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Research Article

Application of Digital Simulation Technology in Agricultural Products Park Architecture Design

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Abstract: The digital lifestyle brought by the information society has increasingly changed the agricultural Products architecture and urban city that public foods are depending on, which has also brought a new designing form. This study takes the overview of digital simulation technology as a breakthrough point, discussing the influence of digital simulation technology on the agricultural Products industry as well as its specific application, which can make the designers update designing concept during the process of agricultural products architecture design, so as to achieve the personalized requirement of the modernization.

Keywords: Agricultural products, digital simulation technology, modernization

INTRODUCTION

Digital simulation technique is a high and new technology that is widely used in the world, the application of digital simulation technology has brought great economic and social benefits (Meehae and Wolfgang, 2002). In the agricultural products architecture design field, digital simulation technology as a kind of unique technology can solve the problem between abstract thinking and its generated entities. Since 1990's, digital simulation technology widely has been widely used in solid modeling, information management, art field and some other fields, which has also attracted some planners and architects, moreover, it has obtained the preliminary application in the field of agricultural Products architecture and city planning (Bonacchi *et al*., 2002). The rapid development of the agricultural products park is closely related to the development of national economy and urbanization. Due to its own architectural space and functional characteristics, the research on digital architectural design has its unique significance (Donald, 1979).

MATERIALS AND METHODS

An overview of digital simulation technology: Digital simulation technology, computer graphics software technology as well as virtual simulation system build up 3D simulation model, which also has build up testing technology through a series of experiments on three-dimensional model (Seymour, 1980).

Three dimensional simulation technology has the advantages of high efficiency, safety, which can be less affected by environmental conditions and constraints, according to the actual needs of the project, it has the advantages that can change time and ratio of model size (Iansiti, 1998). From the characteristics of computer's three-dimensional simulation technology, there are three features: the first feature is the interactivity of three dimensional software, followed by the feature of imagination, finally the feature of immersion.

"Immersion refers to the degree that users are in the real virtual environment. The ideal virtual environment can make it difficult for users to distinguish the degree between true and false (such as 3D visual scenes which are changed because of the changeable view), even beyond the reality, such as the realization may be more real than real lighting and sound effects and so on."

"Interaction refers to the degree of an object model that can be operated by users within 3D virtual environment, as well as the degree of natural level that is got feedback from the environment (including real-time). If users can directly control the objects in the virtual environment, users also can move freely through the virtual environment when users are encountered with trees or walls in virtual scene, users will be covered by an object and they have to stop the motion."

Imagination refers to users who are immersed in the multidimensional virtual space, they can rely on their own perception and cognitive abilities so as to increase spatial conception effect in a full range, who can play full role initiatively and form new concept.

Relationship between agricultural products architecture design and simulation technology: Simulation technology has close relationship with agricultural Products architecture when it has not entered into the digital era. As early as in the era of Da Vinci, the architects were willing to draw virtual space on the four walls of the construction, in the hope that people could feel vaster in the area of the construction.

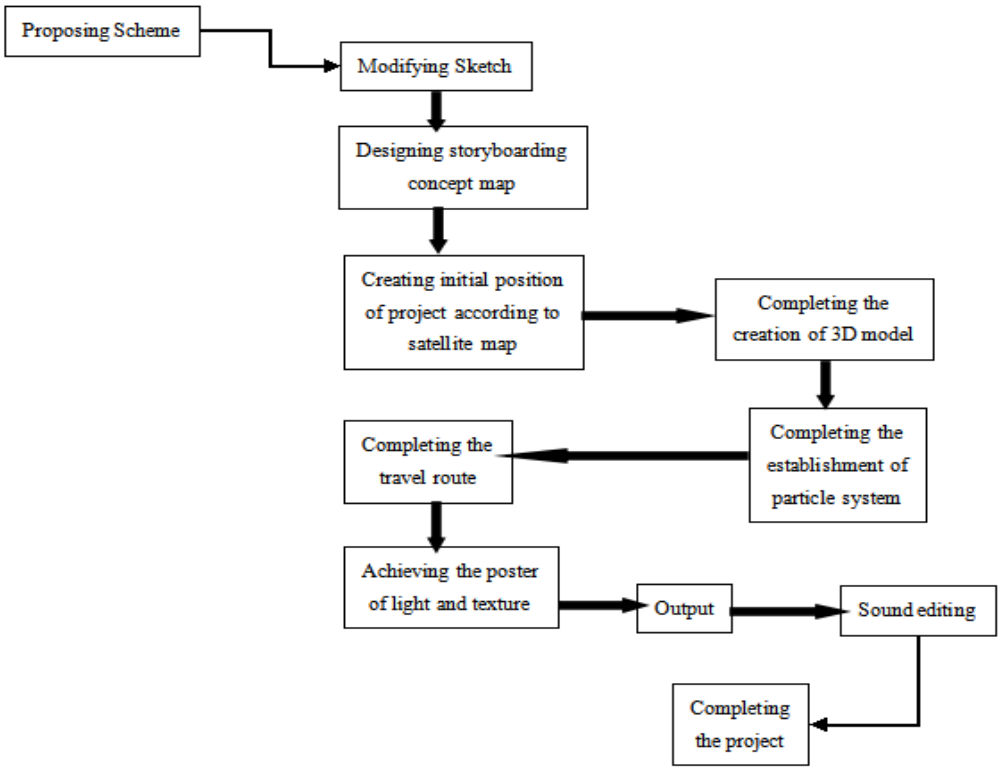

Fig. 1: The operation of creating virtual reality scene

In 1930's, people tried to use four frame movie projectors to have wall projection at different agricultural products architecture corners within the interior space, which can make people feel and experience the changeable agricultural products architecture space in this room. After 1980's, with the development of computer technology, people simulated agricultural products architecture interior space and group agricultural Products space in the CAVE system.

After entering the twenty-first century, simulation technology was usually used for the construction of the study group or restoration. Eindhoven University of Holland once used simulation technology to design and consult, they developed a software package that was composed of a set of functions of CAD, called CAAD software, which can create, modify and provide a toolkit for visualization of agricultural Products architecture. It can support the input and output of Auto CADDXF file, moreover, it also can increase the dynamic behavior animation for objects in the virtual environment. Taking a domestic example, in 2003 one VR for the Forbidden City called The Forbidden City, Emperor's Palace was an immersive theater, which could accommodate 54 staff, the high resolution images projected were 50 feet wide, 14 feet high on the curved screen. Visitors could fly freely in the virtual Forbidden City by using the controller so that visitors could roam in the Forbidden City between Kangxi Dynasty and Qianlong Dynasty, who could have closest watch on the panorama of the Forbidden City.

The main effect of the digital simulation technology in the construction industry: Computer's 3D simulation technology is mainly the integration of all kinds of technologies, in the computer simulation field, technology and research contents are mainly including: the first is the application of map baking technology; the second is the application of seamless editing biological modeling technology; the third is the application of MultiGen real-time interactive technology; the forth is the application of particle system technology. Three dimensional simulation technology has three characteristics, namely, interactive feature, feature of imagination and immersion, this kind of technology has the advantages of safety, high efficiency, less restricted by the environmental condition, which can change time and ratio of model size according to the actual needs of the project and so on.

In 3D scene simulation system, the real sense of simulating virtual reality needs a lot of elements, generally speaking, creating a virtual reality scene should be in accordance with the needs of the following operations step by step, which is shown in Fig. 1.

Taking the construction of agricultural products park as an example, in the reformation of agricultural products architecture design, usually the designers will propose several designing plans, through different elevation design of agricultural products park appearance, 3D simulation system by using computer can realize real-time switch. During this process, we need to take the image thinking of computer simulation

in three-dimensional space into account, who mainly agricultural products park scene in various facilities. After completing the creation of agricultural products park 3D scene with AutoCAD, importing it to 3DSMAX, creating a ground model, because of its strong modeling capabilities, the creation of agricultural products park three dimensional model will show the strong stereo effect of the simulation.

Effects of digital simulation technology on the construction of art designing concept: Virtual simulation has brought a new designing way of expression, it can change our understanding for the perception of space and construction program, therefore, with the deep development of digital information revolution, it can also change our thinking habits during the process of agricultural products architecture designing.

Virtual simulation can aid agricultural products architecture design: From different aspects. During the process of agricultural products architecture design, it is required rational thinking and emotional thinking, the effects of using virtual simulation can be expressed in two aspects: on one hand, it can reduce the restriction during the process of design, which can make designers have creative thinking and play its full role, not only by the tools, methods and so on, but also by the creative ideas for agricultural Products so that designers can get the enlightenment and inspiration; on the other hand, the assisted rational thinking can help designers to analyze things comprehensively, more reasonably, which can allow the designers to obey the designing rules. That is to say, on one hand, the application of virtual simulation in the conception of agricultural products architecture design makes the conception of agricultural products architecture design have more freedom, on the other hand, it makes the design more rational. Virtual simulation with the aided agricultural products architecture design can reduce many restrictions during the process of design, therefore, designers have more freedom to play their imagination. moreover, the agricultural products architecture design combined with virtual simulation and aided design can make architects get rid of the limitation of expression, the agricultural products architecture forms have got use AutoCAD and 3DSMAX to complete the virtual breakthrough, the accurate description can easily complete the complex 3D space.

RESULTS AND DISCUSSION

The stage of creating agricultural products architecture design: We usually use "two-dimensional" graphics to express three-dimensional objects, however, it is a simplification for two-dimensional information, there is inevitably simplification and abstraction. As shown in Fig. 2. The viewer can not have normal perspective to experience the agricultural products architecture space, who cannot acquire the real person's true feelings in the future. However, by using virtual reality, it can make the space of agricultural products be fully reflected in the agricultural products architecture creation stage, so the agricultural products architecture design of the space experience is more interactive and flexible, at the same time, the spirit of the place can be shown and expressed as much as possible, thus, the authenticity is greatly strengthened. In the virtual reality system, the actual feeling of be personally on the scene can show the proportion of the layout in agricultural Products architecture, which can be refined by adjusting the schemes of the designing elements. Immersed in the future construction, the designer thinking can be no longer interrupted and they cannot wait so long time, creativity and inspiration will be greatly stimulated, therefore, the traditional methods cannot compare with this method.

The performance stage of agricultural products architecture design: Digital simulation technique can provide designers more opportunities to experience man-machine program with multi-angle, so as to experience free multi-dimension interaction. People can choose to observe the agricultural Products with static state, or in a variety of forms of motions to experience agricultural products architecture space. At the same time, it also can have real-time comparison between different schemes, then after comparing, making judgment and choice. Moreover, the system can also simulate the sun light, as well as the related equipments and other facilities, which can make the overall

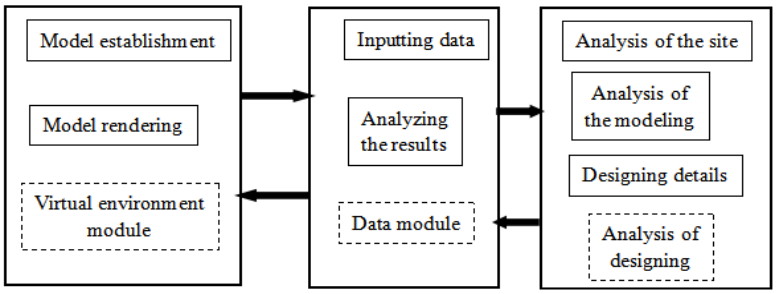

Fig. 2: Steps of aided agricultural products architecture design for virtual reality

expression of the agricultural Products more comprehensive, real, scientific and convincing.

Interaction with other designing links: Using numerical simulation technology, it can be used to study and review the design of other links. Such as the simulation of wind environment of high-story agricultural Products, so as to design the lower part and adjust the agricultural Product's outer space, thus, the wind environment of high-story agricultural Product's surrounding can be improved. In addition, it also can verify the safety of fire compartment, the control of smoke, evacuation routes and so on. In short, today, digital simulation technology can give support to the agricultural products architecture design from the aspects of the professional integration, which can consider comprehensively with different majors, so as to make the agricultural Products to be designed more perfectly.

CONCLUSION

The application of digital simulation technology will have a very broad development in the agricultural product construction industry, at the same time, it is also great extension for art designing, in the virtual environment with construction roaming. Meanwhile the designing requirements for the environment has brought new challenges, how to create different agricultural products construction types in the virtual environment, so as to make color delicate and make particle dynamic effect within 3D environment vividly, how to combine with the dynamic objective virtual model and create a more beautiful visual experience is a great challenge for all designers.

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