

Pros and Cons of Augmented Reality

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Abstract

The purpose of this project is to explore the different uses of augmented reality. Augmented reality has many applications that are used in medical, military, and entertainment fields including social networks. These applications have made it easier for doctors to operate, have saved thousands of dollars on military training and have made social life a lot more interesting. But at the same time, many people have become somewhat apprehensive of some of these applications. Some of the negative aspects of augmented reality are safety and privacy issues. However, only people make the choice of placing their lives on the hands of technology, rely on machines to do their job and register to be part of a social network.

Augmented reality has existed since late 1950's, used by a cinematographer, Morton Heilig, who created a simulator device called Sensorama. Later, Ivan Sutherland created the head mount display also known as "window into virtual reality." In 1975, Myron Krueger formulated the first Videoplace where people engage with virtual reality objects. By 1989, the first commercial business was developed by Jaron Lanier, who coined what we know as virtual reality. A few years after, Tom Caudell made up the phrase augmented reality. And years after, many different types of AR applications were developed. Some of the recent applications are the Wikitude AR Travel Guide, the G1 Android phone and the AR Toolkit that allows the web browser to display augmented reality images (Yuan, 2009).

Augmented Reality (AR) has a large number of applications designed for different devices and for different purposes. Yet still, many people mistake virtual reality with AR. According to Jaron Lanier there is one thing that makes AR different from virtual reality.

A very visible difference between these two types of systems is the immersiveness of the system. Virtual reality strives for a totally immersive environment. The visual, and in some systems aural and proprioceptive, senses are under control of the system. In contrast, an augmented reality system is augmenting the real world scene necessitating that the user maintains a sense of presence in that world (Vallino, 2002).

In simple words, the image appears to be real even though is produced by a computer. Also, the viewer is able to not only look at the image but physically control the image and the combination of those two makes the viewer feel they are part of the technology.

According to the "Student BMJ Archive," the reason why scientists continued to explore AR is because of the great demand in the medical field. Doctors aspire for a piece of equipment

that will allow them to do their job efficiently and with accuracy. Since then, there has been many preoperative AR gadgets implemented “to visualize deep structures and allow minimally invasive operations, for example, tumor surgery, temporomandibular joint repair, dental work, and prosthetic and cosmetic surgery” (Thomas, 2008). Other recent applications were designed for equipment like CT’s, MRI’s and ultrasound. The AR ultrasound imaging is “a volumetric rendered image of the fetus overlaid on the abdomen of the pregnant woman” (Vallino, 2002). Doctors need a head mount device (HMD) with a camera and an image digitizes video to be able to perform this procedure.

Augmented Reality is a technology that is not only used in the medical field. This technology has expanded to other areas such as military training. According to “How Stuff Works,” AR has several applications, one of them was designed to train soldiers on how to clear buildings. Also, the military uses AR to help soldiers get a glimpse of the terrain there in through a “head-mounted display [that] could overlay blueprints or a view from a satellite or overheard drone directly onto the soldier’s field of vision” (Bonsor, 2008). Another application that is frequently and currently used in the military is Augmented Reality for Maintenance and Repair (ARMAR). Stationary LCD screens and HMD helps detect a mechanical problem and it guides the mechanic on how to correct the problem through steps; furthermore, it displays the tool that is needed to fix the problem.

A study done at Columbia University by Profesor Steven Feiner and his apprentice Steve Henderson concluded there is plenty room for improvement “future models of the device by incorporating the viewing cameras onto the HMD, allowing it to function autonomously and with less setup” (Saenz, 2010). Feiner and Henderson predict ARMAR could be utilized for non-military vehicles since it could increase productivity; however they believe the price could deter

automobile agencies to buy it. Both researchers foresee “programs like ARMAR could become the definitive guides to helping humans maintain their mechanical world ... [and] eventually have HMDs in our homes to help us program the DVR or fix the high speed internet modem” (Saenz, 2010). An additional AR application similar to ARMAR is being tested to help engineers construct buildings. Another study done at Columbia University along with other agencies created “a see-through head-worn display that overlays graphics and sound on a person's naturally occurring sight and hearing” (Steven Feiner). This technology mimics ARMAR in the way that it guides the person step by step on how to build a structure.

Augmented Reality has become very popular that it has expanded to other trades. Currently, AR is growing in the entertainment and advertising industry. A French entrepreneur and Valentin Le Fevre exploited the different options AR could be useful in. They figured the toy industry was a major market for AR. In this case, AR partnered with toymaker Mattel, now; every toy comes with a 3-D web tag also known as iTAG, which allows the consumer to interact directly with the toy. According to Informilo's home page, advertising is another industry where AR is been utilized and is currently working “with McDonald's, one of the world's largest toy distributors, on integrating the technology into action figures distributed with Happy Meals” (Schenker, 2009). Advertising agencies unsurprisingly lean more to promote popular sports because it allows the person to immerse themselves into the gadget.

Augmented Reality is also gaining territory in the video game industry. At this time, the most thrilling AR video games are Human PAC Man, Come Out & Play, AR Graffiti, Rainbows End and many more. These video games are like no others because “AR has the potential to do something parents can't: free gamers from their couches and usher them into the real world, to play” (Games Alfresco, 2008). The video games background is the actual environment of where

the player is located at. For example, if the player is at his/her living room then that becomes the background that will display on the video game. Human PAC Man can be played with one or more persons and what makes the game exciting is the ability to physically interact with other users and the game itself.

Internet stalking Recognizr is an AR game that functions with the face recognition application. Face recognition so far can be installed on the android phones and other phones; yet, names have not been revealed. The game is simple; first, the person has to register to be part of the game. Second, the person applying for the game attaches social network links such as Facebook, Twitter, Google, YouTube and My Space to his/her picture. Once that person sets up their account others can search for that person and find their links (Gaus, 2010). Another device that is similar to Recognizr is Augmented ID. Augmented ID was designed and created by a Swedish company. This application allows a person to point at someone with his/her cell phone and find information such as contact information, web links, and information about people's social networking profile. Though, in order to do that people have to register for an ID account (Perez, 2009).

Without a doubt, technology has change the way of how people perform their jobs all the way to how people socialize with others and it is obvious AR applications has played a major role in this era of technology evolution. But critics like Sonia Arrison, a TechNewsWorld columnist, said "growing technologies are set to change social communications, bringing up a number of touchy privacy and control questions" (Arrison, 2010). According to the New York Times anyone who has a Facebook account no longer owns their information "Facebook would retain users' content and licenses after an account [has been] terminated" (Stelter, 2009).

Director of the Augmented Environments Lab, Blair MacIntyre said that in order to fix the

privacy problem, social networks need to be limited with what they can do with people's information (MacIntyre, 2010).

Many would ask what does a Facebook account has to do with AR and the answer is simple. People are concerned about their privacy with Recognizr and Augmented ID applications which have links to various social networks thus these applications allow others to get instant information of people who are registered in these accounts. "Why don't we all just walk around with our [social security], bank number, pin, passwords, email, address, phone number and everything else on the back of our shirts?" is what a person had to say about AR facial recognition application (Barrett, 2010). Then again, others say that it is the responsibility of the user to keep their account private or to not register for these types of accounts if they don't want to be identified.

Another concern people have is if some of these applications are safe. For example, the down side of augmented reality in the medical field is that, it exist the possibility of making a mistake during the operation and cause irreversible damages. Doctors have to be able to monitor and cautiously continue with the operating procedure. And the only way an AR operation can be successful, is if doctors are able to properly surgically navigate also known as 'registration.' Thomas, a student, wrote an extensive research paper about AR in surgery and said that registration is "critical because it involves taking a virtual image, such as a three dimensional image of a patient's tumor, and transferring it so that it displays the route in which to resect the tumor" (Thomas, 2008). This re-affirms how talented a doctor must be and highlights the possibilities of human error.

AR applications in the medical field are not the only ones to raise safety concerns. Scientists say there is the possibility of engineers making an error in the process of piecing the spaceframe structure and halt the entire project (Steven Feiner). In the case of ARMAR a minor mistake could result in the failure of having a functional military vehicle in the middle of a war zone. Clearly, with these types of mistakes it could cost millions of dollars to repair a building and or perhaps it could cost people's lives. Another concern about this technology that has not been taken into consideration is the dependency on machinery. Something very similar to this theory is instant spell check on Microsoft Word. Nowadays, many people don't have to properly spell out words when typing because they have the tool to make those corrections.

In conclusion, AR applications have evolved into various industries and scientists continue to research other possible industries where AR can be useful. In the near future in spite of safety and privacy concerns AR "could actually become as integral to our lives as cell phones and Web 2.0 sites in terms of how it enhances reality and integrates with our surroundings" (Brandon, 2009). Nonetheless, AR "could lead to life-threatening disaster and a new form of hacking and identity theft" (Brandon, 2009). With this in mind people will have to decide if it's worth taking a risk of been part of the new social trend or stay behind technology.

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