Virtual Reality and Metaverse Art Design

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Abstract. The article takes "virtual reality" as a starting point to explore the artistic design of the metaverse, as it is not only one of the core technologies of the metaverse but also a fundamental characteristic and function of metaverse art design. The immersion, interactivity, and creativity of virtual reality technology bear similarities to art. Although multisensory perception may be excluded in traditional theories of artistic imagination, according to contemporary research in neuroscience and imagery studies, the "sensation" created by it is easier to achieve a complete immersive effect compared to the "imagery" constructed by language and text, and the visual imagery brought by dramatic visuals, thus achieving empathy and ethical objectives. Based on this viewpoint, this article proposes a preliminary concept for metaverse art design: metaverse art design constitutes a unique user-generated content community, in which creators and experiencers collaborate to construct a world. In this community, the principle of empathy is considered as the core, and creators can instantly experience the feelings and emotions conveyed by all artistic designs through "empathy" technology, with the objective of confronting technological risks and safeguarding the beauty of humanity.

Keywords: Virtual reality; VR; Art and design; Immersion in art; Empathy

1 Introduction

In the metaverse, the information generated by users can be directly recorded in digital form. This information originates from both individual memories and collective memories, which in turn influence individual memories. How to record this information requires solving the problem of mapping it to real-world data [1]. As early as 1945, Vannevar Bush envisioned a system called "MEMEX" that could store an individual's entire memory information [2]. Limited by the technological understanding of the time, MEMEX was imagined as a physical storage device where all information content was scanned and saved, and could also be retrieved. In 1998, Microsoft Research's Chief Computer Scientist, Chester Gordon Bell, brought the vision of MEMEX to life through the "MyLifeBits" project [3]. Wearable devices were utilized to address the issue of recording memory information data.

With the development of information technology, the volume and complexity of digital media-related information pertaining to individuals has grown exponentially. In 1996, Brad Rhodes introduced the "Remembrance Agent" program for desktops, which was a continuously operating automated information retrieval system primarily focused on recording and retrieving relevant textual information content [4]. By 2003, this system added wearable device systems to determine the usefulness of archived information based on the wearer's physical environment [5]. "Memory Prosthesis" by Michael George Lamming and others was

a memory aid tool designed to help with everyday memory problems, such as finding lost files, remembering someone's name, or recalling how to operate a machine [6]. Later projects like "Forget-me-not" aimed to address these issues [7]. The StartleCam project led by Jennifer Healey at Intel Interaction Experience Research Institute could determine the wearer's interest in the content they observed through signals transmitted via the skin, enabling selective recording [8]. The Living Memory Box project took a different approach to record individual memories, generating memory images through associations with objects, with guided memory itself as the subject [9]. The MemPhone project associated physical content encountered by individuals (buildings, images, books, etc.) with memories and recorded them in the form of digital images. It also established a memory-based social network to enhance memory associations [10].

2 "Immersive Art" in the Metaverse

The VR technology is widely believed to possess distinctive characteristics known as the "3I" features, namely immersion, interaction, and imagination. Immersion refers to the ability of virtual environments to deceive the human senses of vision, hearing, smell, taste, and touch, creating a sense of presence for participants. Interaction involves providing participants with user-friendly human-computer interfaces and natural feedback within the virtual environment. Imagination, on the other hand, refers to the enhancement of participants' creative thinking by allowing them to envision and speculate about the future through the combined effects of immersion and interaction [11].

2.1 Identity in the Metaverse

"Identity," as a term in the field of sociology, determines a person's position within the social system. Digital identity, distinct from virtual avatars that can be arbitrarily fabricated, must be mapped based on personal information and memory. Abhilasha Bhargav-Spantzel suggests that digital identity refers to the electronic information associated with an individual within a specific identity system [12]. Phillip J. Windley believes that digital identity has a core set of information [13]. L. Jean Camp emphasizes the social relevance of digital identity [14]. These studies are based on early applications of digital identity, specifically the intersection between the internet and the physical world. Marit Hansen defines digital identity as a "personal data set" [15]. Digital identity can be understood as a unique identifier for an individual in the digital world, closely linked to their real-life identity. It is shaped by an individual's perceptions and behaviors within social groups, thus possessing a certain continuity. When an individual's data set is regarded as a distinct entity, digital identity can transcend and evolve. Within digital identity, a portion of information can be constructed as a set of attributes, including basic personal details such as gender, date of birth, and residence. These pieces of information form part of one's digital identity, enabling better recognition and positioning of individuals in the digital world.

2.2 Digital Memory in the Metaverse

Within the metaverse of virtual reality, identities undergo transformation, and digital memories can be utilized to create artistic designs that align with individual ideals. The development of the metaverse brings forth a new ecosystem of art and gaming, seamlessly

integrating artistic activities into gameplay. Game streaming itself enables the creation of new narratives, while role-playing and storytelling can be automatically recorded and saved as new visual experiences. People communicate within the metaverse through gaming, forming new teams for artistic creation. Virtual singers like Luo Tianyi and Yan He, nurtured by fans within the metaverse, ascend to "stardom." The metaverse can be seen as the ultimate manifestation of internet development, representing a fully virtualized social space. Essentially, the metaverse originally stemmed from people's imagination of their spiritual world—an evolution from fiction to creation and finally to realization. It serves as a "realm" mediated by art, fusing concrete expression with abstract thinking and possessing a sense of inheritance. The sense of immersion in this realm varies with time, as people become engrossed in the virtual world constructed through text, imagery, and sound. While it carries strong elements of fiction, as a medium bearing human spiritual activities, it possesses greater expansiveness. This "immersive art" is an emerging technology, finding practical application within the metaverse. Within it, people can create, explore, and experience art forms and aesthetics distinct from the real world. The metaverse provides vast creative and communicative space for the fusion of art and gaming, propelling the advancement of digital art and delivering entirely new immersive artistic experiences. Immerse in this virtual world constructed through text, imagery, and sound, people, despite its profound fictional nature, find that this medium bearing human spiritual activities exhibits better stretchability [15]. This is a novel technology, "immersive art" within the metaverse.

3 The Core Technology of the Metaverse

In today's increasingly popular VR applications, humanity stands at the threshold of the metaverse era. However, to merely perceive art as a part of virtual reality may not capture its full essence. Consider the following viewpoints:

Firstly, the development of virtual reality (VR) has surpassed its initial romantic vision of creating fantasies and experiencing beauty. In practical market applications, VR finds wider use in fields such as education, healthcare, manufacturing, commerce, military, and aerospace, rather than solely in artistic pursuits like gaming, film, and art. Therefore, VR today is seen more as an information technology tool or medium, rather than a purely artistic form. There exists a fundamental distinction between virtual reality and art.

Secondly, in the future metaverse, VR will be one of the fundamental login technologies, but that does not imply the metaverse is solely an artistic world. According to mainstream industry concepts, the metaverse could be a complex, diverse, and perpetually expansive digital realm, encompassing various social subsystems such as identity, socialization, economy, and entertainment. People can live in the metaverse similar to the real world. Hence, akin to the real world, not all reading and viewing behaviors in the metaverse are artistic, and not all VR scenarios within it are artistic. This suggests that as long as humans continue to have a need for artistic aesthetics, there is a necessity for an independent literary subsystem within the future metaverse society. This subsystem will utilize VR as a medium, embodying the unique functions and missions of art.

However, the question remains: can such an art come into existence? If it is possible, how should we envision and define it? To answer this question, we need to contemplate the essence

of art. Art is a form of expression for emotions, ideas, and concepts, stimulating our senses, thoughts, and emotions. While artistic forms evolve over time and culture, the core attributes of art lie in its expressiveness and creativity. Hence, if we can express emotions, ideas, and concepts through creativity and expressiveness within the virtual reality environment, we can consider it an art form. In the future metaverse, virtual reality technology will provide a more immersive and interactive experience, potentially creating new modes of expression and mediums for artists. Artists can utilize virtual reality technology to create, showcase, and share their works, while audiences can engage with the artworks through immersive experiences. This combination and sharing of creativity will bring forth new possibilities for artistic forms within the metaverse.

4 Use of virtual reality

The application of virtual reality technology in the field of architectural landscape design indeed offers numerous advantages. Through virtual reality, designers can present comprehensive and multi-angle perspectives of architectural landscape designs, allowing people to personally experience and appreciate every aspect and facet of the design. Compared to previous 3D technologies, virtual reality can simulate buildings more realistically, providing a more authentic experience. To achieve the most genuine experience, virtual reality technology not only constructs realistic scenes in three-dimensional form but also creates an illusion that makes users feel as if they are present in the real world, with the support of both software and hardware. Designers can utilize virtual technology to construct architectural landscapes, followed by analyzing the spatial environment and conceptualizing and designing their structural forms. This process stimulates the creativity and imagination of designers, enabling them to better achieve the desired outcomes.Furthermore, the application of virtual reality technology also aids in cultivating designers' innovative design thinking. Through experiencing virtual reality environments, designers can better comprehend spatial relationships, proportions, atmospheres, and other aspects of architectural landscapes, allowing them to incorporate more innovative elements into the design process. Architectural design embodies the spirit and power of architecture, and virtual reality technology provides designers with a more comprehensive platform for thinking and creating. In architectural landscape design, ideation mainly consists of both rational and emotional aspects. Through virtual reality technology, designers can better express and showcase these two facets. Designers can employ virtual reality to simulate and demonstrate factors such as the shape, materials, lighting, and shadows of buildings, as well as the rational and emotional elements integrated into the design. In this way, designers can communicate and share design concepts more effectively while also better meeting users' needs and expectations for architectural landscape design.In summary, the application of virtual reality technology plays a vital role in architectural landscape design. It enhances design creativity and the ability to achieve desired outcomes, while also helping designers effectively convey the rational and emotional aspects of architectural landscape design to fulfill user demands. In architectural design, the use of virtual technology makes design modeling more intuitive, accurate, and tangible, while also facilitating designers in making design adjustments.

5 Empathy: The Artistic Value of the Metaverse

The process of emotion generation involves experiencing emotions, sensations, and consciousness. Additionally, certain stimuli are associated with specific forms of emotions, indicating a certain level of similarity in emotional responses among all humans.This provides theoretical support for artists who seek to convey emotions through realistic presentations in virtual reality.Virtual reality (VR) precisely addresses the issue of "shared experience."This is shown in Figure 1. By utilizing a range of technologies such as dynamic tracking, visual and auditory rendering, haptic feedback, and powerful network-supported display and interaction interfaces, VR strives to achieve multimodality to ensure seamless communication between our avatars in the metaverse and our physical bodies in the real world. This means that all perceptions and experiences of our avatars in the virtual world are integrated into a synergistic response system with our actual physical bodies, and what our avatars see and hear directly triggers my emotional reactions, becoming my thoughts and reflections.
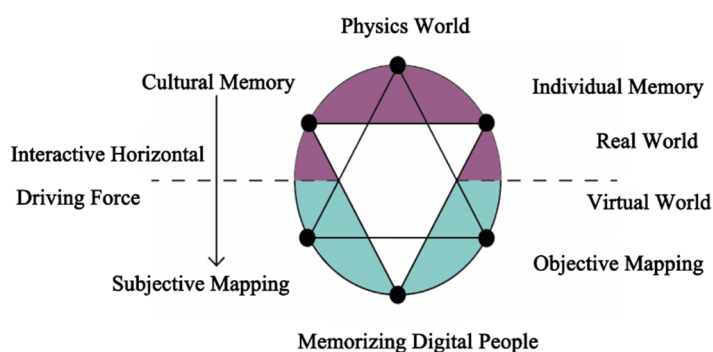

Fig. 1.Virtual Real Mapping Architecture for Personal Digital Memory Products.

6 Conclusions

Each time there is a change in the way humans record information, it disrupts various industries within society. The emergence of the metaverse as an internet form brings about a decentralized interactive architecture, making individuals the main entities for recording information. Through the exploration of the design and demand framework for personal digital memory products based on the concept of "memory digitized individuals," this study aims to provide insights into the future construction of the metaverse from the perspectives of showcasing its social and cultural values associated with the "virtual digitized individuals." Simultaneously, the development of personal digital memory products also brings about related issues and risks. The potential privacy concerns and impacts arising in the metaverse are difficult to foresee. These include the abuse of personal data, as well as the consideration of issues such as information cocoons and privacy breaches when constructing personal digital memory products. Following this research, it is hoped that through more technology-driven metaverse designs, future artistic creations can manifest in a more diversified form. Moreover, due to the wide-ranging exploration fields and research value encompassed by the metaverse, deeper explorations are needed in both theoretical and practical realms.

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