

Applications for Augmented Reality and Wearable Technology in Daily Life



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A New Approach to Communication

Juergen Lumera discusses how augmented reality (AR) will focus on showing as opposed to telling in his article, *Is Augmented Reality the Future of Technical Documentation*. Wearable technology will only enhance this idea, through the use of our phones, smartwatches, or computers.

Our technology has evolving to the point where we are able to incorporate advanced pieces of technology into our daily lives. These devices have a justified use in our world, it's just up to us to find their applicable use in our world.

A Brief History of Augmented Reality and Wearable Technology

According to Whatis.com, AR is the integration of digital information with live video of the user's environment in real time.

AR can be traced back to Morton Helig's Sensorama, developed in 1957, which would have been used with movies. It would have allowed for a person to feel wind in their face or have their seat vibrate under them.

Then, in the year 1966 professor Ivan Sutherland invented the Head Mounted Display, which at the time was a device too heavy for a human head to wear but, an integral development for AR.

Until the creation of apps, however, AR was mostly used for scientific purposes. Due to the fact that the



technology was cumbersome and much too expensive for the average consumer.

While working in Boeing's Computer Services' Adaptive Neural Systems Research and Development project in Seattle, Professor Tom Caudell coined the term "Augmented Reality."

Now, Webopedia.com defines wearable technology as computer powered devices or equipment that can be worn by a user, including clothing, watches, glasses, shoes and similar items. With the earliest wearable technology being traced back to eyeglasses that were created in the year 1256.

However, it wasn't until the 1960's that wearable technology was finally being produced at a constant rate with devices like the Sony Walkman or the SEIKO UC 2000 Wrist PC. However, our more modern types of wearable technology, such as, iPods, Nano or otherwise, and smartwatches did not appear till the 2000's.

Looking towards 2016, the Oculus Rift, a virtual reality device with rotational and positional tracking, is set for release. While the Oculus Rift has been primarily focused on gaming, the Microsoft HoloLens, which uses AR and holograms, is being aimed for more

practical uses in education and the workplace, as well as gaming.

Implications in the Workplace

So, how do you go about repairing a crucial piece of equipment for your job if you have no idea where to begin? AR can help rectify that situation. Instead of calling someone else, who may or may not show up and lose valuable time, AR can teach you do it yourself through a visual means instead of potentially misinterpreting a manual.

A video on TechWhirl.com showcases Marines using AR and a wearable device for this exact process. Through the use of 3D arrows, labels, and cues, they were able to fix their equipment out in the field. These devices could be used in the field or at home, from repairs to teaching you how to cook.

Now, according to *The Studierstube Augmented Reality Project*, the Vienna University of Technology created a collaborative AR system that allowed multiple people to enter a virtual space that could be filled three dimensional data. Equipped with head tracking devices and a Personal Interaction

Panel (PIP), a prop device which could have data overlaid on it, allowed users to see and hold the representations being placed before them.

The PIP also would allow for gestures such as writing and drawing to be made. With full manipulation of objects, as well as, providing animations of live and still images to be displayed.

Software like Autodesk Showcase Professional 2016, can allow designers, architects and engineers to create interactive presentations of their work. These representations are rendered in 3D and allow for full manipulation just like their physical counterparts.

Since tablets already come equipped with a camera they will be ideal to use with AR. Thanks to the numerous amount of apps and developers working on AR applications, tablets will

Implications in Education

Now imagine you don't have enough resources to fully instruct a class on a particular topic. AR could be used to provide visual representations as an alternative solution. Or you could have

be a simply way of incorporating AR in the workplace. With the automotive industry already taking full advantage of this.

According to their website, the Microsoft HoloLens will allow for the use of HoloNotes in Skype in order for your colleagues to see the exact work you are doing and provide feedback. NASA will even utilize the HoloLens to create a 3D representation of Mars through images taken from the Mars Rover that will allow them to "walk" on the surface Mars.

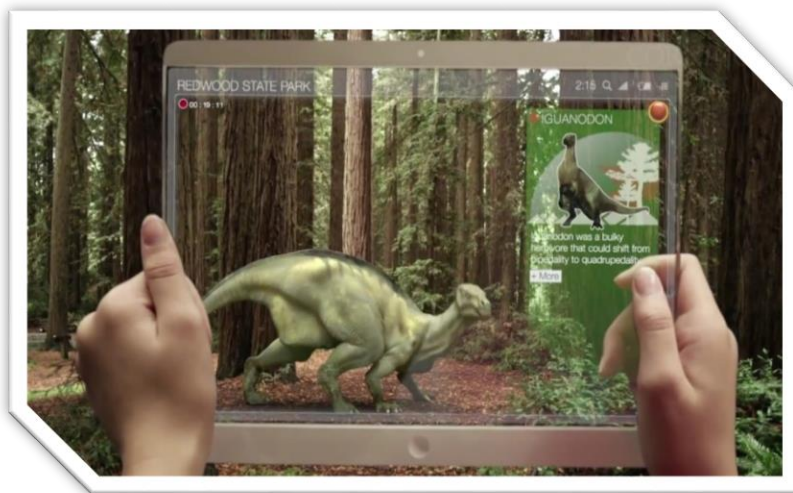


a whole class sit around with one fully rendered 3D model before them.

In the article, *Augmented Reality in Education*, Mark Billingham discusses how children work better in groups as opposed to isolated in front of

computer screen. He proposes using AR to have a class work together while having a virtual floating heart in front of them to encourage communication.

AR could even bring a static reading to life through the use of video or 3D representations. Bringing the material to life and allowing for full exploration or alteration can be more interesting and informative. AR can even provide visual instructions and eliminate the need for manuals that could potentially be misunderstood.



The Studierstube project, through an application called Construct3D, was even able to teach students mathematics and geometry education, by allowing students to see actual three dimensional shapes as opposed to 2D drawings on a piece of paper.

Moving onto wearable technology, a survey done by Matt Bower and Daniel Sturman asked participants about potential uses of these devices in education. Among the responses were the ability to record classes, providing better communication between students and teachers, introducing gameification, and allowing schools to free up space through use of digital representations.

However, one participant mentions that it could allow students to “experience riskier scenarios and perhaps fail at them, without suffering real world consequences.”

This could be used in the medical field to great effect, having students practice risky surgeries or procedures without the need for a living breathing person.

Implications in the Medical Field

Just take a look at Vipaar, a video support solution that can be utilized with Google Glass, an optical head mounted display, that allowed a surgeon to project his hands in front of another surgeon to provide guidance and support during a live surgery.

Then we have AccuVein, a handheld scanner that can highlight where a person's veins are to provide nurses with better accuracy when it comes to injections or blood tests. Or the VA-ST, a sensor made for people who are legally blind that can help them recognize faces and drive.

In *A survey of Augmented Reality*, Ronald Azuma brings up how the naked eye can see things that we cannot see through the use of Magnetic Resonance Imaging (MRI) or Computed Topography (CT) scans. By combining the MRI, CT scans, and Ultrasounds through the use of AR, doctors could render a virtual patient and be able to have "X-ray" vision. Which, in turn, would allow doctors to have better methods to treat and diagnose patients.



Other devices, such as, Quell Relief, The Helius by Proteus Digital Health or Fitbit are changing how we can take care of ourselves. The Quell Relief is a piece of wearable technology that can be used as a knee brace. Meanwhile it will track any relevant information through a companion app and is charged just like a phone.

The Helius by Proteus Digital Health is a pill that once consumed is tracked by a companion app that allows a doctor to track their patient and see if they are responding to therapies and taking their medication. A doctor can even be alerted to when a patient is unwell and check up on them through the use of real time tracking.

Finally, Fitbit, a fitness tracking device, can be used by the average person who wants to stay fit and in control of their workouts. It can track your workout schedule and monitor your heartrate or calories burned. Some smartwatches are even being equipped with heartbeat sensors and fitness tracking applications as well.

These are devices that when implemented by doctors or ourselves are evolving the way our medical processes work.

Implications for the Consumer

Now for gaming, the Microsoft HoloLens is being integrated with the Xbox One to bring consumers a whole new level of interactivity. At E3 2015, an annual video game convention, Microsoft showcased how the HoloLens would be able to bring games to life by displaying an interactive hologram of the video game, Minecraft.

Now Nintendo, a video game company, is also utilizing AR for their Pokémon game being made for mobile devices that would allow you to capture Pokémon in real life. Meanwhile, both

the Nintendo 3DS and PlayStation Vita utilize AR through cards that when used in conjunction with their cameras will bring the characters on them to life.



For non-gaming purposes, we have software that will allow you to test objects before purchasing to avoid dissatisfaction with online purchases.

Like how IKEA is using AR for their IKEA catalog app. The app renders a virtual representation of the piece of furniture you are interested in and displays it within your house. Which you can then scale and resize to see if it would be a good fit.

While TryLive.com allows you to virtually try on glasses, jewelry or look at furniture through the use the camera on your laptop or computer.

The Artvertiser is a software that utilizes goggles read an advertisement in the real world and replace it with another creator's advertisement. This can allow for anyone to create and display their advertisements for products or companies and share them in the real world.

Then we have forms of blending reality, which aim to bridge our digital and physical worlds. Google Glass is a prime example of this. Equipped with a camera, touch pad, and interactive

display, everything would be brought up right before your eyes.

With InifityAR aiming to do this at a larger scale through glasses similar to that of Google Glass. These glasses would encapsulate your entire life with heads up display that can bring news or weather information to you or highlight a GPS route before your very eyes. Even gamifying your workout routines to make them more than rudimentary.

The Future Relies on Us

These devices have a justified use in our world, it's just up to us to find their applicable use in our world. With the use of AR and wearable technology, our forms of communication are changing.

By combining these two forms of technology, we can focus on visual communication instead of only literary communication. The way in which we interact with our world and communicate with each other is undergoing a change that will last for generations to come.

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