Virtual reality (VR), replicates an environment that simulates a physical presence in places in the real world or an imagined world, allowing the user to interact in that world.

Essentially, it transports users totally into an imagined world.

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Augmented reality is an overlay of content on the real world, but that content is not anchored to or part of it. The real-world content and the CG content are not able to respond to each other.

- User is aware about real world.
- User interact with real & virtual in real time.
- Real & virtual interact with each other in real time
- Replaces the real world.

Mixed reality (MR)—sometimes referred to as hybrid reality—is the merging of real and virtual worlds to produce new environments and visualisations where physical and digital objects co-exist and interact in real time.

Augmented Reality can be used on all screens and connected devices :

Through **mobile devices** like smartphones and tablets, Augmented Reality acts like a magic window; through the viewer you can see holograms and manipulate 3D models. Hundreds of Augmented Reality apps are available on iPhone, iPad, and Android.

On **PC and connected TV players**, Augmented Reality works through a webcam and relayed through the screen. This can be quite cumbersome when you have to manipulate a tracker in front of your screen.

On **head mounted displays, glasses, and lenses**, Augmented Reality becomes a part of your entire field of view, making for more life-like Augmented Reality experiences. It almost feels like Ironman with the help of Jarvis.

1. Projection based AR ; As the name clearly says this type of AR projects digital images on physical objects in the physical space. It can be interactive and project a digital keyboard on your desk, or a dialer on your hand. It might be non-interactive and it can be used to create projection of objects that you can position and see in depth – for example, it might show you if your future fridge will fit into that space you have near the oven by projecting the fridge in front of you. Like projection mapping

2. Recognition based AR ; Whenever you scan a QR code, or scan an image and it comes to live, you are actually using a recognition based AR. The AR app detects and recognizes something called AR marker. Once it recognizes the marker, it replaces it with a corresponding object.

3. Location based AR takes advantage of the smart devices' location detection features. If you're a traveler and you want to discover new great places, this method will use your location by reading your smart device's GPS, compass and accelerometer and give you relevant information about what you're looking for on your screen.

4. The line here is a bit blurry – outlining AR uses object recognition to work, and might look a bit like a projection based AR. For example, whenever you're parking your modern car in the dark, outlining AR recognizes the boundaries of the road and outlines them for you. This method can also be used in architecture and engineering to outline buildings and their supporting pillars.

5. Superimposition based AR also uses object recognition in order to replace an entire object or a part of it with an augmented view. For example, if you've ever played FPS games, you know how your soldier may have advanced military equipment showing infrared view, night vision, radioactive view, etc. – this is all superimposition based AR. Also, in medicine, a doctor can use this technology to superimpose an X-ray view of a patient's broken arm bone on a real image to provide a clear understanding of what the bone's damage actually is.

iOS 11 introduces ARKit, a new framework that allows you to easily create unparalleled augmented reality experiences for iPhone and iPad. By blending digital objects and information with the environment around you, ARKit takes apps beyond the screen, freeing them to interact with the real world in entirely new ways.

This new framework makes it much easier to look at virtual objects in the real world using augmented reality.

Apple devices will become augmented reality-capable machines.

How AR transforms something originally meant for a 2D viewing...

Splitter critters is a puzzle game that players have to split the world with a swipe of your finger and then rearrange it to guide critters back to their spaceship.

The AR mode is not just for beauty, The developer created for completely new innovative gameplay mechanics which uses perspective and depth to control pathing.

New forms of expression

World Brush is an AR experience where users can paint on the world for others to discover. Every painting is anonymous and only visible where it was created. Users have the ability to like, dislike and report paintings which helps hide the bad stuff and showcase the good stuff for others.

- Paint on top of the world with others in AR
- Customize paintings with diff brushes, colours and weights
- Discover paintings in your area using map feature / or world
- Record paintings you create and share with friends

Google Tango / AR Core
Google has similarly been experimenting with smartphone AR since it first showed off Project Tango to the world in 2014. Three years later the company has some great technology to show off as a result, but very little in the way of actual users. Recently they are releasing a developer preview of ARCore, a platform that will deliver AR capabilities to Android smartphones at a scale Tango was never able to reach.

ARCore is a platform for building augmented reality apps on Android. ARCore uses three key technologies to integrate virtual content with the real world as seen through your phone's camera:

- **Motion tracking** allows the phone to understand and track its position relative to the world.

- **Environmental understanding** allows the phone to detect the size and location of flat horizontal surfaces like the ground or a coffee table.

- **Light estimation** allows the phone to estimate the environment's current lighting conditions.

ARCore is designed to work on a wide variety of qualified Android phones running N and later.

Allows users to touch, pull, grab 3D holograms and also has the widest field of view in the AR market which offers a more immersive experience.

The front-facing depth sensors have a 270-degree field of view that tracks the real world and can keep track of your hands, as well. There are sensors to track head and body motion, quadrophonic surround sound speakers and a microphone array.

It is a cheaper alternative to Hololens (Meta 2 Development Kit costs $949. The cheapest HoloLens is $3,000.)

There are, though, distinct differences between Meta 2 and HoloLens. The latter is a complete Windows 10 PC, self-contained, polished, well-balanced and comfortable to wear. Meta 2 is noticeably larger and appears to have a relatively large block on the back that counterbalances the weight on the front.

When you wear Microsoft HoloLens, the Augmented reality window is confined to the space of a virtual, large screen HDTV floating in front of you. If you keep your head straight and look a bit to the left or right, the mixed-reality fades away. Meta 2 expands that viewport considerably. One have to look pretty far for the peripheral vision to see where the AR effect ended.

However, Meta 2 can only run when tethered to a laptop or PC running a discrete graphic chip. The company hopes to offer untethered headsets by 2018.

Invades Privacy

Just like other modern technologies on the market, AR & VR can be prone to data hacks as well – and that's a scary thing, considering how much data is connected to virtual environments. Many people also fear the way in which personal data might be used by authorities in order to track or control individuals.

Hampers Interaction With Real-World

If one can see and experience the world from your living room, would you ever really need to leave the house? AR and VR may provide new ways for people to communicate, but they could also possibly take away an important aspect of our social life that involves around human interaction.

Hyper-Reality (total runtime approx 6 minutes) is a concept film by Keiichi Matsuda.

It presents a provocative and kaleidoscopic new vision of the future, where physical and virtual

realities have merged, and the city is saturated in media.

Our physical and virtual realities are becoming increasingly intertwined. Technologies such as VR, augmented reality, wearables, and the internet of things are pointing to a world where technology will envelop every aspect of our lives. It will be the glue between every interaction and experience, offering amazing possibilities, while also controlling the way we understand the world. Hyper-Reality attempts to explore this exciting but dangerous trajectory.

Dogmented Reality will train and entertain your pup. This is a revolution in dog training and will keep our furry friends from feeling lonely ever again.