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Investigation of *Metaverse* in cryptocurrency

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Abstract

Metaverse is an immersive 3D virtual environment, a true virtual artificial community in which avatars act as the user's alter ego and interact with each other. If we do not manage the hype for the metaverse, which has recently been receiving a surge in interest, the metaverse will fail to cross the chasm. This article conducts a comprehensive survey on computational arts, in which seven critical topics are relevant to the metaverse, describing novel artworks in blended virtual-physical realities. The topics first cover the building elements for the metaverse, e.g. Virtual scenes and characters, auditory, textual elements. Next, several remarkable types of novel creations in the expanded horizons of metaverse cyberspace have been reflected, such as immersive arts, robotic arts, and other user-centric approaches fuelling contemporary creative outputs.

Keywords: Metaverse; Technology adoption lifecycle; Cryptocurrency; Virtual assets

1. Introduction

Almost every 10 years, ICT platforms have undergone a paradigm shift. The paradigm of PC communication in the 1990s, the web in the 2000s, and mobile in the 2010s has changed dramatically. The keyword of the paradigm of the 2020s is “metaverse”. Metaverse is a concept derived from the novel “Snow Crash” published by Neal Stephenson in 1992, and represents a three-dimensional virtual world in which ‘Meta’ means virtual and abstract, and ‘verse’ means universe. The metaverse is a virtual construct in which participants interact with themselves through avatars created by themselves to participate or reproduce real life in a virtual metaphorical environment without temporal and spatial constraints (Díaz and et.2020). In the broadest sense, artists, or equivalently creators, who engaged in the artistic creation process, leverage various materials, techniques, and forms to express their ideas and observations and communicate their feelings and thoughts with their audiences (Ruef and et.2010). On an aggregate level, the video game industry has generated total revenue of 155.89 billion USD in 2020 and is projected to reach 268.81 billion USD by 2025 (Moore and et.1991). In incipient fields of arts technologies, there are also signs of a promising future. In digital arts, more creators and traders are paying attention to the rise of the Non-Fungible Tokens (NFT) market, where its sales volume reached 2.5 billion USD two quarters into the year 2021) van Lente and et.2013). The relationship between new arts technologies and traditional arts is not in dichotomy. Instead, they can co-exist in harmony. Unlike some critics may posit, experts and the public’s perception on what counts as an excellent digital artwork may coincide) Kriechbaum and et.2013). Moreover, the rise of NFTs can be interpreted as widening the aggregate art community as it encourages participation from the young generation (Dedehayir and et.2016).

2. When Creators meet The Metaverse

Earlier works tried to employ 3D virtual space to conceptualise creative artworks (e.g., visualization of mysterious ideas) Lee and et.2020), communicate abstract concepts of biological genomics) Lee and et.2020)), and test novel ideas

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(e.g., adding abstract artworks in architectures). In) Lee and et.2020), the magical nature named 'the Aleph' were represented as a cyberspace being, in which a number of Cartesian typographic elements 'Azimuth' attempts to present the unfamiliar concept in easy-to-understand yet artistic manners. In addition, computational artists work with scientists to visualise genome sequence data in aesthetic and comprehensible ways to the general public) Lee and et.2020).

3. Frequency analysis of news on metaverse

Metaverse first appeared in the domestic news on March 8, 1996. It was news introducing Neal Stephenson's novel "Snow Crash". From 1996 to 2019, the frequency of news mentioning the metaverse averaged 2.1 per year. In 2020, when COVID-19 occurred, there were 60 cases, and in 2021 (through July 31) there were 1,940 cases. Figure 3 shows a weekly graph of the number of news articles from the fourth quarter of 2020, when the frequency of news begins to skyrocket, to July 31, 2021. Through this, we could confirm that the present is the rising period of the metaverse hype. Also, due to the situational factor of COVID-19, hype is rising surprisingly) Rogers and et.2010).

4. Metaverse entertainment

These world between real and virtual, between artist members in the 'real world' and avatar members in the 'virtual world', and has a storytelling that sympathizes and grows. It was news about future entertainment on the metaverse, such as BTS and Black Pink, the representative K-pop artists, releasing new songs and holding fan signings in the metaverse world(Blosch and et.2018).

5. Virtual assets

Metaverse enables economic activities in the virtual world. These were Non-Fungible Token (NFT), blockchain, Ethereum, Bitcoin, cryptocurrency, digital assets and virtual assets, that is, digital assets in the virtual world. Topic 3. Non-face-to-face culture technology in the time of COVID-19: The metaverse was mentioned as a cultural and technological environment that appeared characteristically in the online non-face-to-face era due to the COVID-19 pandemic. Artificial Intelligence and metaverse: These were about the next-generation virtual world using artificial intelligence. For example, users can use artificial intelligence to have their avatars learn professional skills and perform professional work in a virtual world. Topic 5. Metaverse service: The news corresponding to this was the contents of the metaverse service using the realistic contents of AR/VR/MR, for example, virtual experience hall, dementia prevention physical education class, children's sports day, and virtual factory (digital twin). And it was about financial services in a virtual environment that combines metaverse and blockchain.

6. Virtual photography / cinematic simulation

In recent years, there have been a surge of artists working with digital virtual imagery, often inspired and influenced by the language of traditional photography and cinema, while exploring the new possibilities offered by computer rendering and simulation technologies. The broader context of this trend is that photography and cinema, the earliest forms of "new media" art, are becoming more computational and moving toward virtual worlds and networked spaces. The boundaries between computer-rendered images and photography have been blurred. On the one hand, computer rendering is replacing traditional photography in many functional areas of application. When consumers today shop for a desk or visualise a new kitchen on Ikea's website, they may not realise that the images are likely to be computer renderings rather than traditional photography, yet this has long been the norm in the architectural and product design fields. These images replace the function of photographs for the lay viewer, at which point they become de facto photographic images. As artist and professor Claudia Hart pointed out, computer generated imagery (CGI) is a form of post-photographic technology) Cabero-Almenara and et.2021).

7. Poetry

The above paragraphs describe the properties of AI-driven artistic representation of characters, and the potential benefits of enriching the metaverse. The latest technology of automatically generated poems, such as Deep-speare, can create Shakespeare's poems that are hardly distinguished by human beings. Furthermore, the existing computational approaches can generate impressive linguistic contents for such artistic texts (e.g., poems). Accordingly, the union of AI-generated calligraphy and poetry genres can facilitate the linguistic creativity of creators and artists in various scenes inside the virtual-physical blended metaverse. More specifically, the prior studies imply that activities between metaverse users, i.e., user-generated content including discussion topics and scenes, can achieve augmentation

linguistically and artistically. Recurrent neural networks (RNN) can process discussion topics and related words, resulting in automatic poetry generation) Lee and et.2020).

8. Auditory and musical metacreation

Musical Instruments for the Metaverse. In 1932, Antonin Artaud published *Theatre of cruelty* in which he foresaw the emergence of the metaverse and in there, recognized the unique role of musical instruments in this space [9]. Fast forward 60 years, in 1992, Jaron Lanier, one of the founding fathers of Silicon Valley, gave a presentation titled *Sound of One Hand* at the SIGGRAPH Conference, where he demonstrated how the sound was being synthesized and improvised in virtual reality. This demonstration marked the beginning of the musical instruments being created entirely in virtual space. After almost 20 years of stagnancy in the field, an audiovisual environment for audio composition and performance, named *Versum* was presented in 2009) Roberts and et.2013).

9. Physical embodiment of art: robotics and drones

In the era of intelligent industrialisation, we foresee the highly intelligent robots or robotic arms would achieve high levels of automation in production lines and hence superior production efficiency and quality. According to a report released by the World Robotics 2021 Industrial Robots report²⁶, the number of robots increases by 10% yearly, with the existing baseline of three million industrial robots or robotic arms currently operating in factories worldwide. Although Microsoft would like to pinpoint its metaverse with the workplace, the social robots, which may play a significant role in artistic creation and performance, are neglected. Although we mainly spot the usage of artistic robots appeared in the existing literature, human artists in physical environments can work collaboratively with artistic robots that either represent virtual avatars or AI-assisted agents from the metaverse. In addition, artistic robots present a new experience (known as a physical embodiment) to the artists during the creative process, in terms of environments, personal experience and emotions, and potentially inspire human artists to reach an unexplored landscape of art performance and artworks in the virtual-physical blended realities) Lee and et.2019).

10. Conclusion

With the burgeoning virtual art trading, the computational arts's next decade will look radically different from what it is today, driven by the advent of the metaverse. Metaverse cyberspace will open numerous opportunities for creators and artists to reshape our virtual and physical environments in artistic and novel ways. By surveying the most recent works across virtual photography, cinematic simulation, calligraphy, poetry, musical metacreation, immersive arts and virtual creativity, as well as other artworks driven by user embodiment and robotics, we hope to have offered a broader discussion within the community of computational arts. We pinpointed the above vital topics and discussed the research agenda and several fundamental challenges to construct an artistic vision for the metaverse cyberspace. We call for interdisciplinary research requiring significant efforts from both technologists and artists to co-investigate the integrated facets of computational arts and technological infrastructures of such an artistic metaverse.

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