Research and implementation of virtual tour training system based on virtools

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Abstract

With high resolution aerial images as scene map, using 3DMAX as a 3D modeling tool, Photoshop as a texture image processing tools, through field photographs the scene really 3D scene, with Virtools as the 3D virtual simulation platform, through the creation of 3D virtual character, with a design concept of cosplay class RPG network game Fu Zhou Municipal Tourism virtual tour guide training system has been Development. This system has the Fuzhou City Attractions Guide demonstration, three-dimensional roaming, information query and tour guide examination spots module, which is a new application of the virtual reality technology in the tourism industry.

Keywords: Virtual Tour, Network Game, Virtual Reality, Virtools

1 Introduction

As an emerging technologies in the 21st century, Virtual reality technology has been widely used in aviation, aerospace, shipbuilding, railway, construction, civil engineering, scientific visualization, medical, military, education, entertainment, arts, sports and other fields. With the continuous development of information technology in education, Virtual reality system has began to be increasingly applied to teaching practice. Using virtual reality technology to make education and training system, the object can be fully presented through a three-dimensional perspective, this is easy for learners to directly accept and understand, so as to obtain the very strong sense of immersion, and achieve better learning outcomes. Virtual reality tour guide training systems compared with traditional training can reduce training costs, and achieve high efficiency. In this paper, taking Virtools engine as the virtual simulation platform, combining with our current situation of tourist guide training and guide concept, we designed and implemented a virtual tour guide training system, using advanced educational assessment theory as a design guide, developed and implemented a training assessment module guides flash as a tool to, with the advantages of flexible hours and friendly interface, interactive evaluation system allows learners to have friendly features, which include automatic timer, look at full volume, at any time you choose and you can do, questions marks, questions filtering.

2 Technology roadmap

According to the development needs of the system, first Fuzhou city data was obtained from the high resolution remote sensing image acquisition, Fuzhou CAD underlay was got after vectorization,we used the digital camera to take real pictures of city 3D scene and classified storage, these all were prepared to create a realistic 3D virtual scene. We built a solid model using 3DMAX software, and used Photoshop for texture processing, and then exported the data format for the 3DS, entity displayed by using Virtools to

read 3DS date, in order to achieve the establishment of the 3D scene of main attractions in Fuzhou. The entire three-dimensional scene was added collision detection and the sky box based on Virtools, we built a virtual scene according to the real geographical environment, and achieved roaming navigation and interactivity. Each sub module of the system was developed and designed. We created a three-dimensional virtual characters, and used design ideas from role-playing RPG network game to develop interactive guide training modules. And the we created attractions guide demonstration module, urban roaming module, attractions information query module and guides assessment modules, and other sub-modules function, Systems development process as illustrated in Figure 1:
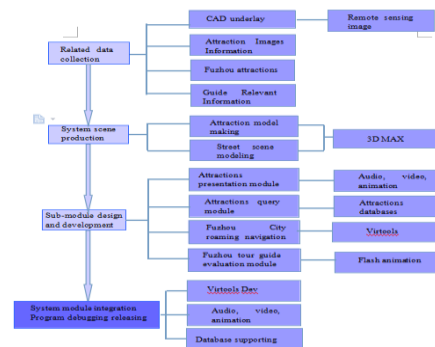

FIGURE 1 system development process

3 Key technologies

3.1 LOD PROCESSING MODEL

There are a large number of scenic spots model and various facilities sketch models in three-dimensional scene of guide training, these objects contain a large number of polygons, because the model is quite a few and more complex model in the scene, the Ordinary users' computers can not meet the requirements of its storage capacity in the memory, had to sacrifice storage switching events. To achieve the desired

visual effects and computer processing speed, you need to use certain technology to manage model in the scene, this paper adopts the model level of detail processing technology, namely LOD technology, to achieve optimization of the complex three-dimensional model of Fuzhou city. When scenes is displayed dynamically, we selected the model according to the screen pixel two kinds of judgment, namely according to the number of pixels of image of an object on the screen to select occupied model. In the premise of ensuring the real-time dynamic display, we dynamically determined threshold and selection model, in order to obtain higher image quality. In Virtools using progressive mesh algorithm, which has progressive mesh data structure requirements, the effect of the observed scene in 500 meters and the effect of the observed the scene in 500 - 800 meters were compared, when the mouse is moved closer. Scene recall geometric texture modeling scene, the browsing speed is not affected, the 3D scene after adjusting LOD is shown in Figure 2 below:

FIGURE 2 LOD Display

3.2 COLLISION DETECTION TECHNOLOGY

In virtual roaming system basing on Virtools, collision detection used the detection method, which bases on AABB. Software provides three function modules dealing with collision detection, the three function modules are Collision De-tection (collision detection), Multi Collision Detection (multiple collision detection) and Prevent Collision (collision avoidance). In the process of software development, we used uniformly the hexahedral bounding box technique to detect collision. To set up a two-dimensional region in the virtual scene with the grid, software can take the two-dimensional area mapped to 3D space, as an invisible 3D entity, which has obstacle attribute at the same time. The collision detection method uses a layer sliding mode to avoid collision. To create a Grid in the virtual scene, and mark the location of the building, and then add the behavior interaction module LayerSlider BB in the role of the script.
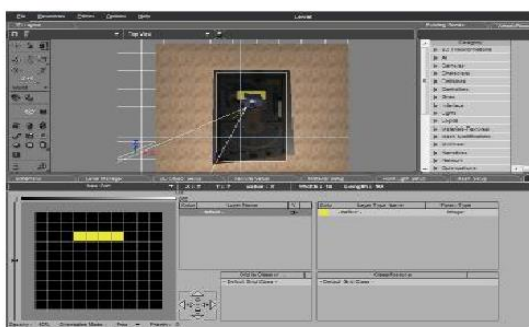

FIGURE 3 GIRD Collision Detection

3.3 THE REALIZATION OF INTERACTIVE EVALUATION FUNCTION

Interactive animation assessment system is used in modern guide education, it is the need of the development of education and the reform mode of education, and it is also a necessary means to improve school teaching effect, teaching efficiency, and the level of research and management. System evaluation function applies AdobeFlash software development, using language is AdobeFlash own language ActionScript development, test questions are from the national tour guide qualification examination and the tour guide qualifycation exam zhenti. Over the years in Fujian Province, they have Intensive targeted, and authoritative, trainers can make self-test via interactive animation module, the module will record trainers detection results, and urge trainers learning, trainers can make substantial gains and improve after practice.The interface of training and examination as shown in Figure 4.

FIGURE 4 The Training and Examination of Interface

3.4 THE DESIGN OF THE DATABASE AND INFORMATION QUERY FUNCTION

System data includes attractions information and the surrounding public information, system uses Virtools built-in Array to store attractions information, it is convenient to operate. Array in Virtools is used to establish data and control time variable etc. If you can use the array flexibly, then can develop the diversified system, the Array is composed of Column (column) and Row (line), you can set for each element of the array and the corresponding parameters by SetCell behavior interaction module, to judge at this time the attraction models selected by the users through the Test and the 2D Picking interactive behavior module, and then write spots name into specified array by Set Cell module. Array relates to mathematical problems such as figure and data, which needs to carefully edit each link. To use Create Array to create Array data, the field is set in ADD Column, Name - names of scenic spots, Type - field type, which can be divided into five kinds, it is respectively Ineger (integer), Float (float), String (string), Object (object), Parameter (parameters), system memory is the scenic spot information, which is mostly text, so string is chosen,a good set of parameters, in this way, to establish the database, store information. Once the database is established, information extraction needs to create a script, using BB Get Row to extract data, You should add to the appropriate number of BB Text Display with a BB Set Texture to display information basing on the number of data. Because information of attractions is huge in the entire Fuzhou, the system only intercepted two route which main attractions through: line that airport to FuZhou Railway Station and the Fuzhou city main road route, the field is set in ADD Column, Name - names of scenic spots. Type - field type, which can be divided into five

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FIGURE 5 Database and Roaming Path Design

4 Conclusion

This article was written from needs of tour guide training in the Fuzhou scenic spot. First of all,by using the digital camera to take real pictures of 3D scene of the main scenic spots and doing classified storage, according to the tour guide role,

training characteristics, 3DMAX software was used to build the real three-dimensional scene, we used Photoshop for texture processing and exported the data format for the 3DS, entity was displayed by using Virtools to read 3DS date. We developed a virtual tour guide training system by above ways, sub modules of the virtual tour guide training system include Fuzhou city tour guide presentation module. Fuzhou city roaming module, Fuzhou attractions information query module, Fuzhou city guide evaluation module etc. the virtual tour guide training system can save training costs for the tour guide training, improve the quality of training and save teaching time,the system also implemented the concept of trainees becoming learning actively, so the virtual tour guide training system is a kind of new training mode.

Acknowledgments

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