Application of VR in Art Design

Jun Qian*
Sichuan Vocational and Technical College, Suining, Sichuan, China, 629000

*Corresponding author e-mail: junqian@163.com

Abstract. VR (virtual reality) is a new type of audio-visual integrated information technology which integrates multimedia technology and network technology. The three significant characteristics of VR make it different from other visual technologies are on information interaction, spatial conception and perception comprehensiveness. With the unique presentation and 3D image generation of VR, it is gradually applied to many fields such as architecture, industry, environmental design, etc. VR through data model modeling and precise data calculation can maximize the intuitive display of the scene to be experienced according to the needs of customers, and improve the customer's feelings and the timeliness of information exchange. At present, the application of VR in the world is more mature in the field of game industry and tourism. With the continuous development of the application, VR brings new vitality and new experience to many industries. This paper makes an in-depth study on the application of VR in art design, studies the change and impact of VR on art design and the feasibility model of VR applied in art design.

Keywords: VR, Art Design, Applied Research Spectrum Technology

1. Introduction
VR is a kind of virtual reality technology based on a series of advanced technology algorithms, such as computer simulation technology, multimedia technology and network technology[1-2]. It creates a virtual three-dimensional space by computer, and finally the auxiliary equipment, such as visual equipment, enables users to establish a multi-dimensional information space in the virtual environment. VR can fully mobilize the main human senses, such as vision, touch and hearing, and can maximize the immediate feelings of customers, which is conducive to the timeliness of information transmission and conversion. The application of VR mainly focuses on four directions: audio-visual display, interior, landscape, planning and design. Through in-depth analysis, the author believes that the three important functions of VR applied to art design are as follow: first, it can significantly improve the interactivity and intuitive feeling of art design; second, it can improve the quasi determination of art design work and save design costs; third, it can effectively reduce design
risks and improve the scientific and practical nature of environmental art design.

2. VR presentation principles

It is not easy for VR to be "immersive", and the human brain structure is quite complex. To achieve immersive experience, it is a very difficult task, which can only be achieved by a very powerful computer and with the help of external hardware[3-4]. This is the reason why VR has been officially used in the research of application since it came out in the middle of last century.

The realization of VR needs not only powerful hardware and auxiliary equipment, but also image processing ability as support. Its basic working principle is shown in Figure 1.

---

**Figure 1.** VR implementation principle

The hardware equipment of VR mainly includes:

1. Camera array for shooting 360 degree panoramic video.

   The reason why VR glasses can bring immersive visual experience is that they make use of the visual difference brought by the camera array for shooting 360 degree panoramic video[5-6]. These panoramic shooting pictures arrange different pictures for our left and right eyes respectively, so that the pictures we see in VR visual wearing equipment can present three-dimensional effect. Unlike 3D movies, VR emphasizes the panoramic interaction between 360 degree people and the experience. It not only has a strong sense of immersion and three-dimensional sense of 3D movies, but also allows users to interact with the virtual world. This is the fundamental feature of VR different from other three-dimensional imaging technologies.

2. Head tracking technology.

   VR doesn't focus on the immersive and stereoscopic experience effect with powerful image presentation performance and stereoscopic performance, but also needs sensitive head tracking technology[7-8]. Head tracking technology can capture human's moving track sensitively, predict human's head movement through the track, and make real-time adjustment so that when we move in the real world and move in the virtual real world, we can achieve synchronization. For example, when...
the experimenter has the intention of looking to the left, the head tracking technology can quickly identify the running track of this action, then the hardware will render the left scene in real time, so that we can see the left scene when looking to the left, and the right scene when looking to the right, so that the VR scene can be presented stably, so as to improve the experience effect.

3. Eye tracking technology.
   Eyeball is the most important external organ of eye movement, and also the organ that VR focuses on. Eye tracking technology is achieved by tracking our pupil key information, while the pupil information captured by computer through eye tracking technology can transform the depth of field according to the scene we gaze at through algorithm, so as to bring more excellent immersion experience.

4. High performance computer
   The current VR not only needs to use external mobile devices to capture and predict key information, but also needs to use external hardware devices with powerful computing functions to assist computing. Therefore, high-performance computers are the core and necessary equipment of VR.

3. Research on the application of VR in art design

3.1. Able to improve the efficiency of each link of art design and reduce trial and error cost

Table 1. For the comparison between VR and traditional art design technology

| Project                          | VR                                                                 | traditional art design technology                                                                 |
|----------------------------------|--------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| 1. Realization technology and principle | three dimensional space construction technology and model drawing technology and model construction analysis time-saving, labor-saving, instant, time-consuming, laborious and lag show the overall model of environmental art and design strong sense of substitution | Reading/listening/writing/discussion pay attention to the local part unable to achieve the overall attention, effectively improve the practical effect of environmental design work, improve the scientific practical effect is invisible, highly dependent on human experiences weak sense of substitution |
| 2. Advantages and disadvantages   |                                                                 |                                                                                                  |

Art design is a complex process of spiritual creation, which contains huge workload and error risk in each stage of art design. With the rapid increase of employment cost and office cost, the trial and error cost of art design is also rising, which has become a major expense of design companies. Therefore, reducing the trial and error cost of each link of art design, improving the efficiency and time cost of each link of art design to meet the needs of customers as much as possible is the core competitiveness of the current art design company. With the continuous change of the public's aesthetic perception and the improvement of the whole society's aesthetic ability, the individual needs of various industries and subjects for environmental art design are also increasing. At present, an important problem in the environmental art design work is to present the most intuitive design effect to customers through the application ability of environmental art design technology, and improve the design efficiency the focus of stage art design work. The reason why VR is introduced into art design is mainly based on the
advantages of VR. Compared with the traditional art design in the past, the advantages of VR in art design are clear at a glance. See Table 1 for the specific advantages and disadvantages.

3.2. Realize the integration of various new technologies, realize both technology and art, and highlight the humanistic function and value

With the construction of today's spiritual civilization and the promotion of the cultural taste of the whole society, while pursuing the application value and function realization, art design is more and more inclined to pursue the artistry and humanity, which also determines the trend and development direction of today's art design. In this paper, we propose to use 3D virtual VR to realize the calculation and Simulation of real art, which is the key to enhance the artistry and humanity of art design. Taking the urban landscape environment art design with high diversified needs of the current society as an example (see Figure 2 for the specific VR art design modeling process), the landscape design should not only meet the landscape needs, but also accurately integrate with the urban planning and urban construction to achieve functional complementarily or even foil, so as to improve the goal of both the technology and art of landscape design, the coexistence of human function and human value This is a key consideration for designers. There are many kinds of trees in landscape environment art, few houses and buildings, and few landscape entities that can be relied on. Traditional landscape design is easy to make the modeling of landscape environment more difficult and cannot take into account the realization of multiple functions, while 3D virtual VR can realize the technical, artistic and Humanistic Functions of landscape art design by using patch modeling and dynamic film pasting Give consideration to what you can.

![Figure 2. Modeling process of urban landscape environment art design](image)

3.3. Better reflect diversified art needs and handle the relationship between technology and art

VR design is no longer limited to the traditional two-dimensional CAD plans, 3D renderings, hand-painted sketches, reference photos and other forms. Instead, VR is used to build models based on the relevant data of computer software input space after communicating with the design requirements
and design requirements of the demander in advance, so as to tighten multiple figures, objects, scenes and so on with the design. With the help of special information conversion equipment, VR can simulate the human visual, auditory, tactile and other sensory functions, and customers can communicate and communicate through body, language and other ways. This new form of design presentation truly enables customers to experience the scientific and technological, humanized and customized professional services of modern design, solves the problem of unequal professional skills reserve and distortion of information exchange between designers and customers in project communication, so as to better reflect the diversified artistic needs and handle the relationship between technology and art.

4. Conclusions
As a new thing, VR can not only improve design experience and help designers to realize art design theory, design concept, creative thinking and art expression, but also facilitate the realization of art innovation easily through the construction of a large number of model databases, so as to create many new artistic expression methods, improve art design process and provide training for innovative talents. Infinite possibilities. Based on the principle of VR, this paper focuses on the application of VR in art design. According to the practical analysis, it puts forward the following three points: first, VR can improve the efficiency of all aspects of art design and reduce the trial and error cost; second, VR can achieve the integration of multiple new technologies to achieve both technology and art, highlighting the human function and value; third, VR It can better reflect the needs of diversified art and deal with the relationship between technology and art.

References
[1] Zhang Xiru. Demand and application of VR in environmental art design [J]. Yangtze River Series, April 2019: 64-69
[2] Lu Xiaocui. Demand and application of virtual reality technology in modern environmental art design [J]. Electronic World, 2018 (17): 194196
[3] Wang Peng. Research on the application of 3D virtual VR in environmental art design [J]. Modern Electronic Technology, 2018 (12): 168-170
[4] Wang Mingjun, Zhu Wenyao. Research and Simulation of 3D virtual reconstruction method of ancient buildings [J]. Computer Simulation, 2014, 31 (3): 437 / 440
[5] DENG Qiang,ZHANG Huaiqiong,L1 Yongliang,et a1. Visualization simulation technique of stand structure adjustment based on 3D virtual environment [J].Forest Research,2016,29 (6):890. 895.
[6] WU Yong,LUO Tengyuan. New method for construction of 3D panoramic virtual system [J].Computer Engineering and Design,2014, 35 (5); 1858-1861.
[7] Yang Liuqing. Application of VR in Environmental Art Design [D]. Suzhou University, 2017
[8] Xu Wei. Research status and development of virtual reality technology at home and abroad [J]. Modern Business Industry, 2009 (21)