


Chapter 11


Digital Twins AR and VR: Rule the Metaverse!

K. Anitha

 <https://orcid.org/0000-0002-1940-2101>

Meenakshi Academy of Higher Education and Research, Chennai, India

Indrajit Ghosal

 <https://orcid.org/0000-0003-0744-2672>

Poornima University, Jaipur, India

Ajay Khunteta

Poornima University, Jaipur, India

ABSTRACT

The term “metaverse” has taken off in the tech world. No day goes by when it isn’t mentioned in the media, particularly when huge firms enter this area of digital engagement. Unquestionably, a 3D virtual world is gaining enormous momentum, which will likely go down in history as a watershed moment for the metaverse. Even though the idea has not fully developed yet, it is likely that cutting-edge technologies like blockchain, IoT, AI, AR/VR/MR, and 5G will become a driving force behind the development of a fully developed, interconnected virtual world. Since VR (virtual reality)/AR (augmented reality) technologies are necessary to the building of metaverses, the market is expected to grow quickly in the future. The immersive virtual environment that metaverse seeks to create will not only be focused on user interaction, but may also be seen as an extension of the physical world where businesses and individuals interact to collaborate, build, and exchange goods and services. This chapter discusses the functional importance and recent developments of digital twins in the metaverse.

DOI: 10.4018/979-8-3693-0920-9.ch011

1. INTRODUCTION

A vast and novel sort of digital civilization is evolving in response to the COVID-19 epidemic and the fourth industrial revolution. The most significant element in a contemporary civilization is that it links the individual and society. The metaverse is a topic of technology advancements driving business potential in the emerging digital civilization. Metaverse can be termed as a persistent, interconnected virtual world where individuals may socialize, work, and play from any location and on any device. Users can engage in real-time interactions thanks to the convergence of physical, augmented, and virtual reality. It is a cutting-edge method of digital connection with boundless potential that offers enormous business chances. This chapter focuses on the function and importance of AR and VR in the metaverse. It also accentuates the uses and recent developments of digital twins in the metaverse particularly on online shopping.

1.1 Background and Importance of Topic

The Metaverse has become a hot topic in technology as a result of cutting-edge innovations like virtual reality (VR), augmented reality (AR), blockchain, and artificial intelligence (Lee, J.Y., 2021). The Metaverse, which consists of countless 3D virtual worlds, can be thought of as a parallel universe made up of various digital immersive experiences and resources. Within the Metaverse, users can interact with others through avatars, engage in a variety of activities, and even own and trade virtual things and land (Lee, B.-K., 2021).

In Neal Stephenson's science fiction book *Snow Crash*, the phrase "metaverse" first debuted. It depicts a virtual reality universe in which users of VR goggles utilize their digital avatars to explore the online world to escape from frequently bleak reality. Since then, owing to the quick development and expansion of internet, a variety of revolutionary technology services have been made available to enable service users to take advantage of a wide range of new services and engage in more virtual interactions online. The metaverse was depicted in the book as a virtual world that could be accessed by audiovisual output devices like goggles and earbuds and allowed for both social and commercial interactions (Stephenson, N, 1992, Yang, J.O. & Lee, J.S., 2021, Damar. M, 2022, Banaeian Far, S. & Imani Rad, A. 2022, F. Tao et.al., 2019).

1.2 Concept of Metaverse: An Overview

The term "Metaverse," which combines the two terms "Meta" and "Universe," was first used in 1992 to describe a 3D virtual environment that attempted to simulate the physical world as closely as possible (Ludlow, P. and Wallace, M., 2007). Numerous recently founded businesses (such as Decentraland, Sandbox, Upland, etc.) and numerous well-known, active technological corporations (such as Facebook or Meta, Microsoft, Google, Samsung, etc.) concentrate on the Metaverse and attempt to deploy their Metaverses as new services. A universal three-layer Metaverse design was presented by Duan et al. in 2021 (Duan et.al., 2021).

A virtual, parallel universe made up of many digital areas is called the Metaverse. It consists of diverse digital assets and online interactive experiences that offer new social and economic freedom with limitless potential. Users can engage in numerous activities, interact with others through virtual avatars, and even own and exchange virtual assets like goods and lands within the Metaverse (Dionisio, J.D.N et.al., 2013).

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