



Industry 4.0

Virtual Reality and Augmented Reality



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Virtual Reality

- Virtual reality is a technology that uses software to generate realistic images, sound and other sensations that replicate real world environment.
- A user can interact and manipulate with virtual objects of virtual world with the help of specialized devices like display screens or other devices.

- **Virtual reality** uses a headset to place you in a **computer-generated world** that you can explore.
- **Augmented reality**, on the other hand, is a bit different. Instead of transporting you to a virtual world, it **takes digital images and layers them on the real world around you** through the use of either a clear visor or smartphone

Virtual Reality

- A person using virtual reality equipment is typically able to "look around" the artificial world.
- virtual realities are displayed either on a computer monitor, a projector screen, or with a virtual reality headset.
- Virtual reality environment is captured by using 360 degree special video camera.



History

- 1965-The beginnings of VR.
- 1977-Interaction through body movement
- 1982-The first computer- generated movie
- 1983-First virtual environment
- 1987-Development of immersive VR
- 1993-Invention of surgery rehearsal system.
- 2007-Google introduced Street View, a service that shows panoramic views

Immersive Virtual Reality

- An immersive Virtual Reality adds special gadgets like Head mounted displays and Boom.
- Stereoscopic viewing adds enhanced features like deep peeping through the Virtual world.
- Eliminating the real world and placing the human in a computer generated world is one of the enhancements.
- Interactions with the objects in the Virtual world are controlled by a data glove, head mounted display and other gadgets.



Head Mounted Display

- Consists of two miniature display screens that produces the stereoscopic images and an optical position tracking system
- It tracks the orientation of the humans head in the Virtual world and that produces the impulse to the image generating large projection Areas to get more immersive feeling.
- Characteristics: walk through , look around, fly through in the 3d Virtual world Computer.



Application of virtual reality

- Movies - Virtual reality is applied in 3-D movies to try and immerse the viewer into the movie and/or virtual setting and environments.



Applications of VR Cont...

- Video Games - Virtual reality is evident in video games. Now you can physically interact with a game by using your body and motions to control characters and other elements of the game that years ago people would only imagine.





Applications of VR Cont...





Applications of VR Cont...



How Virtual Reality Works?

- Virtual Reality tricks your brain into believing you are in a 3D world.
- VR does this is with the stereoscopic display.
- It works by displaying two slightly different angles of the scene to each eye, simulating depth.



Advantages of Virtual Reality

- It creates a realistic world
- It enables users to explore places
- It makes education easier and provides comfort

Augmented Reality

- A combination of real scene viewed by a viewer and a virtual scene generated by a computer that augments the scene with additional information.
- Augmented reality allows you to **see the world around you with digital images layered on top of it**. There are currently a couple of AR headsets available, including the [Microsoft HoloLens](#) and the [Magic Leap](#). However, they are currently more expensive than VR headsets, and are marketed primarily to businesses.
- With virtual reality, we can even explore underwater environment. With augmented reality, we could see fish swimming through the world around you.

Augmented Reality

- Augmented reality adds virtual computer-generated objects, audio and other sense enhancements to a real world environment in real time.
- The goal of augmented reality is to create a system such that a user cannot tell the difference between the real world and the virtual augmentation of it.





Technology Components Cont...

Applications of AR

- Medical
- Entertainment
- Military training
- Engineering design
- Robotics and Telerobotics
- Manufacturing, Maintenance and repair



Applications of AR Cont...



Advantages & Disadvantages of AR

Advantages

- Can increase knowledge and information
- People can share experiences with each other in realtime over long distances
- Things come to life on people's mobile
- Games can provide even more 'real' experience

Disadvantages

- Production is expensive
- Lack of privacy
- Difficult to maintain augmented reality systems
- Low performance level



Augmented Reality vs Virtual Reality



Advantages and disadvantages

Conclusion

- Both VR and AR technologies are growing at a pretty rapid pace. Many experts predict that they'll continue to become more and more popular in the near future. As technology becomes more advanced, it'll be exciting to see how they'll be applied to both business and everyday life!
- We have seen that both virtual reality and augmented reality are similar in the goal of immersing the user, though both systems do this in different ways.
- AR may have more commercial success, while VR is a new technology and is emerging fast. Both technologies are becoming cheaper and more widespread. We can expect to see many more innovative uses for both technology in the future and perhaps a fundamental way in which we communicate and work thanks to the possibilities
- Virtual as well as Augmented reality has very strong potentials in future.

Resources

- <https://www.panono.com/en/blog/blog-posts/augmented-reality-ar-virtual-reality-vr-different-areas-of-application-advantages-and-disadvantages/index.html>
- <https://edu.gcfglobal.org/en/thenow/understanding-virtual-reality-and-augmented-reality/1/>