

Study on the Living Display of Cultural Heritage in Shandong Section of the Grand Canal in the Context of Virtual Reality

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Abstract: The inheritance of the cultural heritage of the Beijing-Hangzhou Grand Canal requires social participation. This study analyzes the living display strategy of the cultural heritage of the Grand Canal, and uses virtual reality technology to practice the restoration and development of the cultural heritage of the Grand Canal on the basis of the excavation and modeling of the cultural heritage of the Shandong section of the Grand Canal.

Keywords: Beijing-Hangzhou Grand Canal; Shandong section; Cultural heritage; Living display

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1. The Living Display Strategy of Grand Canal Cultural Heritage

1.1 Audience Strategy:

Cultural inheritance needs social inheritance and more people need to participate, especially young groups. Virtual reality (VR), as a technology with the characteristics of multi-perception, immersion and interactivity, can enhance the user's cultural experience and has great advantages in information presentation in practical applications. Therefore, this study focuses on the ancient water transport project of the Grand Canal, and uses VR means to reproduce the canal scene in a more vivid and immersive way, showing the unique landscape of the Grand Canal, so that more groups can participate in cultural inheritance and enhance their cultural inheritance and innovation ability in interactive experience. The development of VR provides a more convenient means for traditional intangible cultural heritage protection, and a more suitable carrier for spreading among young people, and provides a feasible path for the Grand Canal culture to integrate into the context of the times.

1.2 Display strategy:

Although traditional media display brings better visual experience to the audience, it can not provide tactile and psychological experience for the participants. VR can be a good solution to this problem. Based on the rich cultural accumulation of the Shandong section of the Grand Canal, the cultural characteristics of the Shandong Canal are reflected by the narrative expression, and the cultural life along the canal is transformed into interesting experiential scenes to awaken people's enthusiasm for participation. Through the digital means of virtual interaction, recreate the water conservancy project at that time, show people the life scene at that time, show the historical geographical information and cultural image space of the canal with a strong sense of presence, form a panoramic audio-visual atmosphere, bring the audience the most direct perception and experience, so as to promote the inheritance and dissemination of cultural heritage.

1.3 Media Strategy:

Through the mixed expression and coding of VR and other media, a comprehensive representation system of canal cultural

heritage is constructed. The ultimate purpose of media selection is to reproduce and display, that is, to present the canal cultural landscape that can be experienced. The canal heritage is presented as a displayed entity, and its cultural memory can be perceived and recognized. The virtual scene of the canal cultural heritage in the VR context has a different appearance because of the interactive participation of the audience. The life of the culture is continued. In this way, the new ecology of the cultural heritage display of the Grand Canal is reconstructed. Through the participation of consumers and experiencers in the “immersive experience”, while spreading and inheriting the canal culture, cultural creation and innovation are formed, so as to give play to the cultural heritage. The important role of hidden inheritance realizes the living display and inheritance development of culture.

2. Excavation and modeling of the cultural heritage of the Shandong section of the Grand Canal

2.1 Cultural Heritage Excavation

With the changes of the times, the Grand Canal has nurtured countless cultures, forming a unique and rich canal culture. The Shandong section of the Grand Canal is an important water transportation line. There are countless material and cultural heritages and buildings, such as bridges, docks, locks, guild halls, etc., which affect people’s residential buildings, folk customs and so on. However, with the passage of time, these cultural heritage lost its original appearance. When excavating the cultural heritage of the Grand Canal, we should select and sort out the representative landscape of the Shandong section of the Grand Canal for restoration and reproduction according to the field investigation, so that more and more people can understand the history carried by the Grand Canal.

2.2 3D data acquisition

The first step in the virtual reproduction of the Grand Canal cultural heritage is to obtain three-dimensional data. Take field trips, Baidu Maps and Google Maps for observation, according to the actual scale of the restoration. For example, in the restoration of the ancient water transport lock, in order to establish a three-dimensional model of the water transport lock, the three-dimensional coordinates, texture information, the terrain of the area is obtained. Image-based and map-based methods are used for surveying and mapping to lay the foundation for the accurate display of landscape, ruins, landscape and other elements along the canal.

2.3 Canal Cultural Landscape Model Reproduction

In the display of virtual reality, the reconstruction of three-dimensional model is an important link. In practical application, there are mainly two ways: scene modeling technology based on geometric modeling, that is, based on computer graphics, using MAYA and other professional modeling software to build the model, adding material and texture mapping, then adjusting the environment and light to complete the construction of virtual scene; The second is image-based scene modeling technology, which mainly uses the picture data in the real world to replace the traditional modeling technology. For the above two methods, each has different advantages and disadvantages, the two can be integrated application, balance the effect of the virtual scene model, in order to ensure the fidelity of the scene at the same time, to ensure a good visual display of the tour.

3. The use of VR to achieve the restoration and development of the cultural heritage of the Grand Canal

3.1 Uses VR to restore the cultural heritage of the canal

France Jean Baudrillard (Jean Baudrillard) believes that with the emergence of various media technologies, simulation not only means the imitation of the prototype, but also will develop into a simulation of things without a prototype; many studies show that: new media technology has fundamentally changed the distribution of scientific knowledge, so that the practice of cultural heritage to the world cultural depth, diversified development of the strong road. In this study, different VR repair schemes can be used according to different situations. For example, for a single item, it can be displayed by three high-precision restoration, providing zoom, 360-degree and other visiting functions; For architectural sites, virtual restoration and tour-style visiting functions can be adopted. In addition, virtual reality technology can be used to restore ancient utensils, life scenes, living environment, paleontology, ancient landforms, etc.

3.2 The use of VR to achieve the development of the canal cultural heritage

The perfect combination of physical and virtual cultural relic information can enrich the visitors’ experience in the exhibition area and online. Bellertal (Behretal) integrated VR virtual tourism during the World Expo in Hannover, Germany, allowing users to watch the pyramids from outside to inside and from different angles, and experience the greatness and mystery of this building. In this study, the existing relics of the Grand Canal, the application of VR exhibition, introduction and parade demonstration, the original display

to provide assistance. Let people change from passive audiences to active participants, and have a more vivid tour and experience of the Grand Canal culture. For example, the ancient gate and dam of the Grand Canal provided important technical support for the development of water transport. Today, the ancient gates of the canal no longer exist, and people's understanding of them is becoming increasingly scarce. As a means of productive protection, VR makes up for the shortcomings that cannot be reproduced in the real world, and reproduces the achievements of ancient outstanding water conservancy projects. This is the most direct expression of VR's display of history and culture.

3.3 To create VR interactive experience scene

The use of VR to restore the Shandong Grand Canal will integrate the restoration, protection and display of cultural relics, give the Grand Canal a new form of expression, and revitalize traditional culture. Driven by the continuous development of modern media, the diversity of the canal cultural heritage, The need for living and immersive experience is highlighted, configured and strengthened, which can enable people to understand the cultural heritage more truly and clearly and feel the wisdom of the ancient people. The exhibition of canal cultural heritage based on VR can not be restricted by region and time, so that people from all over the country can understand the canal at any time. By creating a virtual reality interactive experience scene, people can understand the ancient and modern history and culture of the Grand Canal without leaving home. Users can wear VR glasses to experience, at home can swim along the canal, feel the charm of the canal culture. After entering the virtual scene, the Grand Canal and its surroundings come into view, and users visit the Grand Canal and experience the whole process of the ancient trough ship passing through the gate. At the same time, the navigation bar can also realize the function of scene conversion and get a deeper cultural experience.

4. The Formation of a New Living Display Mode of the Grand Canal Culture

McLuhan mentioned in *Understanding Media* that VR will become the ultimate medium for people to freely perceive and communicate. Compared with traditional cultural media, VR has great potential in changing the way people experience culture. With the innovation of modern media technology, people are more eager to interact with traditional culture, which makes VR images become a new medium for the inheritance and dissemination of cultural heritage. VR transforms the spread of canal culture from plane to interactive three-dimensional spread, from surface to depth, and can spread on a larger scale, effectively stimulating new vitality in the spread of cultural heritage. This study is a new concept different from static protection, which can fully continue the modern social function of the Grand Canal culture and open a new way of cultural communication and display under the premise of protection.

References:

- [1] Wei Yanyu. Research on the active path of cultural and tourism integration in Jiangsu section of the Grand Canal based on immersive experience [J]. *Beauty and Times (Part I)*, 2022, No. 960(10): 95-98.
- [2] Zhong Wenyang, Miao Zhigang, Qu Gengyu, etc. Digital Realization of Virtual Reproduction of Grand Canal Landscape [J]. *Digital Technology and Application*, 2022, 40(08): 121-123.
- [3] Shen Ting, Cao Siqi. Application of VR Technology in the Digital Inheritance of Grand Canal Culture [J]. *Electronic Technology and Software Engineering*, 2021, No. 200(06): 132-133.

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