and yet this technology has not been fully developed but it will be very useful in developing sixth sense technology.

The most innovative aspect of AR is not the technology, it is the objective. Instead of replacing physical objects with a computer, we create systems that allow people to interact with real world in natural ways and at the same time, benefit from enhanced capabilities from the computer. The future we think of it is not a strange world in which we are immersed in “virtual reality”. Instead we see our familiar world, enhanced in numerous, often invisible ways.

REFERENCES

1. *Google, augmented reality*
2. *Slide share, augmented reality.*
3. *Slide share paper, augmented reality.*
4. *You tube, difference of augmented reality and virtual reality.*
5. *Pdf's of augmented reality.*