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AWARENESS ABOUT AUGMENTED REALITY (AR)

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Abstract

The purpose of this article is to find out awareness about Augmented reality (AR) technology.Every day a new technology is been launched. This research is done to find that how many people knows about this technology and to spread information about it. Augmented reality (AR) that is a live direct or indirect view of a physical, real-world environment whose elements are augmented (or supplemented) by computer-generated sensory input such as sound, video, graphics or GPS data. It is related to a more general concept called mediatedreality, in which a view of reality is modified (possibly even diminished rather than augmented) by a computer. As a result, the technology functions by enhancing one's current perception of reality. By contrast, virtual 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 (e.g. adding computer vision and object recognition) the information about the surrounding real world of the user becomes interactive and digitally manipulable. Artificial information about the environment and its objects can be overlaid on the real world.

Keywords:-Global Positioning System (GPS)

Introduction:-

Video games have been entertaining us for nearly 30 years, ever since Pong was introduced to arcades in the early 1970s.Computer graphics have become much more sophisticated since then, and game graphics are pushing the barriers of photorealism. Now, researchers and engineers are pulling graphics out of yourtelevision screen or computer display and integrating them into real-world environments. This new technology, called augmented reality, blurs the line between what's real and what's computer-generated by enhancing what we see, hear, feel and smell.

On the spectrum between virtual reality, which creates immersive, computer-generated environments, and the real world, augmented reality is closer to the real world. Augmented reality adds graphics, sounds, haptic feedback and smell to the natural world as it exists. Both video games and cell phones are driving the development of augmented reality. Everyone from tourists, to soldiers, to someone looking for the closest subway stop can now benefit from the ability to place computer-generated graphics in their field of vision. (bonsor, 1998-2015)

Augmented reality is changing the way we view the world or at least the way its users see the world or picture yourself walking or driving down the street. With augmented-reality displays, which will eventually look much like a normal pair of glasses, informative graphics will appear in your field of view and audio will coincide with whatever you see. These enhancements will be refreshed continually to reflect the movements of your head. Similar devices and applications already exist, particularly on smartphones like the iPhone.

Augmenting our world

The basic idea of augmented reality is to superimpose graphics, audio and other sensory enhancements over a real-world environment in real time. Sounds pretty simple. Besides, haven't television networks been doing that with graphics for decades? However, augmented reality is more advanced than any technology you've seen in television broadcasts, although some new TV

effects come close, such as RACEf/x and the super-imposed first down line on televised U.S. football games, both created by Sport vision. But these systems display graphics for only one point of view. Next-generation augmented-reality systems will display graphics for each viewer's perspective.

Some of the most exciting augmented-reality work is taking place in research labs at universities around the world. In February 2009, at the TED conference, Pattie Maes and PranavMistry presented their augmented-reality system, which they developed as part of MIT Media Lab's Fluid Interfaces Group. They call it Sixth Sense, and it relies on some basic components that are found in many augmented reality systems:

- Camera
- Small projector
- Smartphone
- Mirror

These components are strung together in a lanyard like apparatus that the user wears around his neck. The user also wears four colored caps on the fingers, and these caps are used to manipulate the images that the projector emits.

Sixth Sense is remarkable because it uses these simple, off-the-shelf components that cost around $350. It is also notable because the projector essentially turns any surface into an interactive screen. Essentially, the device works by using the camera and mirror to examine the surrounding world, feeding that image to the phone (which processes the image, gathers GPS coordinates and pulls data from the Internet), and then projecting information from the projector onto the surface in front of the user, whether it's a wrist, a wall, or even a person. Because the user is wearing the camera on his chest, Sixth Sense will augment whatever he looks at; for example, if he picks up a can of soup in a grocery store, Sixth Sense can find and project onto the soup information about its ingredients, price, and nutritional value even customer reviews.

By using capped fingers even fingers with different colors of nail polish would work a user can perform actions on the projected information, which are then picked up by the camera and processed by the phone. If he wants to know more about that can of soup than is projected on it, he can use his fingers to interact with the projected image and learn about, say, competing brands. SixthSense can also recognize complex gestures draw a circle on your wrist and SixthSense projects a watch with the current time.

Augmented Reality on Cell Phones

While it may be some time before you buy a device like SixthSense, more primitive versions of augmented reality are already here on some cell phones, particularly in applications for the iPhone and phones with the Android operating system. In the Netherlands, cell phone owners can download an application called Layar that uses the phone's camera and GPS capabilities to gather information about the surrounding area. Layar then shows information about restaurants or other sites in the area, overlaying this information on the phone's screen. You can even point the phone at a building, and Layar will tell you if any companies in that building are hiring, or it might be able to find photos of the building on Flickr or to locate its history on Wikipedia.

Layar isn't the only application of its type. In August 2009, some iPhone users were surprised to find an augmented-reality "Easter egg" hidden within the Yelp application. Yelp is known for its user reviews of restaurants and other businesses, but its hidden augmented-reality component, called Monocle, takes things one step further. Just start up the Yelp app, shake your iPhone 3GS three times and Monocle activates. Using your phone's GPS and compass, Monocle will display information about local restaurants, including ratings and reviews, on your cell phone screen. You can touch one of the listings to find out more about a particular restaurant. There are other augmented reality apps out there for the iPhone and other similar phones.

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Augmented Reality in Video Games and the Military

Video game companies are quickly hopping aboard the augmented-reality locomotive. A company called Total Immersion makes software that applies augmented reality to baseball cards. Simply go online, download the Total Immersion software and then hold up your baseball card to a webcam. The software recognizes the card (and the player on it) and then displays related video on yourcomputer screen. Move the card in your hands make sure to keep it in view of the camera and the 3-D figure on your screen will perform actions, such as throwing a ball at a target.

Total Immersion's efforts are just the beginning. In the next couple of years, we'll see games that take augmented reality out into the streets. Consider a scavenger-hunt game that uses virtual objects. You could use your phone to "place" tokens around town, and participants would then use their phones (or augmented-reality enabled goggles) to find these invisible objects.

Demos of many games of this order already exist. There's a "human Pac-Man" game that allows users to chase after each other in real life while wearing goggles that make them look like characters in Pac-Man.

Arcane Technologies, a Canadian company, has sold augmented-reality devices to the U.S. military. The company produces a head-mounted display the sort of device that was supposed to bring us virtual reality that superimposes information on your world.

Consider a squad of soldiers in Afghanistan, performing reconnaissance on an opposition hideout. An AR-enabled head-mounted display could overlay blueprints or a view from a satellite or overheard drone directly onto the soldiers' field of vision.

Software and algorithms

A key measure of AR systems is how realistically they integrate augmentations with the real world. The software must derive real world coordinates, independent from the camera, from camera images. That process is called registration which uses different methods of computervision, mostly related to video tracking. Many computer vision methods of augmented reality are inherited from visual odometer. Usually those methods consist of two parts.

First detect interest points, or fiducially markers, or optical flow in the camera images. First stage can use detection methods like corner detection, blob detection, edge detection or thresholding and/or other image processing methods. The second stage restores a real world coordinate system from the data obtained in the first stage. Some methods assume objects with known geometry (or fiducially markers) present in the scene. In some of those cases the scene 3D structure should be recalculated beforehand. If part of the scene is unknown simultaneous localization and mapping (SLAM) can map relative positions. If no information about scene geometry is available, structure from motion methods like bundle adjustment are used. Mathematical methods used in the second stage include projective (unipolar) geometry, geometric algebra, rotation representation with exponential map, kalian and particle filters, nonlinear optimization, robust statistics

Augmented Reality Markup Language (ARML) is a data standard developed within the Open Geospatial Consortium(OGC), which consists of an XML grammar to describe the location and appearance of virtual objects in the scene, as well as ECMAScript bindings to allow dynamic access to properties of virtual objects.

To enable rapid development of Augmented Reality Application, some software development kits (SDK) have emerged. A few SDK such as CloudRidAR leverage cloud computing are developed for performance improvement. Some of the well-known AR SDKs are offered by Meatier, Vitoria, Monett AR, Wikitude, and Blipparand Layer

Limitations and the Future of Augmented Reality

Augmented reality still has some challenges to overcome. For example, GPS is only accurate to within 30 feet (9 meters) and doesn't work as well indoors, although improved image recognition technology may be able to help.

People may not want to rely on their cell phones, which have small screens on which to superimpose information. For that reason, wearable devices like Sixth Sense or augmented-reality capable contact lenses and glasses will provide users with more convenient, expansive views of the world around them. Screen real estate will no longer be an issue. In the near future, you may be able to play a real-time strategy game on your computer, or you can invite a friend over, put on your AR glasses, and play on the tabletop in front of you.

There is such a thing as too much information. Just as the "CrackBerry" phenomenon and Internet addiction are concerns, an overreliance on augmented reality could mean that people are missing out on what's right in front of them. Some people may prefer to use their AR iPhone applications rather than an experienced tour guide, even though a tour guide may be able to offer a level of interaction, an experience and a personal touch unavailable in a computer program. And there are times when a real plaque on a building is preferable to a virtual one, which would be accessible only by people with certain technologies.

There are also privacy concerns. Image-recognition software coupled with AR will, quite soon, allow us to point our phones at people, even strangers, and instantly see information from their Facebook, Twitter, Amazon,LinkedIn or other online profiles. With most of these services people willingly put information about themselves online, but it may be an unwelcome shock to meet someone, only to have him instantly know so much about your life and background.

Despite these concerns, imagine the possibilities: you may learn things about the city you've lived in for years just by pointing your AR-enabled phone at a nearby park or building. If you work in construction, you can save on materials by using virtual markers to designate where a beam should go or which structural support to inspect. Paleontologists working in shifts to

assemble a dinosaur skeleton could leave virtual "notes" to team members on the bones themselves, artists could produce virtual graffiti and doctors could overlay a digital image of a patient's X-rays onto a mannequin for added realism.

Applications:-

Augmented reality has many applications. First used for military, industrial, and medical applications, it has also been applied to commercial and entertainment areas.

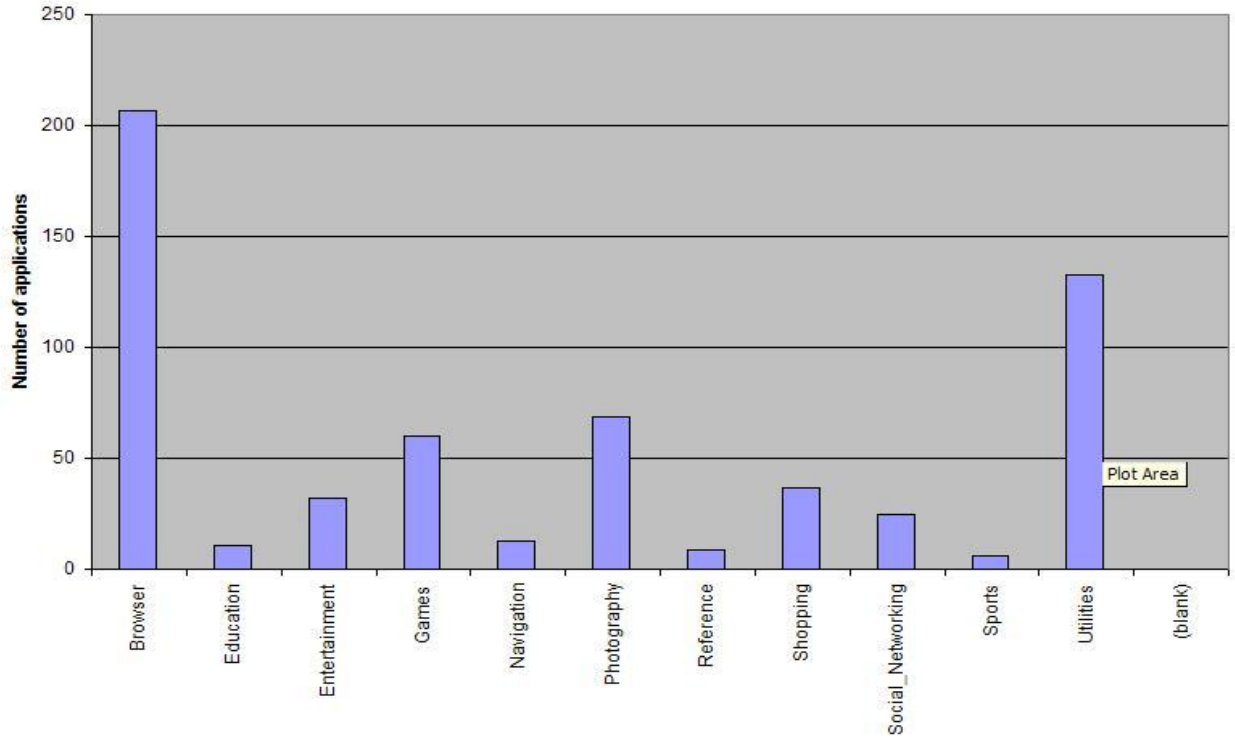


Figure:-Graph of Applications of Augmented reality

The top five marketing uses for augmented reality are:

1. Replacement for standard print literature
2. As an addition tool to win pitches
3. Events and conferences to draw attention

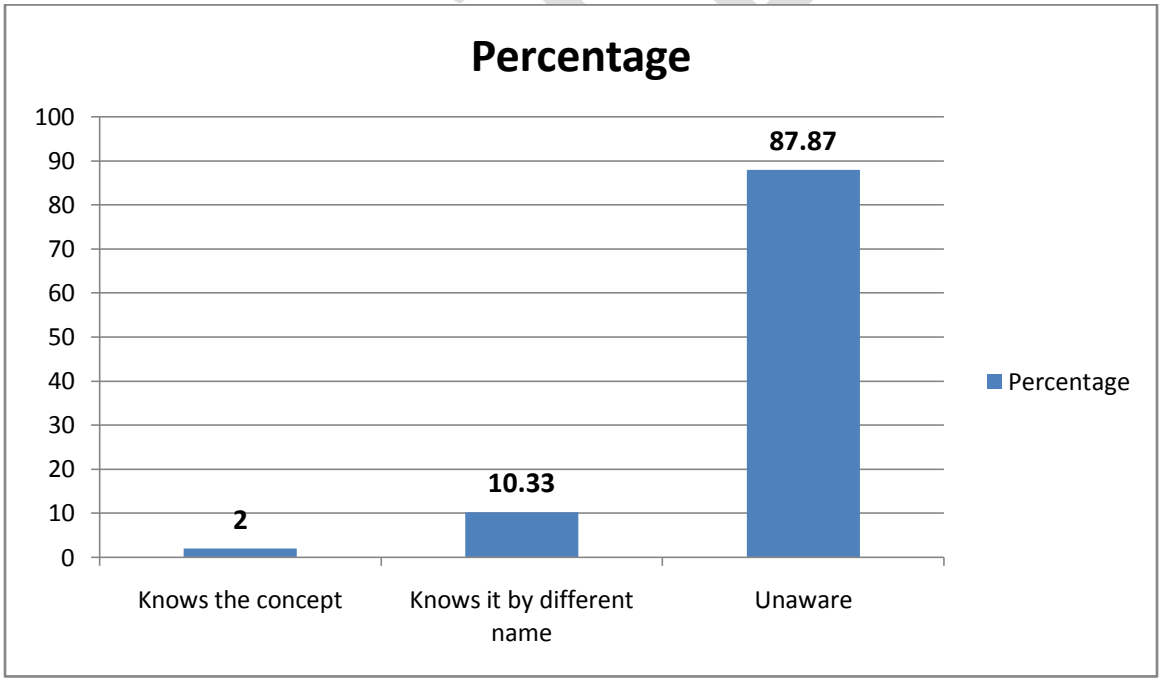
4. Bring online campaigns to life
5. Enhance point of sale material

Research Findings:

A survey regarding this technology was done on 15 lecturers of various disciplines.In this survey various questions relating to the awareness about this technology and its applications were found out.

From the survey, it was found that only2% of the sample know about Augmented Reality by its name, while 13.33% know this technology by different name, while the remaining 84.67% i.e. 13 lecturers were unaware about the technology and its applications.

The graph shows the awareness level of this technology:



Suggestions:

This section identifies certain areas and approaches that require further research to produce improved AR systems.

Hybrid approaches: Future tracking systems may be hybrids, because combining approaches can cover weaknesses. The same may be true for other problems in AR. For example, current registration strategies generally focus on a single strategy. Future systems may be more robust if several techniques are combined. An example is combining vision-based techniques with prediction. If the fiducials are not available, the system switches to open-loop prediction to reduce the registration errors, rather than breaking down completely. The predicted viewpoints in turn produce a more accurate initial location estimate for the vision-based techniques.

Real-time systems and time-critical computing: Many VE systems are not truly run in real time. Instead, it is common to build the system, often on UNIX, and then see how fast it runs. This may be sufficient for some VE applications. Since everything is virtual, all the objects are automatically synchronized with each other. AR is a different story. Now the virtual and real must be synchronized, and the real world "runs" in real time. Therefore, effective AR systems must be built with realtime performance in mind. Accurate timestamps must be available. Operating systems must not arbitrarily swap out the AR software process at any time, for arbitrary durations. Systems must be built to guarantee completion within specified time budgets, rather than just "running as quickly as possible." These are characteristics of flight simulators and a few VE systems [Krueger92]. Constructing and debugging real-time systems is often painful and difficult, but the requirements for AR demand real-time performance.

Social and political issues: Technological issues are not the only ones that need to be considered when building a real application. There are also social and political dimensions when getting new technologies into the hands of real users. Sometimes, perception is what counts, even if the technological reality is different. For example, if workers perceive lasers to be a health risk, they may refuse to use a system with lasers in the display or in the trackers, even if those lasers are eye safe. Ergonomics and ease of use are paramount considerations. Whether AR

is truly a cost-effective solution in its proposed applications has yet to be determined. Another important factor is whether or not the technology is perceived as a threat to jobs, as a replacement for workers, especially with many corporations undergoing recent layoffs. AR may do well in this regard, because it is intended as a tool to make the user's job easier, rather than something that completely replaces the human worker. Although technology transfer is not normally a subject of academic papers, it is a real problem. Social and political concerns should not be ignored during attempts to move AR out of the research lab and into the hands of real users.This technology should be largely used by people in field like medical, film industry, education etc.

Conclusion

Augmented reality is another step further into the digital age as we will soon see our environments change dynamically either through a smartphone, glasses, car windshields and even windows in the near future to display enhanced content and media right in front of us. This has amazing applications that can very well allow us to live our lives more productively, more safely, and more informatively.

Maybe in the future, we will see our environments become augmented to display information based on our own interests through built-in RFID tags and augmentations being implemented through holographic projections surrounding the environments without a use of an enabling technology. It would be incredible to no longer wonder where to eat, where to go, or what to do; our environment will facilitate our interactions seamless.We will no longer be able to discern what is real and what is virtual, our world will become a convergence of digital and physical media. (augreality.wikispaces.com, 2015)

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