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Metaverse: Telepresence in 3D Virtual Digital Worlds through the use of Avatars

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ABSTRACT
This article addresses telepresence through avatars in virtual environments such as Metaverso. Important concepts such as Metaverse and 3D Virtual Digital Worlds, avatars, presence and telepresence were discussed. The applications of avatar telepresence in a variety of areas, including education, healthcare, entertainment, professional training, and customer service, as well as privacy and security concerns associated with this technology, were also explored. It is concluded that avatar telepresence has the potential to create more immersive, inclusive and accessible experiences for people, but privacy and security concerns need to be addressed when developing and implementing these technologies.

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Introduction
The advancement of technology has led to the emergence of new forms of interaction and communication, including telepresence through avatars in virtual environments such as the Metaverse. This technology allows users to connect and interact virtually, creating a sense of presence and telepresence in simulated 3D environments [1].

Virtual environments like Metaverso offer the immersive experience, allowing users to explore virtual worlds, interact with other users and perform activities that would not be possible otherwise. Through the use of avatars, users can express themselves more freely and creatively, choosing their physical appearance, clothing and accessories [2].

This article will address telepresence through avatars in virtual environments such as the Metaverse, including the definition of Metaverse and 3D Virtual Digital Worlds, avatars, presence and telepresence. Applications of avatar telepresence in a variety of areas, including education, healthcare, entertainment, professional training, and customer service, as well as privacy and security concerns associated with this technology, will also be discussed.

The study of telepresence through avatars in virtual environments such as the Metaverse is relevant because this technology is becoming increasingly present in our lives. With the rise of remote work and distance education, avatar telepresence can help overcome geographic and cultural barriers and create more inclusive and accessible experiences for people with physical disabilities or reduced mobility.

Additionally, the use of avatars can help create new forms of collaboration and teamwork, improve the customer experience, and create more effective learning and training experiences. However, it is important to address privacy and security technologies concerns to open up and implement these, ensuring that you have information that weighs on users protected services and that measures to protect security measures have been implemented to prevent fraud and abuse.

Therefore, the study of telepresence through avatars in virtual environments such as the Metaverse is important to hear the implications of this technology in our society and how it can be used to create more immersive, inclusive and accessible experiences for people.

The general objective of this article is to discuss telepresence through avatars in virtual environments such as Metaverso, approaching important concepts and applications in several areas.

The methodology used was the bibliographic review, where books, articles and dissertations published free of charge and online were used.

Metaverse and 3D Virtual Digital Worlds - Mdv3d
Metaverse and 3D Virtual Digital Worlds (MDV3D) are related concepts that refer to three-dimensional virtual environments where users can interact with other avatars and objects in real time. The Metaverse is a species of virtual universe that encompasses several MDV3D, while the MDV3D are specific virtual environments within the Metaverse [3].

MDV3D allow users to create and customize serious avatars, as well as interact with other avatars in three-dimensional virtual environments. These environments can be created for different

purposes, such as games, professional training, virtual meetings, live events, among others.

The Metaverse, in turn, is the broadest vision of this concept, where MDV3D are interconnected and form a network of virtual universes that allow for interaction and collaboration between users from different parts of the world.

Metaverso and MDV3D are constantly evolving technologies, with companies and developers investing more and more in resources and technologies to make these virtual environments increasingly immersive and realistic. For example, virtual and augmented reality technology can be used to create even more immersive environments, where users can interact with objects and avatars in real time [4].

Although the Metaverso and the MDV3D can be seen as the entertainment formation, they also have the potential to transform various sectors such as professional training, education, healthcare and remote work. However, it is important that these technologies are developed in a responsible manner, ensuring the privacy and security of users and avoiding social or financial exclusion.

Metaverso and MDV3D have the potential to transform not only the way people interact and work, but also the way business is conducted. Companies in different sectors, such as retail, entertainment, fashion, among others, are already exploring the possibilities offered by Metaverso and MDV3D to create more engaging and immersive experiences for their customers [5].

For example, the fashion store can create a virtual environment where customers can try on clothes on their avatars, customize their appearance and interact with other users. This type of shopping experience is more immersive than simply browsing the 2D web store and can increase sales and customer loyalty.

In addition, Metaverso and MDV3D can help create new opportunities for work and entrepreneurship. Users can create and sell digital products, such as virtual clothing, room decor, and even art objects, to other users within the Metaverse. This can create a thriving virtual economy and a new form of employment and entrepreneurship [4].

However, as with any emerging technology, existing challenges and concerns that precisely need to be addressed. Users' privacy, security and inclusion must be priorities when developing Metaverso and MDV3D. It is important to guarantee that these technologies are not perpetually prejudiced and socially exclusive, that our users have control over their data and that security measures are implemented to prevent fraud and abuse [6].

Another important challenge that the Metaverso and the MDV3D bones face is the issue of interoperability and standardization. As Metaverso is composed by interconnected MDV3D variants, it is important that they can interact between each other in a transparent and efficient way. This requires common standards that allow interoperability between different platforms and protocols [7].

Standardization is also important to guarantee that our users can migrate their avatars and objects from one virtual environment to another without loss of data or functionality. This can encourage healthy competition between different platforms and stimulate the innovation and development of new technologies.

In addition, Metaverso and MDV3D also face challenges related to accessibility and inclusiveness. While these technologies have the potential to create more inclusive and accessible experiences for people with physical disabilities or reduced mobility, it is also important to ensure that all users have access to these technologies, regardless of its condition will finance or its geographic location.

To address these challenges, it is important that there is open collaboration between developers, companies, users and regulators. This can help to guarantee that best practices are followed and that user concerns are proactively addressed.

Avatar
Avatar is a digital representation of a person within the Metaverse or of other virtual environments. Avatars are created from 3D models and allow users to be teleported into virtual environments where they can interact with other avatars and objects in real time.

Avatars can be personalized in many ways, such as choosing their physical appearance, clothing and accessories. They can be used to represent a person more realistically or to create a completely new character [1].

Avatars are important in the Metaverse and other virtual environments because they allow users to express their identity more freely and creatively. They also help create a sense of presence and telepresence, where users can feel as if they are actually present in a virtual environment.

In addition, avatars have the potential to be used in various applications such as games, professional training, education, health, among others. They can help create more immersive and interactive experiences for users, making learning and training more effective and engaging [1].

However, avatars also raise privacy and security concerns. As avatars can be used to represent the person, it is important to guarantee that users' privacy is protected and that security measures are implemented to prevent fraud and abuse [2].

In addition to privacy and security concerns, avatars can also be used to create unrealistic or even offensive representations of people. This can lead to problems of social exclusion and discrimination, especially in relation to issues of gender, race and sexual identity.

To address these issues, it is important that Metaverse platforms and other virtual environments establish clear and effective policies to moderate and control the appearance and behavior of avatars. Platforms should also allow users to report inappropriate or offensive behavior and take steps to correct these situations [8].

Furthermore, avatars can also be used for research and development purposes in areas such as artificial intelligence and computer science. Avatars can be used to collect data about human behavior in virtual environments, to train machine learning algorithms or to create more realistic and effective human interactions.

Another important aspect to consider is that our avatars may have a psychological impact on our users. They can affect a person's self-image and self-esteem, especially if the digital representation does not match the physical reality. For this reason, it is important for users to be able to create avatars that reflect their identity in an authentic and positive way [7].

In addition, avatar technology can also be used to help people with physical disabilities connect and interact in virtual environments. For example, an avatar can allow a person with a physical disability to explore a virtual environment that will not be accessible in their physical form. This can help increase social inclusion and improve these people's quality of life [9].

On the other hand, it's important to remember that avatars are not a substitute for real human interaction. While the Metaverse and other virtual environments can offer immersive and interactive experiences, real human connection is essential for mental health and well-being. It is important to balance the use of these technologies with real-life social interactions.

Presence and Telepressence
Presence and telepresence are concepts that refer to the feeling of being present in a physical or virtual environment. Presence is the feeling of being present in a physical environment, while telepresence is the feeling of being present in a virtual environment [4].

Presence is the subjective sensation that can be influenced by several factors, such as image and sound quality, interaction and immersion. For example, to attend a film in a cinema as a surround and image in a high definition, viewers can feel that this is in the film environment, immersed in history and our characters [1].

Telepresence, on the other hand, is the sensation of being present in a virtual environment, such as the Metaverse or other virtual environments. Telepresence is created through technologies such as virtual reality, which can create a sense of immersion and presence in three-dimensional virtual environments. When interacting with other users and avatars in virtual environments, users can feel that they are present and interacting in a real environment [7].

Telepresence is an ever-evolving technology, and its potential to transform the way people interact and work is significant. For example, telepresence can be used to create more engaging and effective training experiences, allowing users to learn in simulated environments and interact with others more effectively [3].

However, telepresence also brings concerns about privacy and security, especially when it comes to interactions with others in virtual environments. It is important that telepresence platforms are developed responsibly, guaranteeing that users' privacy is protected and that security measures are implemented to avoid fraud and abuse.

The important aspect of telepresence is that it can help overcome geographic and cultural barriers. Through virtual environments, users can connect and interact with each other from different parts of the world, sharing knowledge and experiences [2].

This is especially important in the context of business and work, where telepresence can help improve collaboration and communication in geographically distributed teams. In addition, telepresence can also be used to create more inclusive and accessible experiences for people with physical disabilities or reduced mobility [6].

However, it is important to remember that telepresence is not a complete replacement for real human interaction. Real human connection is essential to mental health and well-being, and it's important to balance the use of telepresence with real-life social interactions.

Telepresence can be used in many areas including education, healthcare, entertainment and even live events. Telepresence can allow students to learn in simulated environments and interact with others more effectively, creating a more immersive learning experience. In healthcare, telepresence can help provide remote healthcare by allowing physicians to interact with patients virtually, monitoring their condition and providing care from a distance.

In addition, telepresence can also be used in live events such as concerts and conferences. This allows people to attend events that they otherwise wouldn't be able to due to geographic restrictions or other limitations. It can also allow event organizers to expand their audience, attracting more people to participate virtually [9].

However, as in other areas, telepresence at live events also raises concerns about security and privacy. It is important to guarantee that you have information on users is protected and that security measures are implemented to prevent fraud and abuse.

Telepresence Via Avatar
Telepresence through avatars is one of the most common forms of telepresence in virtual environments such as the Metaverse. Through the use of avatars, users can connect and interact virtually, creating a sense of presence and telepresence [9].

By using an avatar, users can feel as if they are present in a virtual environment and interacting with other people in real time. The avatar allows the user to express himself in a freer and more creative way, choosing his physical appearance, clothes and accessories. This can help create a sense of immersion and presence in the virtual environment.

Telepresence through avatars can be used in several areas, such as games, professional training, education and health. For example, in games, avatar telepresence can create more immersive and interactive experiences for players, allowing them to explore virtual worlds and interact with other players in real time. In professional training, telepresence through avatars can help create more effective and engaging training experiences, allowing users to learn in simulated environments and interact with others more effectively [2].

However, avatar telepresence also raises concerns about privacy and security, especially when it comes to interactions with others in virtual environments. It is important that avatar telepresence platforms are developed responsibly, guaranteeing that users' privacy is protected and that security measures are implemented to prevent fraud and abuse [10].

Telepresence through avatars can help create more inclusive and accessible experiences for people with physical disabilities or reduced mobility. Through the use of avatars, people can explore virtual environments that would otherwise be inaccessible, creating opportunities for social interaction and learning that would otherwise not be possible [8].

In addition, avatar telepresence can also be used to promote diversity and inclusion in professional environments. By creating a virtual environment where people can express themselves more freely and creatively, cultural and identity differences can be valued and celebrated.

However, it is important to remember that avatar telepresence is not a complete replacement for real human interaction. While it can create more immersive and interactive experiences, real human

connection is essential for mental health and well-being. Balancing the use of these technologies with real-life social interactions [9].

In addition, telepresence through avatars can also be used to create collaboration and teamwork opportunities. By allowing users to connect virtually and interact in real time, telepresence through avatars can help improve collaboration and communication in geographically distributed teams [6].

This technology can also be used to create more personalized and effective customer service experiences. For example, an avatar can be used to represent an expectant support for a client, forging an experience but interactive and personalizing a user [2].

However, it is important to remember that telepresence through avatars can also present challenges for communication and emotional expression. Through an avatar, it may be more difficult for users to express complex emotions or interpret other people's emotions [3].

Another area where avatar telepresence can be useful is distance education. Through virtual environments, our students connect and interact as teachers and virtual students, creating a sense of presence and telepresence.

Telepresence through avatars can help create more immersive and interactive learning experiences, allowing students to explore simulated environments and interact with other students and teachers virtually in real time. This technology can also be used for live online classes, allowing students to virtually participate in real-time classes [2].

In addition, avatar telepresence can be used to create more effective training experiences in professional environments. For example, in safety training in hazardous locations, an avatar can be used to simulate the environment and provide a more realistic and safer training experience [5].

However, as in other areas, avatar telepresence also raises privacy and security concerns. It is important to guarantee that you have information on users is protected and that security measures are implemented to prevent fraud and abuse.

Conclusion
In conclusion, the use of telepresence through avatars in virtual environments like Metaverso has the potential to transform the way people interact and work, allowing them to connect and interact virtually, creating a sense of presence and telepresence. This technology can be used in many areas, including education, healthcare, entertainment, professional training and customer service, allowing users to explore simulated environments and interact with people virtually in real time.

However, it is important to address privacy and security concerns when developing and implementing these technologies. It is also important to remember that avatar telepresence is not a complete replacement for real human interaction, and it is necessary to balance the use of these technologies with real-life social interactions.

Avatar telepresence is an ever-evolving technology with the potential to improve the way people interact and work across industries. It is important to develop and implement these technologies responsibly, ensuring the privacy and security of

users and remembering that real human connection is essential to mental health and well-being.

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