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Design and Implementation of Virtual Xinjiang Carpet Pattern Museum

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***Abstract*—Xinjiang carpet design is the art treasure among the treasure house of Chinese culture. Virtual museum is the function carrier which collects and promotes the national culture. Through the analysis of the virtual experience interactive technical characteristic, the paper proposed "the scene roaming→ interactive control operation→ interactive content show" design method. And realized the interactive experience technology based on the users and the products through the unity3D, and also enriched the display mode of virtual Xinjiang carpet design museum.**

***Index Terms*—The interactive Display of Virtual Museum,virtual Reality,Unity3D; Interactive experience;**

I. I NTRODUCTION

Xinjiang carpet has a very high aesthetic value and application value, which was known as "soft gold" in the world. Whether in the ancient silk road period, or in modem times, with its elegant manual craft and unique distinctive national features, Xinjiang carpet becomes the important commodity for international trade and art holy product for collection of museum around the world. However, in the last ten years, due to the low price, stylist scarce, as well as the modern generation and the process of globalization, the Xinjiang carpet pattern design is rapidly shrinking, even collapsing. How to protect and inherit Xinjiang carpet pattern is a great challenge for textile industry. Virtual museum is a new stage of the development of museum, and it is the culture symbol of Xinjiang carpet. It displays the historical and cultural achievements of a region and a nation. The main functions of "Virtual museum" include: (1) based on the user's interactive choice, it could complete the independent design, and design patterns have infinite reproduction. (3) show the diversity of the hand; do good to the integration and protection of its resources; the exhibition hall is beneficial to the resources sharing. (4) to make the library content radiation range bigger, increase the benefited range of carpet pattern design and application. This paper is to build a virtual museum of Xinjiang carpet design based on unity3D; based on interactive control operation scene roaming and interactive content show through the acquisition of carpet design data, to realize the interactive experience between users and products. This can promote the application prospect of carpet virtual museum.

II. II.RELATED WORK

Domestic: VRP (mainly do roaming, low side but developing fast, , common VR hardware public drive is not very much, visualization operation, pay attention to the results) [1].Virtools is French software, the middleend software, but there are also more than N application NB, including the online world expo and Olympic simulation. There are a lot of Common VR hardware public drives. Visualization operation, pay attention to the results[2].WEBMAX (lower , but also can do the roaming, early days mainly use MAX to model, common VR hardware public drive haven't been seen, visual work, pay attention to the results.) foreign: VEGA PRIME US software, high-end NB software, is very complicated, basically early VR project is made by it[3-5].Virtual reality technology is keeping the state of high speed development [6].Virtual reality technology shows what we want to express by using digital simulation items and real scene, and reproduce the collection in a way of interactive exploration. The scene can make the audience and exhibition interact and communicate each other. "As far as museum is concerned, on the one hand, it can improve high-tech content of show means; on the other hand also increases the display content, and displayed construction, cultural relics and archaeological site which the original can't show. Realized the whole perspective all-round vision, and full performanced collection Scene's authenticity and integrity are the organic combination of the traditional displaying technology and advanced computer virtual technology. Our feeling and understanding for the real world or the unknown world of will be greatly broadened due to the virtual reality technology in the application of each industry. We also can get a leap of the perception and cognition[7-10]. The main design of a museum include: virtual museum them; determination of virtual museum content; virtual museum's information structure design; virtual museum's whole structure design; virtual museum's logical structure design and user interaction mode, etc[11,12]. After making the scene and characters into VirtoolS, add preventCollisionBB and ObjeetSliderBB to the corresponding role in the script in order to conduct collision detection[13,14,15]. Designate every role's action with Uuli and tedControllerBB[16].

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III. CARPET DESIGN PRESENT SITUATION

More than ten years, especially the past five years, Xinjiang carpet industry is rapidly shrinking, even collapsing. In order to solve the difficulties faced by carpet industry, this paper analyzes the exposed problem of Xinjiang carpet production: the lack of users' studying and understanding for styles. And carpet pattern innovation design in the field of computer application is a new and the most active and widely used branch, playing a major role in the development of national economy. However, how to meet the requirement of computer automatic generation of Xinjiang national fabric design is a challenging problem. The designers need the participation of users[17].

IV. BASED ON UNITY3D CARPET VIRTUAL MUSEUM SYSTEM

4.1 *Modeling*

3D model is the basis of the real-time roaming system[18]. The construction of the model can use convenient and efficient professional modeling tools, such as Maya, 3dsmax, match with light, material, texture, etc so that the model has a strong simulation stereoscopic effect. In this system, through the modeling software, the virtual museum's venues, inherent exhibits are built, and products will be put in virtual items in the venue according to the design, as shown in Fig. 1

Fig.

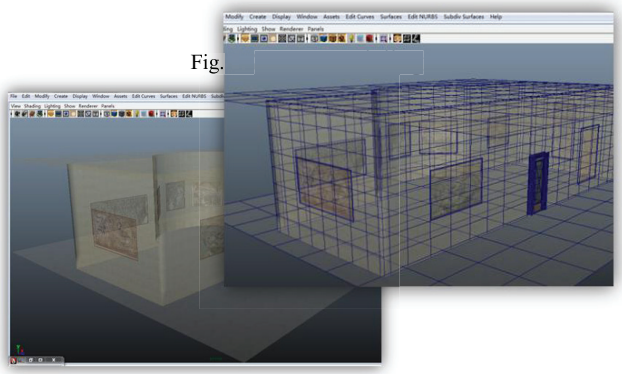

Fig. 1.

4.2 Model import

This step is to combine the three dimensional software build model into Unity3D[19] and adjust properly its location, size, and simply set the collision detection to make sure interaction trigger mode.

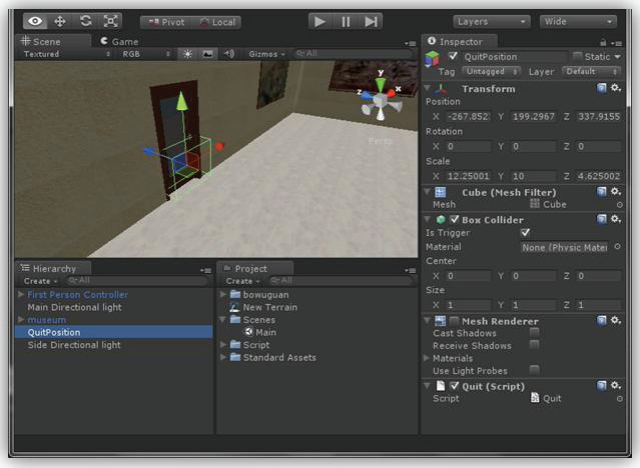

Fig. 2. Model derived

4.3 Interaction system

4.3.1 Virtual roaming character set

Create virtual role, adjust the speed of travel, and control mode (mouse, keyboard, etc.), as well as views in the Unity3D virtual museum.

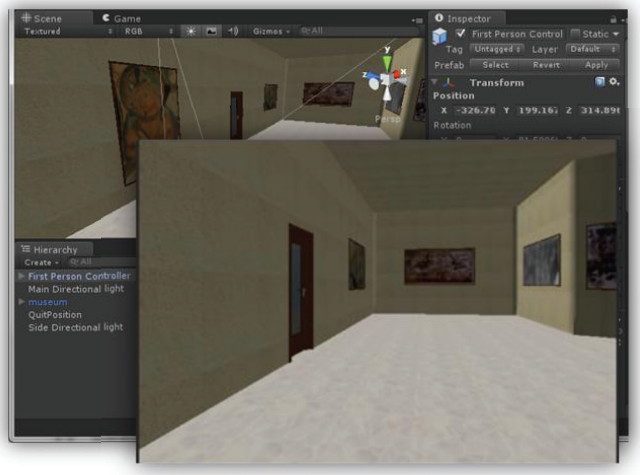

Fig.3. Virtual roaming character set

4.3.2 Interactive exhibits

(1) Collect displayed information

This step is to collect displayed information through the database, XML, etc. Provide information support for the interaction such as words, pictures, and videos.

(2) Add interactive exhibits

Add impact properties for the natural scene exhibits; test users' behaviors. When users touch or click the exhibits, it will show UI elements, and load exhibits information.

4.3.3 DIY workshop

(1) concept

In order to make virtual museum more interactive, this system created a function module for user interaction alone. It can let the

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user, generated virtual products and see the exhibits on display effect, according to their own needs, and follow certain rules after browsing in the virtual museum.

(2) Operation mode

Method1: The user operation

In a 3D virtual scene separately set for DIY workshop, users could generate their own carpet pattern and give scores, through the adjustment of the different parameters. When carpet pattern conforms to the user's need, it can return to 3D scene, and watch the carpet of formation in the performance of 3D scene.

Method2: Background to realize.

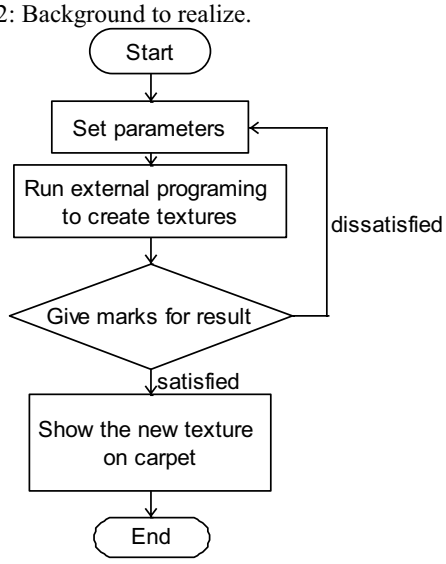

Fig.4. Design process

V. SIMULATION RESULTS

5.1 DIY workshop

Experiment 1：

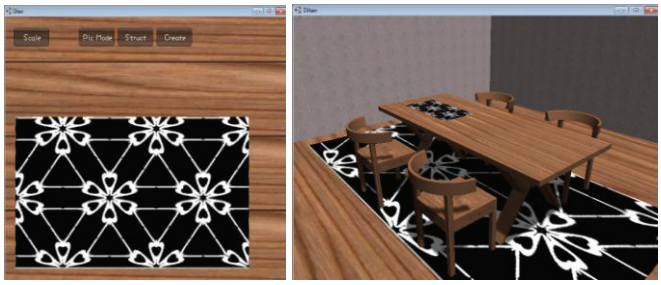

Fig.5. Results show

Experiment 2：

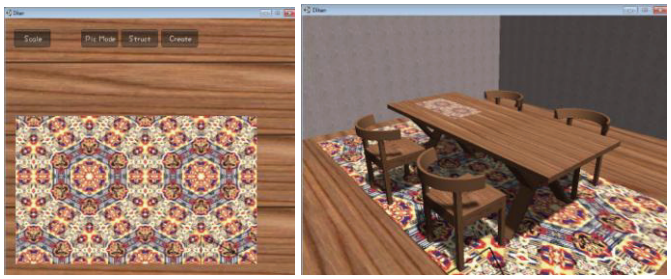

Fig.6. Results show

Experiment 3：

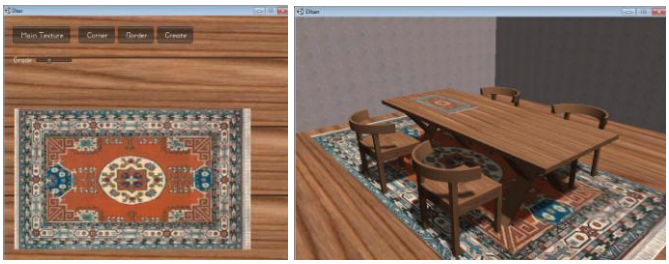

Fig.7. Results show

Experiment 4：

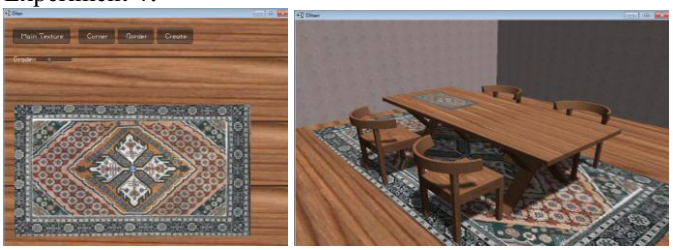

Fig.8. Results show

4.2 interactive exhibits

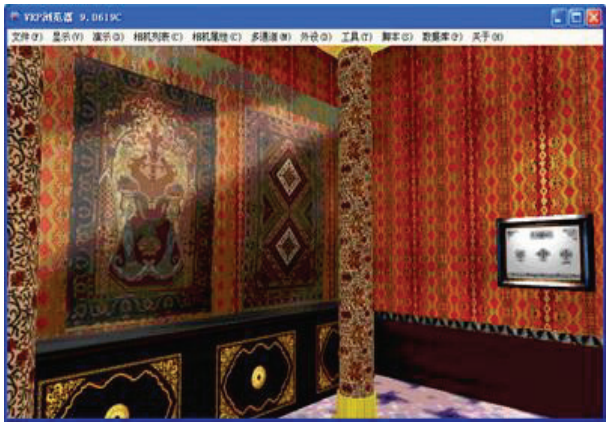

Fig.9. 3D virtual Display platform of carpet designs

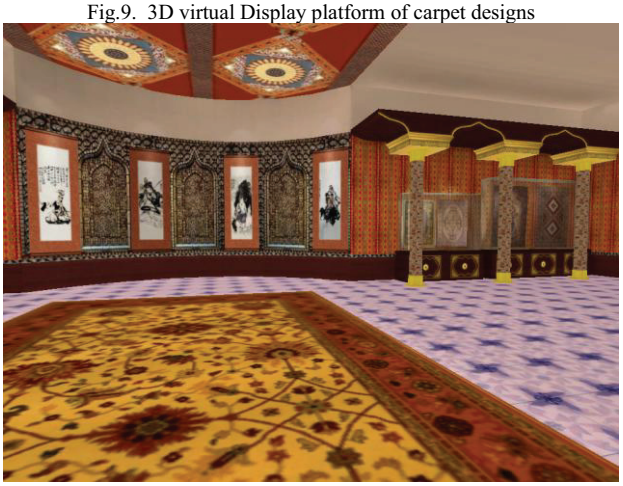

Fig.10. 3D virtual Display platform of carpet designs

VI. CONCLUSION

The application of this network virtual space——Digital museum in cultural heritage protection areas, brings a revolutionary new feelings. But it is worth noticing that although digital museum made up for the deficiency of traditional museum with modern scientific and technological means, and the advantage is obvious, to the museum, a cultural attribute is the first. The digital museum is the extension and development of traditional museums, but it is only useful and indispensable supplement. It can never replace traditional museum, also cannot at root solve the protection of cultural heritage preservation and utilization of digital museum's management to the traditional museum.

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