

# Artificial Intelligence Shaping the Future of Metaverse

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**Abstract-** Artificial Intelligence is one of the most trending tech topics of the decade and Metaverse is the future of social media. Both these technologies are interdependent. AI is revolutionizing various technologies and Metaverse is one of them. AI is a technology with immense possibilities and potential to help other technologies grow. Metaverse is a relatively newer technology which has some major challenges and AI is the solution to them. Combination of AI and Metaverse can provide users a better experience. Also AI will enhance the available features and add some new features to the Metaverse ecosystem.

**Key Words-** Metaverse, Artificial Intelligence, Metaverse Ecosystem

## I. Introduction

- **Metaverse-** Metaverse is one of the most discussed technologies in the last 3 decades. The idea of metaverse was coined by Neal Stephenson in his 1992 novel "Snow Crash" from then the idea of a futuristic digital world that runs parallel to the world in which we live has fascinated many researchers and scientists. Metaverse is the combination of the prefix "meta" (imply-ing transcending) with the word "universe", after around 3 decades it looks like the idea of the digital world is coming true. Metaverse combines various technologies like blockchain, AR, VR, Digital twin etc.

- **Artificial Intelligence-** Artificial intelligence (AI) is the ability of a computer or a computer-controlled robot to perform tasks that are usually done by humans as they require human intelligence.

## II. How is the Metaverse using AI?

- a. **Avatars-** One of the most interesting and spoken about concepts of the Metaverse is Avatars. In Metaverse users can design their own digital twin or avatar. Users can choose their own fashion preferences. AI has the ability to analyze 2D user images or 3D scans to create very realistic and accurate Avatars. Companies such as Ready Player Me have already actively been using AI to help build Avatars for the Metaverse. With Image processing AI will help users design very realistic and look like Avatars for themselves.
- b. **Digital humans-** have the ability to Interact and start a bilateral conversation with other users. These digital humans can resemble humans like body language and speech. Digital humans are 3D chatbots that can interact in a VR world. These digital Humans are also

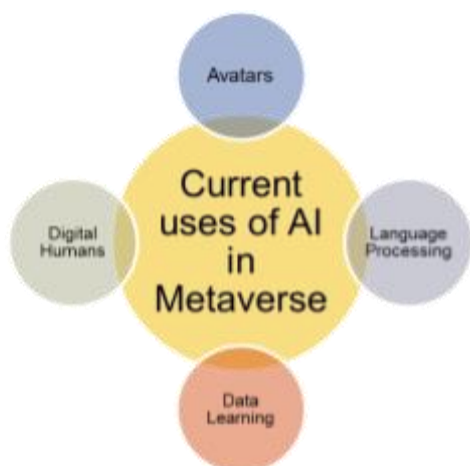


Fig. 1

called as NPC or Non playing characters. These types of characters work on a specified set of rules which are purely built and operated using AI. These digital humans are an important constructive aspect of Metaverse. Digital humans can range from NPC's to automated assistants in the VR workplace.

- c. Language Processing- making Metaverse accessible to everyone is a challenge. With use of AI, users will be able to communicate with Metaverse freely. AI has the ability to convert natural languages such as English, Hindi to Binary. After text analysis AI also converts the output from Machine language to Natural Languages. This is a very time efficient process and AI makes it look more realistic. Depending on the AI's training, we can make most of the language's machine readable, making it usable for everyone and making Metaverse more accessible.
- d. Data Learning- We know that one of the major elements of Machine Learning and Artificial is learning data. When machines are fed with old outputs, the machine learns all possibilities and suggests new and efficient outputs. The more data and human feedback that gets ingested into the model, the outputs get better and better every time. This is building the hope that AI will eventually be able to perform tasks and provide the correct outputs the same way as human beings. There will be less human intervention this way and the scalability of the Metaverse will continuously grow.

### III. Threats

- Metaverse is a very new technology and is still being researched and developed.
- If AI is implemented in combination with Metaverse it can lead to major issues.
- When AI powered chatbots and avatars are implemented in Metaverse, the issue of

authentication will come up. It will be difficult to identify real users and machine users.

- Will the Metaverse allow users to implement AI/ML technology to the Metaverse? Users can manipulate the backend code and gain illegal access to Metaverse.
- Until the Metaverse is being frequently used, the models will lack data to learn on. Problem solving in the early development phase of Metaverse will become difficult as less data will be available for AI to work upon.

### IV. Solutions

- Authentication based on IP addresses should be used in Metaverse to make it easier to find suspects in any kind of illegal activities that take place in Metaverse.
- There should be some regulations on the way machine bots work.
- Strong entry barriers should be implemented so that no one can temper backend and use AI for wrong things.
- Well researched data should be fed in Metaverse, so that we can improve the accuracy rate of output in less time and this will eventually lead to an error free Metaverse.

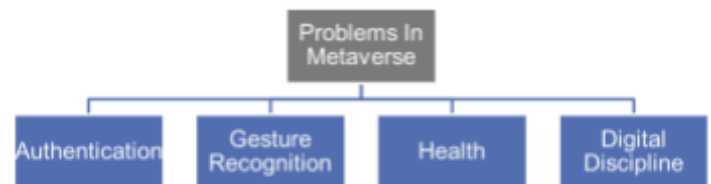


Fig. 2

### V. AI as a solution

Every technology has some glitches in its early development phases. Metaverse also has some Key problems which can be solved using AI. Some key Problems are as follows:-

- a) Authentication
- b) Gesture Recognition

- c) Health
- d) Digital Discipline

AI will prove to be a very effective solution to all these problems.

V1 Authentication- Authentication of users has always been a problem\_in conventional social media and before it becomes a problem for Metaverse it is important to find out solutions for it. Here are some ways in which AI can solve these problems:-

- I. AI can be used to detect Machine generated bots which are used for unethical activities.
- II. By using technologies like facial recognition and by implementing some AI based entry barriers, we can make sure that the user is a real user or a fake user.

V2 Gesture Recognition- As we know Metaverse is a very immersive technology and gives users a 360 degree experience. Also each user gets an avatar in Metaverse which can perform physical activities like walking, running etc. virtually inside Metaverse. This also adds a possibility that some cases of physical abuse can take place inside Metaverse. Many such cases have been witnessed by users in Metaverse. Here is how AI can help us solve this problem:-

- I. AI has the ability to recognize different kinds of gestures using cameras. The same technology can be implemented in Metaverse; AI can recognize good and bad gestures of avatars and can take action by itself to stop bad gestures.
- II. AI can also restrict users from virtually harassing someone

through gestures and make Metaverse safer.

V3 Health: - To give users a fully immersive experience Metaverse uses VR technology which can be accessed by High-tech VR devices like VR glasses. Excessive use of these kinds of glasses can lead to serious health issues. AI can help us to tackle this problem.

- I. AI can be used to automatically adjust the intensity of projection in VR glasses according to user time.
- II. AI can send smart health recommendations to users who use these devices and help them take care of their eyes.

V4 Digital Discipline- In traditional social media also maintaining digital discipline is a very big challenge. And Metaverse being an immensely immersive technology it requires more efforts to maintain digital discipline. Some potential threats are illegal trades through Metaverse, use of abusive language etc. AI can reduce the intensity of these problems.

- I. By language processing AI can easily detect abusive and inappropriate words and language used by avatars, AI can automatically delete these words and can also restrict users. AI based safe language modes can be introduced to make sure that clean and appropriate language is used.

## VI. Advantages

Combination of Artificial Intelligence with Metaverse will give a boost to new technological advancements and will give us safer and more efficient Metaverse In future.

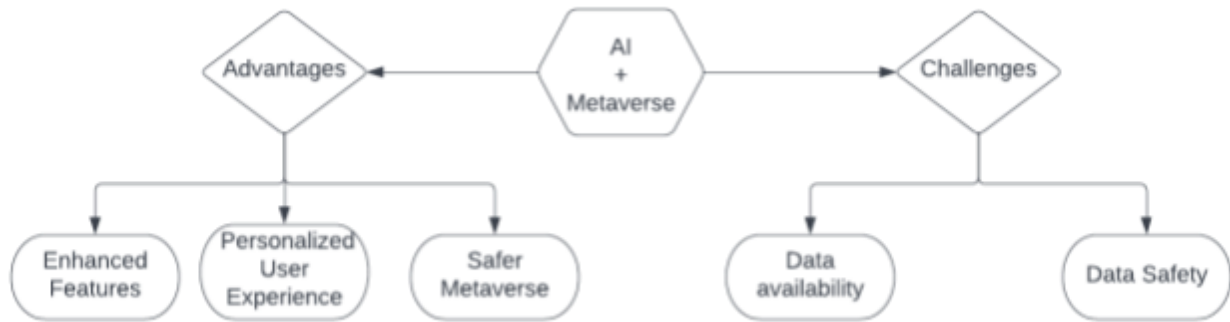


Fig. 3

With use of AI Metaverse companies can give users a better and more personalized user experience.

AI can solve many cyber security related issues like authentication issues and also detect wrong use of Metaverse. By this we can make Metaverse safer in future.

### VII. Challenges

There are 2 main threats in combining AI with Metaverse.

- I. Data availability
- II. Data safety

**VII.1 Data Availability:-** Data availability is a threat in this combination because Metaverse is a new technology and some wrong data can temper Metaverse and this can lead to some very serious problems. Also if less data is available to train AI it will reduce the accuracy of AI and will eventually lead to bad user experience.

**VII.2 Data Safety:-** Artificial intelligence requires a lot of data to train itself and also to provide users a more personalized experience. Safety of this collection is also a big challenge. Metaverse platforms should keep an eye on any kind of Data breach as it can threaten user privacy.

### VIII. Future scope

- Combination of AI and Metaverse is going to revolutionize the future of technology.
- In the future Metaverse can also become an AI dominated technology.

### IX. Conclusion

Combining AI with Metaverse can give users a very efficient and productive user experience. This can help us solve some major challenges present in Metaverse.

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