Art Design Scheme of Modern Urban Commercial Public Space using Artificial Intelligence Technology

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***Abstract*—This article takes the urban public environment facilities as the research object, and cites the related subject theory as well as the mature research methods at home and abroad, to explore the specific characteristics of the commercial public space. We sum up the main points of the space, and complete the basic understanding of the research on the optimization of the status of commercial public space, which lays the foundation for the human and machine intelligent interactive system to permeate the base. According to related theories, the application of man-machine interaction system under the commercial public space is defined, and the changes of the man-machine system to its commercial public are defined from various levels. Then, a commercial public space environment is designed as the blueprint to discuss the commercial public space under the man-machine interaction system. The scheme achieves the interaction between human and space, optimizes the function of the whole commercial public space and improves the art of space environment.**

Keywords-man-machine interaction; artificial intelligence; public space; art design

I. INTRODUCTION

With the development of digital media technology, the development and application of interactive technology and the high integration of art and technology, the mass participation in the form of public art works has changed qualitatively. In the future, interactive urban public art is the fusion of technology and art, which makes the digital interaction possible as a new type of public participation art, and the application of new technology in the interaction of public art will inevitably become the development trend of the future public art. At the same time, new technological means are emerging, and new forms of artistic expression also get developed.

Starting from the related concepts of urban commercial public space, this paper uses the research methods of literature analysis and social practice to explain the significance of the human computer interaction system, as well as its influence category and working principle, and puts forward the idea of the overall design to solve the problem in spatial malpractice in public commercial space. Secondly, it explores the specific characteristics of commercial public space, sums up the main points of space, and completes the basic understanding of the optimization of the current situation of commercial public space, which lays the foundation for the human computer interaction system to penetrate it. Combined with above theoretical research, the application of man-machine interaction system under the commercial public space is preliminarily defined, and the change of man-machine system to its commercial public is defined from various levels. The design of the commercial public space environment at the entrance of "Wanda Intelligent Square" is designed as the blueprint, and the commerce under the man-machine interaction system is discussed based on it. Finally, we discuss the optimization and improvement of the interactive system to the space environment with multiple angles and multiple directions.

II. PRINCIPLE THEORIES

A. Interactive Urban Public Art

Interactive public art refers to the modern urban public art which leads to digital virtual representation in the category of public art. It is a city public art with a certain interactive function by computer control. It can be seen from the definition that interactive city public art is the combination of technology and art. Technology refers to computer technology, and art is the artistic content of public art, such as urban sculpture, equipment, light art, urban image art, and so on. Interaction is another important attribute of public art. To investigate its location and geographical features and the original intention of its creation and construction, the participation of the masses is essential, that is, the interaction between the works and the audience. Such kind of attribute is also a kind of art belonging to the masses in other forms of art. The highest level is that the audience can really participate in the creation of the works to achieve two-way communication between the audience and works. The work is not only in the output of information, but also from the audience's transmission of information feedback. For people, however, there are not many interactive works and most of the current interactions are mechanical and physical.

With the development of science and technology in the economy, electronic technology is more and more widely used in the design including video recording technology, digital media technology, and so on. People have more and more requirements for visual images. In addition to the traditional real, analog, analogical and structural type, they

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are pursuing an interactive sense of vision. Acceptance is no longer the passive acceptance of these visual feelings before, and the joyful feeling brought by design from interactive participation. In the future, the technical content of urban public art will be higher. These technologies include speech recognition, image recognition, human expression recognition, various sensors and so on. The art of urban public art in the future is based on technology, and art is the form of technology.

B. Interactive Design and Ergonomics

In a harmonious environment, it is human-oriented that enables machines to adapt to people rather than people to adapt to machines. With the advent of the immaterial society, people's demand for products rises from simple practical functional to various emotional and cultural needs. The arrival of the right brain has increased the level of people's emotional needs. Therefore, during the process of design, we should gradually shift from the traditional focus on the design of product function and to the design of various factors those affect users' behaviors and habits. Experience design is a kind of design thinking from the perspective of human being. In product design, the harmonious state of people, facilities and environment can be achieved through experience design, which coincides with the purpose of interactive design.

To define whether a product meets the ergonomics, the design center in *German Sturlgart* provides the following criteria:

(1) whether the product is compatible with the size, shape and force of the human body;

(2) whether the product can be used conveniently;

(3) whether we can prevent the risk of accidental operation;

(4) whether each component can be recognized and used clearly.

(5) whether the product is convenient for cleaning, maintenance and repair.

Modern products are being diversified and humanized, not limited to functionalism. People need more emotional elements and personalities which are put into the product design. Modern products are more rich and delicate, and the details are handled properly. On one hand, the product is fully functional and attractive in appearance; On the other hand, it requires corresponding products to satisfy people's emotional needs.

C. The Principles of Man-machine Interaction System

Man-machine interaction system is the most closely integrated product of multidisciplinary integration under the rapid progress of science and technology. They are cognitive psychology, ergonomics, multimedia technology and its relationship with four subjects and virtual imaging technology. Self study and ergonomics are the basis and theoretical basis of the system and multimedia and virtual imaging technology are means, as shown in figure 1.

The man-machine interaction system is first a computer system which is interdisciplinary. It is also a platform and all operations must be carried out on the platform. It is mainly aimed at the relationship between human and system for operations. It involves two aspects of interaction: first, information interaction between people and systems, and the second is followed by information interaction between systems. In the first aspect, human beings can use all the devices that can be instructed to connect with the system using a display screen, such as a mouse, a mobile phone, or an infrared system; In the second aspects, the system sends a signal to a person through a sound, color, display screen and other devices. At the same time, the system also produces connections. Each science affects each other in the system and promotes each other, leading to the final result. Therefore, the man-machine interaction system is not a single system, it is a complex multi-disciplinary interaction system platform instead.

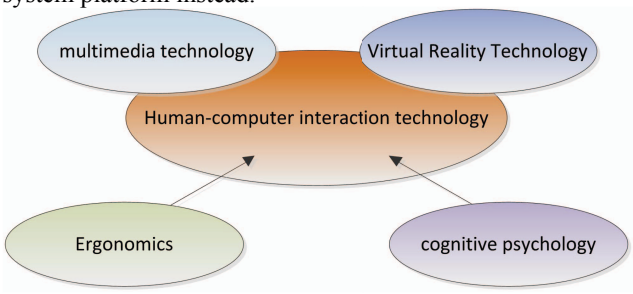

Figure 1. Composition diagram of human-machine interaction system

III. URBAN PUBLIC SPACE ART DESIGN BASED ON MAN-MACHINE INTERACTION

A. Function Design

The performance stability and simplicity of the man-machine interaction system determines whether the entrance public space can really attract the eye of the user, and enable the intelligent equipment under the interaction of all the machines to interact and bring different interactive space to the user. Thus, the entrance space has put forward higher requirements to the man-machine interaction system and the man-machine interaction system will implement the following contents:

(1) The user's ID verification and reading, when users enter a park entrance space, it needs to brush card first in the intelligent door control under the man-machine interaction system. If the user's identity security, intelligent lighting, holographic projection, the intelligent sound control equipment will be all open. If the identity is not passed, there will be a voice alarm, and the valid instructions will be sent to the PLC computer control system. When the user leaves the park, it needs to be reconfirmed. The man-machine interaction system will judge the user's information and whether it is consistent before, providing information in the

park to reduce or close the intelligent vehicle file. Then, the system will be transferred to the standby state.

(2) LED screen synchronous display touch function and voice function: when the users enter the whole area, the man-machine interaction system will prompt them to r know what intelligent devices exist in the current space, such as intelligent indicator, intelligent convenience service desk, and so on. The next step is prompted so it can be seen visually. It can also prompt and assist users to complete the functions of users.

(3) Synchronization function: when users enter the entrance Park, including voice control lights, holographic projection technology it will act according to the distance between user and the equipment.

The system structure mainly adopts single chip computer as the core processor. It is equipped with LCD display module, voice dialogue module, communication module, speech template, ID reader module, clock module, data storage module and so on. It realizes real-time voice prompt and display, real-time data exchange and smooth finish of the control system.

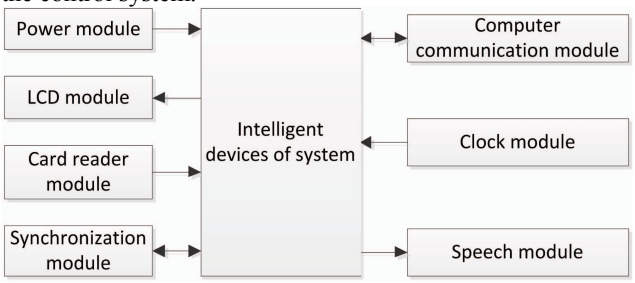

Figure 2. Structure composition diagram of man-machine interaction system

B. Item Analysis

We take the commercial public space "Wanda Plaza" in a commercial area of Beijing as an example to carry out the specific analysis and system design of the project. The "man-machine interaction system" is a solid application of the concept of "man-machine interaction system" in a broad sense. It uses the multidisciplinary results under the man-machine interaction system and "Wanda" intelligent post station to improve the disadvantages of the traditional space environment in the commercial public space, to optimize the spatial environment properties, by focusing on the promotion of the empty space. According to the function and space of the intelligent light, intelligent sound control, intelligent network in the interactive system, the distance between people and space is drawn closer to the space, and the space environment becomes more and more changeable and special, so the user can feel the artistic attribute of the space. It raises its space value, and emphasizes the optimization of human and space. Therefore, the man-machine interaction system under "Wanda" is using the multi-disciplinary technology under the system to solve the distance relationship between space and people, and to create the art of space environment. The intelligent equipment under the man-machine interaction system provides the service according to the user's needs, so the user experience in the process of service.

Geographically, the project is located at the core of the new economic development zone in Beijing, with superior geographical position conditions, developed regional economy, beautiful space environment and convenient transportation, which is beneficial to the construction of the most advanced and most distinctive commercial projects in the area in the future.

C. Spatial Layout

Creating an "artistic" commercial space for users is the foundation of the entire site space design, as shown in figure 4:

(1) The entirety of space

Under the action of the man-machine interaction system, many commercial spaces in the park penetrate and influence each other, providing a more convenient and convenient place for leisure shopping and entertainment for the users.

(2) The theme of space

Under the action of man-machine interaction system, all the space in the field is subject to its commercial characteristics, and the space business atmosphere is set off. Then, the distance between users and space is drawn.

(3) The art of space

Under the function of human-machine interaction system, we optimize the space environment attribute and create the artistic quality of the environment.

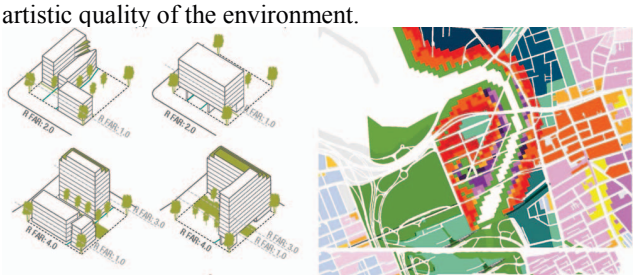

Figure 3. Spatial layout graphs

D. Intelligent Facility Layout Planning under Man-machine Interaction System

The human-machine interaction system is divided into three categories: "look, listen and touch" in the application of intelligent devices of the commercial public space of “Wanda”.

(1) "look" is divided into two major lighting categories: interactive lighting system and general lighting system. The interaction system achieves its functional and functional differences through the control of lamps and lanterns.

The lamps and lanterns of lamps and lanterns under interactive lighting are mainly distributed in public green space and welcoming small square. Their function and small range interactive lighting are designed to control the distance

between the lighting range and the user's behavior, to close the contact between the small space and people and optimize the lighting system under the general lighting system. The equipment is mainly distributed in the square hard pavement area and square landscape planting area, which is used for lighting with large area environmental space, to improve the visibility of pedestrians at night. Under the control of man-machine interaction system, it adjusts its fixed lighting theme mode on special holidays to optimize the artistic and thematic characteristics of the space environment.

(2) "listening" in the entrance public space includes facilities such as digital newsstand, digital island and digital indicator card. Its working principle is to collect the voice information of the user and make a demand judgment on it. The number of digital newspapers and periodicals is 2. It is distributed in the front square of the entrance and on the small square of welcoming. It serves the crowd of the square; the number of digital islands is 3, and it is distributed on the small square of welcoming. The number of digital signboards is 8, which is distributed between the front entrance square and the welcome Plaza and the indoor and outdoor junctions of commercial buildings.

(3) "touch" in the entrance public space mainly includes access control system, intelligent seat, intelligent garbage can. Its working principle is the distance relationship between the equipment collection and the user, and make the corresponding judgment. The number of digital vehicle files is 2, which is distributed in the entrance plaza access control system in space. The number of smart bins is 11, distributing with the entrance square and the welcome square. The number of smart seats is 5, which is distributed in the leisure space of welcoming small square.

E. Specific design of Intelligent Facilities

The artistic and intelligent performance of the "Wanda Plaza" commercial public space mainly depends on the implementation of the space environment with the intelligent equipment under the man-machine interaction system. Under the influence of the intelligent equipment of the man-machine interaction system, the public space is reflected from the three senses of vision, hearing and touch, which makes the space environment changeable, to enable the common communication space be artistic, scientific, interesting and humanized.

Figure 4. Plan of public environment under man-machine interactive system

(1) "visual interaction

We divide the intelligent devices under the interactive system of Wanda's entry space into three categories: "look, listen, touch". They gather on a space platform to influence the space and achieve the artistic enhancement of the public space environment. The "look" under the interactive facilities often affects the visual artistry of its entrance space environment, and affects its space environment modeling and the creation of space atmosphere. However, the change in the light is the greatest impact on the vision. The types of lighting under the human-computer interaction system are divided into interactive lighting and general lighting, and such two kinds of lighting forms are combined in the entrance space to create a unique and artistic interactive space.

(2)Interaction of sound awareness

Under the intelligent facilities, "listening" affects its artistic sense of hearing in its space environment, and strengthens the dynamic and static connection between its space environment and users. It includes "digital island", "electronic newsstand", "electronic guide card" and other intelligent devices.

(3)The interaction of tactile

The "touch" of the intelligent facilities often affects the artistic nature of its space touch, the distance relationship between the user and the space and the creation of the atmosphere, to optimize the artistic expressiveness and participation of its environment. The smart devices mainly include intelligent seats, intelligent access control system, intelligent trash cans.

IV. CONCLUSIONS

This article discusses and studies the artistic means and theories of the commercial public space environment of the human-computer interaction system, analyses the design orientation, excavate the main points of the design, research the setting method, and carry on the practice and try the design. It is proved to own certain promotional value and guiding significance for the design and method of spatial

artistic attributes to enhance the urban commercial public space environment.

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