Chapter 4
Augmented Reality and Experiences:
Augmented Reality, Virtual Reality, Software, Mobile AR, Browsers, Types, Experience, Application

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ABSTRACT

Today technology evolves in two different directions. The first one is to create a new technology for our requirement and solve the problem, and the second one is to do it with the existing technology. This chapter will discuss in detail augmented reality and its use in the real world and also its application domains like medicine, education, health, gaming, tourism, film and entertainment, architecture, and development. Many think that AR is only for smartphones, but there are different ways to enhance the insight of the world. Augmented realities can be presented on an extensive range of displays, monitors, screens, handheld devices, or glasses. This chapter will provide the information about the key components of AR devices. This chapter gives a view on different types of AR and also projects how the technology can be adapted for multiple purposes based on the required type of view.

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INTRODUCTION

As the emergence of new information demands, there emerges a new method to showcase the information to reality. It offers an exclusive experience in a wide range of industries in an attractive and innovative way to showcase the concepts to provide great experience. The term augmented reality is termed by Thomas Caudell (1990) when he explains the usage of head mounted displays worked when used by electricians for assembling complicated wiring connection said augmented reality (AR) is used for a combination of technologies for merging information produced by the computer with the spectator's natural senses. It is an emergent research in the area of virtual reality. It uses the real background and merges the new information over it. Due to enormous information produced in the world, it is very difficult to the world environment around us provides a wealth of information that is difficult to replicate in a computer which is demonstrated by the usage of virtual environments in the world. In 1998, the first AR application in commercial was used in the football match. AR gives a different perspective, and converts the work as we are aware of it. The definition of AR was said by Azuma et al. (1997). In which he says that AR has three features which are: AR has a combination of real and virtual environments, interacts with real time, and is 3D.

Many technical balancing is required relevant to tracking in case of developing AR applications for mobile and other outdoor environments. So there is a necessity to rely on computer vision for very precise tracking or sensor-based tracking. Janson Wither (2011) explains a new approach indirect AR which provides accurate alignment of virtual content. This approach uses captured panoramic image which enables pixel matching between the virtual content and representation of the real world accurately. It improved the quality of the tracking. Though the method has some limitations and challenges people still use this approach since it provides good matching accuracy. It works when the user is away from the physical object more than a few meters.

A good virtual reality system permits the users to physically walk around objects and feel the object by touching it as if it is a real one. Sutherland, the creator of one of the world's first virtual reality systems stated" the ultimate display would, of course, be a room within which the computer can control the existence of matter. A chair displayed in such a room would be good enough to sit in. Handcuffs displayed in such a room would be confining, and a bullet displayed in such a room would be fatal". Computer-presented material is integrated with the real-world environment that the freely roaming person can interact with it to display related information, to position and resolve questions, and to cooperate with other people. The user interface is the world.

An AR-based simulation system that integrates background knowledge and experimental support (AR-SaBEr) was designed as a learning tool for teaching basic principles of electricity to ninth-grade students to examine how it supports the learner to focus on the meaningful activities that affects behaviour and learning performance. Maria et. al. (2016) took a sample of 82 students. They randomly divided into two groups namely control and experimental group. The control group used AR-SaBEr without any support for recommending activities and the experimental group with personalized extra support. The experiment showed that the experimental group performed well compared to control group. They identified that learners' behavioral patterns depend on the support they received and before experimenting, the control group were interested in browsing the information about activities instead of reading about the subject. But in contrast experiment group read the subject first before experimentation. In augmented reality-based simulation it focuses the attention of students on the most relevant topics for them. They analyzed effectiveness of the two scaffolding strategies by considering the way students used an AR-based