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Research Article

Research and Practice on Simulation of Foodstuff Enterprise Architecture Design under Virtual Environment

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Abstract: The emergence of virtual reality technology has provided a new technical method for foodstuff enterprise architects to design and evaluate buildings. This study is based on the overview of the virtual environment and takes it as the breakthrough point, discussing the combination of foodstuff enterprise architecture design designing and virtual environment simulation technology, analyzing the key technologies of building virtual environment as well as the application of VR technology in foodstuff enterprise architecture designing.

Keywords: Foodstuff enterprise architects, virtual environment, virtual reality technology

INTRODUCTION

In the 20th century, the society comes into the digital era, computer using on the building foodstuff enterprise architecture design industry has a huge impact, building professionals at all levels of penetration of digital technology in the course of computer architecture design. Advanced computer technology and information technology bring higher demands, offer more advanced tools and methods as well John (1996). Taking full advantage of the software and hardware technology, applying with the developmental trend, adopt the most advanced technology means and software tools to improve foodstuff enterprise architectural design level and increase the industry productivity, Which is an urgently problem (Robert, 1981).

VR system can provide experience opportunity for the observers to have multi-angle observation, free multi-dimension man-computer interaction. People can choose to observe the building with static state and experience foodstuff enterprise architecture space in a variety of sports modes dynamically, which also can have real-time comparison between different schemes, switch and make judgment and choice.

Virtual reality technology is a series of the combination of new and high technology, these technologies include computer graphics, multimedia, artificial intelligence, artificial interface technology, the sensor technology of real-time computing technology, human behavior and a number of key technology research (Nathan, 1981). It has broken through the pure digital mode interaction information between man, machine, which has created a man-machine harmonious information environment like being personally on the scene. Every time, the progress of science and technology can provide the possibility for architects to break the confines (Francis and Charles, 1982). The invention of virtual reality technology has brought lots of changes in the foodstuff enterprise architecture designing field, which also can make the architects' wisdom and creativity being further liberated and developed. By means of creating and experiencing the virtual world like being personally on the scene, the realization of interactive visual simulation can make the architect's creative thinking unprecedentedly liberated (Rudolf, 1974).

MATERIALS AND METHODS

The overview of virtual environment: In recent ten years, Virtual Reality (VR) technology has become one of the most attractive technology in twenty-first Century for its "a real sense of being personally on the scene", as well as its rich natural man-computer interaction in a fresh and new techniques expression way. Virtual reality technology is a copied or created artificial media space that people with the aid of the computer technology, sensor technology, simulation technology to build up, which is virtual, but with a sense of reality, through the multimedia sensor interaction equipment, it can result in a virtual environment, which can produce "a real sense of being personally on the scene". Compared with the traditional simulation environment in the past, simulation and modeling in the multidimensional information space can have higher fidelity. As shown in Fig. 1. The rise of it can have a new research area for the development of man-computer interaction and simulation system, which can provide a new interface tool for the application of intelligent engineering and also provide a new descriptive method for data visualization for various projects.

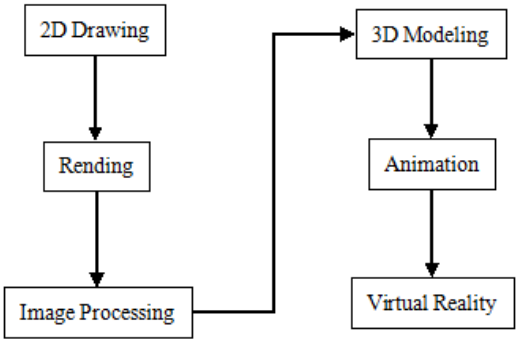

Fig. 1: The application of computer in foodstuff enterprise architecture design

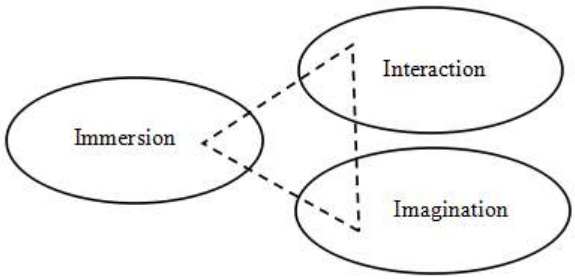

Fig. 2: Features of VR system

Virtual Environment (shorted for VE) is the performance space with application of virtual reality technology, which is a visualization platform combined with various technology integration together, people can perceive and interact in the virtual world through virtual environment. An ideal virtual environment should possess the characteristic such as three-dimension, advanced man-machine interactive means, good sense of being real and so on as shown in Fig. 2.

The combination of foodstuff enterprise architecture design of and virtual environment simulation technology: Design can be divided into two layers of meaning to understand namely, "idea" and "plan". Idea is the expected artistic effect that people want to achieve in an artistic practice; while plan is the adopted method and step which is to achieve the expected effect and artistic conception. Because of the virtual environment simulation technology is concerned with the environment, so, here it refers to the artistic design of environmental design. Environmental design is the design that takes human life space as the object, including city planning, landscape design, foodstuff enterprise architecture design, interior design, which is overall design with a comprehensive natural, social, cultural factors.

At present, the combination of virtual environment simulation technology and design is not so close, there are two situations on the whole: one situation is after having design, virtual environment simulation technology is used passively to perform it, such as: interior design, estate planning engineering and other designing schemes. Designers or developers want to make users feel the real situation, then they have to use virtual environment simulation technology. But the scheme has already been shown by designers in the drawings, thus, virtual environment simulation technology is just a mechanical reproduction on drawing scheme, which has not too much room to create; another situation is when the virtual environment simulation technology is applied, people did not consider or have less consideration of its design feature, which makes people feel stiff and cold, such as: the virtual scenes of some traffic tools, the virtual scenes of education and training and so on. These virtual scenes have no sense of art, which makes people find it difficult to accept and fell them boring, therefore, it affects its using result and effect in a certain extent. Why there is such a situation? This is caused by the irrational education system in our country. On one hand, those who learn design have poor knowledge in science and engineering, who have little idea in the computer and high-tech field and do not know what to do, which makes it unable to participate directly in the virtual technology and unable to bring design to a virtual environment simulation technology; on the other hand those who learn science and technology are poor in design, thus, they cannot have deep consideration in art. Eventually it resulted in the above results.

The key technology of constructing virtual environment: Virtual reality technology involves parallel computer graphics, sensor technology, multimedia technology, network technology, computing technology and some other technologies, which is integration and higher penetration of these technologies. The construction of virtual environment cannot be without the support of virtual reality technology, which also needs the following key technologies.

Modeling technology: Modeling is use the data to generate the corresponding virtual model through acquiring a variety of data of the real environment, then according to the need of application to use it. Modeling of virtual environment includes the geometric modeling of the virtual object, physical modeling and motion modeling.

Geometric modeling can be a description of 3D modeling of the virtual objects (polygons, triangles and vertices) with its appearance (texture, surface reflection coefficient, color, etc.). Three dimensional modeling of the virtual objects can be accomplished by a variety of 3D modeling software, the common software includes 3DsMxa, Maya, Auto CAD, etc. Another method is with the help of special hardware or software to generate the model automatically, such as by using

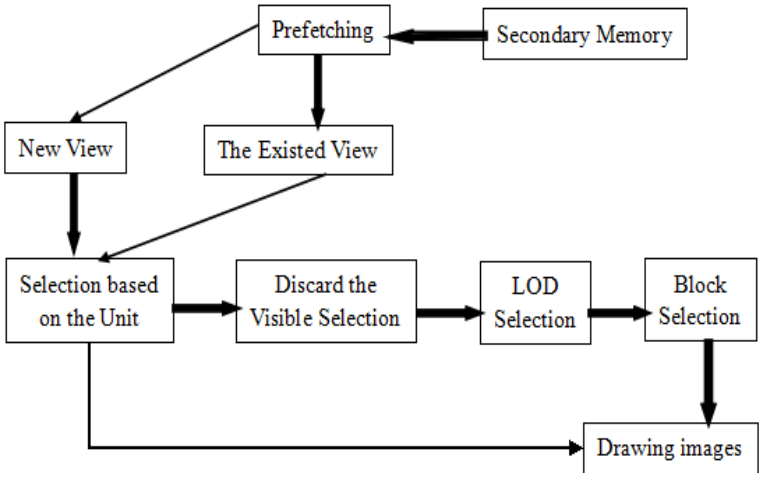

Fig. 3: Real-time drawing program

laser scanning techniques, 3D model can be obtained by the laser beam scanning objects in the object surface. The appearance scene can use digital camera or scanner to save the actual scene photos with the computer image format, which also can buy the texture database.

The motion modeling should consider the changes in virtual environment caused by its location, collision, zoom, surface deformation and dynamic generation, which is one of the most difficult problems in the virtual environment. For example, detecting problem of collision, when the relative positions of the two virtual objects Re changed, how to detect whether they are collided, so as to avoid the mutual penetration between the two objects and other real situations.

Physical modeling can describe physical characteristics of virtual objects, such as quality, weight, inertia, modes of deformation (elasticity or plasticity) etc. In the real world, most objects are not rigid, when the user interacts with it, a variety of deformation can be occurred, the ideal virtual environment should show these deformations, however most of the deformations are very difficult to describe in mathematical method.

RESULTS AND DISCUSSION

Realistic graphics and real-time display technology: Most of virtual environment take the scene generated by computer as the final visual output, therefore, the picture quality will directly affect the participants to Level the sense of reality in the virtual environment. The realistic graphics technology can use a variety of realistic graphics algorithms, including illumination model, ray tracing algorithm, texture mapping algorithm to render the scene, which can eventually generate the realistic scene on computers.

With the development of graphics algorithms and graphics hardware, 3D graphics generation technology is gradually mature, but the key problem is how to generate it in real-time. In order to achieve the purpose of real-time, at least, it must ensure that the graphics refresh rate is not less than 24 frames/sec. As shown in Fig. 3. On the premise of not reducing the graphics quality, how to speed up the graphics rendering speed and improve the display frame rate is the research content of real-time display technology.

The stage of creating foodstuff enterprise architecture design: By using virtual reality, it can make the space of buildings be fully reflected in the construction stage of creation. In the virtual reality system, by means of being personally on the scene roaming in the building, people can quickly understand the spatial quality, inspect the material, color and texture, so as to understand the hydropower, heating, ventilation system and other main components. At the same time, people can actually feel the proportion of space layout and evaluate the construction elements of aesthetic expression ability, so as to refine and adjust the scheme of designing elements.

CONCLUSION

Virtual reality technology and network, is a comprehensive computer technology is developing rapidly these years. It integrates the latest achievements of computer graphics, multimedia, artificial intelligence, sensor, network parallel processing technology, provides the powerful support for the us to create and experience the virtual world. Due to the three-dimensional space real-time performance ability, the man-machine interactive operation environment and bring the feeling of be personally on the scene, virtual reality will become the ideal tool for building and planning design and display.

For foodstuff enterprise architecture design, the charm of virtual reality not only lies in real time, interactive 3D, but also lies in it can provide other traditional expressions of incomparable, new information and communication interface, at the same time, in the experience of three-dimensional space, through real-time and 3D scene adjustment, information querying system and multimedia information integration technology, it also can provide strong support for the elaboration, the comparison of designing schemes, features and related information. In short, the emergence of VR technology can make the application of computer in foodstuff enterprise architecture design enter into a new stage.

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