The Research on Application of Virtual Reality Technology in Museums

Bo Wang and Yue Liu
11th Floor, Hebei Arts and Crafts Vocational College, Ruixiang Street, Jingxiu District, Baoding City, Hebei Province, China. Mr. Wang Bo received, Tel: 18631289226, Zip Code: 071051
No. 102, Ruixiang Street, Baoding City, Hebei Province, China Tel: 13931280331, Zip Code: 071051

Abstract: The advantages of virtual reality technology become more and more obvious since the VR comes out. It is also widely used in different social fields, such as the field of architectural design, aerospace, entertainment and so on. As well, in the field of museums, the VR technology also shows it specific advantages and is widely applied. The article mainly analyzes and studies the application of VR virtual reality technology in museums, and proposes the strategies to improve the application of VR technology used in museums.

Since the VR was came up in 1980s, it has become very mature after decades of development, and it develops really fast especially in recent years. With the wide application of VR technology, it now has also entered people's daily lives and brings people a new audio-visual experience. The VR technology is by the virtual generation of three-dimensional under the integrated information mode to make users free from the limitation when they are viewing objects in the three-dimensional space. With the connection of VR technology, observers, virtual worlds and users can exchange their information smoothly. It also allows users present different states from the real world, which can be transmitted to the virtual world with the control device. As an important public place in people's daily life, museum can also take the VR virtual reality technology to bring people a more real audio-visual experience and make them think they were in it. So widely using VR virtual reality technology is of great significance for museum's future development.

1. The Principle and Composition of Virtual Reality System

The essence of virtual reality is a three-dimensional virtual world generated on a computer by using a computer graphics system and various interface devices such as implementation and control. Let the user observe the objects in the three-dimensional space in a timely and unconstrained manner under the sensory simulations such as sight, hearing and touch. VR is a system between the virtual world, the real world and the user. Through the VR system, the changes made by the user in the real world can be transmitted to the virtual world. After that, the virtual world will be associated with the user. Perform the same interaction as in the real world.

The composition of the virtual reality system mainly includes five parts: virtual environment, sensor device, device, human and virtual environment generator.

1) Virtual environment. The virtual environment is generated by the virtual environment generator. The user can interact with the virtual environment through the sensor device and the action device. Through this information interaction, the user can feel the immersive feeling.
Sensor parts. The function of the sensor device is to transform the sensory information such as the shape, motion, sound and the like of the object in the virtual environment, so that people can obtain a multi-faceted sensory experience, and the feeling that the person experiences is the same as the feeling in the real environment.

Acting device. The function of the action device is to turn the agreed action of the person's walking, gesture, etc. into action information and apply it to the virtual environment.

People. In fact, virtual reality is a closed-loop system, which is also rich in systematic feedback mechanisms. When someone exists, the feedback loop in the system will produce an effective response, so people are also an indispensable part of the VR virtual system. The interaction with the sensor device and the active device causes the virtual environment to change accordingly.

Virtual environment generator. The virtual environment required by the user is generated by the virtual environment generator. At the same time, with the aid of the active device, the virtual environment generator can accurately capture the movements and position changes of the user, and thus the generated the virtual environment is modified accordingly.

2. The Application of Virtual Reality Technology in Museums

In the traditional museum product display, it mainly uses the mode of “communication cabinet + physical + clear card” to manage and display, but this kind of viewing mode can easily bring a single, boring feeling to visitors, and then produce ornamental fatigue. And aesthetic burnout. The VR virtual reality technology is not the same, its own immersive and interactive features, can solve many defects in the museum's traditional display. By applying VR virtual reality technology to the museum, the audience can be connected to the museum through the network, and then select the subject or collection that they are interested in or want to understand in the virtual space for in-depth viewing and learning. In addition, in the virtual environment, due to the useless space, the virtual museum can move the exhibits that are difficult to accommodate in the traditional physical exhibition hall to the exhibition hall, such as ancient palaces, ancient towns, etc. Therefore, in the virtual space, the audience can see more exhibits that are not visible in traditional exhibition halls. At the same time, from the form of the exhibition, the display in the virtual environment is no longer a simple display of traditional, through the integration of virtual reality technology, can bring more interactive experience to the audience, in this case, the audience can not only be more gain a deeper understanding of the exhibits and interact with the collections, as if you are personally experiencing the collection process and understanding the stories that have occurred on them. In short, by applying VR virtual reality technology, it can give the museum a high degree of display and real-time interactivity, and can better display the image and connotation of the exhibit.

3. Application of VR Virtual Reality Technology in Museums

The museum is an important place in people's daily life. By visiting and learning in the museum, you can better feel the charm of culture, and better cultivate your own interest in learning and improve your overall quality. By applying VR virtual reality technology to museums, not only can the museum's commemoration and education be better played, but also new development space for the operation and development of the museum.

3.1 Using VR Virtual Reality Technology to Further Protect Historical Artifacts

In the traditional museum display, most of the historical relics are displayed through the collection cabinets, and this kind of display can make the audience only watch the cultural relics from a distance because of the constraints of the collection space, and often only see the cultural relics. Some parts, but can not see the complete cultural relics, some details of the cultural relics are not known. By adopting VR virtual reality technology, the viewer's viewing of cultural relics can be well solved. Under the application of this technology, the overall shape of the cultural relics can be fully presented to the audience, allowing the audience to see directly and clearly. And feel the size and morphological characteristics of cultural relics. During the viewing process, the audience can display the virtual cultural relics in a comprehensive manner by operating the sensing buttons, so that the viewer can feel
the perceptual effect that is difficult to achieve by viewing the physical artifacts, thereby deepening the understanding and understanding of the cultural relics.

3.2 Using VR Virtual Reality Technology to Better Protect and Display the Ancient Buildings
When viewing ancient buildings, the audience can only watch them on the fence or through the glass in most cases. At the same time, due to the influence of the internal environment of the ancient buildings, it is difficult for the audience to obtain better viewing effects when viewing. A comprehensive understanding of ancient buildings has led to a significant reduction in the educational effect of ancient buildings on the audience. However, after the application of virtual reality technology, the museum can display the ancient buildings in front of the audience in a digital form, so that the audience can see the overall structure and image features in a more comprehensive and detailed manner, thereby deepening the audience's understanding and understanding of the ancient buildings.

For example, the large-scale film and television works such as "The Palace of the Son of Heaven" photographed by the Palace Museum with virtual reality technology can let the audience visit the major palaces from the film and television. Through this display, the audience can fully see the internal conditions of the palace. Therefore, under the application of VR virtual reality technology, not only can the ancient buildings be better protected, but also the audience can better understand and understand the ancient buildings and stimulate people's interest in visiting ancient buildings.

3.3 Using VR Virtual Reality Technology to Better Display Cultural Connotation
Historical relics contain rich cultural connotations, which reflect the spirit and culture of the nation. The application of VR virtual reality technology to museums can better bring the history and culture of historical relics and the national spirit they contain to the audience. In the environment of virtual reality, the cultural connotations contained in historical relics can be expressed better, so as to bring a brand-new visual feeling to the audience, and then obtain better cultural edification.

3.4 Promotion of Cooperation between Museums Using VR Virtual Reality Technology
With the advent of the wave of globalization, more and more foreign people show a strong interest in China's traditional culture, and began to gradually and deeply understand the history and culture of our country. In order to better communicate with other countries, our museums are also actively establishing a good relationship of mutual assistance with foreign museums. Through exchanges and cooperation with foreign museums, we can not only better expand the influence of our museums in other countries, but also better spread the national cultural spirit of our country to all parts of the world. However, due to the constraints of time and space, so that China's external display of the number and grade of cultural relics can not be optimized, for example, those large-scale cultural relics and ancient buildings, such as can not be very good to show the eyes of foreign audiences. And through the application of VR virtual reality technology can be perfect to solve this problem, not only those can not move the history and culture to the display site, but also can be the production process and process of these historical relics complete, graphic display in the eyes of foreign audiences, thus, It can not only make foreign people fully feel the historical and cultural spirit of our country, but also promote the spread of our national culture in the world, and then make more foreign people understand and learn about our culture. Thus, through the application of VR virtual reality technology, it can effectively promote the communication and cooperation between museums, and then give full play to the cultural communication role of museums.

4. Promotion Museum VR Virtual Reality Technology Application Strategy

4.1 Increase the Capital Investment of the Application of the Museum VR Virtual Reality Technology
The application of museum VR virtual reality technology in order to obtain further development and perfection, it is necessary to constantly optimize the technology and equipment of VR virtual reality, to quality as life, and to be oriented to the needs of the audience. And this series of work can not be carried out without the investment of funds, for this reason, the museum should be VR virtual reality
technology in the application of increasing capital investment, only in this way to ensure the long-term development of the museum.

4.2 Perfecting the Talent Cultivation in the Application of the Museum VR Virtual Reality Technology
Museums should strengthen the training of maintenance talents and management talents in the application of VR virtual reality technology with the principle of combining basic subject and information technology discipline, and construct the talent training mode of museum VR, and constantly improve the training system of VR virtual reality technology talents, So that every VR virtual reality technology maintenance personnel and managers have a broad, spiritual knowledge of the comprehensive subject.

5. Conclusion
All in all, in the field of museums, VR virtual reality technology has great potential for development. VR Virtual reality technology can be the museum's environment vivid, image, realistic simulation out, to create a dynamic visiting environment for the audience. In the VR virtual environment, visitors are better able to visit a variety of cultural relics, collections, to bring an immersive sensory experience to the audience, and thus improve the quality and efficiency of audience visits. Therefore, the museum should increase the investment of funds in the application and construction of VR virtual reality technology, perfect the relevant personnel training mechanism, and constantly promote the construction process of VR virtual reality technology application. With the rapid development of VR virtual reality technology, virtual technology will certainly get better development in the field of museums and become the mainstream of leading museum visits.

6. References
[1] Yang Shanjin, Peng Chunrong. The effective application of VR virtual reality technology in Museum Pavilion [J]. China New Communications, 2018 (22).
[2] Zhou Zijie, Zhu Yan, Zhang Kai. Application of virtual reality technology in museums [J]. Intelligence, 2011 (20).
[3] Lu Kaifeng. Research on the application of virtual reality technology in museum display [J]. Popular literature and art, 2018 (16).
[4] He Minxuan. Application of virtual reality technology in museums [J]. Science and Technology Economics Guide, 2019 (3)
[5] Li Jinwen. Application of virtual reality technology in museum exhibition [J]. Informatization of China, 2017 (11).
[6] Cheng Du. Development of virtual Reality (VR) technology and its application in museums [J]. Tourism overview (second half month), 2018 (8).