






EDITORIAL

Immersive environments, Metaverse and the key challenges in programming

Entornos inmersivos, Metaverso y los principales retos de la programación

Denis Gonzalez-Argote¹   

¹Universidad Argentina de la Empresa. Facultad de Ingeniería y Ciencias Exactas, Carrera de Ingeniería Informática. Ciudad Autónoma de Buenos Aires, Argentina.

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DEAR AUTHORS

While the Metaverse is a relatively new addition to the everyday vocabulary of tech speakers and students, the term was first used in 1992 by Neal Stevenson in his book *Snow Crash*. Dwivedi et al.⁽¹⁾, presents the metaverse as a virtual reality (VR) environment with avatars and software agents using the internet and augmented reality (AR). Described as a new iteration of the internet, Metaverse uses VR headsets, blockchain technology and avatars in a new fusion of real and virtual worlds.

This shared virtual space where users can interact with each other and with virtual objects and entities - has been around for many years, and there have been numerous efforts to create such spaces over the years.

One of the first "metaverses" that can be cited is the game "Adventure," which was developed in the 1970s and allowed players to explore a virtual world and interact with objects and characters within it. Another early example is "The Palace," which was launched in the mid-1990s and was one of the first online communities to use 3D graphics and avatars.

More recent examples of metaverses include virtual worlds such as *Second Life* and *World of Warcraft*, as well as emerging technologies such as virtual reality and augmented reality, which allow users to interact with virtual objects and environments in more immersive ways.

The role of the programmer in the metaverse is to create and maintain programs that control the behavior of virtual objects and entities within the virtual space. This can include characters controlled by the computer, animations, special effects, and other visual and interactive elements.⁽²⁾

Programmers in the metaverse may work on a variety of different projects, such as developing new virtual worlds, creating games or other interactive experiences, or building tools and applications for use within the metaverse. They may also be responsible for maintaining and updating existing programs, fixing bugs, and optimizing performance.

In addition to writing code, programmers in the metaverse may also be involved in the design and planning process, working closely with artists, designers, and other professionals to create engaging and immersive experiences for users. They may also need to collaborate with other programmers, as well as with testers, project managers, and other team members, to ensure that their programs function properly and meet the needs of the project.^(3,4,5)

The main challenge facing programmers in the metaverse is creating a seamless and immersive experience for users. This involves designing and implementing a wide range of features, such as realistic and interactive 3D environments, avatars, physics and interactions, network communication and synchronization, and AI-powered non-player characters.

One of the key challenges is ensuring that the metaverse is able to scale to support a large number of users and a wide range of devices, including desktop computers, VR headsets, and mobile devices. This requires efficient use of resources and robust network infrastructure.⁽⁶⁾

Another challenge is creating a sense of presence and immersion for users, which requires designing and implementing realistic and intuitive interactions and behaviors. This may involve using techniques such as

haptic feedback and real-time rendering of 3D environments.⁽⁷⁾

The development of the metaverse requires a wide range of skills and technologies, including expertise in computer graphics, networking, AI, and user experience design. And in this sense, the role of the programmer is to use their technical skills and expertise to bring virtual worlds and experiences to life, and to create engaging and immersive environments for users to explore and interact with.

BIBLIOGRAPHIC REFERENCES

1. Dwivedi YK, Hughes L, Baabdullah AM, Ribeiro-Navarrete S, Giannakis M, Al-Debei MM, et al. Metaverse beyond the hype: Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. *International Journal of Information Management* 2022;66:102542. <https://doi.org/10.1016/j.ijinfomgt.2022.102542>
2. Jiang Y, Kang J, Niyato D, Ge X, Xiong Z, Miao C, et al. Reliable Distributed Computing for Metaverse: A Hierarchical Game-Theoretic Approach. *IEEE Transactions on Vehicular Technology* 2022:1-16. <https://doi.org/10.1109/TVT.2022.3204839>.
3. Yang Q, Zhao Y, Huang H, Xiong Z, Kang J, Zheng Z. Fusing Blockchain and AI With Metaverse: A Survey. *IEEE Open Journal of the Computer Society* 2022;3:122-36. <https://doi.org/10.1109/OJCS.2022.3188249>.
4. Lee J, Lee TS, Lee S, Jang J, Yoo S, Choi Y, et al. Development and Application of a Metaverse-Based Social Skills Training Program for Children With Autism Spectrum Disorder to Improve Social Interaction: Protocol for a Randomized Controlled Trial. *JMIR Research Protocols* 2022;11:e35960. <https://doi.org/10.2196/35960>.
5. Ng WC, Yang Bryan Lim W, Ng JS, Xiong Z, Niyato D, Miao C. Unified Resource Allocation Framework for the Edge Intelligence-Enabled Metaverse. *ICC 2022 - IEEE International Conference on Communications, 2022*, p. 5214-9. <https://doi.org/10.1109/ICC45855.2022.9838492>.
6. Njoku JN, Nwakanma CI, Amaizu GC, Kim D-S. Prospects and challenges of Metaverse application in data-driven intelligent transportation systems. *IET Intelligent Transport Systems* 2022:1-21. <https://doi.org/10.1049/itr2.12252>.
7. Xu M, Ng WC, Lim WYB, Kang J, Xiong Z, Niyato D, et al. A Full Dive into Realizing the Edge-enabled Metaverse: Visions, Enabling Technologies, and Challenges. *IEEE Communications Surveys & Tutorials* 2022:1-1. <https://doi.org/10.1109/COMST.2022.3221119>.

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