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Study on Digital Reconstruction Scheme of Wenzhou Cultural Auditorium

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Abstract

With the frequent emergence of Internet virtual reality application technology in the market, the field of virtual reality has been the focus of social attention, the development of virtual reality application technology has been greatly improved. It is a hot topic in various fields to make use of information and Internet platforms to integrate the Internet with traditional industries, and make use of the advantages and characteristics of the Internet to create new development opportunities. It is an important part of the implementation of the "digital village" strategy to study the digital reconstruction plan of the local cultural auditorium in Wenzhou City, which plays a substantial role in the development of digital agriculture, rural e-commerce and the promotion of digital precision empowerment.

Keywords

Wenzhou; Virtual Reality Application Technology; Cultural Auditorium; Digital; The Metaverse.

1. Introduction

By the end of 2021, Wenzhou has built more than 3,600 cultural halls, won nearly 200 five-star provincial rural cultural halls, created 8 provincial demonstration counties, 11 provincial advanced counties, 37 demonstration towns (streets), and 21 provincial "Most beautiful Cultural hall", the above three honors are among the top in the province. Wenzhou has spared no effort in the development of the local cultural auditorium, which has become a name card of Wenzhou. In February 2022, Wenzhou City issued the "14th Five-Year Plan" for the Development of Digital Economy, proposing the goal of "cultivating industrial clusters of digital economy of 100 billion level and building a leading area of digital economy". The cultural auditorium plays a self-evident role in the revitalization of rural culture. It is very necessary to reform the cultural auditorium in Wenzhou city by digital means. The digital reconstruction of Wenzhou Cultural Auditorium is beneficial to inherit the traditional culture of local towns and streets, and promote the comprehensive development of science and technology, economy and social fields.

2. Wenzhou Cultural Auditorium 1.0 online Community and 2.0 Interactive Platform

2.1. Forms and Characteristics of Online Communities

Wenzhou Cultural Auditorium 1.0 online community usually takes the form of web pages or small apps. Mainly by the administrator to edit and release a variety of related activities and information, which is characterized by small amount of information, a single form of information, mainly composed of text and pictures, is developed from the early Internet web page production technology, also known as the Internet professional term "WEB1.0 era". It is precisely because of the above characteristics of online community that this form plays a

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considerable role in "issuing notices and announcements", "reporting relevant meetings and work" and "conveying thoughts and spirits". It is simple, clear and easy to operate, and the network transmission speed is fast and easy to copy. This form has been widely used in the period and region where the network speed is generally low. It is one of the important schemes of the early Internet of Wenzhou Cultural Auditorium, and has made certain achievements. The example of online community of Cultural Auditorium is "Wenzhou Publicity" sponsored by the Publicity Department of Wenzhou Municipal Committee of the Communist Party of China. As shown in Figure 1, users can obtain content one-way through the official website of "Wenzhou Publicity" by using a WEB browser, and conduct some browsing, searching and other functions. This kind of cultural auditorium online community content is detailed, can timely show the development of local cultural auditorium.

Wenzhou Cultural Auditorium 2.0 interactive platform is an upgrade based on the 1.0 online community, which is an addition and improvement on the original basis. 2.0 interactive platform is a new Internet way of cultural auditorium, which promotes information exchange and collaborative cooperation between people through network apps. Compared with 1.0 online community, this mode is more user-centered, focusing on sharing mechanism and decentralization. Users are more closely connected with the platform, and even dominate the content of the platform, forming a brand new interactive platform. This form represents the network application APP Wenzhou Municipal Party Committee publicity Department sponsored, Wenzhou News network undertook "propaganda". As shown in Figure 2, in addition to the main functions of "issuing notices and announcements", "reporting relevant meetings and work" and "conveying thoughts and spirits" similar to online communities, "Promotion and Jia" also adds many user-centered interactive function modules, such as "Qiushi Forum" to share users' daily life; Users can participate in the teaching and learning of various local cultures and crafts through the "skills classroom". Users can also invite different groups and organizations to conduct offline spiritual civilization education activities by "ordering". It not only greatly improves the browsing time of users, but also improves the enthusiasm of the surrounding users to participate in the construction of the local cultural auditorium. It effectively solves the many pain points of the cultural auditorium's low activity, small number of topics, low user viscosity, and slow update compared with the comprehensive information platforms such as news and entertainment. Interactive platforms can serve as an effective tool for promoting national democracy and as a reference for drawing on the views of a wide range of people.

2.2. Main Technologies of Online Community and Interactive Platform

The online community of the Cultural Auditorium belongs to the form of informational web design. Most of the technologies adopted are the first, multimedia functions, including but not limited to 3D animation, Flash animation, vector graphics design and various layout design technologies. Second, HTML technology (an application of the standard General Markup Language), CSS, Javescript and other basic scripts. Third, PHP, ASP, ASP. Net and other development program technology, PHP is currently one of the mainstream website development languages, its advantages for open source code, new function library frequently joined, whether UNIX or WINDOWS platform can have more new functions to provide developers; Fourth, database knowledge, including ACCESS, MSSQL or MYSQL technology, must understand the installation, establishment and use of various database technology.

3. The Development Trend of Wenzhou Cultural Auditorium 1.0 and 2.0

As the Internet speeds up with the 4G network, WEB2.0 technology updates rapidly, Blog, MicroBlog, instant messaging, short video social networking and other related technologies have reached a mature stage. It is difficult for innovative content expression forms to appear in

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the interactive platform of Cultural Auditorium 2.0, and the majority of users' experience of this form is gradually losing its freshness. Objectively, the digital Wenzhou Cultural Auditorium is required to make greater technological breakthroughs and make innovations in form and content by using the new Internet technology in the 5G era.

4. Wenzhou Cultural Auditorium 3.0 Virtual Reality Community

4.1. Forms and Characteristics of Virtual Reality Community

Virtual reality is a three-dimensional virtual world based on the Internet generated by computer simulation, allowing users to personally observe or have interactive experience with the things in the surrounding three-dimensional space. The technology integrates the development achievements of many new technologies such as computer graphics, virtual simulation technology, artificial intelligence, stereoscopic display and sensing technology, system integration technology and so on. It is a kind of realistic simulation system generated by computer aid. With the rapid development of science and technology in recent years, virtual reality has become a hot topic and gradually entered the public's vision. Virtual reality technology has been vigorously promoted and applied in film and television films, network broadcast, offline theme pavilions, online digital pavilions and various training and teaching. The following is an in-depth exploration of the application ways and schemes of virtual reality technology in Wenzhou Cultural Auditorium.

4.2. Main Technologies of Virtual Reality Community

(1) Panoramic roaming technology

Panorama camera technology emerged in the 1990s, integrating digital image processing, computer graphics, multimedia technology, sensor technology and other information technology. Compared with traditional photo display, panoramic tour has obvious advantages in the following aspects:

A strong sense of reality. Panoramic tour in the field of 360-degree shooting, then image Mosaic processing, giving people the feeling of being in the scene.

A strong sense of interaction. The experiencer can manipulate the character to walk around freely in the 360 panoramic tour; The sense of human-computer interaction can be further enhanced if virtual entity sensing devices and helmet devices are configured.

Strong economic applicability. Panorama Tour design and production cycle is short, the production speed is fast, the cost is low, the data volume is not large, the format is common and convenient transmission is very suitable for the use of network communication.

Panorama tour technology can play a crucial role in the exhibition of Wenzhou Cultural Auditorium. The street environment and interior buildings of the Cultural auditorium were photographed by 360-degree panoramic camera. Take 360-degree aerial photos of the terrain around the cultural auditorium by UAV; Finally, computer software, such as 720Cloud and Landscape Architect, combined the photos to create a panoramic tour of the auditorium and its surroundings.

The panorama tour of the cultural auditorium can greatly spread its cultural radiation range and solve the pain point that the local cultural auditorium has little influence on the region, which is of great significance in the post-epidemic era. The Panorama tour of the Cultural Auditorium can increase the accurate information data of the GPS map of urban and rural streets, and cover the accurate map navigation data of the whole city with points and areas; Panorama tour of Cultural Auditorium can be used as a technical platform for future online activities, with high functional scalability.

(2) real-time 3D graphics generation technology

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The mainstream 3D graphics technology has two kinds, the first: the use of 3D modeling software for model production. The advantages of this process are as follows:

Model quality is high. The data quantity of the model is controlled by reasonable wiring. Improve the art of the model by hand mapping; The material quality of the model is improved by lighting correction in the later stage.

Strong model plasticity and diverse styles. Can make the fantasy of the virtual scene model, and convenient model modification and iteration; The style displayed by the model can be changed at will to show the personality of the artist.

The model has strong applicability. The models produced by 3D modeling software can be applied to almost any virtual reality application scenario.

Second: Use panoramic cameras or drones for 3D scanning. The 3D scanning technology uses a camera to scan a real object -- from a key to a building or a mountain -- in multiple directions, and the computer builds a 3D digital model based on the images.

The advantages of this process are: high degree of modeling automation, short process and fast speed; Low learning cost, no additional learning of professional modeling technology; The model is based on reality scanning and has a high degree of authenticity.

The disadvantages are also very prominent: limited by the development of technology, 3D scanning can not perfectly restore the metal and other highly reflective objects; Scanning environment requirements are high, the scanning object should have a large color and brightness difference with the background, the lighting layout is the best; There is no way to make a model where reality does not exist, or where it is difficult to scan.

The real-time 3D graphics generation technology can provide an extra layer of insurance for the spiritual and material assets of Wenzhou Cultural Auditorium and solve the pain point of the lack of protection of ancient cultural relics in the cultural auditorium. Firstly, 3D scanner is used to scan the existing material and cultural assets, and then the computer is used to modify, add and polish the scanned 3D model with 3D modeling software, so as to digitally restore the material and cultural assets in the local cultural auditorium to the maximum extent, and place them in the virtual reality community or website as digital collection display.

The digital collection of the Cultural Auditorium can protect local assets while displaying them; The digital collection of cultural hall can effectively display the cultural characteristics of different places and strengthen the cultural identity and pride of residents. Cultural auditorium digital collection combined with blockchain technology, can open up a new way of marketing.

The online Palace Museum in Beijing set foot in the field of digital collections earlier and achieved good results. As shown in Figure. 1 exhibit album and Figure. 2 exhibit 3D model, the effect is worth imitating and learning from local museums, cultural halls and other cultural export bases.

Figure 1. The Imperial Palace digital collections photos

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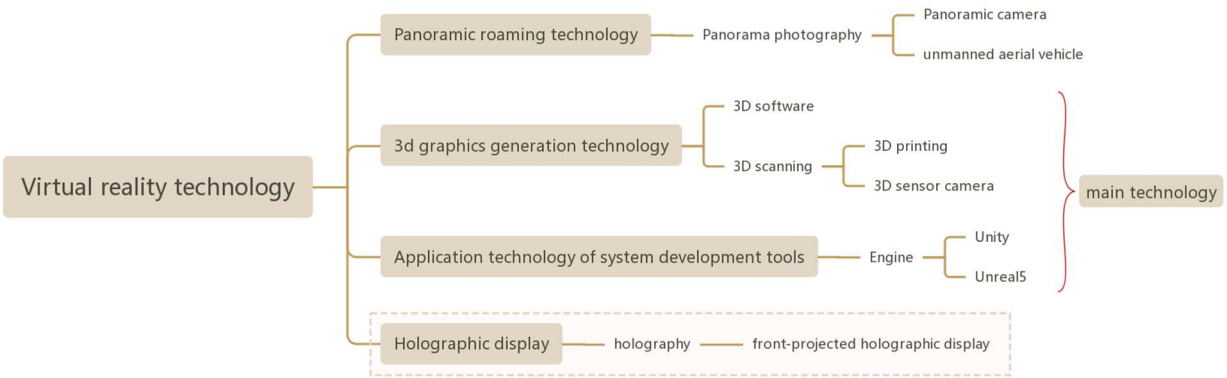
Figure 2. The Imperial Palacedigital collections 3D Models

Application technology of system development tools.

Common development tools for developing virtual reality projects are the Unity and Unreal5 game engines. Unity is suitable for small size project development, usually in the web terminal, mobile terminal application development is more, is characterized by small size of the project, the development process is simple. On the contrary, Unreal5 is suitable for PC client project development, characterized by excellent visual performance, strong sense of light and shadow layer, realistic effect, followed by a large project volume, long loading time.

At the present stage, we can use Unity engine to develop Wenzhou Cultural Auditorium 3.0 virtual reality community project and publish it on the website of local cultural auditorium. 3.0 Virtual reality community project adds traditional "Tomb-sweeping Day" memorial activities according to local cultural needs -- residents carry out unified online virtual memorial ceremonies across regions, which are consistent with offline processes and have a strong sense of interactive experience; Add specific time for spiritual and cultural learning activities -- there is no limit of place and time, and finally test the learning situation in the form of answering questions, which is full of fun and highly efficient; Increase the collection exhibition experience activities -- strengthen the experiential users' awareness of the local characteristic culture, and pave the way for the inheritance of traditional culture; Increase fire safety drill activities in the auditorium -- Through virtual reality fire experience, greatly reduce the training cost of carrying out unified fire safety drill offline.

Table 1. Breakdown of virtual reality technology



In the near future, 5G network will be popularized, the Internet will speed up, and the community server reserves will increase. It is possible to use Unreal5 to produce and develop Wenzhou Cultural Auditorium 3.0 virtual reality community project. Its Nanite virtual polygon

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geometry technology allows developers to create all geometric details. Nantie geometry can be streamed and scaled in real time, greatly improving the level flow. Lumen is a full dynamic global lighting solution that responds to scenes and lighting changes in real time. The right use of Unreal5's powerful technology can make virtual reality projects look real and keep users hooked. The hierarchical decomposition table of the whole virtual reality technology is shown in Table 1 below.

5. Wenzhou Cultural Auditorium 4.0 Yuan Universe

5.1. Major Technologies of the 4.0 Metaverse

The metaverse originated from the American science fiction novel Avalanche, published in 1992. Professor Chen Gang and Dr. Dong Haoyu of Peking University defined the metaverse as: "The metaverse is a virtual world that is linked and created by means of science and technology, mapped and interactive with the real world, and a digital living space with a new social system." Metacomes are conceptualized under new technologies such as Extended reality (XR), blockchain, cloud computing, and digital twinism.

Metaverse main technologies are: digital twin, digital man, block chain.

Digital twinning uses operations in the virtual world to influence the real world. At present, digital twin technology has been widely used in industrial Internet.

Digital human technology, also known as virtual human. Through motion capture, face capture and other technologies to achieve the same actions and expressions with the virtual world characters, currently in film and television, live broadcast and other industries are widely used. It's not new, it's a mature technology. However, due to the extremely expensive equipment, the capture environment is harsh and not widely spread. As the concept of metacomes exploded, 3D character modeling, motion capture, facial expression capture and other related technologies were combined to re-emerge in the public as the concept of "digital man".

Block chain technology, using block chain to build a set of virtual world economic system. Previously, "Bitcoin" has been applied for a long time. With the proposed concept of NFT digital collection, it can be predicted that blockchain technology will be the main technology to build the virtual world currency system in the future meta-universe.

5.2. The Prospect of Metaverse

Wenzhou Cultural Auditorium 4.0 universe needs flexible use of the above three technologies, digital twin technology to develop cultural auditorium data visualization, digital management, so as to effectively reduce the auditorium management labor costs. Digital human technology can shape the cultural auditorium into a virtual square, free from the limitations of the real site, to hold a variety of large-scale cultural gathering activities. Blockchain technology can make profits while exporting some local cultural products.

The advance layout of the meta-universe version is of profound significance to grasp the future trend of the meta-universe and advance its application in the cultural industry. It can make Wenzhou Cultural Auditorium adapt to the current new development opportunities, and finally promote the continuous development of Wenzhou traditional cultural industry.

6. Conclusion

Today, with the rapid development of information technology, it is necessary for Wenzhou Cultural Auditorium to follow the trend of The Times, make full use of Internet website technology, adjust the interactive display form of the cultural auditorium, and use virtual reality technology, panoramic tour technology, real-time 3D graphics generation and other technologies to rebuild and upgrade the cultural auditorium in Wenzhou, so as to bring better

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experience for visitors. In the current investigation, Wenzhou Cultural Auditorium is mainly in the stage of 1.0 online community and 2.0 interactive platform, and there is a long way to go before digital reconstruction.

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