

# INTRODUCTION

# 1. INTRODUCTION

It's 2020, our reality has changed. Due to COVID-19, many of us are working from home, a new way of doing business that requires a dependency on technology like never before. Platforms like Zoom help us to maintain connection and communication with clients, team members, and sometimes family and friends. As a result of social distancing and travel restrictions, advanced technologies such as XR are no longer distant possibilities but instead strong considerations for our new emerging reality. XR has slowly made its way into industries such as education, medicine, entertainment, training, real estate, gaming, and several others.

The XR technology has seen interesting use cases in business. Almost every industry is using it to meet specific objectives around training, learning, marketing, and customer experience. With the help of virtual projectors and slides, businesses can target their audience better, thus leading to incredible customer experiences.

The XR is not a device but its a trending technology that we are using today as the combinations of VR,AR,MR. This XR technology allows us to open a way to the emerging future technologies. It can easily develop a virtual-real environment where we can touch, sense and smell the real world entities with the help of newest technologies like machine learning, artificial intelligence, computing devices and virtual reality continuum.

The recently happened mars exploration of perseverance rover is tested in NASA before its creation with the help of XR technology whereas, its prototype designed model were created in a virtual environment using computing devices, applies statistical studies of mars surface with machine learning, working of rover in such a surface is created using artificial intelligence.

# XR

## 2. XR - Extended Reality

A new term has lately been widespread in the immersive technology world. This is XR [Extended Reality]. The concept is a fusion of AR [Augmented Reality], MR [Mixed Reality] and VR [Virtual reality]. Thus, with these full-scale mature technologies, the user generates new forms of reality by bringing physical objects into the digital world and vice versa.

In a typical scenario, the process involves creating holographic images and letting humans interact with them. XR, is thus an awesome combination of the Completely Real World and the Completely Virtual World without any borders differentiating the two. The meaning of XR has been currently broadened to include technologies of extended Intelligence.

Those developing XR technologies are battling with some of the challenges to mainstream adoption. First, XR technologies collect and process huge amounts of very detailed and personal data about what you do, what you look at, and even your emotions at any given time, which has to be protected.

In addition, the cost of implementing the technology needs to come down; otherwise, many companies will be unable to invest in it. It is essential that the wearable devices that allow a full XR experience are fashionable and comfortable as well as always connected, intelligent, and immersive. There are significant technical and hardware issues to solve that include but are not limited to the display, power and thermal, motion tracking, connectivity and common illumination—where virtual objects in a real world are indistinguishable from real objects especially as lighting shifts.

# HISTORY

## 3. HISTORY

The history goes back a long time, a computer scientist in Sutherland creates a VR headset early 90's. Later the VR technology has arrived and by its contradiction the newest technologies like AR & MR has arrived. Afterall XR is considered as a new umbrella term used to represent those three technologies. But now XR is the emerging technology which combines the those three reality technologies. Year 2020 plays major important in the life of XR whereas it emerges with combining of artificial intelligence, machine learning computing devices with Reality technology.

### 3.1 AR

Augmented reality (AR) is an enhanced version of the real physical world that is achieved through the use of digital visual elements, sound, or other sensory stimuli delivered via technology. It is a growing trend among companies involved in mobile computing and business applications in particular. AR can be defined as a system that fulfills three basic features: a combination of real and virtual worlds, real-time interaction, and accurate 3D registration of virtual and real objects.

Augmented reality (AR) adds digital elements to a live view often by using the camera on a smartphone. Examples of augmented reality experiences include Snapchat lenses and the game Pokemon.

- Augmented reality (AR) involves overlaying visual, auditory, or other sensory information onto the world in order to enhance one's experience.
- Retailers and other companies can use augmented reality to promote products or services, launch novel marketing campaigns, and collect unique user data.
- Unlike virtual reality, which creates its own cyber environment, augmented reality adds to the existing world as it is.

## 3.2 VR

Virtual reality (VR) refers to a computer-generated simulation in which a person can interact within an artificial three-dimensional environment using electronic devices, such as special goggles with a screen or gloves fitted with sensors. In this simulated artificial environment, the user is able to have a realistic-feeling experience. It implies a complete immersion experience that shuts out the physical world. Using VR devices such as HTC Vive, Oculus Rift or Google Cardboard, users can be transported into a number of real-world and imagined environments such as the middle of a squawking penguin colony or even the back of a dragon.

- Virtual reality (VR) creates an immersive artificial world that can seem quite real, via the use of technology.
- Through a virtual reality viewer, users can look up, down, or any which way, as if they were actually there.
- Virtual reality has many use-cases, including entertainment and gaming, or acting as a sales, educational, or training tool.

## 3.3 MR

Mixed reality (MR) is the merging of real and virtual worlds to produce new environments and visualizations, where physical and digital objects co-exist and interact in real time. Mixed reality does not exclusively take place in either the physical or virtual world, but is a hybrid of reality and virtual reality. There are many practical applications of mixed reality, including design, entertainment, military training, and remote working.

In a Mixed Reality (MR) experience, which combines elements of both AR and VR, real-world and digital objects interact. Mixed reality technology is just now starting to take off with Microsoft's HoloLens one of the most notable early mixed reality apparatuses.

# RESEARCH



## 4. RESEARCH

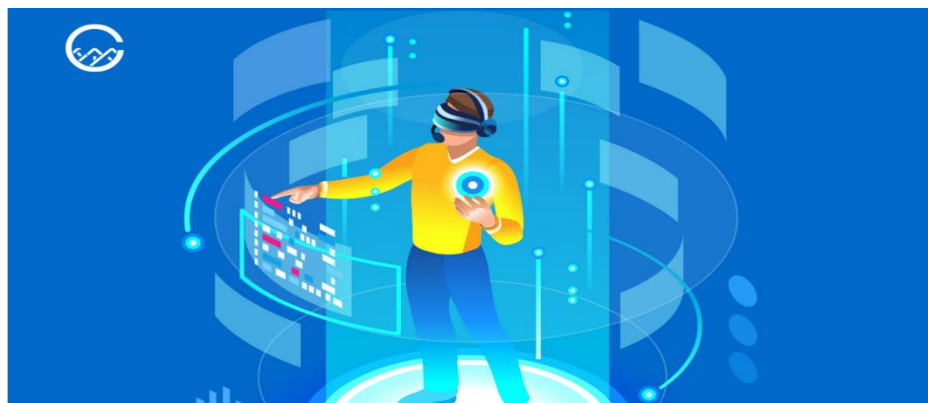
XR eliminates distance barriers. Extended Reality banishes the restrictions due to remoteness and as a result, a number of businesses and industrial solutions became prevalent and are being distributed on a larger geographical landscape. It also enhances the application of obtaining vital insights through better immersion and a 3-dimensional environment.

There are many researches are still ongoing upon the XR technology. Few months ahead a Korean scientist who was researching upon the Nikon Tesla's Thought Machine invention that had still not exit where findouts the hope of its arrival with the help XR technology and he successfully builded its prototype.

### 4.1 WORKING

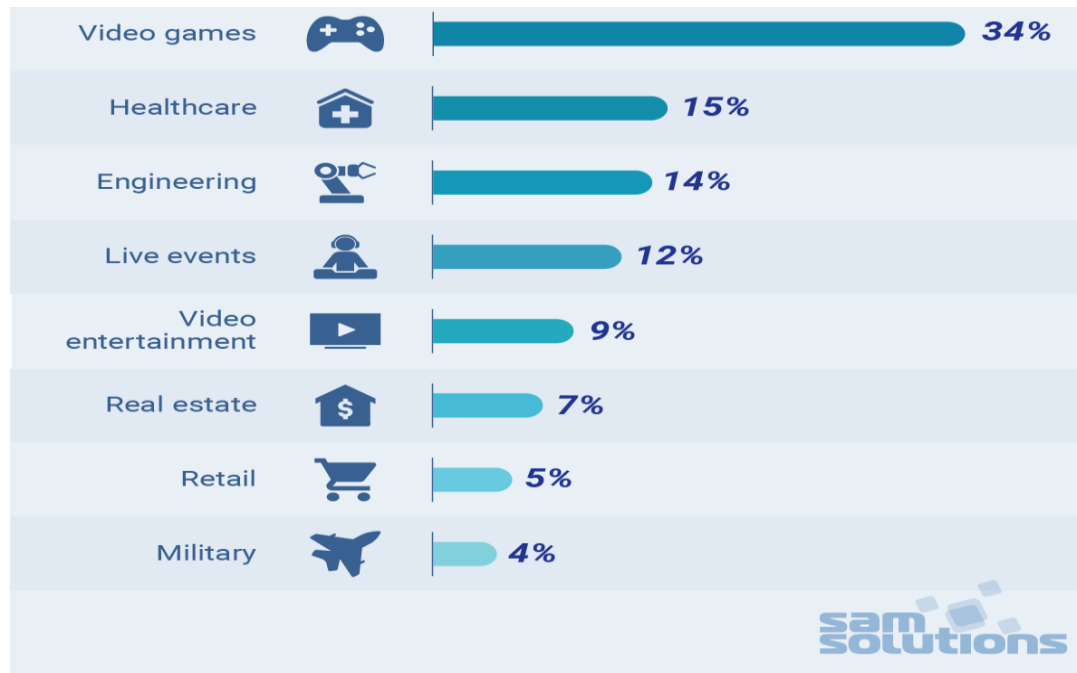
XR is not a device and its a emerging technology whereas which combines the three realities AR, VR and MR with the artificial intelligence, machine learning and computing devices to build a virtual environment in the physical world.

XR is just a technology for the implementation of different platform with the help of AI and ML. Whereas it build ups a virtual environment and develops a prototype models of real world entities in it. With the help of 3D printers we can print out the entities created in the virtual environment to the real world.



## 4.2 Uses

Numerous companies from the gaming industry, healthcare, engineering, entertainment industry, real estate, retail and the military sector around the world are already making the most of the technology



# **ADVANTAGES & DISADVANTAGES**

## **5. ADVANTAGES & DISADVANTAGES**

### **5.1 ADVANTAGES**

1. According to the latest survey, 45% of XR technology, is today used in the education world. Virtual classrooms are a big hit in the modern education scenario whereby hands-on knowledge is imparted by creating virtual slides using high-end projectors.

2. In the medical profession, this technology is proving to be a boon to physicians, who can explain the methods and stages of treatment to their patients, thus aiding in better patient outcomes in the healthcare setting.

3. The greatest advantage of XR technology is that it has helped a lot in boosting online trade and business. Customers get good exposure beforehand, as to what lies in store for them, in terms of online goods and services. It helps blur the difference between an online and brick and mortar store and provide a truly omnichannel experience.

4. Big organizations can be safely connected with their employees and at the same time, broadcast and announce schemes, show live projects and conduct live projects and discussions regarding the betterment of their organization.

### **5.2 DISADVANTAGES**

- Compromised privacy. As with any other technology, XR is prone to cyber-attacks, in particular, to data hacks. ...
- Reduced social engagement. ...
- Physical harm. ...
- The high cost of implementation

# LIMITATIONS & APPLICATIONS

## 6. LIMITATIONS AND APPLICATIONS

### 6.1 LIMITATIONS

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In addition, the cost of implementing the technology needs to come down; otherwise, many companies will be unable to invest in it. It is essential that the wearable devices that allow a full XR experience are fashionable and comfortable as well as always connected, intelligent, and immersive. There are significant technical and hardware issues to solve that include but are not limited to the display, power and thermal, motion tracking, connectivity and common illumination—where virtual objects in a real world are indistinguishable from real objects especially as lighting shifts.

### 6.2 APPLICATIONS

1. Entertainment and gaming
2. Employees and Consumers
3. Healthcare
4. Marketing and business solutions

# CONCLUSION

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XR technology has seen interesting use cases in business. Almost every industry is using it to meet specific objectives around training, learning, marketing, and customer experience. With the help of virtual projectors and slides, businesses can target their audience better, thus leading to incredible customer experiences. Thus, we can safely say that, as an emerging technology, XR or Extended Reality is proving to be a valuable asset to clients and organizations worldwide. Its immense sensory and immersive appeal helps organizations across the different sector to meet stated objectives easily.



## 8. REFERENCE

[1]. <http://www.wikipedia.com>

[2]. <http://www.google.com>

[3]. <http://www.forbes.com>