

# The Application of Virtual Reality and Simulation Technology in Design

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**Keywords:** Virtual Reality Technology, Public Environment Design, Integration

**Abstract:** Objective to Explore the Application Strategy and Development Direction of Virtual Reality Technology in Public Environment Design. Methods Starting from the Advent of Computer and Virtual Reality Technology, This Paper Analyzes the Many Changes Brought by Virtual Reality Technology to People's Life, Then Analyzes the Internal Part of Virtual Reality Technology, Explores Its Basic Concept, Basic Characteristics and Basic Composition, on This Basis, Summarizes the Important Role of the Combination of Virtual Reality Technology and Public Environment Design, and Concludes That It Can Break the Time. the Limitation of Space and Space Can Make Up for the Deficiency of Environmental Art Creation, Avoid the Potential Threat Brought by Practical Operation, Improve the Accuracy of Project Cost Budget and Other Practical Effects. Finally, the Author Puts the Foothold in the Public Environment Such as Museum, Urban Architecture, Classical Garden and So on, and Explores the Specific Application Path of Virtual Reality Technology. Conclusion Virtual Reality is the Product of the High Development of Computer Technology. the Combination of Virtual Reality and Public Environment Design Realizes the Integration of Science and Technology and Art, Makes the Environmental Art Design More Accurate and Humanized, and Fully Displays the Charm of Environmental Art.

## 1. Introduction

The Advent of Computer Has Promoted the Change of People's Life and Work Style. the Application of Computer in Various Fields is Increasingly in-Depth, Which Not Only Improves the Design Form, But Also Achieves Certain Results. among Them, the Public Environment Design Has Tried to Apply the Virtual Reality Technology, Making the Environmental Art Design More Convenient and Fast, Opening a New Development Situation[1]. Due to the High Cost and Immature Technology of Virtual Reality, Its Application Process is Not Smooth, and There Are Still Some Shortcomings to Be Improved and Solved. in Order to Achieve This Goal, Virtual Reality Technology Will Be More Fully Integrated into the Design of the Public Environment, and Designers Need to Conduct More in-Depth Study and Exploration, and Thoroughly Understand the Virtual Reality Technology. with the Correct Cognition, and Then with the Specific Design Requirements and Design Ideas to Design a More Ideal Effect.

## 2. Interpretation of Virtual Reality Technology

Virtual Reality Technology is Called Physical Environment or Artificial Environment. It is a Kind of Simulation or Virtual Reality Operation. It Emphasizes the Experience in the Real World and Allows Users to Interact with Virtual Objects with the Help of Vision, Hearing and Touch. Specifically, Virtual Reality System Includes Computer Technology, Psychology, Computer, Real Machine, Tracking Equipment, Interactive Equipment, Virtual Audio and Other Hardware Equipment, Modeling, Visual Simulation, Object Control, Dynamic Three-Level Acoustic and Other Software Systems, Which Are Composed of Learning, Cognitive Science, Information Science and Other Majors[2]. as a New Technology, Virtual Reality Technology Breaks the Traditional External Modeling Convention, Provides Users with Intuitive Experience, and Gradually Becomes a Research Hotspot. in General, Virtual Reality Technology Emphasizes the Following Characteristics. First of All, When the Device is Manipulated by Virtual Reality Technology, the User Receives, Recognizes, Responds and Feeds Back the Transmitted Information,

and the Device Adjusts the Image According to the User's Behavior and Language. Sound Has Strong Interaction. Second, Virtual Reality Technology Uses the Multi-Dimensional Interactive Space Created by Modern High-Tech Information Technology Equipment to Bring Users a Sense of Immersive and Real Natural Environment[3]. Third, Even If Buildings, Streets, Cities and Even the World Are So Beautiful, Virtual Reality is One after Another, Giving People Different Experiences and Feelings.

### 3. the Important Role of Virtual Reality Technology in Public Environment Design

Virtual reality technology has broken the traditional thinking restrictions and brought great convenience to the public environment art design. It has a prominent positive role in detail display, problem prevention and accuracy improvement[4]. Specifically speaking, its important role in public environment design mainly includes the following points.

#### 3.1 Show Details Easily, Break the Limitation of Time and Space

In the public environment design, designers are often affected by various objective and non objective factors, so it is difficult to complete the final effect of environmental art design works perfectly. However, the application of virtual reality technology breaks the limitation of time and space, and presents all links at a glance[5]. It is convenient for designers to make detailed observation and research from inside to outside one by one, and analyze the internal relations among them. Even if some problems occur, they can be solved in time. Especially for the changes of public environment art and design works brought by the changes of time and season, virtual reality technology can also be used to show.

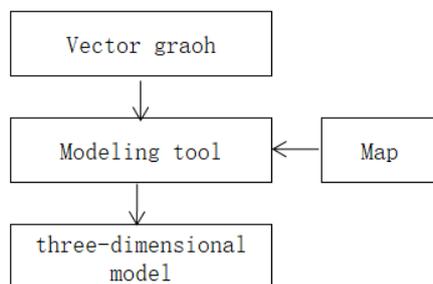


Fig.1 Interaction Model

#### 3.2 Prevention and Intervention in Advance to Solve Various Deficiencies in Operation Practice

There are many unexpected situations and potential dangers in the practice of public environment art design. If we can't prevent and intervene in time, the actual function value will be greatly reduced. With the help of virtual reality technology, it can be simulated on the spot, bringing designers almost real feeling on the spot, so that they can freely carry out various operations and experiments in the virtual environment[6]. In this way, all kinds of potential security risks can be prevented and avoided in advance, greatly improving the security of the real environment.

#### 3.3 Improve the Accuracy and Realize the Combination of Technology and Art

Virtual reality technology improves the accuracy of the project cost budget. Whether it is large-scale urban planning, indoor and outdoor decoration, or the complex building into a virtual environment, it greatly shortens the design process[7]. On this basis, designers began to design public environment at a higher level, combining science and technology with art, giving more possibilities to public environment design, and improving the artistic connotation of works.

### 4. Application of Virtual Reality Technology in Public Environment Design

With the improvement of computer and interactive hardware facilities, virtual reality technology

is becoming more and more mature. It has been unconsciously infiltrated in many important aspects of the public environment design field, thus breaking away from the shackles of the traditional two-dimensional plane form and greatly improving the design efficiency and effect[8]. The following mainly combines several representative aspects of public environment design to discuss theory and practice one by one.

#### **4.1 Application of Virtual Reality Technology in Museum Environment Design**

As a non-profit service organization open to the public, the public environment design of Museum has important practical value. For a long time, the existence value of museums has been shouldering the important task of collecting, collecting, displaying and researching the physical objects of natural and human cultural heritage, and emphasizing the exertion of their social and educational functions[9]. In order to make the overall environment of the museum more humanized and scientific, virtual reality technology began to enter its design link, injecting new vitality into the development of the museum. From the perspective of cultural relics protection, there are some difficulties in the application of virtual reality technology. For example, many exhibits in the museum are collected in the exhibition cabinet, and there are many restrictions on the space of the exhibition cabinet. Some cultural relics are blocked by the exhibition cabinet and cannot be displayed perfectly, and the audience cannot see the details of the exhibits. This defect is easily solved under the role of virtual reality technology. Cultural relics can be displayed by means of data technology to maximize their external characteristics, and then cooperate with some operations that can be actually operated by the audience, such as the rotation, amplification or reduction of virtual cultural relics, to further improve the interactivity of cultural relics display. From the perspective of the protection and internal display of ancient buildings, there are many disadvantages in the traditional way of visiting the interior of ancient buildings outside the fence or through the glass. The audience can only visit from a long distance. In addition to the limitations of indoor light and visiting distance, the details of display are often unclear. Virtual reality technology is used to show the interior furnishings of ancient buildings at zero distance from the original appearance of ancient buildings, which greatly meets people's desire for knowledge and exploration. From the perspective of cultural connotation display, virtual reality technology can maximize the excavation and display of the historical background, religious culture and traditional production process behind cultural relics and historic sites, and visualize and concretely display the cultural connotation existing inside them[10]. When necessary, it can cooperate with later effects such as dynamic painting and interpretation to create a cultural experience beyond the general vision. From the perspective of cultural relics virtual restoration and data preservation, embrittlement, discoloration, peeling and other phenomena make the cultural preservation and restoration work very urgent. At this time, the use of virtual reality technology for digital recording and the preparation of virtual restoration plan in advance can greatly improve the accuracy of recording the real state of cultural relics and historic sites, avoid unnecessary damage of traditional manual operation, and lay the foundation for more detailed and precise work in the future.

#### **4.2 Application of Virtual Reality Technology in Urban Architectural Environment Design**

Virtual reality technology has a very strong expressive force. It integrates computer graphics, multimedia, artificial intelligence and so on, creating a virtual experience world for people. This is particularly prominent in urban architectural environment design. If applied properly, this technology can not only assist the planning and design of the building, but also realize interactive three-dimensional experience, so that people can feel the technology and charm of three-dimensional space, and can timely adjust the three-dimensional scene in real time, greatly improving the work efficiency. On the hardware system, virtual reality technology mainly includes keyboard, mouse, data glove, steering wheel feedback device, handle and other peripherals, which can construct virtual reality system, make users feel better experience in virtual reality environment, at the same time, it can produce good tactile perception effect, and provide basic technical support for the overall architectural environment design scheme. In the software system, virtual reality technology is mainly divided into three parts: building geometric model, building three-dimensional

scene, realizing the basis of user experience; building physical model, determining the structural material of geometric model, adjusting the influencing factors such as color and light; building behavior model, describing the movement and behavior of objects. The virtual reality technology is used to model a small city. During the virtual design, the designer should first digitize the map of the city, create a basic model, and then make three-dimensional arrangement based on the location of each building in reality. Even the door frame and window frame of each building should be carefully arranged to better show the aesthetic characteristics of the city and give the whole. The design brings more accurate and intuitive technical support.

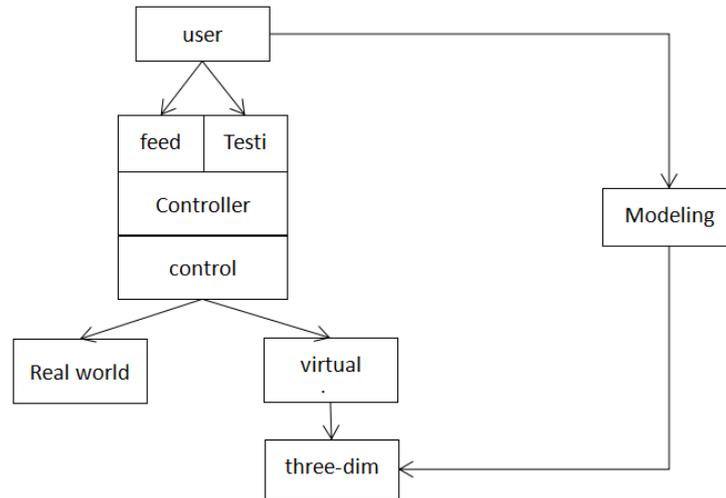


Fig.2 Basic Structure of Virtual Reality System

## 5. Conclusion

With the development of society, the benefits of using virtual reality technology for art design, especially the benefits brought to designers by the perception and understanding of the future real environment, become more and more prominent. Designers help to eliminate the constraints of traditional design ideas. Virtual reality technology has been widely used in the field of design and plays an important role. As designers, we need to study this complex technology in depth, and constantly improve the design level. All the drawing and data storage work must be completed on the computer, which has strong design advantages and can assist the practice of public environment design. Simplify the design process and improve the design level.

## Acknowledgement

Based on virtual reality and simulation technology in the application of building decoration design teaching research Zhejiang education technology research program JB137.

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