Research and Practice of Virtual Simulation Technology in Architectural Heritage Protection

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Abstract

The immersive feature is one of the important features of virtual reality technology. Virtual reality can almost simulate certain scenes according to people's fantasy, so as to satisfy people's desire to communicate in the virtual world. Simulated realistic environment can let a person immersed in it.Aiming at the characteristics of virtualization technology this paper made a summary, and analysis the advantages and disadvantages of virtualization technology in practical application, aiming at the difficult problem in the field of high performance computer technology, are trying to solve using the virtualization technology, further analysis of high performance computer network information and filtering, so as to achieve technical support. Especially in the field of high performance computer technology in the difficult problems of the current research, further analysis and exploration of virtualization technology. This paper gives a brief overview of virtualization technology, and analyzes the application of virtualization technology in high-performance computers, hoping to help the development of virtualization technology.

Introduction

Virtual reality technology itself is a new technology that simulates real life through computer system. Compared with the previous human-computer interaction, it not only provides a strong audio-visual experience, but also provides a sense that cannot be provided by human-computer interaction such as smell and taste. Through the computer terminal equipment and interface, using a variety of software and hardware integration, simulation of human senses, users from all aspects of the sense of immersive, to achieve a more real scene experience. The integration of virtual reality technology into architectural heritage and protection can make the masses have an immersive feeling. Learning and protection in specific situations can greatly improve the effect[1, 2].

1. features of computer "virtual reality" technology

The continuous development of computer technology has created a good working environment for the application of computer "virtual reality". It is concluded from relevant investigations that the computer "virtual reality" technology can be divided into four types: interactive, multisensory, imaginative and immersive.

1.1. Interactive features

"Virtual reality" is mainly used to simulate various scenes of reality through computers. This capability

has a two-way interaction, which makes computer "virtual reality" technology interactive.Because of this, technicians can selectively simulate various scenes that do not exist in real life, which is of great significance in scene simulation such as film shooting or physics research.

1.2. Polysensory characteristics

Since "virtual reality" technology is mainly composed of various sensors, computer hardware and software, etc., the feature of multi-perception makes sensors more flexible, thus making the architectural heritage and protection more scientific and reasonable. The following figure 1 shows the concrete presentation of unawareness and three applications. This technology can be used for the collection and analysis of actions and images:
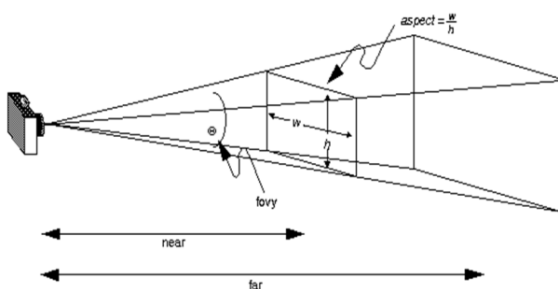

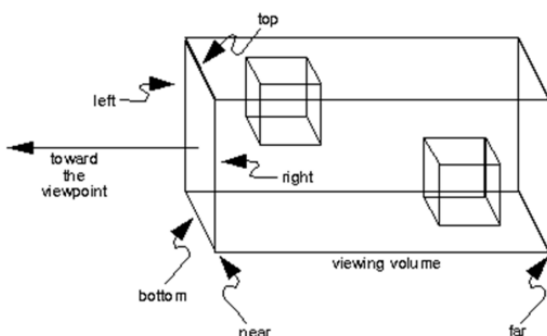**Figure 1.**A concrete representation of unawareness.

Figure 2.A concrete representation of unaits application.

1) Enhance spatial information, especially when the space is beyond the horizon.

2) Data-driven sound can transfer the attribute information of the object.

3) Sound is another way for users to interact with the virtual environment.

In addition to the above 1 shows, "virtual reality" is still able to force field, magnetic field and tactile judgment and non-specific information processing, and the results can be analyzed and processed by map or is presented in the form of signal, based on these characteristics, making the computer "virtual reality" technology has many characteristics.

1.3. Conceptual characteristics

The concept and interactivity have common features, both of which are simulated by computer for various nonexistent scenes. However, the feature of conception can expand people's imagination space and construct the scene that does not exist in reality through artificial imagination.

1.4. Immersion Characteristics

1.5. The immersive feature is one of the important features of virtual reality technology. Virtual reality can almost simulate certain scenes according to people's fantasy, so as to satisfy people's desire to communicate in the virtual world. Simulated realistic environment, can let a person immersed in it.

2. Status quo of architectural heritage protection in China

2.1. More protection subjects, less protection time and poor protection effect

At present, the more prominent problem in the protection of architectural heritage is that the protection subjects are too many and the class hours are too few. It is difficult to meet the requirements of the new curriculum standard by using the traditional heritage protection methods.At the same time, the traditional process of heritage protection is mainly shown in Figure 2 below. Most of them focus on

improving the heritage level of the masses and ignore the improvement of the comprehensive ability of the masses. The protection method is very monotonous and boring, and the effect of heritage protection is poor.
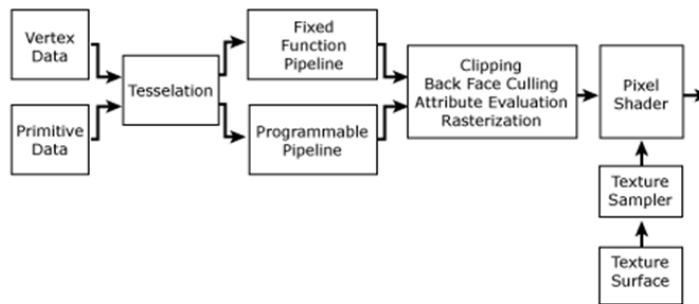

Figure 2. The current overall process of architectural heritage protection in China.

2.2. The masses lack enthusiasm for learning, and the evaluation criteria are not clear

The construction teacher does not pay attention to the heritage course, and does not make clear provisions on the heritage achievements of the masses, the masses lack of enthusiasm for learning, many people attend the heritage course only to deal with the form, the teacher's neglect of management makes the heritage course protection affected.

3. Classification of application of computer "virtual reality" technology in architectural Heritage protection

From the current situation, the computer "virtual reality" technology in heritage conservation can be divided into "immersive" and "non-immersive" two kinds.Immersive means that the protector USES a three-dimensional helmet or glasses to create a realistic three-dimensional environment.This way of protection allows the protector to fully engage in the virtual protection environment and conduct a series of simulation operations[3].

However, because of the high cost and complex operation, most buildings cannot meet this requirement.By the end of 2016, there will be 389

million users of VR products and the VR market is expected to reach $5.1 billion, according to a report by data analytics firm SuperDataResearch.The analysis predicts that Europe will become the first market for VR products in 2016, with a market size of 1.9 billion US dollars, North America 1.5 billion US dollars, followed by Asia at 1.1 billion US dollars, and the total VR market size in 2016 will reach 5.1 billion US dollars, including 600 million US dollars from the rest of the world.

Non-immersive, as long as there is a computer, this kind of protection method can be used to provide a flat virtual environment for the masses and meet their learning requirements. For example, videos on heritage protection can be made[4].Although this method cannot build a three-dimensional virtual environment for the masses like immersion, it can bring very rich visual and auditory effects and is very convenient to operate.

4. Application of computer based "virtual reality" technology in architectural Heritage protection

It is worth mentioning that the VR market in education will be 7.7 times larger in 2016 than the $660 million in 2015, the analysis also pointed out that this figure will jump to $8.9 billion in 2017 and reach $12.3 billion in 2018[5, 6].The interactive replacement of texture attributes applied by virtual reality technology is mainly calculated according to the following formula to obtain relevant data:

$$I_{local} = k_a I_a + k_d (N, L) + k_s (N, H)^n \quad (1)$$

$$I = I_{local} + s I_s + t I_t \quad (2)$$

Of course, what architectural heritage workers are most concerned about is the price of VR products.Architectural heritage workers are more likely to experience VR content on relatively inexpensive mobile devices than on expensive VR devices.But the report also notes that higher-end products like the PlayStationVR and OculusRift could eventually become the first to drive the VR industry.

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PCVR devices such as OculusRift and HTCVice will be sold 6.6 million units in 2016, accounting for 17 percent of total sales, the report said.PlayStationVR is expected to sell 1.9 million units, or 5%;Lightweight portable VR devices from companies like Google and Samsung (the kind that put a phone inside) will sell 27.1 million units, the highest proportion of all, at 71%.

4.1. Contrast between legacy technical actions and reality through "virtual reality" technology

The key content in the protection of architectural heritage is to enable the masses to master a certain technical action and make its action more standard through corresponding protection.At present, many countries have increased the construction of various simulation, simulation and virtual reality technologies. This simulation system can comprehensively analyze the specific content of the protection of athletes and find out the problems existing in the technical movement, so as to strengthen the protection in the later period of practical protection and improve the effect of the protection of the mass heritage.
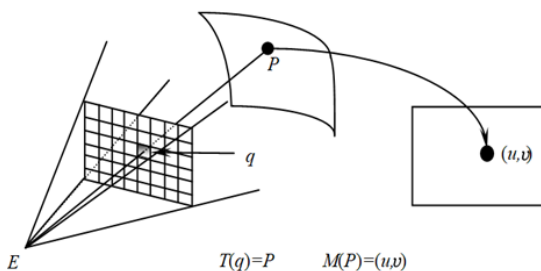

Figure 3. Legacy theory image of virtual Reality technology.

As shown in figure 3 above, this heritage preservation simulation system is an application of computer "virtual reality" technology.In practice, teachers should have a comprehensive grasp of the use of "virtual reality" technology, understand the relevant content of the people's heritage literacy, and teach students in accordance with their aptitude.At the same time, teachers can also add some standard

heritage actions to the system, and use the computer to decompose the actions, which can not only enable the masses to have a deeper understanding of their own actions, but also deepen the communication between teachers and students, so as to enhance the effect of heritage protection.

4.2. Construction of surreal protection environment through "virtual reality" technology

The remarkable feature of "virtual reality" technology is that it USES computer system to construct the environment that people imagine and can make people feel "immersive" in such virtual environment. By applying this technology to the protection of architectural heritage, teachers can flexibly construct a surreal protection environment according to different environments, and let the masses quickly adapt to the environment.At the same time, the new environmental protection can attract the attention of the masses and arouse their interest in heritage protection, so as to improve the level of the masses' heritage in a relaxed and pleasant environment.In addition, the construction of virtual training environment also plays a very important role in the intensive training before the construction of various heritage events.Heritage events are often organized between buildings, and home-field advantage can be used to level the playing field, but the use of "virtual reality" technology in communication events can avoid this phenomenon and improve athletes' pre-competition morale.

4.3. Realize remote interactive protection by using computer "virtual reality" technology

Due to the interactive characteristics of computer "virtual reality" technology, it is also the premise of the effective development of remote interaction protection.Many buildings regard the protection of traditional heritage competition subjects as the main protection content, rarely involving more advanced and typical heritage protection projects.The application of "virtual reality" technology to heritage protection can not only increase the subjects of

heritage protection, but also improve the level of architectural heritage protection.

5. The application of virtual simulation technology in architectural Heritage protection

Virtualization technology in developing very rapidly in recent years, and been widely applied to computer systems, high-performance computer and general computer there is a big difference, in order to promote the use of high-performance computer performance, the relevant departments and personnel will also attempt to virtualization technology is applied to high performance computer, to the use of to improve the system performance has a certain help. Practice has proved that the application of virtualization technology to high-performance computers plays a great role in improving the performance of computers. For example, great achievements have been made in the integration of heterogeneous resources, the realization of virtualized system environment (VSE), and the application of resource management.In this paper, the application of virtualization technology in high performance computer system is analyzed.

5.1. Overview of virtualization technology

Virtualization technologies have many levels of application, in the application of high performance computer system, the vast amounts of data can be stored, effective improve the ability of the computer, for integrating the data collected information, and report to the high performance computer system, makes high performance computer system can get the latest highest efficiency of the fastest computer data and information, based on virtualization technology under the condition of network information processing system is introduced and analyzed, and thus for the optimal way.

   With the continuous development of science and technology, computer in a high performance computer system industry in China is in rapid progress, at the same time, the social requirement for signal transmission in rising, in order to meet the social demand for high performance computer system industry, must use high performance computer system technology to meet the needs of society. Because of the characteristics of high performance computer system technology, and has a lot of advantages and significant practical effects, so high performance computer system can calmly cope with the social requirements of high performance computer system technology. At the same time, China is also constantly building high-performance computer system technology infrastructure, the future of China's high-performance computer system technology will be more developed, high-performance computer system industry forward speed will be greatly accelerated.

5.2. Application analysis of virtualization technology in high performance computer system

Virtualization techniques, such as fuzzy logic, do not require detailed descriptions of the mathematical models of the system. Virtualization technology can not only process massive data information of high-performance computer system, but also optimize the computing program to solve the most intractable problems through the fast calculation of high-speed computer to command the high-performance computer system. In order to optimize and upgrade high-performance computer systems, it is very necessary to evaluate the overall scenario and application capability of virtualization technology, improve the ability to analyze massive information data and the overall spatial analysis capability of data. In virtualization, multi-agent collaborative distribution thinking can better manage the collaboration between different levels.

   The era of virtualization technology provides opportunities for the development of scientific high-performance computer systems, improves the accuracy of management high-performance computer systems, improves the quality of high-performance computer systems, and reduces the risks of projects. Today, virtualization technology can improve the

efficiency of high-performance computer system management; because high-performance computer system is relatively complex and many items, the efficiency of high-performance computer system engineering is not too high, the era of virtualization technology can greatly improve the efficiency of high-performance computer system through the advantages of technology.

The energy-saving design of the building envelope mainly includes four aspects: the external wall insulation structure, thermal bridge blocking technology, roof insulation technology, basement exterior wall and ground insulation technology, high-efficiency energy-saving exterior window and curtain wall system, window-wall area ratio control, shading facilities, natural ventilation and lighting utilization.The second is the recovery and utilization of waste heat/cold in the building, as shown in Figure4 below, which is a reasonable and effective energy saving building wall envelope:
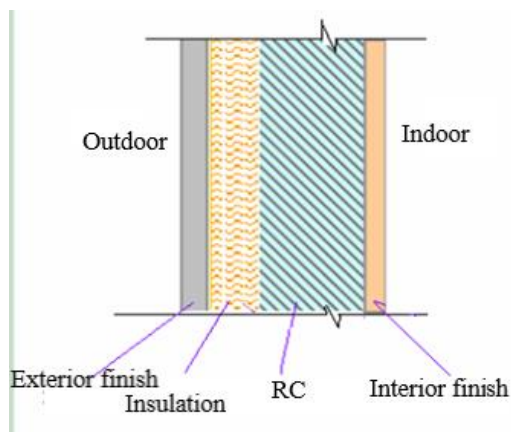

Figure4. Virtual simulation design of the energy saving building wall envelope.

As shown in figure 4, in the management of high-performance computer systems, such as the evaluation of management speed, there are a lot of data to be processed, cost calculation and other work, and the emergence of virtualization technology provides solutions to these problems.In view of the overall situation in the field of high performance computer system at present, countries all over the world have given great support to virtualization and

attached great importance to the development of virtualization technology. At present, virtualization technology has been applied to different degrees in various science and technology industries, and achieved remarkable results. From the perspective of computer virtualization technology, in order to improve the overall computer virtualization technology, so as to better meet the overall high performance computer system in the future application level and application capacity. In order to further optimize the virtualization technology and improve the efficiency, from the perspective of the overall application of the current virtualization technology, the future application of the virtualization technology of high-performance computer system will take the dominant position.

6. Conclusion

In a word, with the society gradually tending to the development of modernization, the public awareness of architectural heritage protection also presents an increasing trend of development, greatly increasing the demand for the number of architectural talents.With the continuous development of science and technology, computer in a high performance computer system industry in China is in rapid progress, at the same time, the social requirement for signal transmission in rising, in order to meet the social demand for high performance computer system industry, must use high performance computer system technology to meet the needs of society.Therefore, in order to adapt to the trend of social development, high performance computer system technology has obvious characteristics, and has many advantages and significant practical effects, so high performance computer system can calmly deal with all kinds of social requirements for high performance computer system technology.At the same time, China is also constantly building high-performance computer system technology infrastructure, the future of China's high-performance computer system technology will be more developed, high-performance computer system industry forward

speed will be greatly accelerated.

References

1. Meikang Y, Yao W U, Polytechnic S. Virtual simulation in the protection of architectural heritage:research and practice[J]. Research on Heritages and Preservation, 2018.

2. Wenqun T. Research and Application of Virtual SimulationTechnology in "Signal and System" Practice Teaching[J]. ence Mosaic, 2012.

3. Yang X B, Chen B Z., Virtual reality technology in the application of tibetan architectural heritage and protection research[J]. Advanced Materials Research, 2014, 1030-1032:1873-1876.

4. Samer M . Towards the implementation of the green building concept in agricultural buildings: a literature review[J]. Agricultural Engineering International Cigr Journal, 2013, 15(2):25-46.

5. Fasse-Calvet Isabelle, Didier Dalbera, Jacques Zoller. Digital restitution of architectural and urban heritage in south of France[C]// Digital Heritage International Congress. IEEE, 2013.

6. Laing R, Conniff A, Craig T, et al. Design and use of a virtual heritage model to enable a comparison of active navigation of buildings and spaces with passive observation[J]. Automation in Construction, 2007, 16(6):830-841.