Chapter 5
Blockchain in the Metaverse

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ABSTRACT

This chapter seeks to provide a thorough investigation of blockchain for the metaverse in order to better understand its function in the metaverse. An introduction to blockchain and the metaverse is given first, along with a focus on the reasons for using it for the metaverse. There is discussion of the layers of blockchain and the metaverse. The next section discusses technological aspects of blockchain-based approaches for the metaverse, including data collection, storage, sharing, interoperability, and privacy protection. We outline the technological difficulties of the metaverse for each perspective before highlighting how blockchain can be useful. Additionally, we look into how blockchain will affect important metaverse supporting technologies including the Internet of Things, digital twins, multi-sensory and immersive applications, artificial intelligence, and big data. Finally, some prospective avenues for advancing research, innovation, and development in the direction of blockchain's potential usage in the metaverse are provided.

1. INTRODUCTION

A blockchain is a digital record of all cryptocurrency transactions. As more records are uploaded for finished blocks, it keeps growing. Each block contains information on the transactions, a timestamp, and a cryptographic hash of the block before it. Bitcoin nodes utilise the blockchain to differentiate between legitimate Bitcoin transactions and attempts to respend coins that have already been spent someplace else (Lee et al., 2020).

The word "Metaverse" combines the words "meta," which means "virtual, transcendence," and "verse," which is a backformation of the word "universe." The decentralised Metaverse network of virtual worlds and 3D environments was created using blockchain technology. Anyone can create their own virtual world or 3D environment using the simple Metaverse framework. People can interact there in many parts of their lives. It incorporates a variety of platforms and websites that may be viewed using a single browser. Users can create avatars, interact with other Metaverse users, and buy, sell, and trade virtual things.

A network of 3D virtual worlds known as a "metaverse" that focuses on social interaction can be described as a simulated digital environment that employs blockchain, augmented reality (AR), virtual reality (VR), and other technologies to create areas for rich user interaction that mirror the real world. The goal of Metaverse is to provide a flexible, secure, and user-friendly blockchain platform. It also places a strong emphasis on the development of digital assets and smart contracts. The Metaverse Digital Asset System(Lee et al., 2021) allows users to create and publish their own unique digital assets, which can contain anything valuable like stocks, bonds, or even reward points. Smart contracts are computer programmes that can be used to autonomously regulate the transfer of digital assets on the Metaverse-blockchain.

The establishment of a virtual economy using various utility tokens and non-fungible tokens (NFTs)(Shiau & Huang, 2020) is made possible by cryptocurrencies, which makes it a wonderful fit for the metaverse. NFTs provide you access to various digital assets, such as avatar clothing, digital artwork, virtual homes and enterprises, and other virtual items. NFT will protect your digital assets from copying and hacking.

1.1 Relation Between the Metaverse and the Real World

Interactions in politics, business, society, and culture can be seen in the Metaverse, which resembles the actual world in many ways. The interaction and convergence between the physical world and the metaverse are depicted in Figure 1 (Thepmanee et al., 2020). The Metaverse conveys an alternate reality that is difficult to achieve in the physical world.

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