

Reviews on Augmented Reality: Google Lens

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Abstract: This paper presents an overview of basic aspects and concepts of Augmented Reality (AR) technology. Some characteristics of Augmented Reality systems will be discussed and this paper will provide an overview of them with special mention Google lens; recent approach and briefly focus on the latest update on Google lens.

Keywords: Augmented Reality; Virtual Reality; Google lens.

INTRODUCTION:

Augmented Reality (AR) is proving to be a very useful tool in our everyday lives. Even though this technology is still in a relative infancy and may not be as exciting as a full-blown virtual reality roller coaster ride, it has, however, become handy in many areas including medicine, entertainment, manufacturing and education, surgical process, social media, etc.

It brings elements of the virtual world, into our real world, thus enlarge the things we hear, see and feel. When compared to other reality technologies, augmented reality lies in the middle of the mixed reality spectrum i.e. between the real world and the virtual world [1].

Over the past few decades, researchers and scholars have defined Augmented Reality in many different forms. Milgram, Takemura, Utsumi, and Kishino (1994) explained AR into two definitions: a broader term and a restricted term. In the broad sense, AR is defined as “augmenting natural feedback to the operator with simulated cues” (p. 283). Whereas in the restrictive definition, the technological aspect is considered defining AR as “a form of virtual reality where the participant’s head-mounted display is transparent, allowing a clear view of the real world” (p. 283). Others define AR based on its features or characteristics. According to Azuma (1997), AR is a system that fulfills three basic features namely a combination of real and virtual worlds, a real-time interaction, and an accurate 3D registration of virtual and real objects [2].

Klopfer and Squire (2008) defined AR as “a state in which a real world environment is dynamically overlaid with coherent position or context sensitive

virtual information”. AR could provide users technology-mediated immersive experiences in which real and virtual worlds are blended (Klopfer & Sheldon, 2010) and users’ interactions and appointment are augmented (Dunleavy, Dede, & Mitchell, 2009). For educators and designers, defining AR in a large area would be more

productive because such a definition suggests that AR could be created and implemented by various technologies, such as desktop computers, handheld devices, head-mounted displays etc.

The view of AR is not limited to any type of technology and could be reconsidered from a wide view these days. AR does the affordances of the real-world by providing extra and relative information that augments learners’ experience of reality (Squire & Klopfer, 2007). AR might be based on and accompany with technology, but it has to be conceptualized beyond technology only [3].

AUGMENTED REALITY VS VIRTUAL REALITY:

Virtual reality replaces the real world environment with a simulated one whereas augmented reality alters the observer’s current perception of a real world environment [4].

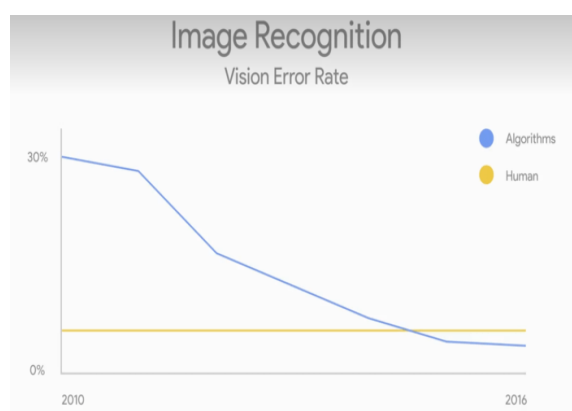


Figure 1: - Image Recognition: Graph shows Vision Error Rate of augmented reality image and actual image (2010-2016).

It is related to two similar terms: mixed reality and computer-mediated reality. One type of AR which is of particular concern is spatial augmented reality (SAR). It enables users to experience AR without the use of monitors, head-mounted displays or hand-held devices. Digital projectors are used to display graphical information onto physical things. What distinguishes SAR from other forms of AR is that the display is separated from the users of the system. Due to this advantage, SAR can scale up to multiple users, thus allowing for collocated collaboration between users.

APPLICATION:

An application can be as fundamental as a plain text based notification or as complicated as audio visual instruction on how to do a life-threatening surgical process. They identify different characteristics, improve understandings, and provide accessible and real time data.

There are many augmented reality application developments among which are mobile phones apps, special purpose apps for areas like medicine, military, space and scientific exploration; and design and business applications for institutes and companies. The information provided by AR is very topical and appropriate to the tasks of concern [1].

Application of SAR can be found in mobile projectors; virtual tables; smart projectors; and shader-lamps that enable augmented reality by projecting imagery onto neutral objects, providing the option to enhance the object's appearance with materials of a simple unit comprising of a projector-camera-sensor receiver system.

a). Medical:

In Medical field, the main motivation of the augmented reality is focused on the need of visualizing medical data, the patient within the same physical space [6]. Another application in the medical domain is in ultrasound imaging [7]. The ultrasound technician can view a volumetric rendered image of the foetus inside the abdomen of a pregnant woman by using an optical see through display. The image displays as if it was inside of the abdomen [8].

b). Education:

Augmented Reality provides many possibilities for Educational researchers. They are increasingly recognized for teaching and learning purposes. The virtual objects present in the environment allow learners to visualize complex spatial relationships and also make the abstract concepts easier which are not possible in the real world.

It has shown improvement in mobile entertainment using AR apps for educational purposes and the technology has great potential beyond fun and games. One of the well-known apps that show AR is Google

Sky Map. This Android app points the phone to the sky and identifies the stars, planets, and constellations, their details and scenery change in real time as moving the Smartphone across the sky [5].

c) Industrial design (CAD/CAM):

Product designers utilise AR to experience a product's design as well as its working before actual manufacturing and mass production. AR used Volkswagen for comparing simulated and actual crash test imagery. [9] It is used to visualize and modify car body structure and engine layout. It also used to compare digital mock-ups with physical mock-ups for finding discrepancies between them. [10][11]



Figure 2: Designing of product before manufacture.

d) Mobile App with amazing Augmented Reality Functions:

Piclings is one of the interesting app uses of augmented reality in gaming (Fig.3). It is an iOS game that uses the iPhone's camera where we can take photos and play them as levels. The images taken by the camera is recognized by the game and then redefines them digitally, and incorporates them into the game world. The iPhone's camera captures everything that lies in front of the player in real life and then integrates it into the game.

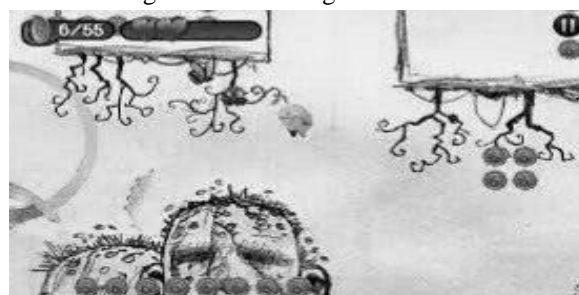


Figure 3: Piclings App, an example of Augmented Reality.

Some other games examples: Star Wars Arcade: Falcon Gunner, Pokemon Go, and Ingress. They'll be shooting down TIE fighters in the same background that actually exists in face of them when players are looking at scenery of mountains [5].

GOOGLE GLASS/LENS:

a). PHYSICAL EXAMS: In dental clinics, dentists wear an augmented reality headset e.g. Google Glass. The technology allows to accessing past records, pictures, and other past data in real-time to discuss. This digital information allows immediately accessing without to log into a computer or check a records room proves to be a major advantage to healthcare professionals. AR assisted systems with patient record management technologies is already very desirable utility. Advantages of the system include: consistent across all professionals with the most current records, instructions, and policies and data integrity and accessibility where record access becomes instantaneous and [1].



Figure 4: Doctor wearing Google Glass to examine patient during surgery so he can access different records.

(b) GOOGLE LENS IN PHONE'S CAMERA:

Google's new technology enables to search with the phone's camera. It's augmented reality beyond photo filters.



Figure 5: Google Lens find context with what the camera points.

The new technology is known as Google Lens which is announced at the company's I/O developer conference. It's a way to use phone's camera to search for information [12]. It won't just see what we see, but will also understand what we see to help us take action [13].

For example, point camera at that flower and Google will tell what kind it is (Fig. 5). When pointing it at a book and it gets information on the author and sees reviews. In restaurants: It'll be able to see reviews and pricing information on a little digital card that appears above the building on the phone screen. With Lens, Google can "understand what it is looking at and help you take action; we can give you the right information in a meaningful way." CEO Sundar Pichai said on stage [12].

c) GOOGLE CONTACT LENS:

Google Contact Lens is a Google's project of the smart contact lens. The aim of this project is to help diabetes patient by constantly measuring the glucose levels using tears. The life sciences division of Google X have carried out this project and it is currently being tested using prototypes.

The lens consists of a miniaturized glucose sensor and a wireless chip [14]. There is a tiny pinhole present in the lens. The tear fluid goes into the sensor from this hole and the body sugar levels can be measured. The sensors are embedded inside the two soft layers of the lens material. No damage can be done to the eyes since the electronics lies outside of both the pupil circumference and the iris. Inside the contact, there is a wireless antenna thinner than a human's hair. This wireless antenna will act as a controller to communicate information to the wireless device [15].

CONCLUSION:

Augmented Reality has its implications, promises, and hurdles. In this paper, we can conclude that Augmented Reality is very important technology that can be widely deployed on mobile devices, educational and medical use, consumer-level hardware, and create location-based AR experiences that can be enjoyed on a global scale.

The better computing power of hardware and better affordability of the physical devices will drive the adoption of this technology. Affordability will be a major factor for mass consumers who are always looking products that meet their budget. Personal computers and mobile phones have followed the same trend of adoption driven by affordability when they were first produced. On the other hand better computing power will lead to the quality development and increased capability of AR.

Augmented Reality will be a future battleground: Majority of online users and social media platforms have started using augmented reality. In Marketing, AR is recognized as an innovative and creative way of connecting customers with the sellers and producers of goods and services. Various apps are already using Augmented reality and more will be updated to the AR capabilities, it is clear that the scope of technology is heading to [16].

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