International Journal of Applied Mathematics and Soft Computing

Volume 4, Issue 2, April, 2018

Contents

Research on Technology Framework of Simulation Virtual Navigation Multi-Line System Based on Big Data for Characteristic Culture Tourism

Jiangmei Lin
Guangxi Vocational College of Water Resources and Electric Power, Nanning, 530105, China

Abstract: In order to improve the performance parameters scheduling and scene reappearance ability of virtual navigation multi-thread control in characteristic cultural tourism simulation, the design method of virtual navigation multi-thread system is proposed based on big data. The 3D geometric model modeling of virtual navigation of characteristic cultural tourism simulation is carried out. Big data analysis method is used to render the 3D model of characteristic cultural tourism simulation, and the OpenFlight data structure model is combined to carry out the virtual navigation multi-thread big data scheduling. The interface development and system design of virtual navigation multi-line system based on Creator interactive user interface are presented. The simulation results show that the design of virtual navigation multi-thread system for characteristic cultural tourism simulation using this method has good stability and strong data loading ability, and the ability of loading and controlling map vector data is improved.

Keywords: Big data; Characteristic cultural tourism; Virtual reality; Multithreaded big data scheduling

1. Introduction

With the progress of social civilization, people's pursuit of spiritual life has been improved constantly. It has become the main content of people to carry out characteristic cultural tourism to explore and understand the characteristic cultural details contained in the tourism activities. Characteristic culture is the source of tourism driving force. The so-called characteristic culture refers to the individual culture with unique connotation and charm in a certain area, including unique historical humanities, folklore color and personality charm and so on. From the perspective of tourism behavior, tourism is a temporary cultural space spanning behavior and process for people to seek for this kind of cultural difference (that is, characteristic culture). It can be said that the exchange of characteristic culture is the whole meaning of tourism. Is the most primitive driving force that people begin to travel. Only through excavating and refining the characteristic cultural resources, can we become the tourism products of real significance. Therefore, in order to develop characteristic cultural tourism according to the rules of tourism development, it is necessary to combine virtual reality technology and computer technology to develop and design virtual navigation system of characteristic cultural tourism simulation. Combined with multimedia image processing technology and big data analysis technology, the technical framework of virtual navigation multi-

thread system of characteristic cultural tourism simulation is realized[1].

With the development of modern information processing technology, scene simulation and image information processing technology are developed, the virtual navigation multi-line system of characteristic cultural tourism simulation is made up, and the entity object model of virtual navigation of characteristic cultural tourism simulation is established[2]. Combined with the virtual reality framework, the virtual navigation system of characteristic cultural tourism simulation is carried out, and the navigation effect of cultural tourism is obtained, and the recommended value of tourism culture is improved[3]. By constructing the 3D stereo vision field model of the virtual navigation of the characteristic cultural tourism simulation and combining the rendering method of the boundary bounding volume model in the virtual scene, the virtual navigation design of the characteristic cultural tourism simulation is carried out[4]. The image information loading and adaptive processing of 3D cultural tourism simulation virtual navigation are carried out by texture mapping technology, and good navigation effect is obtained. But there are some problems in the design of virtual navigation system based on traditional culture tourism simulation, such as poor real-time data loading and so on.

In view of the above problem, the design method of virtual navigation multi-thread system based on big data is

proposed. The 3D geometric model modeling of virtual navigation of characteristic cultural tourism simulation is carried out. Big data analysis method is used to render the 3D model of characteristic cultural tourism simulation. The interface development and system design of virtual navigation multi-line system based on Creator interactive user interface are presented in this paper. Finally, the performance test is carried out through the simulation experiment, which shows the superior performance of this method in improving the virtual navigation and multi-thread control ability of the characteristic cultural tourism simulation.

2. 3D Geometric Modeling and Big Data Analysis of Virtual Navigation in Simulation of Characteristic Cultural Tourism

2.1. 3D geometric modeling of virtual navigation for cultural tourism simulation

In order to realize the virtual navigation simulation of the characteristic cultural tourism under the virtual reality technology framework, the 3D geometric model of the virtual navigation of the characteristic cultural tourism simulation is first constructed. Given the pixel sequence samples (x_1, y_1), (x_2, y_2), ... (x_N, y_N), $y_i = 1$ or 0 represent the edge pixel set of the virtual navigation design of the characteristic cultural tourism simulation respectively, and take the edge pixel point as the information location center. The region block matching feature quantity of the virtual navigation image of 3D characteristic cultural tourism simulation is extracted, and the feature extraction equation is obtained as follows:

$$h(x) = \begin{cases} 1 & TH = \sum_{t=1}^{T} a_t h_t(x) - \frac{1}{2}\sum_{t=1}^{T} a_t \geq 0 \\ 0 & others \end{cases} \quad (1)$$

Where, $a_t = \log\dfrac{1}{b_t}$, it is the scene state information

of the virtual navigation in the simulation of characteristic culture tourism. and the block matching diagram of the virtual navigation of the simulation of characteristic culture tourism is obtained by using the region segmentation method as shown in Figure 1.

According to the block matching result of the virtual navigation scene data of 3D characteristic cultural tourism simulation given in figure 1, the feature segmentation is carried out, and the edge contour segmentation method is adopted to get the virtual navigation secant line mark of the characteristic cultural tourism simulation[5]. For $H_x = -jw_x / \|w\|$ and $H_y = -jw_y / \|w\|$, where $w = (w_x, w_y)$ represents the correlation coefficient in scene database, in $N \times N$ block region, the vector clipping method is used for reading template data, 3D geo-

metric modeling and information fusion of virtual navigation of cultural tourism simulation with characteristics are realized.
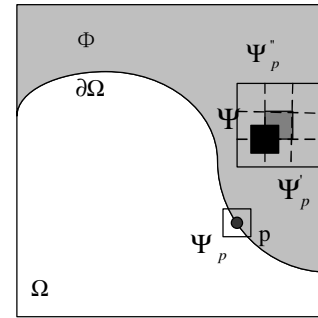

Figure 1. Block matching diagram of virtual navigation for cultural tourism simulation

2.2. Cultural tourism simulation virtual navigation image tracking rendering and big data analysis

The 3D geometric modeling is carried out in the virtual scene, and the deviation of the real part of the field of view control vector is obtained:

$$= 4\left(\left|y_{R,j}(n)\right|^2 - R_{2,R}\right) \times \frac{\partial J_{R,j}(n)}{\partial f_{ij}(n)} = \frac{\partial\left(\left|y_{R,j}(n)\right|^2 - R_{2,R}\right)^2}{\partial f_{ij}(n)} \frac{\partial\left(\left|y_{R,j}(n)\right|^2 - R_{2,R}\right)}{\partial f_{ij}(n)} \quad (2)$$

According to the method of sample template size matching, the 3D geometric modeling in the virtual navigation of characteristic cultural tourism simulation is carried out to improve the visualization effect of the observer in the virtual scene[6].

3DStudio MAX and Multigen Creator are used to carry out 3D geometric modeling and image big data loading of virtual navigation of characteristic cultural tourism simulation, loading 3D tourism environment and geometric layout, and adopting scene state fusion method to determine 3D feature[7]. The model of the gradient vector of virtual navigation for cultural tourism simulation is obtained as follows:

$$|G_A| = \sqrt{G_x^2(A) + G_y^2(A)} \quad (3)$$

The distribution range of images in tourism landscape design is determined by the position of $\Psi_q{}^"$, and the map image information of virtual navigation of 3D characteristic culture tourism simulation is realized through the above analysis.

3. System Development Design and Implementation

3.1. Big data scheduling of virtual navigation based on multithreading

In the design of virtual navigation system for characteristic cultural tourism simulation, the relationship between scene node and other simulation nodes is determined according to the simulation requirements, and the basic 3D model of virtual environment is established, and the

characteristic text is carried out with Ceator software. The 3D model of virtual navigation multithread system for tourism simulation is constructed, and the tourist attraction model and virtual scene model are generated, including the simulation of the scene model of the tourist attraction, the module of the control program driver and the visual simulation program. The real-time operation control algorithm is used to design the control program, and the big data scheduling model of the virtual scene of the characteristic cultural tourism simulation is established. The Terrain menu module of the virtual navigation multi-thread system of the characteristic cultural tourism simulation is established. An Open Flight format is generated to adjust the visual parameters and control the scene of the virtual navigation of the cultural tourism simulation according to the motion state of the current scene frame[8].

3.2. Technical design of virtual navigation multi-line system

The simulation system uses Multigen Creator3.2 modeling, Vega Prime2.2.1 visual simulation platform and Matlab7.0 programming to establish the technical route of the simulation system. The technical framework of the virtual navigation multi-line system of characteristic cultural tourism simulation is expressed as follows:
Int CMyApp: : configure ( )
{vp InputSourceBoolean *OpenGL = *vpVega Prime: : begin ( ) ;
channel - > Explosion (vsChannel: : TEXTURE_MODE, this) ;
void pFxExplosion_Explosion:: notify (vsChannel: : Event, const vsChannel *channel, vpIsectorLOS(Line OF Sight)) }
3D geometric model modeling of virtual navigation of characteristic cultural tourism simulation is carried out. Big data analysis method is used to render 3D model of characteristic cultural tourism simulation. Combined with OpenFlight data structure model, multi-thread virtual navigation is carried out. Data scheduling, using Creator interactive user interface to carry out the characteristic cultural tourism simulation virtual navigation multi-line system interface development and system design.

3.3. Multi-thread scheduling of characteristic Cultural Tourism

In the virtual reality environment, the entity objects of the virtual navigation system node model of the characteristic culture tourism simulate the operation, the collection and the storage of the network communication node. Using the OpenFlight to construct the hierarchical structure attribute unit to describe the three-dimensional entity model of the characteristic cultural tourism simulation virtual navigation system. The tracking and recording method is used to configure the control system

and the grid unit of the database. The geometric features, the location and the size of the 3D visual simulation are determined. The Vega Prime editor is used to display the 3D/2D and static / dynamic text in the instrument display, and the dynamic three-dimensional simulation of the virtual navigation system of the characteristic cultural tourism is completed. The optimization design of the system is realized.

4. Simulation Experiment

In order to test the performance of the characteristic cultural tourism simulation virtual navigation system based on big data and virtual reality technology designed in this paper, the simulation experiment is carried out, and the characteristic culture is carried out by using the Creator interactive user interface. The interface development and system design of virtual navigation multi-line system of tourism simulation are developed. The program is loaded with PlaySound function, and big data scheduling of virtual navigation multithread is carried out with OpenFlight data structure model. The characteristic cultural tourism simulation is obtained. The development interface for virtual navigation is shown in figure 2.
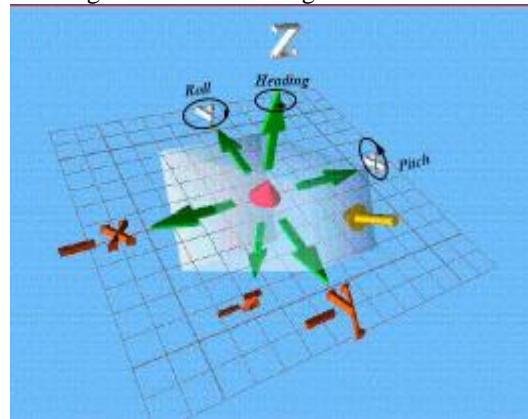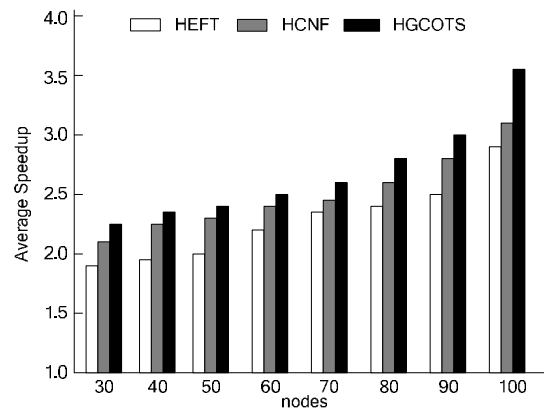

Figure 2. System development interface

Figure 3. Performance test of map vector data of tourism navigation system

In the development interface of Figure 2, the multi thread scheduling of the characteristic cultural tourism simulation virtual navigation is carried out, the loading ability of the map vector data is tested, and the results are shown in Figure 3. It shows that the ability to load and control the map vector data is higher.

5. Conclusions

In this paper, the design method of virtual navigation multi-thread system is proposed based on big data. The 3D geometric model modeling of virtual navigation of characteristic cultural tourism simulation is carried out. Big data analysis method is used to render the 3D model of characteristic cultural tourism simulation, and the OpenFlight data structure model is combined to carry out the virtual navigation multi-thread big data scheduling. The interface development and system design of virtual navigation multi-line system based on Creator interactive user interface are presented. The simulation results show that the design of virtual navigation multi-thread system for characteristic cultural tourism simulation using this method has good stability and strong data loading ability, and the ability of loading and controlling map vector data is improved. The system has good application value in the recommendation of characteristic culture tourism and virtual navigation.

References

[1]   HU Min, LI Chong, LU Rongrong, HUANG Hongcheng. Performance analysis of motor imagery training based on 3D visual guidance. Journal of Computer Applications, 2018, 38(3): 836-841.

[2]   ONO T, KIMURA A, USHIBA J. Daily training with realistic visual feedback improves reproducibility of event-related desynchronisation following hand motor imagery[J]. Clinical Neurophysiology, 2013, 124(9):1779-1786.

[3]   REN Shuai, ZHANG Tao, XU Zhenchao, WANG Zhen, HE Yuan, LIU Yunong. Information hiding algorithm for 3D models based on feature point labeling and clustering. Journal of Computer Applications, 2018, 38(4): 1017-1022.

[4]   QI K, ZHANG D F, XIE D Q. Steganography for 3D model based on frame transform and HMM model in wavelet domain[J]. Journal of Computer-Aided Design & Computer Graphics, 2010, 22(8):1406-1411.

[5]   HUA S G, ZHONG Q, LI S S. 3D shape deformation based on edge collapse mesh simplification[J]. Journal of Dalian University of Technology, 2011, 51(3):363-367.

[6]   PIPAUD I, LEHMKUHL F. Object-based delineation and classification of alluvial fans by application of mean-shift segmentation and support vector machines[J]. Geomorphology, 2017, 293:178-200.

[7]   WANG X Y, ZHAN Y Z. A watermarking scheme for three-dimensional models by constructing vertex distribution on characteristics[J]. Journal of Computer-Aided Design & Computer Graphics, 2014, 26(2):272-279.

[8]   WU J G, SHAO T, LIU Z Y. RGB-D saliency detection based on integration feature of color and depth saliency map[J]. Journal of Electronics & Information Technology, 2017, 39(9):2148-2154.