

A Study on Augmented Reality

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ABSTRACT

Augmented reality is a developing technology, in which humans get an interactive experience to real-world environment, where the real-world elements are augmented by computer-generated perceptual information. Educational technology has the potential to offer a highly realistic situated learning experience and more specifically augmented reality (AR). AR is a technology that adds virtual content to the physical real world, thereby augmenting the perception of reality. With augmented reality virtual learning is made even more easier in a way that the learners take a very less time to get enhanced in the chosen topic.

Keywords : Augmented Reality, ISMAR2012, HMD, Firefox Reality

I. INTRODUCTION

Augmented Reality(AR) is brings an object or thing from a digital world to real world environment in human's perception. It doesn't just bring the object digitally but with integration of its immersive sensory modalities t makes the person believe that the object is physically there in real world. The first AR systems were invented in early 1990's , starting with the Virtual Fixtures systems developed at the U.S. Air Force's Armstrong Laboratory in 1992. Augmented reality is used to enhance natural environments or situations and offer perceptually enriched experiences. With the help of advanced AR technologies the information about the surrounding real world of the user becomes interactive & digitally manipulable.



Fig 1. Human perception of seeing the digital entity in real world

II. METHODS AND MATERIAL

1. AUGMENTED BROWSING

Augmented browsing describes the experience of using a system that can automatically augment or improve the information in web pages. For example, augmented browsing could be used to automatically add definitions for all scientific or technical keywords that occur in a document. (Example: FIREFOX wants to make FIREFOX REALITY which is based on augmented reality)

2. AUGMENTED WEB

The Augmented Web is a combination of HTML5, Web Audio, Web GL, and Web RTC that improves the experience of users on existing pages on the web.[1]

It was the focus of a Birds of a Feather meeting at ISMAR2012 and is now the focus of the W3C Augmented Web Community Group

3. APPLICATIONS

❖ Archaeology

AR has been used to aid archaeological research. By augmenting archaeological features onto the modern landscape, AR allows archaeologists to formulate possible site configurations from extant structures. Computer generated models of ruins, buildings, landscapes or even ancient people have been recycled into early archaeological AR applications. (For example, implementing a system like, "VITA (Visual Interaction Tool for Archaeology)" will allow users to imagine and investigate instant excavation results without leaving their home. Each user can collaborate by mutually "navigating, searching, and viewing data.")Hrvjone Benko, a researcher for the computer science department at Colombia University, points out that these particular systems and others like it can provide "3D panoramic images and 3D models of the site itself at different excavation stages" all the while organizing much of the data in a collaborative way that is easy to use. Collaborative AR systems supply multimodal interactions that combine the real world with virtual images of both environments.

❖ Visual art

AR applied in the visual arts allows objects or places to trigger artistic multidimensional experiences and interpretations of reality.

AR technology aided the development of eye tracking technology to translate a disabled person's eye movements into drawings on a screen.

❖ Social interaction

AR can be used to facilitate social interaction. An augmented reality social network framework called Talk2Me enables people to disseminate information and view others' advertised information in an augmented reality way. The timely and dynamic information sharing and viewing functionalities of

Talk2Me help initiate conversations and make friends for users with people in physical proximity.

❖ Medical

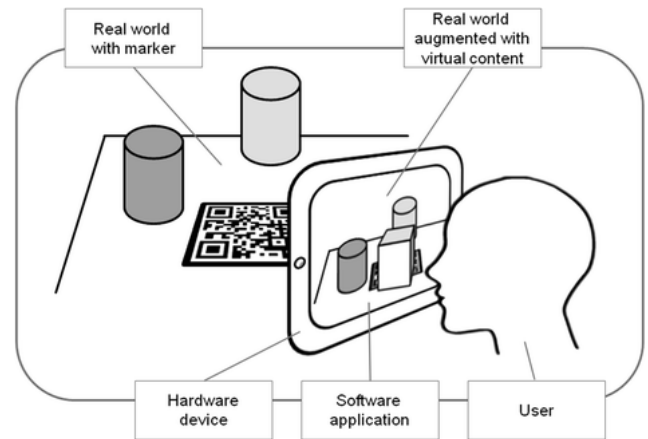
Since 2005, a device called a near-infrared vein finder that films subcutaneous veins, processes and projects the image of the veins onto the skin has been used to locate veins.

AR provides surgeons with patient monitoring data in the style of a fighter pilot's heads-up display, and allows patient imaging records, including functional videos, to be accessed and overlaid. (Examples: A virtual X-ray view based on prior tomography or on real-time images from ultrasound and confocal microscopy probes, visualizing the position of a tumor in the video of an endoscope, or radiation exposure risks from X-ray imaging devices.) AR can enhance viewing a fetus inside a mother's womb. Siemens, Karl Storz and IRCAD have developed a system for laparoscopic liver surgery that uses AR to view sub-surface tumors and vessels. AR has been used for cockroach phobia treatment. Patients wearing augmented reality glasses can be reminded to take medications. Virtual reality has been seen promising in the medical field since the 90's. Augmented reality can be very helpful in the medical field. It could be used to provide crucial information to a doctor or surgeon with having them take their eyes off the patient. On the 30th of April, 2015 Microsoft announced the Microsoft HoloLens, their first shot at augmented reality. The HoloLens has advanced through the years and it has gotten so advanced that it has been used to project holograms for near infrared fluorescence based image guided surgery. As augmented reality advances, the more it is implemented into medical use. Augmented reality and other computer based-utility is being used today to help train medical professionals. With the creation of Google Glass and Microsoft HoloLens, has helped pushed Augmented Reality into medical education.



There are many different hardware devices that can be used for AR. The most commonly used is a handheld device like a smart-phone or a tablet. A non-handheld device is a *Head Mounted Display* (HMD). The display is worn on the user's head, mounted in a helmet or a pair of glasses. The advantage of the HMD is that the display stays in front of the eyes, no matter in what direction the user might look, supporting situation awareness. Google Glass is an example of an HMD used by the Radboud University Medical Centre, Nijmegen and the Academic Medical Centre, Amsterdam to explore the possible added value for health care and medical education. All hardware devices used for AR have in common that they have a processor, a camera, GPS, sensors and/or a compass.

In order to enrich the physical world with augmentations, a software application that uses one or more of the different hardware components must be installed on the device. There are two primary AR software implementation types: marker-based and marker-less AR. Marker-based augmented reality uses 2D or 3D images such as a QR code or a physical object (for instance a building or humans, which can be recognized by the software application). When the AR software application receives input from the marker or object, it generates the augmented virtual content and projects this information onto the recognized object. The user perceives that added information as really existing within the surroundings; he is immersed into an enhanced reality.



III. ADVANTAGES

- ✓ Increase Sales
- ✓ One obstacle to online shopping is that products are not always correctly represented, oftentimes due to poor photo availability. With augmented reality, it is possible to visualize an object in its "true" form before actually making a purchase.
- ✓ Alternatively, in situations where users may find themselves without the proper assistance or information in real time, augmented reality adds value to the procurement process. On a commercial site, it can create interactions that would not have existed between a customer and a vendor.
- ✓ Enrich Content
- ✓ Augmented reality is a data-adding system that offers cultural, security, and time savings benefits. The technology provides additional information in real time in a defined position or in a specific environment, without the user having to look for it. (example: augmented reality can provide users information about historic sites on a sightseeing tour, stops along a scenic drive, or even about plants and formations seen on a bike ride.)
- ✓ Improve Notoriety
- ✓ Technological innovations and developments are increasingly popular with users and potential customers. A company or brand that chooses to

use augmented reality acquires leverage to gain visibility but, also, a certain image. By taking advantage of this trend, the brand or the company can both attract new audiences and retain its existing customers.

[4]. <https://next.reality.news/news/mozilla-wants-make-firefox-reality-your-web-browser-for-augmented-virtual-reality-headsets-0183917/>

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IV. DISADVANTAGES

- ✓ Spam and Security
- ✓ Social and Real-Time vs. Solitary and Cached
- ✓ UX (User Experience): Using AR can be inappropriate in social situations.
- ✓ Interoperability: The lack of data portability between AR environments (such as Wikitude AR and Layar AR browser).
- ✓ Openness: Other people can develop their own layers of content to display.

V. CONCLUSION

Augmented reality will take human lifestyle to next level. If utilized properly augmented reality will enhance the technological field throughout the industry. Augmented reality is also transforming the world of education, where content may be accessed by scanning or viewing an image with a mobile device. Another example is an AR helmet for construction workers which display information about the construction sites.

VI. REFERENCES

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