Chapter 2
AI Enabled Virtual Reality in the Metaverse: Technologies, Use Cases, and Ethical Challenges

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ABSTRACT

The combination of Artificial Intelligence (AI) and Virtual Reality (VR) in the Metaverse represents a paradigm shift in the online interaction, and it changes the sphere of education, healthcare, business, and government. AI enhances VR space by facilitating flexible, customized, and intelligent interactions, but VR gives humans rich, and immersive human interaction. This cooperation facilitates the active virtual worlds with real-life-like avatars, real time generation of content, and context responsive engagement. Nevertheless, the problem of data privacy, algorithm bias, digital identity protection, and psychological outcomes should be brought up to ensure ethical and fair development. This chapter also explores the technological backgrounds, industry-related usage, and social impacts of AI-VR integration .Through the emphasized transparency, justice, and autonomy to the users, stakeholders can be able to maximise the potential of the Metaverse and reduce the dangers associated with the technology.

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1. INTRODUCTION

The Metaverse theory is not new and acquired popularity only because of the renaming of the word, which was called Meta. The Metaverse of virtual reality (VR) and the combination of artificial intelligence (AI) is definitely going to be a paradigm shift in the digital transformation that will permeate the entertainment sector, higher education sector, the workplace, and life overall. The two innovative tools that have emerged to be major drivers of innovation in the fast-changing digital technology world are Artificial Intelligence (AI) and Virtual Reality (VR).All these technologies, individually, have already demonstrated high potential to transform the way we work, live and interact with digital content. However, by converging into the conceptual and technical framework of the Metaverse, a new phase of digital change is imminent, which envisions a time when highly personalized, immersive, and intelligent virtual worlds will form an inseparable part of the human experience.

Artificial intelligence imitates the human intellect in robots that can learn, reason, solve problems, see and interpret natural language. AI has evolved to a multidisciplinary field that supports adaptive learning and autonomous decision-making that ranges from rule-based expert systems to deep learning and neural networks. These days, virtual assistants, recommendation systems, driverless cars, and more and more intelligent systems in various sectors are powered by AI. Virtual reality is a computer-generated simulation of a three-dimensional environment that might be interacted with the use of special electronic devices, such as motion-sensor-equipped headgear, in a way that appears real or tangible. The psychological experience of “being there” in a virtual environment is created by virtual reality (VR). This immersion of senses allows for applications in gaming, training simulations, educational, therapy, and other fields to allow users to partake in similar or better experiences of the real world.

Neal Stephenson's 1992(Stephenson, 2022) book Snow Crash introduced the word “Metaverse” which was inevitably endorsed by large tech corporations. It refers to a persistent, shared and connected network of three dimensional virtual worlds. Users are able to interact, work, play, conduct business, and create in this environment, which is represented by digital avatars. Although the Metaverse is still in its early stages, virtual reality and artificial intelligence are helping the Metaverse to grow, and this is being facilitated by edge computing, blockchain, and fast internet. The Metaverse's link of AI and VR brings an incredible opportunity to create intelligent, immersive, and interactive environments that understand, anticipate, and react to the user's activities in real time. Virtual worlds are more interactive, customizable, and flexible and dynamically change in response to the behavior of the user with the assistance of AI.