Chapter 5
Augmented Reality and Its Significance in Healthcare Systems

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ABSTRACT

Augmented reality and virtual reality are terms often used together and even interchangeably sometimes without knowing their actual meaning. Augmented reality (AR) enhances the real world by mixing and overlapping digital objects with the real world whereas virtual reality (VR) is a completely different world created in a virtual space. VR can be experienced with wearables; but AR needs a device as simple as a phone and it's also wearable. In this chapter, AR is discussed and explored in a detailed manner. With its rapid evolving time, AR will be more common than it is now. It already is a part of everyone's life with the help of applications like Google Lens and Snapchat. AR has been experimented on for a while and the first spine surgery on a patient has been performed by John Hopkins neurosurgeon on June 8, 2020, using AR headsets. In this chapter, the types of extended reality (XR) and their differences. AR technology used in the study of anatomy, medical surgeries, pharma study, MedTech, and case studies of AR implementation in the field of medical surgeries is discussed.

INTRODUCTION

With the evolving industry, technology has improved a lot and things like augmented reality (AR) and virtual reality (VR) are not the technology of future anymore. Both the technologies have started integrating with many fields and industries including everyday life.

AR and VR terms are more commonly been used interchangeably by the people, but it all comes under Extended Reality (XR). With new types coming, the XR term was coined to represent any immersion in the real and virtual world. This technology still has a lot of potentials to be explored and might take a few more years to be completely a part of our life. It may be new but it has been around and worked upon since the mid-1950s. It was back in 1957, the filmmaker Morton Leonard Heilig, came up with a prototype to enhance the experience of watching films and theatres. He made a big box-like machine where he played five films and the viewer would experience different senses like visual, sound, smell, and touch. He named it Sensorama (Jones 2018,183). The viewer using the Sensorama would feel the motion, smell, touch, and realistic visuals along with the film to make the experience as real as possible. This Sensorama was not easily portable and needed space to use.

Later in 1968, a computer scientist, Ivan Edward Sutherland, created the very first head-mounted display to make the experience more portable. This display was similar to the new wearables but was not practical enough. It was a level up from Sensorama but the head mount display was heavy to be used, hence it was not a successful production but made a mark in the field.

In the mid-1970s, another computer artist, (Myron Krueger 1985), created a virtual interface called 'Videoplace'. This was a grade-up from previous inventions as it was more interactive. It used goggles and gloves to enhance the experience. It was not portable but rather needed a good amount of space to execute. It was different because it was not interconnecting a digital film with humans but two actual humans can interact without physically being in the same room. Videoplace needed two rooms for users to experience it. Each participant is present in two different rooms and while using a projector, cameras, gloves and goggles. A silhouette image of each other was visible to both through which they would interact. Along with this. they can also interact with virtual objects integrated by the programmer.

Around the 1980s is when portable and wearable devices started to stem. The heads-up displays were researched and experimented with by many researchers around the world.

One of the notable creations was of Steve Mann, an engineer who made the first Wearable computing' (Parisay 2020). He made the first wearable computing device called 'EyeTap'. This is similar to the head-up device and current google glass. In

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