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Research Article

Virtual Reality Technology in Landscape Design at the Exit of Rail Transit Using Smart Sensors

Chuan Sun[1] **and Li Dong**[2]

[1]*The School of Arts, Hubei University of Education, Wuhan, 430000 Hubei, China*
[2]*School of Art and Design, Wuhan University of Science and Technology, Wuhan, 430000 Hubei, China*

Correspondence should be addressed to Chuan Sun; sunchuan@hue.edu.cn

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The artistic thought of traditional garden landscape design has an important influence on garden art, and architectural theory and gardening theory are also inextricably linked. In modern gardens, traditional architecture lacks applicability to the construction of garden painting environment. Based on the background of modern gardens today, this paper studies the landscape design approaches that have the effect of painting in modern gardens, in order to provide references for modern gardens design. Virtual reality technology mainly provides users with a three-dimensional image environment through the use of simulation methods, which can truly reflect the changes and interactions of operating objects, thus forming a virtual world and establishing a relationship between users and the virtual world, interactive virtual 3D interactive interface. Based on the comparison of mainstream engine systems, this paper selects a suitable virtual reality system based on the characteristics of garden landscape design. On this basis, it further studies and researches the functions of the engine system selected by the research institute and explores the virtual reality system that meets the characteristics of creating garden landscape engineering. In the real work process, a three-dimensional virtual environment of the garden landscape is finally selected, so as to lay a solid foundation for applying virtual reality technology to garden landscape design, and strive to gain an advantage in the application field of virtual reality technology in this industry. Traffic congestion and frequent traffic accidents have become a major obstacle to urban development, the use of intelligent transportation systems to solve urban traffic problems has become the consensus of managers, so this paper uses intelligent sensor technology to schedule traffic flow. Experimental results show that virtual reality technology mainly uses simulation methods to give users a personal experience. The density of green space corridors simulated by VR technology can be increased from 1.25 km/km^2 to 2.41 km/km^2, which is more than doubled, which significantly improves the connectivity of green spaces and effectively improves the ecological functions of green spaces. Engineers, owners, and the public can see the final design effect in real time from any angle and can also interact with the flowers and trees in the scene to understand the design concept of landscape architects more comprehensively, thereby enhancing publicity effect, to achieve fast and effective dissemination. It is beneficial for users to really participate in the project design. The application prospect will be very broad.

1. Introduction

Since the 20th century, computer science and technology have developed rapidly, and virtual reality technology is the crystallization of its development. Through simulation, virtual reality technology provides users with a real and interactive three-dimensional simulation environment, thereby establishing a virtual world. Traditional Chinese architecture has a long history. As early as the Southern and Northern Dynasties, thanks to the free thinking and open social background at that time, traditional architecture developed rapidly and various architectural painting theories were born.

In modern garden research, scholars often mention the relationship between architecture and gardens. Sun et al. pointed out that historical art techniques are consistent. Gardens are a comprehensive artwork composed of various elements, and each scenery is like a different picture scroll. Architecture needs to have charm and interest, and garden

construction can also refer to [1]. Othman and Kasim proposed that designers must take people-oriented as the main design idea, based on coordination and sustainable development, to effectively plan the residents' activity space and rural landscape design [2]. Scognamiglio proposed that designers must fully understand the industrial development structure of the region and design some fishing, fruit and vegetable picking, sightseeing experience, and other projects while ensuring that the natural ecology of the region will not be damaged [3]. Hwang et al. proposed that the ultimate goal of the landscape transformation of industrial heritage sites is to show the historical culture of industry, inherit history and talk to the future, and use landscape design to express the cultural characteristics of the landscape [4].

Kurtaslan et al. proposed that the creation of virtual scenes for VR training teaching is based on the actual scenes provided by the school-enterprise cooperative enterprise, focusing on the integration of virtual scenes and real scenes. The creation of virtual scenes requires good experience and interactivity [5]. Facing the challenge of smart landscape, Wu combines advanced technology, landscape teaching construction education reform mode under the background of digital landscape design with science and technology, aiming to solve the current problems in landscape design [6]. Hongtao elaborated on the standards and aesthetic principles of architectural creation. As a representative traditional painting theory, it not only has a theoretical guiding role for flat architectural art but also has positive reference and guiding significance for three-dimensional garden art [7]. Xuepeishan decomposes the operational links and technical points of the actual project, finalizes the virtual animation construction model, develops the software, and constructs the training platform [8].

In this paper, a suitable virtual reality system is selected according to the characteristics of the garden landscape design of the rail transit exit. On this basis, the virtual reality system and various functions selected by the laboratory are studied, and the virtual reality that meets the characteristics of the creation of the garden landscape project is studied. Work flow finally choses the 3D virtual environment of garden landscape. According to the beautification effect of the virtual reality technology on the garden landscape, the construction of the garden landscape at the exit of the rail transit is engineered to enhance the connectivity of the garden landscape and improve the ecological function. It also uses smart sensor technology at rail exits to observe and dispatch traffic flow and alleviate traffic difficulties.

2. Virtual Reality Technology and Garden Landscape Design Theory

2.1. Virtual Reality Technology. The current concept of virtual reality technology is divided into two types: macro and micro. The main concept of the micro is based on the natural way of human-computer interaction. Just like the real world environment. In this way, users can naturally feel the virtual world created by the computer. This virtual world is a digital virtual model beyond the real environment, and it is a simulation of the real environment. This interactive interface composed of virtual graphics allows users to there is an immersive feeling [9]. The main concept of the macro is the simulation of the real world in three-dimensional visualization, with some virtual imagination [10]. His main part is the detailed digital simulation of the inside of the object. This simulation is not only an interactive interface but also a simulation of the real environment. The user can directly experience the virtual environment in the easiest way. Sensory stimulation can interact and communicate with it at the same time, making it more immersive [11]. All in all, the definition of virtual reality technology is a virtual digital environment that integrates vision, touch, and hearing. Its main core is computer digital technology [12]. When carrying out landscaping, it is necessary to foresee the changes of the environment and the state of the surrounding scenery in advance, so it is necessary to have a clear and clear concept of the surrounding environment before the project starts. Designers generally use sand tables, visual 3D renderings, or animation to show the final design effect.

The user communicates and communicates with objects in the virtual environment by using professional equipment, thereby producing a real feeling of being in the environment. Its main characteristics are completeness and immersion [13]. Its main core technology is content-based spatial interaction technology, and at the same time, it can most intuitively show the results of garden landscape design. Secondly, this paper has deeply studied the application of virtual reality technology platform in landscape design and planning [14]. And the application of virtual reality technology to garden landscape design is beneficial to speed up the design [15]. Virtual reality technology mainly provides users with a three-dimensional image environment through the use of simulation methods, which can truly reflect the changes and interactions of operating objects, thus forming a virtual world and establishing a relationship between users and the virtual world. The interactive virtual three-dimensional interactive interface allows users to have a personal experience.

2.2. Technical Composition of Virtual Reality in Garden Landscape Design. In the virtual reality technology (VR) garden landscape simulation system, as a digital unified and innovative cognition of the real garden landscape and related phenomena, it can intuitively and comprehensively provide users with realistic scene phenomena and specific information. At present, the combination of landscape garden design and virtual reality technology is still in its infancy, and the application of virtual reality engine Quest3D in landscape garden design still has a lot of room for development. If you want to perfectly combine landscape garden design with Quest3D engine, there are many technologies have to be broken through. The garden landscape VR simulation system can play a number of technical features such as immersion, imagination, and interactivity [16]. As the research object, the garden landscape VR landscape simulation system in this design often has the characteristics of large-scale, massive, long cycle, and difficult technical realization [17]. For garden landscapes, large-scale terrain data usually generates several gigabytes or more. By using

multilevel structure objects for scene description, multiple models can be used to express. The key is the level of detail expressed by the model, that is, the LOD model. The rendering algorithm can simplify the details of the scene one by one without affecting the rendering effect, reduce the complexity of the effect, and also improve the rendering efficiency and the speed of image generation [18]. In the process of garden landscape terrain modeling, through the use of visualized regional terrain and landforms, according to the modeling algorithm, the continuous topographic changes in the garden landscape area are completed, so as to realize the true reflection of the garden landscape terrain [19]. At present, mathematical elevation models are the most commonly used. DTM is used as a garden 3D planning model. The total information storage of terrain features is completed through the use of digital forms. Most of the terrain surface forms represented are information models, which are combined with the needs of different research fields to achieve the combination of terrain and nonterrain information characteristics [20]. With the rapid development of GIS technology, it has also promoted the rapid development of DTM model products and has provided GIS with operational basis numbers that can realize garden landscape spatial analysis and auxiliary decision-making [21]. In particular, the spatial data infrastructure implemented in recent years has also created room for the development of GIS technology [22].

The application of virtual reality technology in the real estate industry is a new real estate marketing method, which integrates various methods such as film and television animation, multimedia, and network resources. In the interior design industry, virtual reality technology is not only a technical medium but also a design tool. Through the three-dimensional visual space, it can more realistically reflect the designer's design intention and vividly transform it into a virtual object and environment that users can see and feel deeply. In this way, it can get rid of the traditional design mode and upgrade it to the perfect realm of digitalization, which greatly improves the quality and efficiency of the design. The concept of roaming in virtual reality the meaning of roaming is mainly to realize from one place to another [23]. In the real world, roaming is mainly driving, traveling, flying, etc. In the virtual world, roaming mainly refers to finding a way and traveling, and these two parts are independent. Generally speaking, the concept of finding a way is that the user knows where he is, and the concept of traveling is that the user moves within the scope of space or time [24]. Through some prompts, the user roams in the virtual reality environment in a more natural way and observes the objects in the virtual reality world in an all-round way and then produces an immersive real feeling. At the same time, you can also manipulate the objects in it. Finding the way refers to determining where you are and determining the route to the target area. Ways to find the way mainly include maps, roads, landmarks, compasses, and coordinates. Among these, along the road is the simplest method, and traveling along the road in the virtual world is the way to find the way. The most commonly used form of finding a way is a map. The map is put into the virtual world environment by means of virtual control, and the map can be put into the method of traveling at the same time [25].

By means of simulation, virtual reality technology provides users with a real and interactive three-dimensional environment, thereby establishing a virtual world. On this platform, users can communicate and interact with objects in the virtual world, thereby creating an immersive feeling. Its main supporting technology is the interactive technology based on three-dimensional space. Although virtual reality technology has been developed by leaps and bounds in recent years, there is still a big gap in technology and research applications compared with developed countries. In addition, in recent years, more and more virtual reality technology has been applied in the engineering industry, but the application of virtual reality technology in the landscape design industry is still in its infancy and internship stage. At present, as a developing multimedia expression method, virtual reality can be introduced into garden landscape design to fully display gardens, trees, landscapes, and engineering work points, it will more vividly show the concept, style, and effect of landscape design and bring closer there is some interactive space with the construction unit, and the digital model established based on some real data is combined into a virtual environment. It is established by virtual reality technology and established according to the requirements of the project and its design standards more realistic three-dimensional scenes; these all truly present the planning project, and the combined application with landscape design helps designers avoid design risks and complete landscape design tasks more quickly and intuitively.

2.3. Virtual Reality Technology Garden Landscape Design Research Model. The user locates a certain point on the map and then moves to this specific place. The control methods often used in the march are virtual control and physical control. According to different goals, different control methods are selected. When it is necessary to show a certain way of movement, such as entering a vehicle or an aircraft, virtual control is often used with equipment such as a steering wheel:

$$y_{it} = \alpha_0 + \alpha_1 D\max_{it} + \alpha_2 X_{it} + \mu_i + \eta_t + \alpha_{it}. \tag{1}$$

$$U_2 = \begin{cases} s - p_1 - kx_2, \\ x - p_2 - k(1 - x_2). \end{cases} \tag{2}$$

Supposing U is the exit of the critical rail transit, the second-stage opposing solutions can be obtained from equations (1) and (2) as follows:

$$\Delta_{\text{ikjl}}(\varepsilon) = \begin{cases} 0, & x_{ik}(\varepsilon) = \dfrac{N}{A} \quad \text{or} \quad x_{jl}(\varepsilon) = \dfrac{N}{A}, \\ 1, & x_{ik}(\varepsilon) = \dfrac{N}{A} \quad \text{and} \quad x_{jl}(\varepsilon) = \dfrac{N}{A}, \end{cases} \tag{3}$$

$$x_1 = \frac{p_2 - p_1 + k}{2k}. \tag{4}$$

Therefore, it is stored in the virtual reality private chain after verification by the entire network node:

$$p_1{}^* = \frac{2k}{k+1} + \frac{2c_1 + c_2 + 3et + 2et\zeta}{3}. \tag{5}$$

$$\begin{aligned} I &= \frac{n\sum_{i=1}^{n}\sum_{j=1}^{n} w_{ij}(x_i - \bar{x})(xj - \bar{x})}{\sum_{i=1}^{n}\sum_{j=1}^{n} w_{ij}(xi - \bar{x})^2} \\ &= \frac{n\sum_{i=1}^{n}\sum_{i\neq j}^{n} w_{ij}(x_i - \bar{x})(xj - \bar{x})}{S^2\sum_{i=1}^{n}\sum_{j=1}^{n} w_{ij}}. \end{aligned} \tag{6}$$

Let the changes in queue length and speed in equation (9) are, respectively, expressed uniformly and substituted into equation (2), we can get

$$P(d_i, w_j) = P(d_i)P(w_j|d_i)\,; P(w_j|d_i) = \sum_{k=1}^{K} P(w_j|z_k)P(z_k|d_i), \tag{7}$$

$$\begin{aligned} \frac{\partial \pi_B^{LH}}{\partial p_2} &= \frac{1 - p_2 + p_1}{2} - \frac{p_2 - c_2}{2} + \frac{k - p_2 + p_1}{2k} \\ &\quad - \frac{p_2 - c_2}{2k} - et\left[-\frac{1}{2} - \frac{1}{2k}\right] = 0. \end{aligned} \tag{8}$$

In addition, there are proxy control or direct user control. The direct user control is through a substitute in the virtual world, moving along a certain route from a specified location to a new location. In the roaming of the virtual environment, users generally need only some kind of interactive control. The optimal system planning is

$$\begin{aligned} C(k) = [&\zeta_1 c_1(t) + \zeta_2 c_2(k) + \zeta_3 c_3(k) + \zeta_4 c_4(k) \\ &+ \zeta_5 c_5(k) + \zeta_6 w_{ik}], \end{aligned} \tag{9}$$

$$c_1(t) \geq 0, c_2(k) \geq 0, c_3(k) \geq 0, c_4(k) \geq 0, c_5(k) \geq 0, \tag{10}$$

$$\zeta_1 + \zeta_2 + \zeta_3 + \zeta_4 + \zeta_5 + \zeta_6 = 1, \tag{11}$$

$$\begin{aligned} \min w_k(t) = \Bigg[&\omega_1\left(\frac{d_k}{V}\right) + \omega_2\left(\frac{d_k}{V}\right) + \omega_3\left(\frac{T_k}{ND_K}\right) \\ &+ \omega_1(P_K T_K)\Bigg]. \end{aligned} \tag{12}$$

This interaction mode is mainly to control the virtual object and its self-control in the scene. These two interaction modes are realized through external device input. Therefore, the solution of the second stage opposition is still

$$\delta_1 = \frac{p_2 - p_1 + 1}{2}, \tag{13}$$

$$\delta_2 = \frac{p_2 - p_1 + k}{2}. \tag{14}$$

The original complex model was improved and streamlined, and 5% of the original face count was used to create a simple model close to the original effect. The texture is mainly used to express the details, and the normal texture is used reasonably, so that some particle objects in the model can have a sense of unevenness without modeling, so as to obtain the balance of the second stage and the optimal planning of the two garden design clusters are

$$\vartheta = \frac{2k}{k+1} + \frac{2c_1 + c_2 + 3et - 2et\zeta}{3}, \tag{15}$$

$$(\text{In-}\alpha W)y = (\text{In-}\alpha W)X\beta + \varepsilon, \tag{16}$$

$$\wp_\kappa = \frac{2k}{k+1} + \left[\frac{1}{2} + \frac{1}{2k}\right]\left[\frac{c_2 - c_1}{3}\right]^2 + \frac{2(c_2 - c_1)}{3}, \tag{17}$$

$$y = \alpha W y + \beta_1 X - W\beta_2 X + \varepsilon. \tag{18}$$

In view of the project characteristics such as poor biodegradability of incoming water quality, high requirements for wetland water quality, limited wetland construction area, and low-temperature operation period, the available garden design data square matrix is

$$\psi = \sum_{x=1}^{\theta} Vx = \sum_{x=1}^{\vartheta}\left(\frac{Wx}{\sum_1^n W_{\Im}} Sx\right). \tag{19}$$

Among them,

$$\Delta Q_L + \Delta Q_S + \Delta Q_R = \Delta Q, \tag{20}$$

$$w_{ik} = \sum_{a}^{n} \tau_1 X_{ik} + \sum_{b}^{n} \tau_2 U(Y_{ik}) + B_{ik}. \tag{21}$$

2.4. Smart Sensors. In recent years, with the rise of the concept of the Internet of Things, as the peripheral nerves of the Internet of Things, smart sensors have attracted more and more attention in the industry. The rail transit industry, which has higher and higher requirements for automation, networking, and intelligence, is no exception. And sensors, the advanced rail transit represented by high-speed rail, are the first gate to the era of intelligence. Smart sensors are sensors with information processing functions. The intelligent sensor has a microprocessor, which has the ability to collect, process, and exchange information. It is the product of the combination of sensor integration and microprocessor. Smart sensors can collect vast amounts of information from the process to reduce downtime and improve quality. The intelligent transportation system is an intelligent system developed on the basis of traditional transportation system. It combines computer technology, electronic technology, automation technology, and other technical means; it has great advantages in traffic information monitoring, traffic control, and traffic scheduling. As a real-time sensing network, the intelligent sensor network can be applied in many aspects of intelligent transportation. It is decided by the decision-making system to find the best plan and return the plan to the execution system to guide vehicles and dispatch traffic.

3. Garden Landscape at the Exit of Rail Transit

3.1. Garden Design Object. Under the guidance of the principles of landscape classification, the garden landscape green space at the exit of rail transit is divided into 6 categories. With the help of GIS, an interpretation map of the status quo of green space and corresponding databases with both graphics and corresponding data are established; on this basis, the corresponding landscape index is selected according to the research needs, and the landscape data analysis software fragst is used to analyze the green space landscape pattern. Combined with the existing 3D database software, MultigenGreator and 3ds Max technology combined modeling was selected in this system design. Then, in the process of modeling landscape terrain, it can be combined with the spatial distribution characteristics of different geographical objects, and divided into discrete entity features based on trees, roads, buildings, etc.; and the continuity feature of the landscape based on landscape terrain and landform scene. Choose the MultigenGreator modeling tool, first complete the Openflight terrain file production, convert the basic elevation data to form the Cerator digital elevation data format, and combine with the landscape topography, area, and degree of refinement. The interaction of landscape architects can affect virtual reality products. The buttons that can interact with the virtual reality system program are called interfaces. The keyboard and mouse are the most basic common interfaces used by most programs.

3.2. Garden Design Steps

3.2.1. Design Sand Table. The garden landscape renovation design adopts the principle of combining garden landscape planning, construction, and management, creating a green ecological corridor, combining local culture to optimize the garden landscape environment, combining with the principles of low-carbon garden landscape, optimizing the living environment of the people in the garden landscape, and improving the local ecological environment; the principle of combining ecological protection and pollution control, based on the existing green ecological resources, building a diversified ecological green space to form a greenway system; combining the principle of green building energy conservation and environmental protection, using existing resources to create energy-saving and environmentally friendly building form, combined with the principle of cultural promotion, fully demonstrates the cultural charm of the garden landscape, strengthens the protection of industrial cultural resources, and shows the characteristics of industrial culture; adopts the principle of ecological sustainability, pays attention to daily plant maintenance, and adopts localization plants, pay attention to the configuration of seedlings, create creative landscape nodes, integrate the principles of sustainability through landscape design, and improve the surrounding ecological environment, but they cannot give users an immersive experience. The aspect deeply feels the effect, usually only the partial effect can be felt. However, the use of virtual reality technology can effectively overcome this deficiency. The application of virtual reality technology can allow designers, management decision-makers, construction technicians, and the public to experience the environmental effects in all directions, making it easier to understand the designer's design intent.

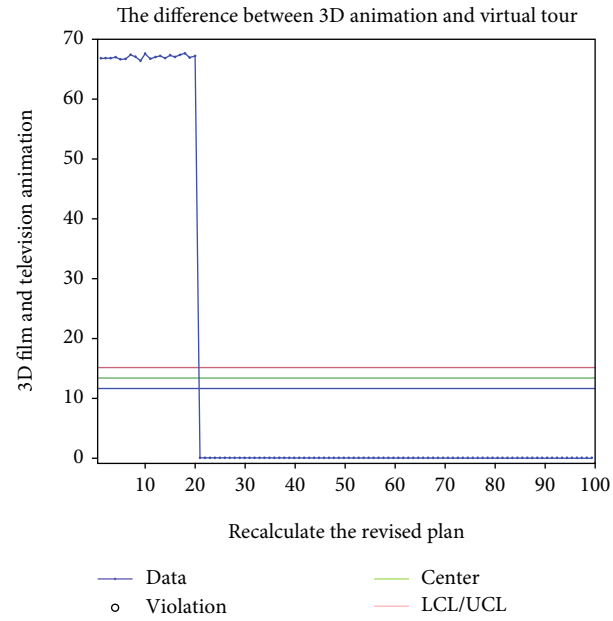

Figure 1: The difference between 3D animation and virtual tour.

Table 1: Application of virtual reality technology is beneficial to avoid design risks.

Independent variable	X value	Standard	3D	VR
Constant	1.5	0.26	2.6	<0.01
Design flaws	0.16	0.06	2.0	0.50
Loss	0.2	0.19	1.5	0.30
Effectiveness	0.9	0.13	1.9	<0.01
Assess quality	0.01	0.04	0.38	0.41

3.2.2. Choose a Garden Design Plan. Using virtual reality technology to be able to compare and modify different design plans. Generally, in the design of landscape gardens, a number of different design plans will be proposed. With the help of modern big data construction, such as the agricultural carnival will be integrated into the VR system, allowing the audience to experience the innermost plant the growth pattern of the worm and the natural secrets that are difficult to observe with the naked eye, such as making the mechanism of photosynthesis into VR material for experience. Continue to enrich popular science products to provide more popular science carriers, adapt to popular science activities in various scenarios, provide more problem solutions for garden design, and develop more home gardening products for citizens. Immersive experience of design effects at different observation points enables users to fully understand the designer's intentions, comprehensively feel and compare the respective characteristics and deficiencies of these multiple design options, which will help decision

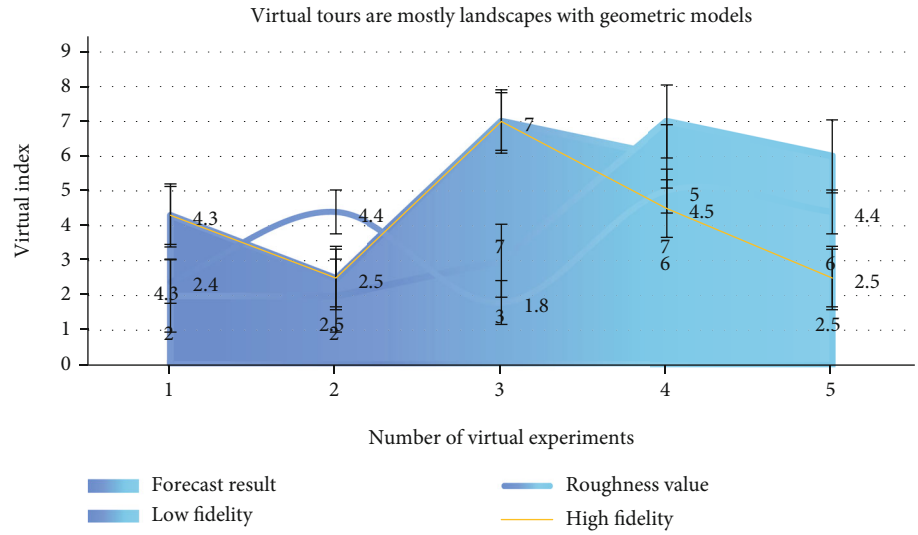

Figure 2: Virtual tours are mostly landscapes with geometric models.

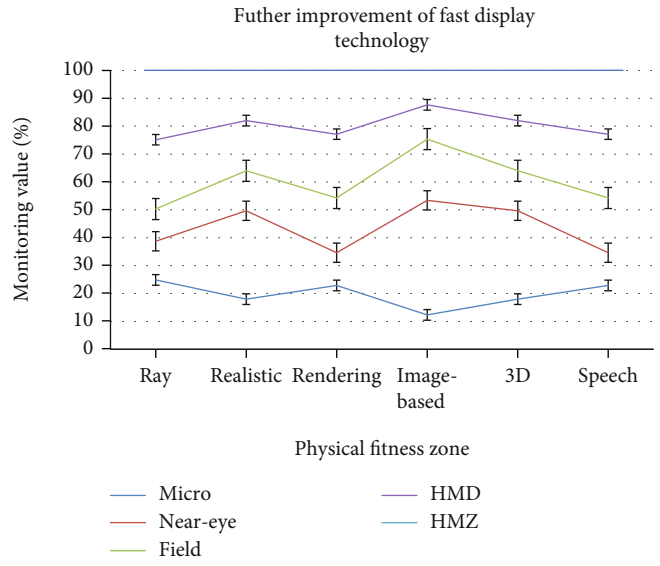

Figure 3: Further improvement of fast display technology.

makers to learn more, make a decision more in line with customer needs.

3.2.3. Effect of VR. Use virtual reality technology to modify in real time, and compare and analyze the difference between the effects before and after modification. The application of virtual reality technology in design can greatly save financial, manpower, and material resources. VR technology is conducive to real-time communication between garden landscape designers and construction units. The network and three-dimensional visual effects allow both parties to see the final effect. Choose the best design plan efficiently.

4. Garden Landscape at the Exit of Rail Transit

4.1. Simulation and Analysis of Virtual Reality Technology. As shown in Figure 1, the difference between three-dimensional animation and virtual roaming although three-dimensional animation has very strong visual expressiveness; it lacks real-time interaction with users. In 3D film and television animation, the viewer is in a passive position and needs to recalculate the modified scheme and changes

Table 2: Model performance index results.

Item	Micro	Near-eye	Field	HMD	HMZ
Ray	6.2	2.4	1.6	3.9	4.3
Realistic	2.5	4.4	2.1	2.5	2.5
Rendering	3.5	3.8	3.3	3.5	3.9
Image-based	4.5	2.8	5.3	4.5	4.3
3D	2.5	4.4	2.4	2.5	2.5
Speech	3.5	1.8	3.6	2.3	3.9

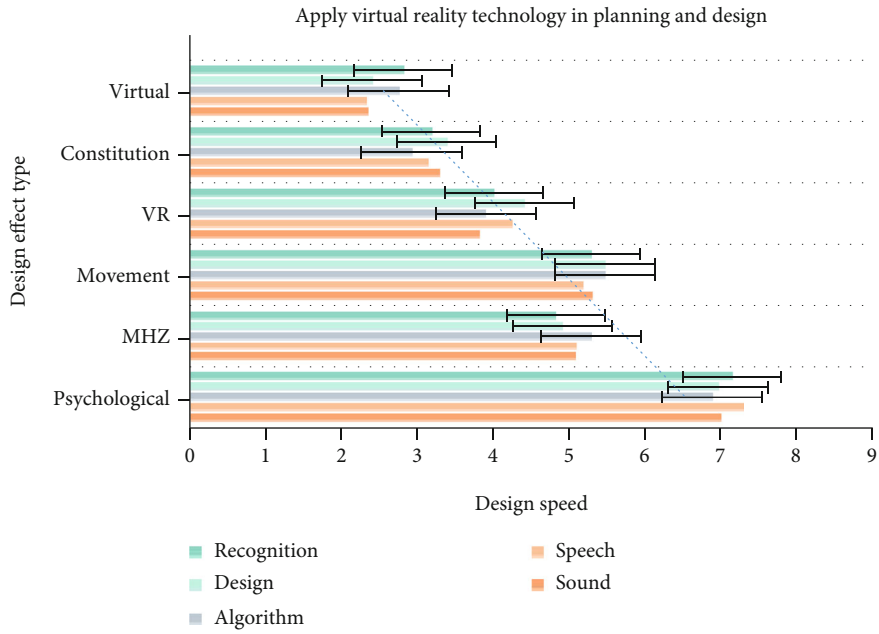

Figure 4: Apply virtual reality technology in planning and design.

in the route. After a period of time, the final result can be seen. Using virtual reality technology in routine data analysis, such as automatic and manual tracking of horizons, characterization of geological bodies, fault analysis and interpretation, etc., can generate and analyze various attributes.

As shown in Table 1, large-scale terrain data usually generates several gigabytes or more bytes for the garden landscape at the exit of rail transit. By using multilayer structure objects for scene description, it can be expressed in multiple models. The key is the level of detail expressed by the model, that is, the LOD model rendering algorithm can simplify the scene details one by one without affecting the rendering effect, reduce the complexity of the effect, and also improve the rendering efficiency and the speed of image generation.

As shown in Figure 2, as a developing multimedia expression means, if virtual reality can be introduced into landscape design to fully display gardens, trees, landscapes, engineering sites, etc., it will more vividly show the concept, style, and effect of the landscape design. The main traffic on the site is divided into three types: main roads, secondary garden roads, and rail trails. The main road consists of four horizontal and vertical roads with a width of 5 m. The east-west main road is the main landscape axis of Hanyang Iron Factory, and the north-south main road is directly connected with the main garden landscape main road. The railway track retains the original train track form, combined with the addition of new paving elements to form a new landscape. The secondary trunk road in the garden is dominated by curved paths, connecting various nodes, with a width of 2.5 to 4.5 m, which serves as a guide for the flow of people.

As shown in Figure 3, some of the original traffic tracks of the site are retained in the design and transformed into a scenic line outside the garden landscape. The garden landscape building adopts a modern and simple style, with a square shape, using wooden materials to build an external frame, while the interior is made of glass to form a closed space to meet the basic viewing functions.

Table 3: Garden virtual reality design structure data.

	Recognition	Design	Algorithm	Speech	Sound
Virtual	2.28	2.36	1.84	1.8	2.43
Constitution	2.83	2.58	2.76	2.72	2.34
VR	3.25	3.19	3.03	3.5	3.08
Movement	4.32	4.29	3.88	4.44	3.91
MHZ	5.39	5	5.16	5.28	5.08
Psychological	5.08	5.17	4.81	5	4.93

As shown in Table 2, in the planning display, the immersion and mutual inductance of the virtual reality system not only give users a great sense of realism and lifelikeness but also make users feel like they are in the environment. In addition, the data set in the virtual environment can be obtained in real time according to the needs of users. In large and complex projects, users can assist in design, bidding, approval, management, and other aspects of project design and program review.

As shown in Figure 4, the application of virtual reality technology in planning and design can increase the speed of design, and it is easy to modify these designs, such as changing the height of the building, the appearance of the building and the material and color of the facade in the architectural design, and the greening, this can speed up the design speed and quality. The virtual reality design structure data of gardens is shown in Table 3.

As shown in Figure 5, in view of the limited construction area of the garden, the existence of low-temperature operation period and other project characteristics; in order to

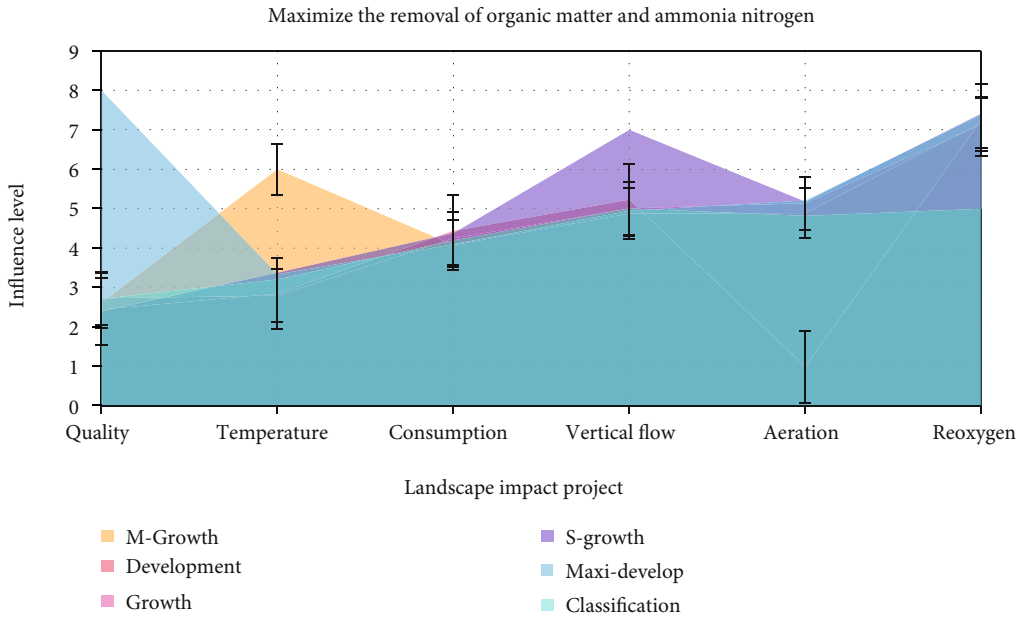

Figure 5: Maximize the removal of organic matter and ammonia nitrogen.

ensure that the garden effluent is stable and meets the standard, the garden is operated with low energy consumption and high efficiency, which is connected with the second phase of the project. Based on the optimization and combination of processes, the addition of aeration and return systems, and comprehensive consideration of various factors, the combined process of vertical underflow garden-oxidation pond-vertical underflow garden in series is finally determined. The two-stage underflow garden can optimize the removal effect and maximize the removal of organic matter and ammonia nitrogen. The addition of oxidation ponds can save head loss, increase the water reoxygenation capacity, and provide space for garden aeration.

As shown in Figure 6, the VR virtual simulation technology can enable people to experience the management and operation technology of the construction site immersively through interactive operations, perform virtual construction operations by completing virtual tasks, and master operating skills and technical points. VR virtual simulation technology can also be used to simulate the entire construction process of each individual project of a certain project, which is conducive to cultivating people's concept of large projects, learning and analyzing the complete construction management system of the project. Create a landscape garden project to lay the foundation for the construction of a VR training system for the wind forest and garden majors.

4.2. Virtual Reality Regression Model of Garden Landscape Design. As shown in Figure 7, from the perspective of ecology, design concept or life, the theme type of garden landscape belongs to the human landscape type and the theme artistic conception type. The sun always symbolizes power and hope, so facing the sun means that we are moving towards hope, symbolizing an upward force. The theme is designed as a combination of a circular sculpture and a fountain. At the same time, red, a color that symbolizes vitality, is used for sculpture creation. The combination of the two not only brings people a sense of visual impact but also makes people feel the positiveness conveyed by it, the power of life, and further shows the rhythm and circulation of life, but also reflects the endless life of life.

As shown in Figure 8, when designing the landscape garden green space landscape, the landscape layout lacks levels, the foreground and the back scenic area are not clear, and the overall design of the garden landscape lacks a sense of hierarchy and sense of order and cannot well highlight the artistic beauty of the garden green space landscape. Reasonable use of the hierarchy method can arrange the front and back of the garden landscape to show the relationship between the front and the back, make the landscape of the garden green space three-dimensional, and better express the artistic conception and meaning of the main theme of the landscape, and attract the attention and interest of tourists.

As shown in Table 4, the minimum distance index of the park green space in the central urban area has increased significantly, indicating that the distribution of park green space has changed from agglomerated to random distribution, which is beneficial to residents' use; unit, residential area green space and road green space the little change indicates that the two types of green space are randomly distributed as before; the minimum distance index for production green space and protective green space is decreasing, indicating that the clustering of the two types of green space distribution has increased. For the garden landscape ecosystem, the primary function of the corridor is its ecological function. As the main channel for the connection between patches, it can promote the protection of garden landscape biodiversity by providing corridors for the migration of animals and plants. Green corridors are mainly composed

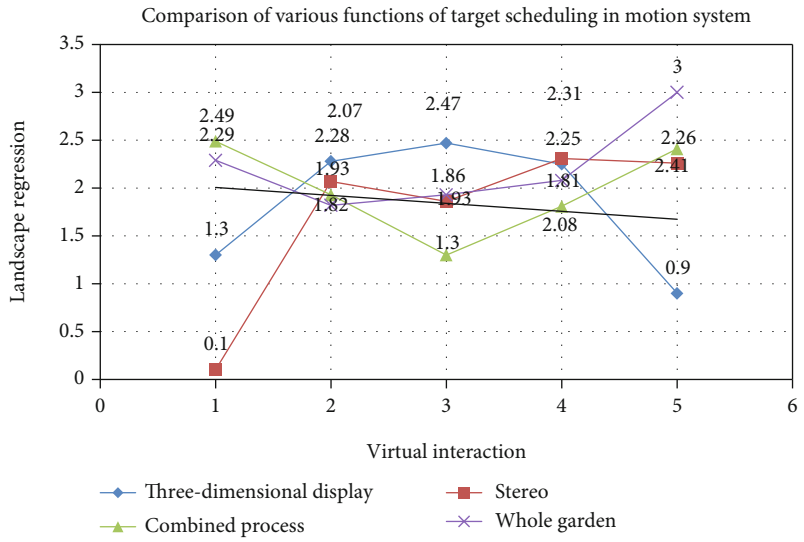

Figure 6: VR virtual simulation technology can be operated interactively.

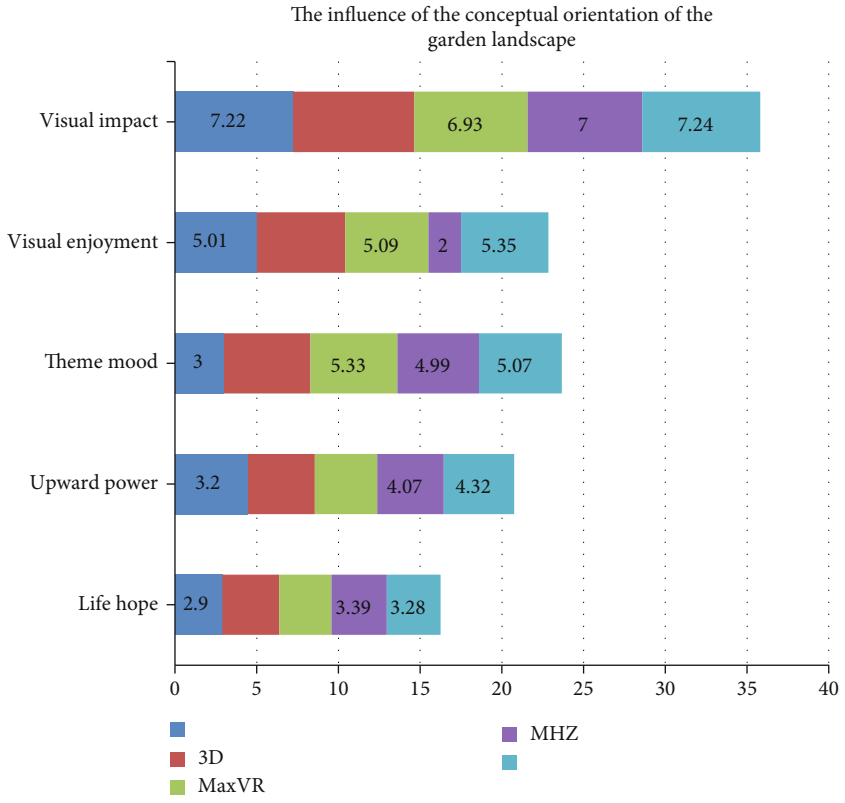

Figure 7: The influence of the conceptual orientation of the garden landscape.

of road green corridors and green corridors. The density of green corridors has increased from 1.25 km/km^2 to 2.41 km/km^2, which is more than doubled, which significantly improves the connectivity of green spaces and effectively improves the green space.

As shown in Figure 9, from the ecological point of view, the theme type belongs to the theme artistic conception type and biological ecology type. Use design techniques such as ingenious reasoning and symbolic metaphor to design themes. Water is the source of life, and the green branches and buds also show the vitality and source of life. The sculpture is built on the edge of the pool, with a leaf standing on the edge of the pool as the shape of the sculpture. Behind the sculpture, there is a huge ginkgo tree that shows the power of life. The combination of the source of life, the young green leaves, and the flourishing tree strongly demonstrates

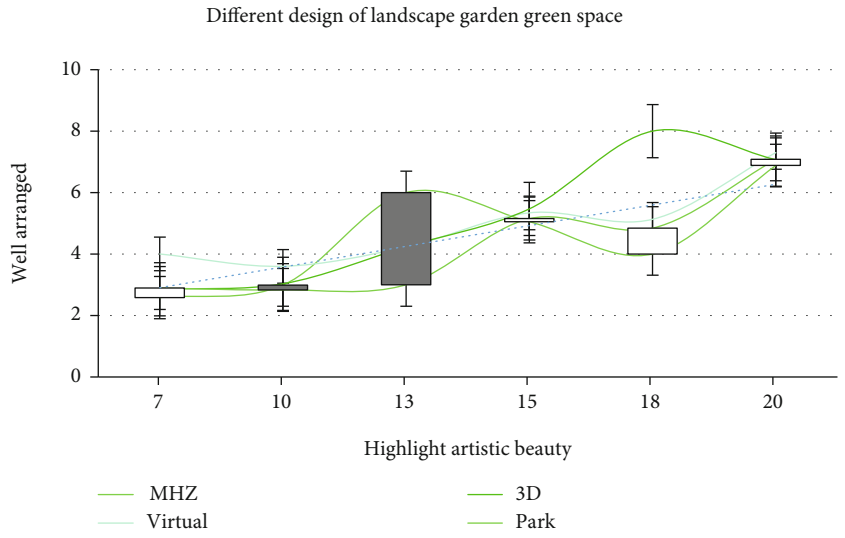

Figure 8: Different designs of landscape garden green space.

Table 4: The minimum distance index of parks and green spaces.

Reunion	Corridor	Matrix type			Linear		
		VR	Virtual	3ds Max	VR	Virtual	3ds Max
Weak	Green space	126.5	172.4	45.66	26.62	63.25	39.55
	Corridor	124.3	171.1	46.89	26.52	61.92	37.46
Strong	Green space	124.5	160.6	34.19	25.59	55.66	30.32
	Corridor	121.6	158.5	36.63	23.63	51.74	28.91

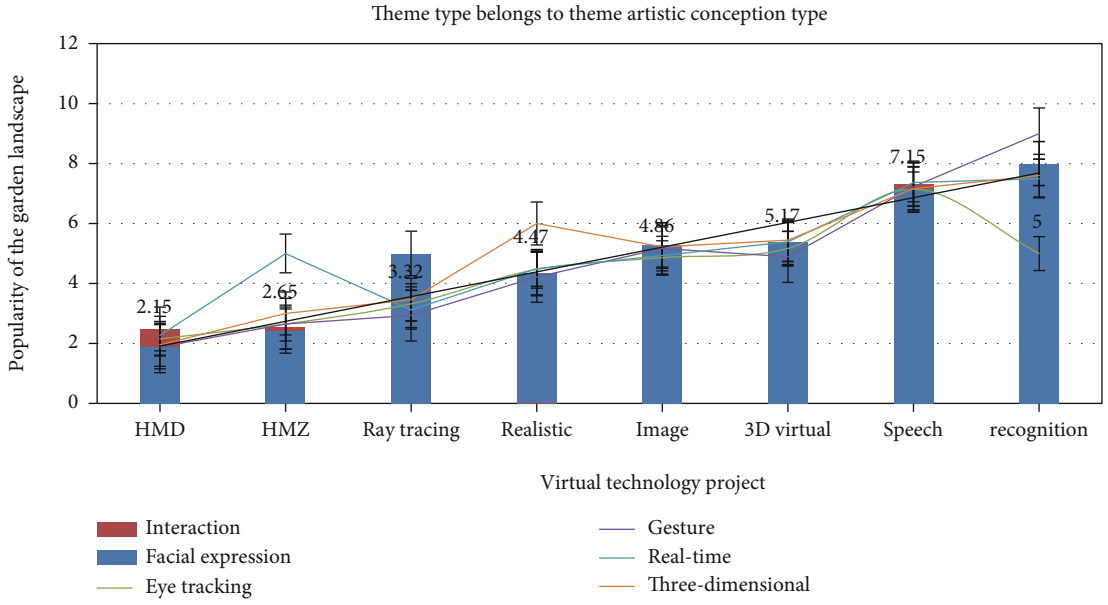

Figure 9: Theme type belongs to theme artistic conception type.

the concept of the source of life. Water and green leaves embody the evergreenness of life, while the big tree embodies the continuation of life, making the meaning of the sculpture more prominent.

As shown in Figure 10, the fragmentation of the garden landscape is the result of being deeply affected by human activities and is closely related to the landscape pattern, function, and process. Further analysis of the data shows

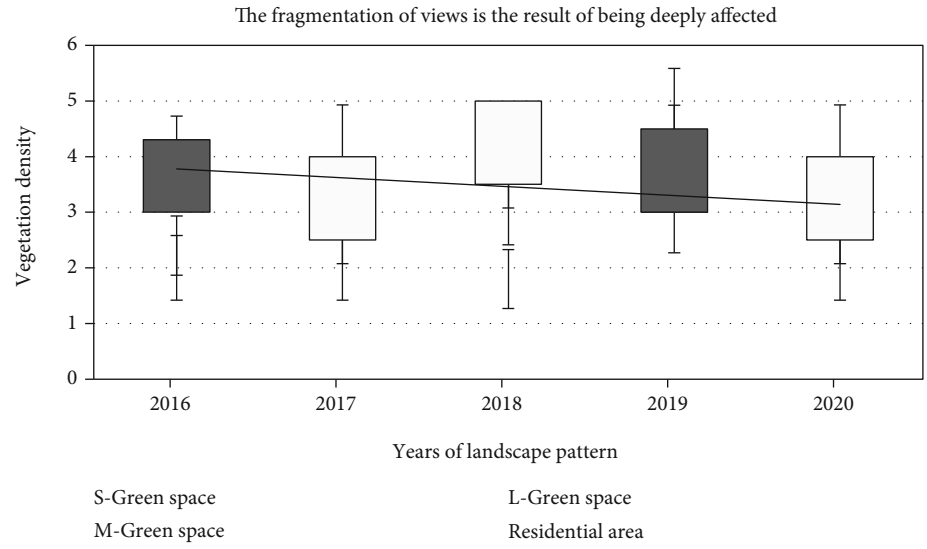

Figure 10: The fragmentation of views is the result of being deeply affected.

Table 5: Comparison of physical shape of garden landscape.

Shape	Flexible	Changeable	Beautiful	Diverse	Match	Meets
Perfect circle	33	32	30	50	30	33
Square	32.5	33	34	38	34	36
Oval	35.6	37	39	45	38	40
Tortuous	40	42	45	50	41	47

that the patch density of urban green space has decreased from 5.97 patches/hm^2 to 2.45 patches/hm^2, indicating that the fragmentation of the landscape has decreased in the past 5 years, and the ecological benefits and biodiversity protection functions have increased accordingly. Among all kinds of green space, the fragmentation degree of other green space and protective green space is low. Although the fragmentation degree of green space in gardens is second only to that of road green space, the vertical contrast has changed greatly, from 22.19/hm^2 to 3.92/hm^2, indicating that the past 5 years the quality of Chinese gardens and green spaces has improved significantly. Although the fragmentation degree of road greenbelt patches has declined, but the decline is not large, and the quality of road greenbelt construction should be improved in the future construction. The absolute elevation of the platform floor at the centerline of the effective platform is 393.709, the absolute elevation of the top of the roof at the centerline of the effective platform is 410.459, the absolute elevation of the rail surface is 392.659, and the absolute elevation of the bottom of the bottom plate is 390.169. The longitudinal gradient of the main body of the station is 2‰, the net height of the platform floor structure is 4.4 m, the floor height of the equipment floor structure is 6 m, and the floor height of the station hall floor structure is 4.5 m. The thickness of the covering soil at the centerline of the effective platform is 3.59 m, the minimum burial depth is 2.45 m, and the maximum burial depth is 4.05 m.

As shown in Table 5, in the landscape garden green space landscape, the main scenery design method of seeking twists and turns is generally to be curved, zigzag, uneven, surface unequal changes in the appearance of the scenery, or change according to the topography of the site. The shapes of pools, flower beds, green spaces, etc. are mostly regular shapes such as a perfect circle, square, oval, etc., and the scenery in the natural garden green space is more flexible and varied than the shape in the regular garden, and it is not restricted to rules. The style of the building, such as the common curved bridges, curved corridors, and other garden buildings or the winding roads that match the landscape. The twists and turns can be seen everywhere in the main landscape layout of the landscape gardens. This design method has a profound influence and important significance to it, but it is not advisable not to twist for the twists and turns.

5. Conclusions

The application research of virtual reality platform in the garden landscape design of rail transit exit, the virtual reality system, is conducive to improving design efficiency. It is not only a multimedia tool for presentation but also a tool for design planning. This is a visual form that uses a subjective perspective to express the designer's design ideas and concepts. Using the virtual reality system, landscape architects can change their observation points in the scene at will to observe the effects of

the design and continue to modify and improve them. The landscape designer, Party A, and the public can see the final effect of the designer's design in real time from all angles and can interact with the flowers and trees in the scene to fully understand the design concept of the landscape designer and achieve the purpose of enhancing the effect of publicity. The application prospects will be very broad.

The main landscape and surface plants at the exit of the rail transit were clearly expressed through virtual reality technology and exceeded the expected effect. Through the key technology of electronic sand table production, the whole picture of Banpo Station after construction was fully demonstrated, the effect was vivid and smooth, and the expected effect was achieved. In the current garden planning process, relevant personnel must advance with the times to establish innovative ideas and people-oriented design ideas, fully understand all aspects of garden planning, and formulate highly scientific and targeted landscape design plans. At the same time, it is necessary to fully understand the historical and cultural connotation of the area and the characteristics of the development of garden landscape, start from different angles, combine the landscape pattern and theme of garden planning, and scientifically introduce some suitable rural landscape elements to make. It can maintain coordination and unity with garden planning. In addition, some advanced design concepts and methods must be introduced in time to comprehensively improve the scientific, standard, contemporary, characteristic, and humanistic nature of rural landscape design, so as to be able to fully develop rural landscape design in the process of garden planning. The intelligent sensing system is adopted at the exit of rail transit to dispatch the traffic flow at the exit and reduce traffic congestion.

The construction of home ecological gardens is an important driving factor for the optimization of the landscape pattern and function of gardens and green spaces. Through ecological restoration, development of green corridors along rivers and roads, and balanced layout of parks and green spaces, the landscape pattern of gardens and green spaces has been continuously optimized. The average area of green patches has increased, the fragmentation of patches has decreased, and the density of corridors has increased. Improve the ecological functions of the garden landscape and green space, and promote the protection of garden landscape biodiversity; the distribution of the park green space is developed to be uniform, which is convenient for residents to use. In the future landscape construction of gardens and landscapes, we should continue to strengthen the construction of parks and greens in weak areas according to requirements, and further improve the uniformity of the distribution of parks and greens; improve the level of road and green construction and the quality of ecological corridors, and further strengthen the connection between green spaces; continue to strengthen ecological restoration and further optimize the landscape structure and pattern of gardens and green spaces.

Data Availability

No data were used to support this study.

Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this article.

References

[1] S. Sun, P. Ray, and D. De, "Intelligent internet of things enabled edge system for smart healthcare," *National Academy ence Letters*, vol. 40, no. 4, pp. 1–6, 2020.

[2] R. Othman and S. Z. A. Kasim, "Assessment of plant materials carbon sequestration rate for horizontal and vertical landscape design," *International Journal of Environmental ence & Development*, vol. 7, no. 6, pp. 410–414, 2016.

[3] A. Scognamiglio, "Human neuroblastoma cells trigger an immunosuppressive program in monocytes by stimulating soluble HLA-G release," *Cancer Research*, vol. 67, no. 13, pp. 6433–6441, 2016.

[4] Y. H. Hwang, Y. Feng, and P. Y. Tan, "Managing deforestation in a tropical compact city (part B): urban ecological approaches to landscape design," *Smart & Sustainable Built Environment*, vol. 5, no. 1, pp. 73–92, 2016.

[5] B. O. Kurtaslan, O. Demirel, and S. S. K. Konakoglu, "Investigation of Selcuk University campus landscape design in terms of water efficient landscape arrangement," *Journal of Environmental Protection and Ecology*, vol. 20, no. 4, pp. 2130–2140, 2019.

[6] Y. Wu, "Educational reform on landscape design under the background of digital era," *Region-Educational Research and Reviews*, vol. 2, no. 1, pp. 17–19, 2020.

[7] K. Kim, J. S. Jang, C. Keum, and K. S. Chung, "Individual presence-and-preference-based local intelligent service system and mobile edge computing," *Journal of Korean Institute of Communications & Information ences*, vol. 42, no. 2, pp. 523–535, 2017.

[8] C. Xuepeishan, "An analysis of climate impact on landscape design," *Atmospheric and Climate ence*, vol. 6, no. 3, pp. 475–481, 2016.

[9] W. M. El-Bardisy, M. Fahmy, and G. F. El-Gohary, "Climatic sensitive landscape design: towards a better microclimate through plantation in public schools, Cairo, Egypt," *Egypt. Procedia Social & Behavioral Sciences*, vol. 216, no. 4, pp. 206–216, 2016.

[10] L. H. Juang and S. Zhang, "Intelligent service robot vision control using embedded system," *Intelligent Automation And Soft Computing*, vol. 25, no. 3, pp. 451–458, 2019.

[11] N. Mueller and Y. Morimoto, "Landscape design and urban biodiversity," *Landscape & Ecological Engineering*, vol. 12, no. 1, pp. 105-106, 2016.

[12] L. Li, "Landscape design of urban extensive green roofs," *Journal of Landscape Research*, vol. 10, no. 6, pp. 31–33, 2018.

[13] B. Gao, "Research on thematic landscape design," *IOP Conference Series Materials ence and Engineering*, vol. 371, no. 1, pp. 12014–12064, 2018.

[14] M. Xiaodong, "Provisional thoughts on criticism in China's landscape design," *Jola Journal on Landscape Architecture*, vol. 13, no. 3, pp. 21–23, 2018.

[15] F. Chen, X. Zhu, and J. Lin, "Statistical analysis on behavior characteristics of public space users in winter city and landscape design inspirations," *Journal of Xian University of Architecture & Technology*, vol. 49, no. 4, pp. 508–515, 2017.

[16] J. H. Park, "An intelligent service middleware based on sensors in IoT environments," *International Journal of Software Engineering and Knowledge Engineering*, vol. 30, no. 4, pp. 523–536, 2020.

[17] L. Dacan, H. Min, Z. Cailian, Y. Gong, and Y. Zhang, "Construction of 5G intelligent medical service system in novel coronavirus pneumonia prevention and control," *Chinese Journal of Emergency Medicine*, vol. 29, no. 4, pp. 21–28, 2020.

[18] K. Grushevska, T. Notteboom, and A. Shkliar, "Institutional rail reform: the case of Ukrainian railways," *Transport Policy*, vol. 46, no. 2, pp. 7–19, 2016.

[19] B. F. Spencer, J. W. Park, K. A. Mechitov, H. Jo, and G. Agha, "Next generation wireless smart sensors toward sustainable civil infrastructure," *Procedia Engineering*, vol. 171, pp. 5–13, 2017.

[20] X. Cai and F. Gao, "Study on joint regulation and safety supervision of urban rail transit system," *Journal of Physics: Conference Series*, vol. 1437, no. 1, pp. 12037-12038, 2020.

[21] S. Eun and I. N. Sener, "Traffic-related air emissions in Houston: effects of light-rail transit," *Science of the Total Environment*, vol. 651, no. 1, pp. 154–161, 2018.

[22] J. Liu, Y. Zhang, S. Xu et al., "Top-level design study for the integrated disaster reduction intelligent service," *Geomatics and Information ence of Wuhan University*, vol. 43, no. 12, pp. 2250–2258, 2018.

[23] J. Baumgartner, "VR equipment market mixed," *Broadcasting & Cable*, vol. 147, no. 8, pp. 23–23, 2017.

[24] A. Schütze, N. Helwig, and T. Schneider, "Sensors 4.0- smart sensors and measurement technology enable Industry 4.0," *Journal of Sensors and Sensor Systems*, vol. 7, no. 1, pp. 359–371, 2018.

[25] S. Nihtianov, Z. Tan, and B. George, "New trends in smart sensors for industrial applications-part I," *IEEE Transactions on Industrial Electronics*, vol. 64, no. 9, pp. 7281–7283, 2017.