

21CY712 – Blockchain Technology - 02

Assignment topic: Feasibility Study on role of Blockchain technology in Metaverse.

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Metaverse:

A metaverse is a shared, online 3D space where users can interact with each other and with customized objects and avatars. It is a virtual world that uses the internet as its underlying network. Metaverses are used for various purposes, including social networking, online gaming, education, and training. They can be used to create virtual worlds that mirror the real world, or they can be used to create entirely new and imaginary worlds. It offers unique and immersive experience unlike anything else on the Internet. They are constantly evolving and expanding and offer endless possibilities for exploration and interaction.

Blockchain Technology:

A blockchain is a distributed database or ledger that is shared among the nodes of a computer network. As a database, a blockchain stores information electronically in digital format. Blockchain has the potential to transform the ecosystem by becoming an indispensable part of our daily lives. Understanding the underlying technology and its impact is imperative for those looking to capitalize on this new era. Let's break down how blockchain is changing the world and what it means for your business. Blockchain's non-fungible tokens and cryptocurrencies will create an ecosystem for the creation, ownership, and monetization of decentralized digital assets. A non-fungible token (NFT) is a unique digital identifier that cannot be copied, substituted, or subdivided, that is recorded in a blockchain, and that is used to certify authenticity and ownership.[1] The ownership of an NFT is recorded in the blockchain and can be transferred by the owner, allowing NFTs to be sold and traded. NFTs can be created by anybody, and require few or no coding skills to create.

Relation between Blockchain and Metaverse:

The term "metaverse" refers to a virtual space created within the new Internet using 3D technologies. This concept is directly related to such technologies as blockchain, augmented and mixed reality, NFT, and many other advances of recent years. In the metaverse, the user is immersed in a virtual space where they can do everything they do in real life, such as visit exciting locations, meet people, buy works of art, or sell real estate. Experts agree that creating a blockchain-based metaverse can open up an amazing virtual world which will change the way everyone involved interacts. many blockchain-based platforms use so-called non-fungible tokens and cryptocurrency, providing an ecosystem for creating, owning, and monetizing decentralized digital assets. Without blockchain, the metaverse concept is incomplete due to the various shortcomings of centralized data storage. The fact that blockchain can function

globally, being a digital source operating on the principle of decentralization, fundamentally distinguishes the metaverse from the capacities of the traditional internet, which of course takes the form of websites and applications. The blockchain-based metaverse provides access to any digital space without the interference of a centralized institution. Any metaverse has two main components: hardware and software. The hardware component includes all types of controllers, allowing the users to interact comfortably with virtual or augmented reality. In the case of software, we're talking about a digital environment with content available to the user. Blockchain technology which represents a secure decentralized database where independent nodes can interact in a single, dynamically updated network. It becomes quite obvious that blockchain technology can meet the requirements of the metaverse.

Benefits of Blockchain in Metaverse:

- **Security:** The fact that the metaverse stores data measured in exabytes raises the question of safe storage, transmission, and synchronization. In this sense, blockchain technology is very relevant in the context of decentralization of storages and data processing nodes.
- **Trust:** Blockchain implies the presence of tokens - secure storage devices capable of transmitting the likes of virtual content, personal data and authorization keys in encrypted form. In this regard, the metaverse blockchain increases the user's trust in the ecosystem due to the fact that confidential information will not be available to third parties.
- **Decentralization:** To ensure the full functioning of the metaverse, all participants must see the same virtual world. A decentralized ecosystem based on blockchain technology allows thousands of independent nodes to synchronize.
- **Smart contracts:** These make it possible to effectively regulate economic, legal, social, and other relations between ecosystem participants within the metaverse. In addition, smart contracts allow you to develop and implement the basic rules for the operation of the metaverse.
- **Interoperability:** Blockchain facilitates the joint interoperability and functioning of different systems and interfaces without restriction. This is especially relevant when it comes to NFT valuation and turnover.
- **Money relations:** Cryptocurrency, being an integral part of the blockchain, can act as a properly working analog of traditional money; and via the metaverse crypto it is an effective way to perform mutual settlements.

Use Cases Of Blockchain In Metaverse

- **Virtual Currency:** The future where customers shop in virtual stores is not far away, and to make it possible, virtual currencies in transactions are quite necessary. Cryptocurrency will soon find its place in a decentralized environment, given that consumption is continually expanding and offline trading is rapidly giving way to online businesses. One of the metaverse examples of the use of virtual currencies in the metaverse is MANA. This token is used to buy virtual property in the game "Decentraland". Besides, not just in Metaverse Games, virtual currencies can also be

utilized in DeFi for virtual lending, borrowing, investing, and trading within the metaverse.

- **NFTs:** Another use case in Metaverse is non-fungible tokens, which are Blockchain-based applications. These NFTs can be used in Metaverse crypto projects for buying game assets, avatars, verifying Metaverse user ownership, and serving as a reward for Metaverse games. An NFT is, in a broad way, a key to certain sections of the metaverse. To summarize, NFTs have enormous potential to advance in the Metaverse.
- **Real Estate:** In such a virtual environment, real estate is one of the most valuable digital assets. However, assessing and regulating these digital attributes becomes difficult for the Metaverse. Fortunately, Blockchain may be a viable answer. All actions conducted with virtual real estate assets, such as creation, change, acquisition, sale, or disposal, can be recorded on the blockchain in Metaverse.
- **Self-identity Authentication:** With the growing number of Metaverse users, data management is critical to avoid fake data, identity data manipulation, and illegal activities. Fortunately, Blockchain technology can help us reach this goal. All information, including age, activities, look, and other attributes, is saved in the distributed ledger. Furthermore, blockchain ensures that no one can alter or falsify data because all actions are recorded and visible to all parties. As a result, it assures maximum transparency and protects the metaverse from illegal activities.
- **In-game Assets:** Metaverse games are expected to grow in popularity in the future, and blockchain can assist in presenting in-game assets as non-fungible tokens. This will enable individuals to earn real-world money and transact in a particular economy. For players, the incorporation of blockchain in Metaverse games means that their assets will be safe even if they exit the game, delete it, or suffer a life-changing incident. The Sandbox - a virtual environment with an integrated Ethereum-based coin - is an example of a game like that.

Blockchain and artificial intelligence encounter in the Metaverse:

Blockchain plays an important role in implementing the economic system in Metaverse. The economy of Metaverse without blockchain will eventually be controlled by someone. If the blockchain is not supported, it is difficult for resources or goods used in the Metaverse world to be recognized for their value or to have economic interactions equivalent to the real economy. NFT-based blockchain technology further activated the Metaverse. With the advent of WEB 3.0 and Blockchain 3.0, Metaverse becomes the world to realize it. In the Metaverse, people appear by scanning themselves in 3D or transforming them into avatar characters. Characters in the Metaverse are recognized as beings like clones in real life, not just game characters. In the Metaverse, besides their own avatars, they create things that can express their uniqueness. And to prove this, the NFT technology of the blockchain is used.

- **High quality learning data**

In the real world, the problem of people's time, labour, and cost is easily replaced by using artificial intelligence in Metaverse. In the real world, when delivering news, you have to go through a lot of work, such as recruiting an announcer, shooting in a studio, and editing video. However, in the virtual space, by utilizing an artificial intelligence announcer, it is possible to deliver urgent and important news quickly and continuously

for a long time. In order to deliver news in the Metaverse, it is necessary to learn the facial expressions, muscle movements, voices, nuances, and gestures of real announcers. When learning by receiving a long-time news video from a broadcaster to make an artificial intelligence announcer video, we extract only the part where the voice of another reporter and noise-free data, and the announcer's face and voice come out clearly toward the camera, and only detect a specific person techniques must be applied. If you use blockchain meta-information when searching for various data like this, you can select only the pure data necessary for learning and induce high-quality learning. Metadata stored within the blockchain block makes the necessary high-quality data selectively available. It is created as reliable data in the Metaverse, which increases the number of users who use the Metaverse.

- **Reusable data:**

Recently, creative activities in Metaverse are often developed using artificial intelligence instead of real people. When artificial intelligence artists create works, they learn about the trends and styles of the works, and then express what they learned for creation. In the past, a lot of data was used for style analysis. Now, artificial intelligence artists store the data in the distributed ledger so that it can be easily selected and reused. Acquiring more data and practicing iteratively reduces the chance of selecting the wrong data and shortens validation time.

- **Stable decentralized network:**

Metaverse is a virtual 3D environment that requires a large amount of data and server capacity. However, controlling through a central server can incur a lot of cost. By utilizing the distributed environment system of blockchain, it is necessary to have a network system that can use the Metaverse environment with each individual's PC computing. When individuals control the Metaverse environment they want to use or view, the burden of centrally managing vast amounts of data can be reduced. It can also prevent some big tech companies from monopolizing the Metaverse environment.

- **Privacy:**

There is a need for a system that can govern so that ethical problems do not arise with respect to persons belonging to the Metaverse. Only the publicly available information about real and virtual people should be made known. And a personal information security system should be applied to prevent any damage to privacy. However, digital virtual people have no legal basis, so they are easier to manipulate or transform photos than real people, and there is a concern that the wrong algorithm may be applied, which may lead to serious racial and gender discrimination. With regard to personal information, it can be safely protected with blockchain to prevent external attacks. If personal information is erroneously altered, it can be managed responsibly with a clear path that can be traced based on the time of occurrence.

- **Distinguishing between virtual and real**

In order to create a stable environment in which users are not confused in the Metaverse, a device that can distinguish between artificial intelligence and real people is needed. The fictional characters used in the Metaverse have now reached a level where it is

difficult to distinguish the real from the fake from the human point of view. A reliable data construction system is needed to inform the comparison and judgment between real and fictional people. Data should be transparent and descriptive so that fake news and fake photos can be identified. Data content should be stored in a blockchain so that people can accurately know and understand the data generated by artificial intelligence and know the detailed history if desired. Blockchain technology can be used as a data to explain the data generated by artificial intelligence.

- **Rich content:**

We are using artificial intelligence technology as a way to imitate human behavior and replace it. Artificial intelligence analyzes the user's behavioral patterns such as words and messages in the Metaverse to predict the user's personality, intellectual level, and economic level. Metaverse uses artificial intelligence to create human-like voices and unique content. These data can be automatically converted into games, YouTube, news, advertisements, and lecture materials by simply inputting simple information. It is possible to create vast pattern content that imitates human behavior by using artificial intelligence technology with the vast data needed for the Metaverse world. With blockchain, personal information can be safely protected and various types of content can be created more abundantly.

- **Economic virtuous cycle**

In investment and business, artificial intelligence can be used to make decisions about which data to use. It is important to have more reliable data in changing forecasts. If blockchain data is used, more reliability can be guaranteed through history management, thereby increasing the reliability of business predictions. In addition, the Metaverse Marketplace can be further activated through the payment of tokens and coins based on blockchain technology.

Conclusion:

Blockchain is an integral part of the metaverse, because the technology enables users to protect their digital assets in virtual reality. This point is underlined by real blockchain projects such as "Axie Infinity" and "The Sandbox". Both involve the metaverse. Users can create and sell digital assets in the form of NFTs, as well as benefit from the domestic economy using the metaverse crypto. Experts agree that it is impossible to realize the idea of a fully-fledged virtual ecosystem without blockchain technology. This is because, as we have described, users need to be able to securely own and sell their digital property by moving assets between the platforms without permission from a centralized authority. For example, the virtual real estate in the game "The Sandbox" can be successfully sold outside the metaverse (on the corresponding exchanges). Experts say that not being able to move digital assets outside a specific ecosystem significantly reduces their value. This is why these days the blockchain is an indispensable technology allowing you to identify with precision any virtual object without involving a centralized institution. The ability of every participant in the ecosystem to identify a digital asset and track its ownership within the logic of decentralization is the key to building a fully evolved metaverse. The metaverse cannot exist without a domestic economy. This helps explain why the integration of the metaverse crypto is inevitable. Blockchain ensures the

transparency and economic effectiveness of this metaverse market. When creating virtual reality, it is extremely important to use reliable algorithms for replacing real assets with digital ones. In this respect, the metaverse blockchain is almost the only technical solution that could currently provide the proper level of trust in economic transactions within the metaverse. Beyond this, blockchain allows different ecosystems to be combined which further underlines how this technology is indispensable when it comes to introducing the metaverse concept.