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Intelligent Perception in Healing Landscape Design Based on Multi-sensor Information Fusion

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Abstract. As a means of environmental design and transformation, landscape design can affect people's sound in body and mind by shaping and transforming the environment. Intelligent sensing technology can collect environmental data through sensors, and process and analyze the data, so as to gain in-depth understanding and insight into the environment. In this article, multi-sensor information fusion (MSIF) technology is applied to the healing landscape design. By collecting various sensor data, processing and analyzing the data, we can gain a deep understanding and insight into the environment, thus providing a scientific basis for landscape design. The results show that the perceptual algorithm based on MSIF performs well in feature detection and fitting degree, and shows better stability, reducing the inconsistency of data. The proposed MSIF method reduces energy consumption by more than 10%. This algorithm can improve the accuracy and efficiency of feature detection, and help designers to better grasp the landscape features and create more personalized designs in healing landscape design.

Keywords: CAD; Healing Landscape Design; Intelligent Perception; Multi-Sensor
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1 INTRODUCTION

In today's society, people are facing many pressures, such as work pressure, life pressure and health problems. These problems make people's sound in body and mind worrying, so how to improve people's sound in body and mind through environmental factors has become an important issue. In the fields of smart homes and homes, data-driven methods for multi perspective parameter discovery have broad application prospects. For example, by analyzing and predicting household electricity consumption data, more reasonable power dispatch plans can be developed to reduce energy consumption; By monitoring and analyzing household environmental data, the health status of the household environment can be evaluated, providing guidance for improving the household environment; By mining and analyzing behavioral data of family members, we can understand their

living habits and needs, and provide support for providing personalized family services. In practical applications, the multi perspective parameter discovery method of the Bert model can help us better understand the sustainable development issues of smart homes and households [1]. As a comprehensive art and science, landscape design reflects important significance in creating a pleasant environment and improving people's quality of life. As a means of environmental design and transformation, landscape design can affect people's sound in body and mind by shaping and transforming the environment. Research has shown that digital tool knowledge has significant advantages in architectural design teaching. On the one hand, digital tools can help students more intuitively understand architectural space and form, improving their ability to sense space and form; On the other hand, the parameterized design of digital tools can guide students in innovative thinking and practice, improving their design ability and innovation level. In addition, the collaborative design function of digital tools can also strengthen communication and cooperation between students, and improve their team collaboration ability. Ceylan [2] used a case study method to select students with different levels of digital tool knowledge for observation and research. Firstly, based on students' level of digital tool knowledge, Then, interviews and questionnaire surveys were conducted on students at each level to understand their perception of changes in architectural design. Finally, organize and analyze the collected data to summarize the impact and mechanism of digital tool knowledge on architectural design perception. Specific landscape design and environmental factors can have a positive impact on people's sound in body and mind. Therefore, how to create an environment conducive to people's sound in body and mind through reasonable landscape design is an important research topic. Disease geography is a discipline that studies the distribution, transmission, and impact of diseases in geographical environments. In urban environmental health research, disease geography helps to reveal the distribution characteristics and influencing factors of urban diseases, providing scientific basis for formulating targeted health policies and taking effective intervention measures. Dushkova and Ignatieva [3] collected disease data from different regions of the city. Analyzing disease geography research can help identify susceptible populations and high-risk areas, and further explore the pathways and mechanisms of disease transmission. The therapeutic landscape is a therapy that promotes human physical and mental health through natural and cultural landscapes. In urban environments, the design and application of therapeutic landscapes can help alleviate stress, improve mental health levels, and have auxiliary therapeutic effects on certain diseases. The therapeutic landscape in a city can be a park, garden, public space, or other place with therapeutic effects. At present, landscape design mainly focuses on aesthetics, function and ecology, but there is little research on the healing effect of landscape on human sound in body and mind. The structural analysis and optimization of landscape architecture is one of the important applications of AI technology in landscape architecture. Through AI technology, designers can simulate and analyze the structure of landscape architecture, predict its load-bearing capacity and stability. Based on the analysis results, designers can optimize and adjust the structure to improve the performance and safety of landscape architecture. In a certain ecological park planning project, Fernberg and Chamberlain [4] utilized artificial intelligence technology to conduct detailed data collection and analysis on the site. Through the analysis of terrain, climate, vegetation and other information, the characteristics and needs of the site were understood, and various planning schemes were generated using AI algorithms. After optimization and selection, a planning plan that meets both ecological requirements and tourist needs was ultimately determined. Therefore, this article aims to study the intelligent perception method in the healing landscape design based on CAD, and provide theoretical support for realizing the intelligent perception of healing landscape and the innovation of landscape CAD design method.

Intelligent sensing technology can collect environmental data through sensors, and process and analyze the data, so as to gain in-depth understanding and insight into the environment. Jin and Yang [5] used computer-aided design software for 3D modeling and simulation. Designers can conduct detailed planning and design of buildings and landscapes. This includes the appearance, structure, materials, and colors of buildings, as well as the design of elements such as landscaping, water features, and sketches. Outdoor environmental design includes landscape design, urban planning, park design, and other aspects. Computer intelligent assistance technology can assist designers in

terrain analysis, waterscape design, plant configuration, and road planning. Through 3D modeling and simulation, designers can simulate the outdoor environment in a computer to better evaluate the effectiveness and quality of design solutions. students can engage in a large amount of conceptualization and experimentation during the scheme design phase. Through model building and virtual reality technology, students can more intuitively experience issues related to spatial form, scale, proportion, and other aspects, thereby better improving design solutions. Computer aided design software can quickly generate various renderings, such as elevations, perspectives, bird's-eye views, etc. Through the software's built-in rendering function, students can create high-quality renderings intentions. By using computer-aided design software, students can create accurate digital models. These models can not only be used for teaching demonstrations, but also for practical engineering construction drawing design and material budgeting. This technology can be applied to many fields, such as environmental monitoring, medical health, intelligent transportation and so on. In landscape design, intelligent perception technology can be used to monitor the changes of environmental factors, such as air quality, temperature and humidity, so as to provide a basis for landscape design and environmental transformation. Lin [6] explored how to apply algorithmic frameworks and applications. Firstly, the concept and significance of topological vision were introduced, and its importance in architectural conceptual design was elaborated. Secondly, common topology algorithm frameworks such as Topoly and CGAL were introduced, and their advantages and disadvantages were analyzed. Then, through a practical case study, it demonstrated how to use a topology algorithm framework for architectural conceptual design and interpreted its design ideas. Next, a detailed introduction was given on how to use the aforementioned algorithm framework for computer-aided design of architectural concepts, including implementation processes, key technologies, and application areas. Finally, the application prospects of topology vision in the field of architectural conceptual design in the future were discussed, and its advantages were analyzed. In addition, the interaction and feedback between people and the environment can be realized through intelligent perception technology, thus improving the pertinence and effectiveness of landscape design. Based on this, this article applies MSIF to therapeutic landscape design to realize intelligent perception of landscape. By collecting and analyzing environmental data, we can understand people's feelings and reactions to the landscape environment, thus providing scientific basis for landscape design. Moreover, the intelligent perception technology is combined with landscape CAD design the pertinence and effectiveness of design. Through MSIF and intelligent perception technology, the intelligent perception of healing landscape and the innovation of landscape CAD design method are realized. This research not only helps to improve the scientific and pertinence of landscape design, but also promotes people's concern and improvement on sound in body and mind and environmental quality. The research has made the following innovations:

(1) Traditional landscape design mainly lay emphasis on aesthetics, function and ecology, but seldom lay emphasis on the influence of environment on human sound in body and mind. In this article, intelligent perception technology is introduced into healing landscape design, and environmental data are collected and analyzed by sensors to understand people's feelings and reactions to landscape environment, thus providing scientific basis for landscape design.

(2) In this article, the MSIF technology is applied to the healing landscape design, and the data are collected, processed and analyzed, so as to gain a deep understanding and insight into the environment.

(3) Through intelligent perception technology, the changes of environmental factors can be monitored in real time, and people's feelings and reactions to landscape environment can be understood, thus providing scientific basis for landscape design. This combination can improve the pertinence and effectiveness of design and promote people's sound in body and mind and quality of life.

The chapters of this article are arranged as follows:

Section Ⅰ: Introduction

This section introduces the background and research significance of healing landscape design, and expounds the application value of MSIF technology in landscape design.

Section Ⅱ: Literature review

This section combs and evaluates the previous research on landscape design and intelligent perception, summarizes the advantages and disadvantages of the existing research, and provides reference for the follow-up research.

Section III: Intelligent perception of heal landscape design based on MSIF

This section introduces the implementation method and workflow of a landscape design CAD system based on MSIF.

Section IV: Algorithm testing and analysis

This section shows the experimental results and analysis, including the experimental results of feature detection and fitting degree, system stability and energy consumption in different scenarios.

Section V: Conclusion

This section summarizes the research results and their significance for healing landscape design, and looks forward to the future research direction and challenges.

2 LITERATURE REVIEW

Innovation is the vitality of art and an important driving force for its development. In teaching, innovation should become the core of teaching. By cultivating students' innovative awareness and ability, we can help them better understand and apply computer-aided design, thereby creating more innovative works of art. Liu and Yang [7] guide students to engage in innovative thinking and practice by selecting innovative teaching content, such as design cases and design concepts. Adopting diverse teaching methods, such as project-based learning, group discussions, and practical operations, encourages students to actively participate and innovate. Establish an evaluation mechanism centered on innovation, and when evaluating students' works, not only focus on technical level, but also value innovation and artistry. With the continuous development of computer technology, we need to update teaching content and methods in a timely manner to keep up with the pace of the times. Introduce the latest computer-aided design technologies and tools to enable students to understand and master their applications in innovative design. At the same time, diversified teaching methods such as project-based and discussion-based methods can be adopted to encourage students to actively participate and cultivate their innovative thinking and problem-solving abilities. Establish a good innovation platform to provide students with the opportunity to showcase their innovative achievements. By organizing design competitions, exhibitions, and other activities, students are encouraged to actively participate in innovative design activities, stimulating their innovation enthusiasm and confidence. The application of network architecture teaching systems in the field of architecture is becoming increasingly widespread. In order to better meet user needs, improve teaching quality and efficiency, Ma et al. [8] aimed at providing students with more convenient and flexible learning methods, while also providing teachers with more efficient and practical teaching tools. Through this system, students can learn at any time and place, and communicate and interact with teachers and other students. Teachers can improve teaching quality and efficiency through system operations such as course design, teaching management, and student evaluation. Noulamo et al. [9] introduced a method can automatically generate landscape design schemes and has broad application prospects. By establishing a neural network model, the use of big data and prediction algorithms to evaluate and optimize design schemes is the core of computer-aided landscape design. By collecting a large amount of data, including information on terrain, climate, vegetation, and culture, landscape design can be quantitatively evaluated and predicted. For example, machine learning algorithms can be used to train historical data, and then the trained model can be used to predict and evaluate the design scheme. Making it difficult to ensure the scientific and systematic nature of the design. After the model training is completed, new design parameters can be input, and the model can be used for prediction to generate a design plan. Multiple evaluation criteria can be used to evaluate and optimize the predicted design scheme, such as aesthetic value, ecological benefits, cost control, etc.

With the increasingly serious global environmental problems, ecological protection and sustainable development have become hot topics in today's society. Ecological parks, as a public space that integrates nature, culture, and human activities, play an important role in environmental protection and ecological restoration. Okasha and Mekkawy [10] took the NRIAG Ecological Park in Helwan, Egypt as an example to explore the practice and significance of participatory ecological landscape design in environmental design. Its design philosophy embodies the essence of participatory ecological landscape design. Firstly, the park emphasizes ecological restoration by restoring local vegetation and adjusting land use methods to enhance biodiversity and enhance the stability of the ecosystem. Secondly, the park emphasizes landscape beautification, utilizing natural elements and artistic techniques to create a unique landscape style and enhance people's aesthetic experience. With the rapid development of technology, the Fourth Industrial Revolution is deepening globally. This revolution is characterized by the widespread application of technologies the global economy, society, and culture. Among them, intelligent design engineering product design and development. Pereira et al. [11] reviewed the historical evolution of intelligent design engineering in the industrial revolution, elaborated on its application and challenges, and explored the opportunities and challenges of intelligent design engineering in sustainable development. Reliability and safety are crucial in the process of product design and development. Intelligent design engineering needs to solve various problems, such as structural strength, performance stability, user experience, etc. With the rapid development of urbanization, people's requirements for quality of life continue to improve. In this context, spatial transformation has become a highly concerned topic in urban planning and design. Yari et al. [12] revolved around the theme of "Transforming Space into Place: A Human-Environment Exchange Method for Designing Assisted Living Facilities Courtyards", exploring how to use design methods to transform spatial features into functional places that meet people's needs for quality of life. When conducting spatial transformation, including geographical location, natural environment, cultural background, etc. These factors will directly affect the design concept and the final conversion effect. Secondly, it is necessary to plan the space reasonably and set up corresponding facilities and functional areas according to people's living needs and habits. Finally, attention should be paid to the interaction between humans and the environment, starting from human needs and experiences, to create a comfortable and pleasant living environment.

Zhang and Li [13] used the emotion map method for data collection and analysis. Firstly, representative campus outdoor spaces were selected as experimental sites, including playgrounds, gardens, libraries, etc. Then use an emotional scale to measure students' emotional responses in different spaces. Research has shown that the characteristics of campus outdoor space have a significant impact on students' emotions. Different types of outdoor spaces on campus can trigger different emotional responses, which provides an important basis for optimizing the campus environment. In future research, further exploration can be conducted on how to plan campus outdoor spaces reasonably to enhance students' positive emotions and reduce negative emotions. Collaborative design systems in the field of landscape design is becoming increasingly widespread. This system provides a convenient communication and collaboration platform for designers, and also provides more possibilities for the application of color effects in landscape design. Zhang and Deng [14] with the aim of providing guidance for practical engineering practices. In landscape design, color is a crucial element. It is not only about aesthetic effects, but also affects people's emotional, psychological, and environmental experiences. The research and practice of color effects in landscape design are receiving increasing attention. Through specific practical cases, the designer has planned the color effect of the park in detail through this system, including the selection of main tones, the distribution of color blocks, and the harmony of color combinations. The final park is not only beautiful and elegant, but also complements the surrounding environment, providing citizens with a pleasant leisure place. 3D CAD technology provides landscape designers with new design methods and tools, making the design process more intuitive, accurate, and efficient. Zhao [15] explores the application of 3D CAD in landscape design and how to optimize hierarchical details. A reasonable data structure is the key to improving the performance of 3D CAD. Designers can establish efficient data models as needed to reduce computational complexity and improve rendering speed. By adopting advanced rendering technologies such as real-time rendering, ray tracing, etc. In addition, optimizing materials

and lighting settings can also improve rendering performance. In order to improve the work efficiency of designers, the interactive operation of 3D CAD software can be optimized. For example, developing a more intuitive user interface, providing more customization options, and introducing intelligent auxiliary design features.

3 INTELLIGENT PERCEPTION OF HEAL LANDSCAPE DESIGN BASED ON MSIF

(1) Healing landscape design

Healing landscape design mainly promotes people's sound in body and mind through landscape design. Some studies show that specific landscape design and environmental factors can have a positive impact on people's sound in body and mind. For example, some plants and landscape elements can relieve stress, improve attention and enhance immunity. Therefore, how to create an environment conducive to people's sound in body and mind through reasonable landscape design is an important research issue.

In the research of healing landscape design, some scholars lay stress on the influence of different types of design elements on people's sound in body and mind. Liu et al. research shows that natural landscape and green environment can alleviate anxiety and depression symptoms, and at the same time can improve people's attention and creativity. Erdolu et al. discussed how to create a safe, comfortable and relaxed environment through design to promote people's sound in body and mind.

(2) Application of intelligent perception in landscape design

Intelligent sensing technology can collect environmental data through sensors, and process and analyze the data, so as to gain in-depth understanding and insight into the environment. This technology can be applied to many fields, such as environmental monitoring, medical health, intelligent transportation and so on. In landscape design, intelligent sensing technology can be used to monitor the changes of environmental factors, such as air quality, temperature and humidity, so as to provide a basis for landscape design and environmental transformation. In addition, the interaction and feedback between people and the environment can be realized through intelligent perception technology, thus improving the pertinence and effectiveness of landscape design.

In the application research of intelligent perception in landscape design, some scholars lay stress on how to improve the ability of monitoring and insight into the environment through sensor information fusion technology. Xu et al. research shows that MSIF can improve the reliability of air quality monitoring. Daemei et al. discussed how to realize the interaction and feedback between people and the environment through intelligent perception technology to improve the pertinence and effectiveness of landscape design.

(3) Intelligent perception of healing landscape design based on CAD

Rehabilitation landscape design refers to the design and planning of outdoor environments to promote people's physical and mental health and rehabilitation. This environment can include external spaces and public areas of hospitals, nursing homes, rehabilitation centers, nursing homes, and other places. CAD based intelligent perception technology for rehabilitation landscape design can help designers better understand the needs and behaviors of users, thereby designing rehabilitation environments that are more in line with people's needs.

Intelligent perception technology can collect and analyze user behavior and environmental data through various sensors and data analysis tools. For example, by installing sensors in rehabilitation facilities, it is possible to monitor the user's movement trajectory, amount of exercise, physical condition, and other data. These data can be analyzed through intelligent algorithms to identify user behavior patterns and preferences, providing designers with more accurate design basis.

By combing and evaluating the relevant literature, we can find that the current research mainly focuses on the research status of healing landscape design, the application research of intelligent perception in landscape design and the research status of intelligent perception of healing landscape design based on CAD. These studies provide valuable reference and enlightenment for researchers,

and also provide the basis and basis for further discussion of intelligent perception research of healing landscape design based on CAD.

In the healing landscape design, MSIF technology can provide more comprehensive and accurate environmental information, including air quality, temperature, humidity, illumination and so on, and provide scientific basis for landscape design. This section will introduce how to apply MSIF technology to healing landscape design to realize intelligent perception.

In the design of healing landscape, it is needed to choose appropriate sensors to collect environmental information. According to the research requirements, various types of sensors are selected, including air quality sensor, temperature sensor, humidity sensor and illumination sensor. These sensors can collect a variety of information in the environment, providing a basis for subsequent data processing and analysis. Because the data collected by the sensor may have noise and abnormal values, data preprocessing is needed to improve the accuracy and reliability of the data. Then the data collected by multiple sensors are fused by information fusion algorithm to get more comprehensive and accurate environmental information. The recognizer block diagram of MSIF is shown in Figure 1.

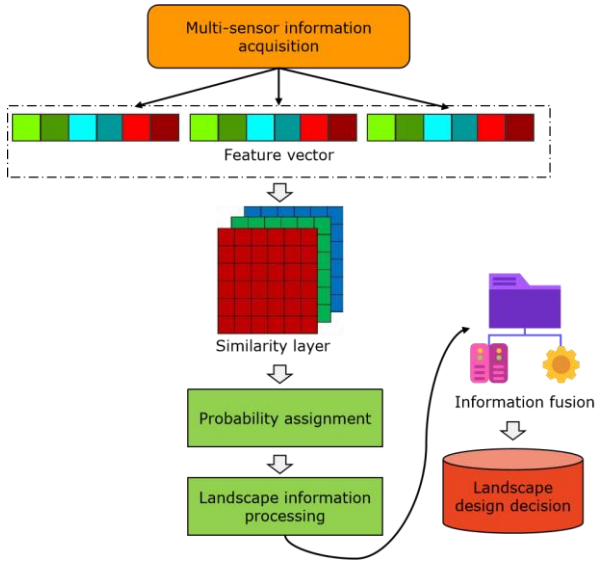

Figure 1: Recognizer block diagram of MSIF.

Filtering processing is a method to remove noise, and low-pass filter and high-pass filter are used to remove noise in the data collected by sensors. Outlier processing is a method to remove abnormal data, and many methods based on statistics and distance are used to detect and process outliers. Data normalization is a method of mapping data to a specific range. The minimum-maximum normalization and standardization methods are used to normalize data to the same scale, which provides an accurate basis for subsequent information fusion. On the basis of information fusion, the intelligent perception model of healing landscape design is constructed. The model can design the landscape according to the environmental information to improve the healing effect of the landscape.

A multi-layer neural network model is studied and constructed. The data of multiple sensors are used as input, and the characteristics and laws of the data are learned by training the model to get the fused data. This method can deal with different types of data and outliers, and has high accuracy and generalization ability. The information fusion algorithm model of intelligent perception of healing landscape design is shown in Figure 2.

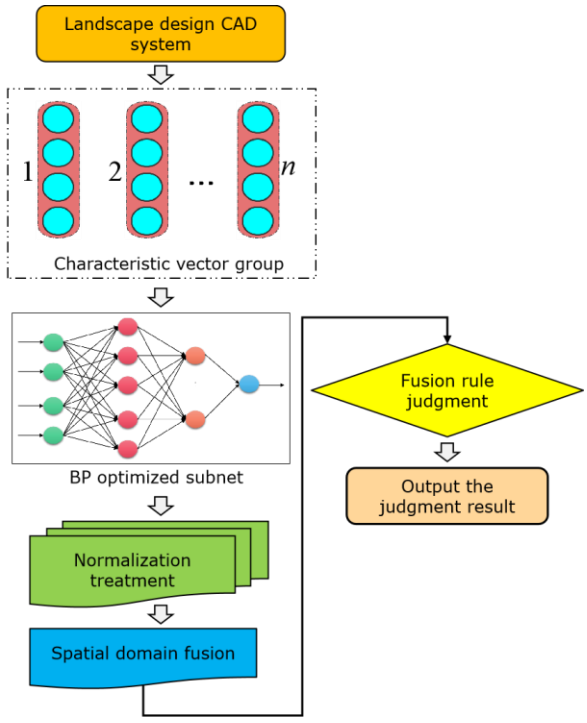

Figure 2: Information fusion algorithm model.

In the process of information fusion, at the expense of emphasizing some information and losing other information, the image quality is improved as much as possible on the premise of reducing the image quality. After information fusion, feature detection is carried out. This process is mainly to extract the most representative features from the original data. The implementation process of information fusion algorithm includes data preprocessing, information fusion, feature detection and model construction. These steps are interrelated and influenced each other, and finally more comprehensive and accurate environmental information is obtained. Consider a nonlinear discrete stochastic system in the following form:

$$x_{k+1} = f(x_k, k) + w_k \tag{1}$$

$$z_{k+1} = h(x_{k+1}, k) + v_{k+1} \tag{2}$$

$x_k \in R^n, z_k \in R^m$ represents the state vector and observation vector of the system at the k-th moment, w_k, v_k represents the process noise and measurement noise, $f(\cdot)$ represents the state function of the system, and $h(\cdot)$ represents the observation function of the system.

Now define the Euclidean distance from evidence E_i to evidence set E:

$$S_i = \frac{1}{n}\sum_{j=1}^{n} d(m_i, m_j)\, S_i \in [0,1) \tag{3}$$

$$avg(X(a_i)) = \frac{1}{g_i}\sum_{j=1}^{g_i} a_{ji} \quad i = 1,2,\ldots,m \tag{4}$$

$$std(X(a_i)) = \sqrt{\frac{1}{g_i - 1}\sum_{j=1}^{g_i}(x_i(a_i) - avg(X(a_i)))^2} \quad i = 1,2,\ldots,m \tag{5}$$

$$x_j(a_i) = \frac{x_i(a_i) - avg(X(a_i))}{std(X(a_i))} \tag{6}$$

According to the collected sensor perception results, it is needed to analyze the data in depth. Through analysis, we can understand the relationship between environmental factors and landscape design, and the influence of different environmental factors on landscape healing effect. Based on the analysis of the sensor's perception results, we can work out a practical design scheme according to the relationship between environmental factors and landscape design and the influence of different environmental factors on landscape healing effect. For example, children can choose to plant more flowers and trees when the air quality is good; In the case of high temperature, you can choose to build more sunshade facilities.

State space model is a mathematical tool to describe the relationship between internal state and external observation of dynamic system. In this model, the internal state of the system is unknown, but this state information can be deduced by analyzing external observations. Estimating the internal state of the system by using observational data:

$$\theta_k = f(\theta_{k-1}, v_k) \tag{7}$$

$$y_k = h(\theta_k, n_k) \tag{8}$$

$$E_T(i,j) = (E_{elec} + \varepsilon_{amp} d_{(i,j)}^2)B \tag{9}$$

$$E_R(j) = E_{elec} + B \tag{10}$$

Finally, CAD software is needed to transform the design scheme into actual landscape design drawings. In CAD software, operations such as modeling, rendering and adjusting parameters can be carried out according to the design scheme. Through CAD software, the design scheme can be transformed into practical landscape design drawings. After completing CAD design, it is needed to evaluate and optimize the design scheme. This can be done by building a real model or using virtual reality technology. Through the evaluation, we can know whether the design meets the expected healing effect, and adjust and optimize the design according to the evaluation results.

4 ALGORITHM TESTING AND ANALYSIS

The experiment aims to verify the superiority and application value of perception algorithm based on MSIF in healing landscape design. By comparing the traditional methods, the performance of the algorithm in feature detection, fitting degree, stability and energy consumption is analyzed to prove its effectiveness. In order to simulate the real landscape design scene, the experiment was carried out in a relatively open and diverse environment. The collected sensor data are preprocessed, including denoising, normalization, outlier processing and other operations. Moreover, image and video data are preprocessed, such as image enhancement and feature detection, to extract the feature information related to landscape design. The perceptual algorithm based on MSIF extracts and fuses the features of the preprocessed data, and uses classifiers to classify and identify landscape elements. During the experiment, the energy consumption of different methods is recorded, including traditional methods and MSIF methods proposed in this article.

The results of fitting test of feature detection using traditional perceptual algorithm show (Figure 3). This shows that there is a certain deviation between the features identified by the traditional perceptual algorithm and the real image features. Because the traditional sensing algorithm can't fully capture the internal relationship and correlation between data when dealing with complex multi-sensor data, it affects the accuracy of feature detection.

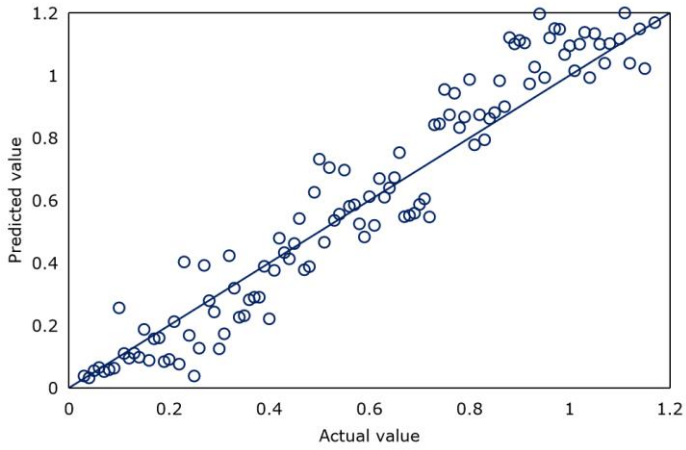

Figure 3: Test results of traditional sensing algorithm.

The results of the fitting test of feature detection using the perceptual algorithm based on MSIF show that the ratio between prediction and reality is very close to the y=x line (Figure 4). This shows that the features identified by this algorithm are very close to the real image features and have higher fitting degree. Moreover, the algorithm may also have higher computational efficiency and real-time, which is conducive to playing a greater role in practical applications.

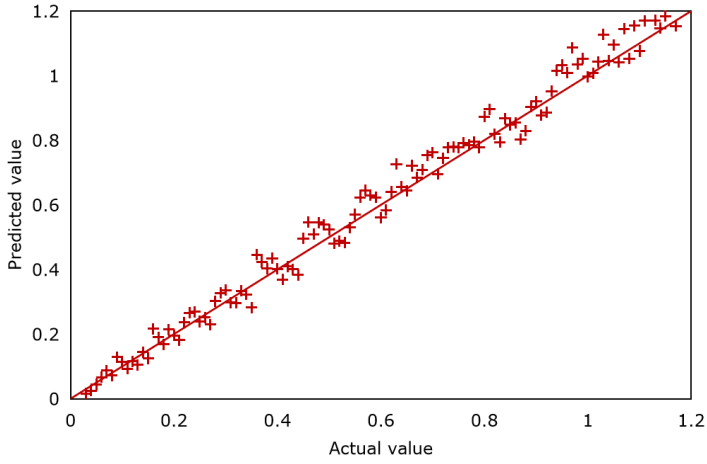

Figure 4: Test results of this algorithm.

The advantage of this algorithm is that it can better deal with complex multi-sensor data and capture the internal relations and correlations between data, thus improving the accuracy and efficiency of feature detection. Perception algorithm based on MSIF has higher accuracy and efficiency in dealing with MSIF, which provides a better solution for practical application.

Compared with the traditional sensing algorithm, the recall rate of the MSIF algorithm in this paper is higher (Figure 5). CAD technology can automatically detect and extract key features in the environment. For example, terrain, vegetation, buildings, etc. This feature detection capability helps designers to quickly and accurately identify and understand important elements in rehabilitation landscapes, thereby enabling better design and planning. The algorithm can effectively fuse data from different sensors. By comprehensively analyzing the data of multiple sensors, the algorithm can

understand the environmental information more comprehensively and reduce the possible false positives or false negatives of a single sensor. MSIF algorithm also has the original sensor data and reduce the influence of redundant information on classification accuracy.

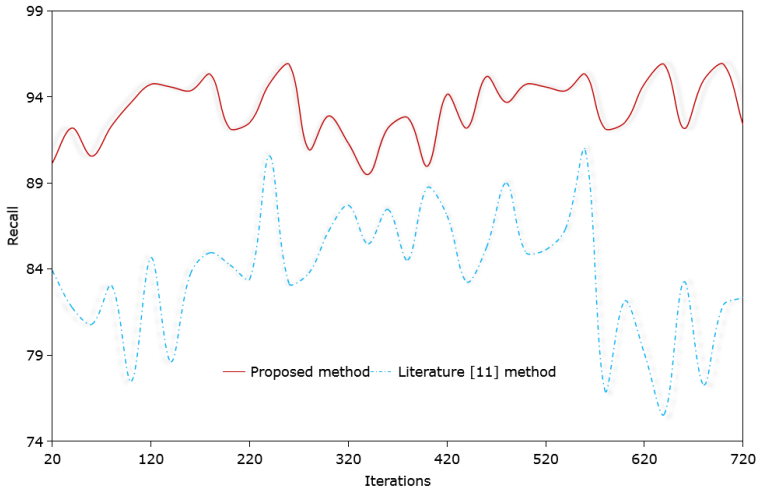

Figure 5: Recall of different algorithms.

The MSIF algorithm in this article has higher stability in the landscape design CAD system (Figure 6). MSIF algorithm reduces data inconsistency by effectively fusing data from different sensors. This consistency processing ensures that the system can still maintain stable performance in the face of data changes from different sensors. The algorithm adopts advanced signal processing and error elimination technology, which helps to reduce system errors and enhance stability. In addition, the algorithm can also compensate the sensor data in real time to cope with uncertain factors such as environmental changes and sensor failures. MSIF algorithm may have real-time feedback and adjustment mechanism, which enables the system to respond and adjust quickly according to real-time environmental data and system operation status. This mechanism helps to ensure the stability of the system and the ability to adapt to environmental changes.

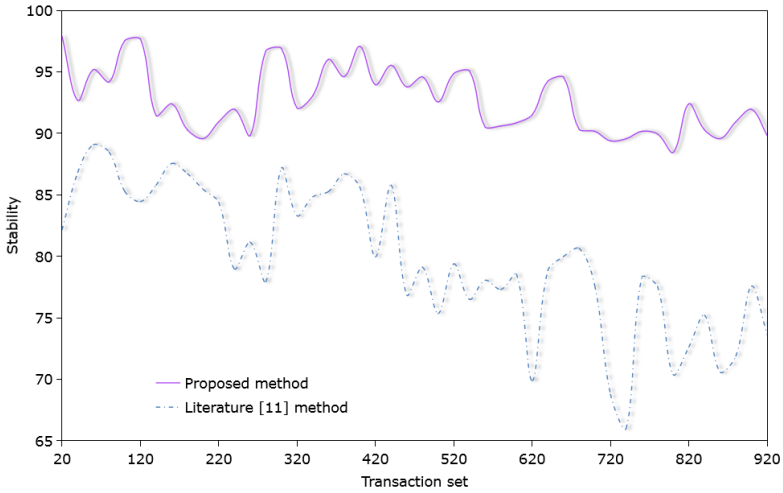

Figure 6: Stability comparison of the system.

In landscape design CAD system, stability is very important to ensure the continuity and repeatability of design. Unstable system may lead to deviation of design results, decrease of accuracy and even failure of correct operation. The perception algorithm based on MSIF can improve the stability of the system and provide more reliable technical support for landscape design. This will help designers to give full play to their creativity and artistic talent and realize more accurate and personalized landscape design. According to Figure 7, we can see the performance of two different information fusion methods in energy consumption.

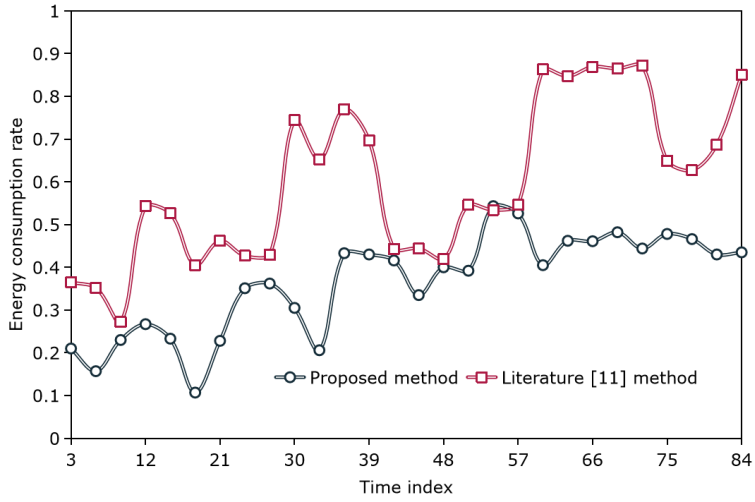

Figure 7: Comparison of energy consumption rates of different data acquisition methods.

Compared with the method in literature [11], the proposed MSIF method reduces energy consumption by more than 10%. This means that the MSIF method consumes less energy when performing the same task. By effectively integrating the data of different sensors, this method reduces the processing and transmission of redundant information, thus reducing energy consumption. By optimizing the information fusion algorithm, this method can make better use of sensor data, improve information accuracy and reduce energy consumption.

The CAD design of healing landscape needs to combine the sensor data with the landscape design process, and realize the automatic landscape design scheme generation by analyzing the sensor perception results, making the design scheme, realizing CAD design, evaluating and optimizing. Perception algorithm based on MSIF performs well in feature detection and fitting degree, and has higher accuracy and efficiency than traditional methods. MSIF algorithm shows better stability, reduces data inconsistency and has better robustness and reliability in landscape design CAD system. The MSIF method in this article reduces the energy consumption by more than 10%, optimizes the information fusion algorithm and adopts a more efficient algorithm and calculation model. This algorithm can improve the accuracy and efficiency of feature detection, and help designers to better grasp the landscape features and create more personalized designs in healing landscape design.

5 CONCLUSION

As a means of environmental design and transformation, landscape design can affect people's sound in body and mind by shaping and transforming the environment. In this article, MSIF is applied to healing landscape design to realize intelligent perception of landscape. By collecting and analyzing environmental data, we can understand people's feelings and reactions to the landscape environment, thus providing scientific basis for landscape design. The results show that the sensing algorithm based on MSIF performs well in feature detection and fitting degree, and has higher

accuracy and efficiency than traditional methods. MSIF algorithm shows better stability, reduces data inconsistency and has better robustness and reliability in landscape design CAD system. Compared with traditional methods, the proposed MSIF method reduces energy consumption by more than 10%.

To sum up, the perception algorithm based on MSIF has important application value for healing landscape design. It can improve the scientific and personalized design, reduce energy consumption and improve the sustainability of the system. For the accuracy and efficiency of feature detection, although the sensing algorithm based on MSIF has achieved good results, there is still room for improvement. Future research can try to introduce more advanced feature detection and fusion technology to further improve the recognition efficiency of the algorithm.

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