ISSN : 0974 - 7435 Volume 10 Issue 19

2014

BioTechnology

An Indian Journal

FULL PAPER

BTAIJ, 10(19), 2014 [11101-11105]

Research on theory and practice of virtual reality technology in national environmental art design

Junbo Cao

Fine Arts Department of Lanzhou University of Arts and Science, Lanzhou, 730000, (CHINA)

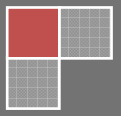
ABSTRACT

With the modern technology developing by leaps and bounds, the advent of virtual reality technology has brought great conveniences to people who has get rid of the colossal databases. It can be said that virtual reality technology has provided a unprecedented platform for showing and exchanging information. Meanwhile, it has gradually modified the tedious and rigid man-machine interface to be user-friendly. By creating a virtual world, virtual reality technology offers users simulations for their senses, which makes the users feel that they really live in that world. The clumsy mouse and keyboard has been embarrassing, while any attempt to move these gadgets will be bound up by wires. But we can still claim that in national environmental arts design, the virtual reality technology has offered effects of simulation, interaction, directness, coordination, allowing users to experience the virtual world. Trough the introduction of the definition and the present application situation of virtual reality technology, this research analyzed the impact of virtual reality technology on national environmental arts design, introduced the real application effects of virtual reality technology by designers.

KEYWORDS

Virtual reality technology; Virtual world; National environmental arts design.

© Trade Science Inc.



INTRODUCTION

As the 21st century's most popular information technology, the virtual reality technology can be claimed to have transcended architectural animation and multimedia technology to come under the spotlight. Trough the rapid development of artificial intelligence, computers, multimedia technology, the virtual reality technology have collected their advantages and become more convenient and practical. It can show the system of virtual architectural environment, and some crucial technologies of it can deal with the problem of synthesizing human faces and expressions. The virtual reality technology has been widely used in the following fields, including visible scientific area (exemplified by virtual wind tunnel), design and plan (represented by architectural design and external design), education and training (represented by virtual classrooms, virtual music, virtual museums, virtual actors), medical care (represented by urgent anatomy, virtual surgery training and plan), manufacturing industry (virtual products design and tests) and so on. This kind of technology is based on hardware which are restrained by computers, artificial intelligence, etc. The existent hardware products (like helmet display) have ignored the definition of virtual reality technology, which is the experience of reality. The virtual reality software abroad include OpenGL、Vega、Open Inventor、EON、VRML and X3D, etc. While the domestic virtual reality software started late, and include WEBMAX、VRP、BH HALA/RTI, etc.

DEFINITION OF VIRTUAL REALITY TECHNOLOGY

Virtual reality technology

Trough computer technology, the virtual reality technology creates a virtual environment in which several senses coexist with three characteristics, such as interaction, imagination and immersion. Imagination makes the imaginary space very vast. Apart from the simulating the real environment, this technology also expands the cognitive scope and at the same time those non-existent objective environment can be constructed at will. Immersed in the virtual environment, the users would feel that the virtual world is just the same with the real world. Interaction is about manipulation and response, through which the users can control and change the virtual environment at their will. In 2004, the Japanese olfaction simulator as well as the British prototype virtual cocoon in 2009 are capable of showing the situation of virtual environment, especially physical and psychological feelings.

Through the sensors, the users can interact between the physical and virtual environments which is realized through the computer hardware and virtual reality technology engines. The principle of virtual reality technology is shown in Figure 1.

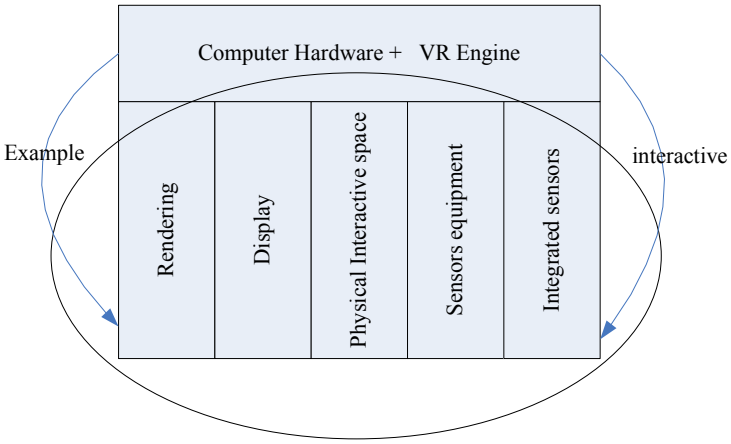


Figure 1 : The principle picture of virtual reality technology

There are four styles of virtual reality technology: table style, reinforcement style, immersion style, distribution style.

The function of the distribution style is connecting users at different places to realize simultaneously manage and manipulate the virtual world, making the experience of virtual world more comprehensive. Perfect combination of the virtual and real worlds in the reinforcement style the users' experience more fantastic. The immersion style is to offer a real feeling to the users through assistant equipment. The table style is to allow the users to observe the virtual world through the display.

The present application situation

At present, the virtual reality technology has seen great development around the world. But this technology at home still lags behind the international level, because it started relatively late. In order to accelerate its development, China has put

forward some research guidelines to encourage more research institutions, key universities and leading enterprises to join this field. The application areas of present virtual reality technology are shown in Figure 2.

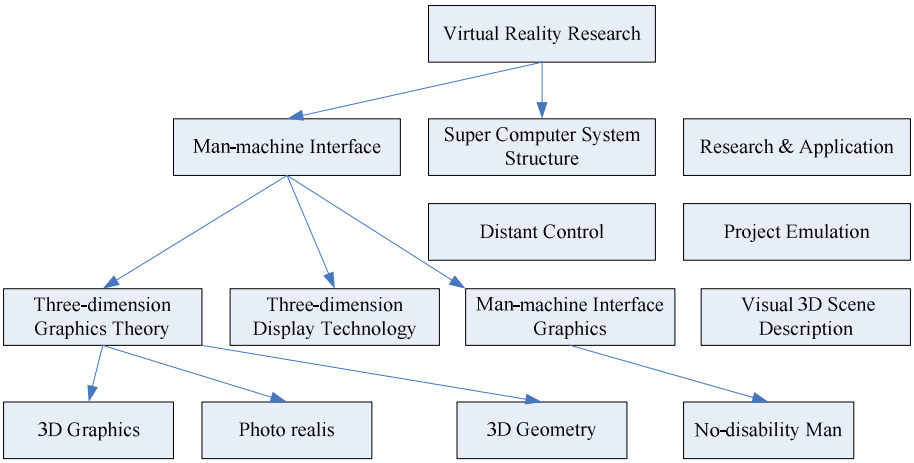


Figure 2 : The application areas of virtual reality technology

Through Figure 3 and 4 regarding the patent application of virtual reality technology, we can find out the development speed and the increase in application areas.

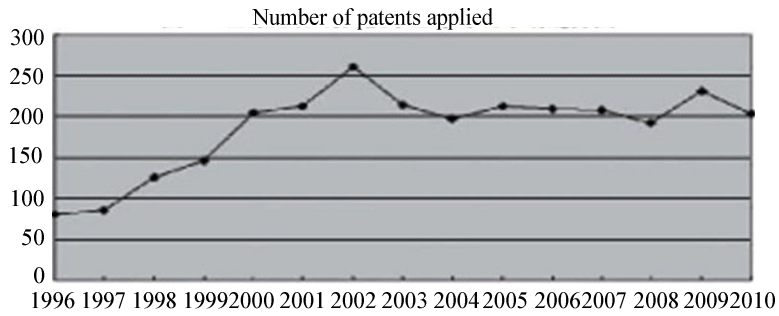


Figure 3 : The number of global virtual reality technology

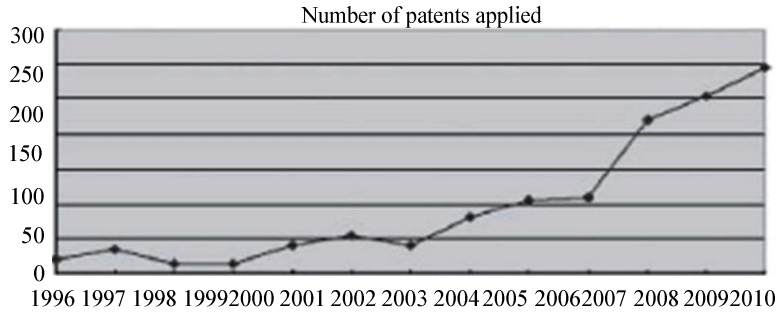


Figure 4 : The number of chinese patent for virtual reality technology

Through creating the virtual environment of the enemy's battlefield to for soldiers, this technology can substantially improve the army' s training performance. In such way, the development time of weapons and training expenses will be largely reduced. At present, virtual military training system has already enabled the soldiers to complete the training tasks, such as individual soldier training, close combat, joint combat, which are totally the same with real combat.

The virtual reality technology has also been well utilized in industrial emulation, dynamic analysis of models (refer to Figure 5), sample machines' design plan. As a result, the development time and costs of products have been hugely slashed, while the product quality has been proved at a early stage. Several sample machines in several key universities are relatively advances in China, which have been well developed.

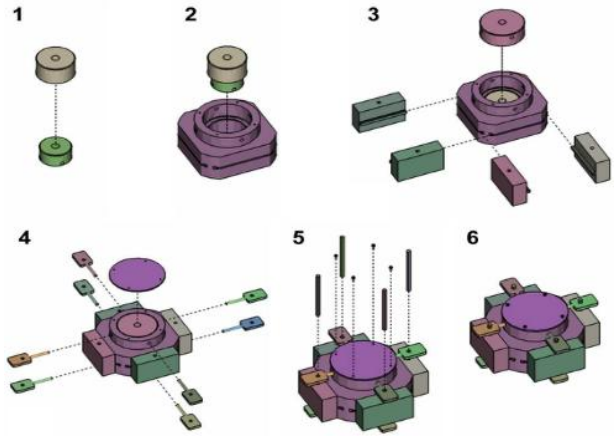


Figure 5 : The application of virtual reality technology in model analysis

The virtual reality technology has been used for training and teaching purposes, such as virtual anatomy, virtual surgery, etc. Trough the prior virtual scene, the virtual surgery avoids the problems of costs, or hazardous effects, etc. The traditional medical tuition can not be repeated and must be dependent on subjects, such as animals. While the virtual reality technology totally avoids this kind of problems. Through the method of immersion, the trainees can get access to the simulated scene. The virtual endoscope can be claimed to be the most mature fruit in the application of virtual reality technology. In the future, this technology can be used in tooth treatment, audio training and visual training, etc.

On top of that, the technology can be used in archaeology, architecture as well. At the same time, this technology has gradually changed the previous working models. Virtual museums, virtual field visits, virtual architecture simulation systems are all examples of the application of the virtual reality technology.

THE APPLICATION OF VIRTUAL REALITY TECHNOLOGY IN NATIONAL ENVIRONMENTAL ARTS DESIGN

Advantages

The rapid modernization of cities and towns has enormously pushed forward the popularization of environmental arts design. The demands for environmental design and construction teams have increased exponentially. Fro example, urban construction, residential buildings construction, city plazas, street blocks, public buildings, private houses have a strong demand for environmental design and decoration. Each year, these environmental constructions which are worth billions have an urgent demand for environmental arts and culture.

The national environmental arts designs can not only satisfy the demands of material houses but also the cultural and spiritual demands, which shows that urban citizens pay more attention to the enhancement of city culture and tastes. The national environmental arts design covers two areas, internal and external. The internal spatial combination design includes furniture, decoration, inside arrangement and inside arts, etc; while the external environmental arts design mainly consists of roads, greenery, landscapes, architectures, etc. Different from other design concepts, the national environmental arts design' s principles are all based on natural environment and real situations. When recreating or creating the existent environment, the national environmental arts design deploys geometry principles and methods of arts so as to provide the final designs that would satisfy people's lives and exchanges.

Based on software and hardware, the virtual reality technology can create vivid and graphic virtual environment in full dimension. When the users receive the senses' stimulus, they would pay high attention to the designer' s design concept and final designs. The users' attention could be easily attracted and their related impression would linger for a long time in their mind.

Budgetary accuracy and positive interaction

In the process of project development, the budget of national environmental arts design has always been a headache, which is attributed to the large combination of structures and myriad easily ignored articles. The role of virtual reality technology in reducing budget is given full play to largely increase the budgetary accuracy. Through virtual urban planning maps, building structures, etc, the designers can have a holistic understanding of the whole design structure, avoiding the problems caused by insufficient budgetary materials and greatly enhances customers' satisfaction.

The exchanges between the designers and customers will also be an attractive attribute shown by the virtual reality technology. The interaction will allow the users to enter the virtual room created by the designer to find out whether they like it and evaluate every part and design elements. The designer then modify their design to satisfy the customers' demands. This technology has fundamentally changed the problems of modification after production occurred in the previous national environmental arts designs which largely reduces the cost, increases the interaction between the customer and designer and kill the problem in the buds.

Background Scene Show and Future Prospects

In order to show all the aspects of national environmental arts design more effectively, the virtual reality technology has not only designed theme scene but also been applied in background scene show, for example, plants, cars, tasks, etc. The virtual reality technology can also show human-friendly environment in national environmental design, for example, to show environmental arts design concept through restoring historical scene.

In national environmental arts design, virtual reality technology has substantially revolutionized the traditional design concept to more effectively express the designer's thinking which can be said to be a extremely comprehensive design and show method. Apart from breaking through the previous restrains on users' senses imposed by 2-dimension, it can also show a large amount of design elements. As a result, all the environmental arts designs can be carried out in virtual design.

Virtual reality technology have the following characteristics in the future development:

[1] The speed of graphics is speedier and the definition is higher.

[2] Interactive equipment will have witnessed great development. For example, input and output equipment will be more common in use and their cost will be much lower.

[3] The processing capability will be more stronger to meet super projects' design demands.

[4] The strong technology of virtual dynamic environment will be further realized to generate perfect display effect.

[5] The intelligent phonetic system will be established to simulate more real environment, which is even equipped with language to produce and confirm virtual environment.

[6] The member countries of the space station can complete the astronomers' training tasks in their own countries, thus reducing the adjustment time in unfamiliar places and the risks in personnel exchanges.

CONCLUSION

The future development of virtual reality technology is dependent on computer technology. At present, the big challenges of transmitting and processing large amount of data and vividly simulating complex environment need to be dealt with. National environmental arts design has always been limited, as a result, it is impossible to speculate the later effect. Designers and developers can show all the desired design effect through virtual reality technology, which reduces potential risks at the primary stage. The designers can carry out their design concept at their will and enhance their design' s integrity and appropriateness. And its potential can be realized by revolutionize its own previous design concept. The economic globalization and exchanges have brought many challenges and opportunities. Against this backdrop, it is necessary to improve productivity, reduce development cost, and enhance competitiveness in markets. The impact of national environmental arts design can be totally evaluated. By way of visionary effect, the designers complete their arts design projects and fully express the original design concept, which offers a great push to national environmental arts design and is of great significance. The designers will realize their full potential in the future national environmental arts design, acquire more in senses and emotions, while the virtual reality technology will also be further improved.

RENFERENC

[1] Dan Liu; The application of virtual reality technology in environmental arts design[J], Hunan Agricultural University, **34(4)**, 459-461 **(2008)**.

[2] Xiaoling Han; Study on the development trend of virtual reality technology[J], Academic Exchanges, **1(2)**, 549-550 **(2007)**.

[3] D.Derbyshire; Revealed: The headset that will mimic all five senses and make the virtual world as convincing as real life [N], Daily Mail, 03-05 **(2009)**.

[4] Qinping Zhao; General review on virtual reality[J], Science of China, **39(1)**, 2-46 **(2009)**.

[5] Guangya Si, Zhiqiang Li, Xiaofeng Hu; The application of virtual reality technology in simulated military environment[N], Computer World, 07-09, (B18-B19), **(2007)**.

[6] Shuzi Yang, Bo Wu, Bin Li; Advanced manufacturing technology and development trend[J], **42(1)**, 1-4 **(2006)**.

[7] Marcus Kolga Schlickum, Leif Hedaman, Lars Enochsson et al.; Systematic video game training in surgical novices improves performance in virtual reality endoscopic surgical simulators :A prospective randomized study [J], World Journal of Surgery, **33(11)**, 2360-2367 **(2009)**.

[8] Guanyang Liu, Yuru, Zhang, Yu Wang; Dynamic interaction simulation among dental operation tools in double-channel interaction system[J], System Simulation Journal, **19(20)**, 4711-4715,4738 **(2007)**.

[9] A.Londero, I.Viaud-Delmon, A.Baskind; Auditory and visual 3D virtual reality therapy for chronic subjective tinnitus : theoretical framework [J], Virtual Reality, **14(2)**, 143-151 **(2009)**.

[10] Linlin Wang, Hongli Liu; The summer palace under virtual reality[J] The Journal of Capital Normal Universitym, **30(1)**, 76-82 **(2009)**.