The Application Function of Virtual Tourism for the Temple of Heaven

Hong-li LIU*, Xu-hui LI and Wan-ting ZHANG

College of Resources and Environment, Capital Normal University, Beijing, China, 100048

*Corresponding author

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Abstract. In this paper, the Open Scene Graph was used to develop the virtual tourism system for the Temple of Heaven, the principle of the functional design was discussed, and the function of the virtual tour system for the Temple of Heaven was designed. It is agreed that under the premise of technical and safety guarantee, virtual tourism, as a new type of modern business concept, will embrace a higher-speed development in the future by taking advantage of its authenticity, immersion, operability and interactivity.

Introduction

Virtual tourism has made outstanding contribution to modern tourism, with the rapid development and the continuous function improvement. Based on the system developed for the tourism system of Temple of Heaven, the problem of functional design was discussed to make the system more authentic, immersive, feasible and interactive.

The Virtual Tour System of the Temple of Heaven

The Temple of Heaven, an altar of the Ming and Qing dynasties, was built in the period of Yongle 18th year of Ming dynasties (1920) and was named Tian di tan (the Temple of Heaven and Earth). In the period of Jiajing 9th year of Ming dynasties (1530), its name was changed into the Temple of Heaven after the sacrifice of heaven and earth was departed. The Temple of Heaven was included in the world cultural heritage list in 1998.

The virtual tour system for the Temple of Heaven is a three-dimensional geographic information service platform developed on the basis of open source OSG system. The Open Scene Graph (OSG), developed by OpenGL technology, is a set of application program interface (API) based on the C++ platform, and it allowed the programmer to create high-performance and cross-platform interactive graphics program more rapidly and easily [1].

The Design Principles of Virtual Roaming System

(1) The principle of friendly interface. System should have a friendly man-machine interface and a multilevel Chinese menu which is intuitional and can be operated easily. The system is made up of two different types of resources: virtual reality and multimedia, multimedia resources are seamlessly integrated into the part of virtual reality.

(2) The principle of usability. The virtual application system design has reasonable and convenient performance, allowing the user to fully grasp the operation in a very short period of time. By this way the system itself can be widely spread.

(3) The principle of reality. The system is a virtual tourism roaming system requiring realistic scenario to confirm that the user can get real experience in the whole roaming process. In order to realize this function, during the model building progress, appearance of the model should be life-like, the proportion of the local part to the whole should be reasonable.

(4) The principle of openness. The data of virtual application system ought to be open instead of closed system software and can exchange or be converted with data in other formats. Secondary development production should be possible if needed.
The Function of Roaming System

This part gives a targeted elaboration to the application of the system\cite{2}\cite{3}. Secondary development was carried out on the basis of the optimization, adding real picture data and tour guide interpretation, to further improve the system use function.

(1) Tourist attractions interact roaming

Interactivity is the key function of virtual reality technology, this system can implement a full range of interactive roaming in the virtual tourist attractions and at the same time adjust angle freely through normal operation equipment. Users can roam freely in the virtual attractions and watch the vegetation and construction in the scene. (Figure 1)

(2) Roaming parameter setting

There is a user roaming perspective in the system set up. For convenience consideration, users can also adjust the roaming speed or select the viewing point according to individual need. (Figure 2)

(3) Collision detection setting

In order to increase the authenticity of the user roaming experience, a collision detection switch is added into the system. When the collision detection is working, the user cannot pass through if encounter with walls, trees and other obstacles in roaming process, just like the real world.

(4) Map navigation

In each tour system interface, the two-dimensional map of the corresponding area is lay out, the user can clearly understand their own location, and can reach any designated location quickly shown in the map. (Figure 3)
(5) Scene information query

A scene information database is built in the system. By simply clicking on the building or vegetation in attractions, users can quickly get the relevant information, including text, pictures, video and so on. Users only need to use the mouse click lightly to bring up the background information about the relevant attractions they want to know. (Figure 4)

(6) Key attractions shifting

Virtual scene system set up a shortcut switch menu for the key scene to facilitate the operation, and enhance the autonomy of the operation of tourists. (Figure 5)
Conclusion

According to the results of the study, virtual tourism, as a new type of modern business concept, will embrace a higher-speed development in the future. Before that, in the designing process of virtual tourism examples, key functions must be highlighted, reflecting the characteristics and advantages of virtual tourism, taking full account of the user requirements of interface and function. The advantages of authenticity, immersion, operability and interactive should be fully taken under the premise of technical and security protection.

References

