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Retraction

Retracted: 3D Simulation Landscape Design Based on Image Sensor

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This article has been retracted by Hindawi, as publisher, following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of systematic manipulation of the publication and peer-review process. We cannot, therefore, vouch for the reliability or integrity of this article.

Please note that this notice is intended solely to alert readers that the peer-review process of this article has been compromised.

Wiley and Hindawi regret that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

[1] Y. Lu, B. Chen, Y. Xing, and Y. G. Seok, "3D Simulation Landscape Design Based on Image Sensor," *Journal of Sensors*, vol. 2022, Article ID 1577945, 7 pages, 2022.

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Research Article

3D Simulation Landscape Design Based on Image Sensor

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In order to solve the problem of heavy workload of landscape plant modeling, the lack of efficient auxiliary or automatic methods for establishing three-dimensional models for various landscape plants, and the general three-dimensional models of landscape plants which cannot reflect the natural growth of plants and the interaction between the environment, this paper proposes a method of three-dimensional simulation of landscape design based on image sensors. This method includes the construction of three-dimensional image simulation landscape feature analysis function and rationality judgment model, so as to provide theoretical support for landscape design. The experimental results show that the matching number and matching rate of landscape feature points obtained by the traditional deep evaluation method are lower than those obtained by the 3D image simulation method used in this paper, and the steps of image feature points matching are relatively simple. With the gradual expansion of the scope, the accuracy of the three-dimensional image simulation judgment method used in this paper is gradually improved, up to 89%, while the traditional method is always maintained at about 40%. *Conclusion*. The 3D simulation landscape design method based on image sensor has higher accuracy and wider application prospect.

1. Introduction

Landscape architecture planning and design plays an important role in society, economy, and ecology and is an important part of building a "beautiful China." Good garden design helps people to live in harmony with the environment and build a good ecological and aesthetic environment. The ecological effect of garden needs the living plant environmental function to complete, and plants also have irreplaceable landscape making function and aesthetic value in garden aesthetics. The planning, design, and application of garden plants involve ecology, plant geography, plant physiology, floriculture, and other disciplines. The design shall comply with the planning requirements such as the classification standard of urban green space and consider the regional characteristics, ornamental, and other factors. In order to fully consider these factors in the design, landscape designers have already made extensive use of computer-aided design and virtual simulation technology to carry out the planning, design, and display of plant landscape in three-dimensional landscape design software [1]. At present, three-dimensional landscape design software can realistically display the three-dimensional image form of plants, but there are still some deficiencies in simulating the growth process of plants and the dynamic effect of interaction with the environment [2]. Virtual plants can effectively improve the efficiency and quality of landscape plant configuration design [3]. Realize the dynamic visualization of landscape plants, and intuitively display the morphological appearance, growth process, and interaction with the outside world of landscape plants (including light, soil, diseases and pests, plant communities, and other elements). The virtual simulation of garden landscape plants can provide scientific basis and prediction for plant configuration, environmental protection, and plant maintenance [4]. Although many achievements have been made in the research of virtual landscape

plants, there are still some problems affecting the application of virtual landscape plants in practice. These problems mainly include the following: (1) the workload of landscape plant modeling is large, and there is a lack of efficient auxiliary or automatic methods to establish three-dimensional models for all kinds of landscape plants; (2) the general three-dimensional model of landscape plants can not reflect the natural growth of plants and the interaction between the environment.

In view of the problems existing in the above methods, the rationality of landscape design is analyzed by using the three-dimensional image simulation judgment method, which can quickly and accurately judge the rationality of landscape design and provide guarantee for environmental beauty [5].

2. Literature Review

Lb et al. combine the time series drawn modeling of the NARX neural network with mass routing protocol based on simple vector quantization and transfer of small amounts of molten data to the gravity of the suction to remove and improve the time and place and enhance data collection efficiency. However, the actual melting of this sample is not good and its efficiency is not very high [6]. Hussein modified the integration model based on the changing dimming c-application agglomeration. Adaptive clustering of the unknown C values is used for data collection. Adaptive coefficients are shown to show clusters of various shapes and sizes. The principle of Kalman filter and neural network process prediction based on multilayer perceptrons is used in error comparison to improve melting reliability. However, the performance of these models is low, and it is difficult to meet the needs of the actual options [7]. Lin and Zhang divided the virtual plant modeling methods into four categories: plant overall shape simulation, plant organ three-dimensional modeling, plant growth process simulation, and plant structure function parallel simulation [8]. L-system is a kind of virtual plant modeling method which has been widely studied and expanded. A formal mathematical expression system L-system for plant topological structure is proposed. L-system is a string rewriting system, which can describe the morphology and growth of plants. L-system describes the topological structure of plants and expresses the topological relationship between various organs of plants in the form of symbols [9]. Mckinley et al. extended the L-system, proposed open L-system and stochastic L-system that can interact with plant growth environment, and developed l-studio system [10]. The l-studio system has been able to complete the functions from virtual plant modeling to 3D model generation and visualization and can dynamically simulate the growth of plants and the interaction with the environment [11]. In the early development of computer science, researchers began the research of automatic computer program generation and made a lot of achievements in compiler, software modeling, auxiliary program development, and so on. Recently, with the improvement of computer performance and the development of artificial intelligence, the research on the automatic generation of executable software programs by computers has also made great progress. Bellorobles et al. proposed a computer program automatic generation algorithm of genetic algorithm with guidance [12]. The target recognition algorithm based on 3D point cloud has made many application achievements in the research of obtaining plant point cloud and reconstructing 3D plant model by using Kinect, leap motion, and other devices [13]. Laser 3D scanning technology is widely used in plant detection, automatic driving, 3D modeling, high-precision measurement, and scene restoration [14].

Based on current research, this paper provides a way to create a triangle to identify the advantages of landscape design. The principle of using an orthophoto pair to create three-dimensional landscapes is to draw three-dimensional and three-dimensional landscapes in an orthophoto pair. The special steps are to create a harmonious orthophoto to meet the needs of the city three-dimensional landscape design, create a triangle at the same time, and bring it to create a comparison of three-dimensional images of the city. And it is regarded as the contrast image of three-dimensional urban landscape design. Depending on the location, the value of the change, the direction of the slope, the slope, and other conditions, the relative angle of the three landscapes of the different shapes should change, and all things must be accomplished. The structure of the three-dimensional landscape will be renovated, additional vegetation will be painted, and the three-dimensional landscape will be renovated according to the city plan. The results of the experiments show that this method collects data samples accurately, quickly and accurately to evaluate the quality of landscape design in difficult areas and to beautify the environment.

3. Method

3.1. Ant Colony Algorithm. The best selection of aesthetics by 3D landscape mode plays an important role in the immediate improvement and layout of the landscape [15]. During the design of a three-dimensional landscape, the choice of a path is covered by legal planning methods in a challenging environment, and practical ant colony algorithm is used to complete the model. Starting with the actual problem, the spatial scope of the selection process is defined, and the adjacent weight, representing the optimal scale of the problem, is given in a complete picture. The person of the ant is considered to be the agent in order to visualize the ants and to complete the point characteristics of each path of the whole image with the best possible resolution. At the same time, each ant in ant colony algorithm is set to have the following characteristics: traverse the complete path in the complete graph at a time, all ants left characteristic pheromones on the path they passed, and the path selected by the ants is correlated with the characteristic pheromone. The specificity of ants is related to pheromones. In order to prevent the heuristic information from being buried due to too many feature pheromones, the pheromone should be updated after the ant traverses a complete cycle, so the amount of information in the path (i, j) in the $t + n$ period can be adjusted by equation (1).

$$\tau_{ij}(t+n) = (1-\rho) \cdot \tau_{ij}(t) + \Delta\tau_{ij}(t), \tag{1}$$

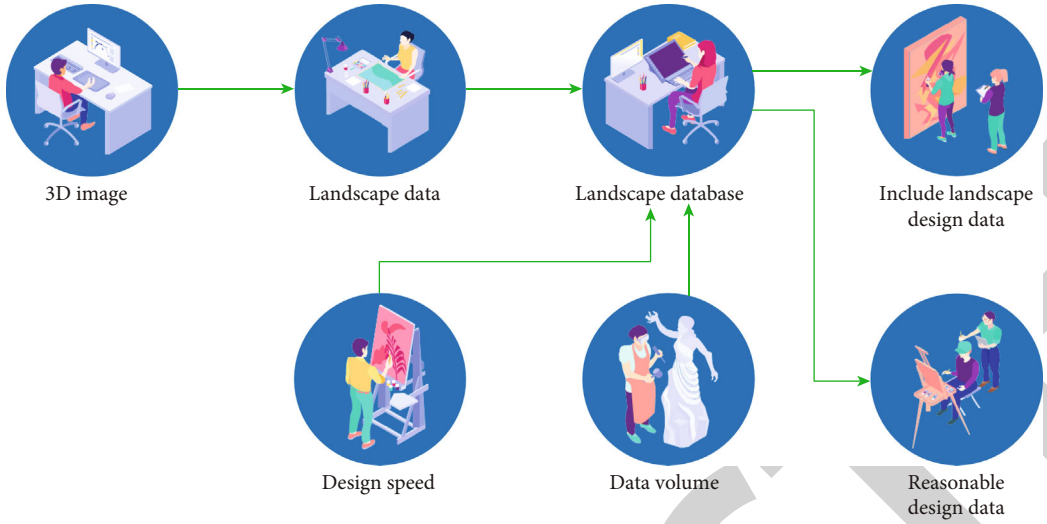

Figure 1: Data acquisition process of 3D image landscape.

where

$$\Delta\tau_{ij}(t) = \sum_{k=1}^{m} \Delta\tau_{ij}^{k}(t). \tag{2}$$

Among these, ρ is the volatile matter of pheromone, and M is the number of ant colony determined depending on the magnitude of the optimization problem. In general, the higher the value of m, the higher the accuracy of the optimal solution. In order to confirm the true efficacy of the ant colony algorithm, it is necessary to modify the necessary pheromone sequencing further. As each ant crosses a path with known patterns, the pheromone concentration of each edge covering along the path should be adjusted according to the length of the process. The sequence of pheromone renewal is as follows.

$$\Delta\tau_{ij}^{l} = \begin{cases} \dfrac{Q}{C^{K}}, \\ 0. \end{cases} \tag{3}$$

Equation (3) is a mathematical formula for pheromone renewal rates. C^{K} represents the entire length of the formation by K ant. Q has an uncertain value and is usually set to 1.

3.2. Research on Rationality Judgment Method of Landscape Design

3.2.1. 3D Image Data Acquisition. In daily life, due to the influence of weather factors and architectural factors, whether the landscape design is reasonably distributed cannot be guaranteed [16]. To this end, the data acquisition process of 3D image landscape is designed, as shown in Figure 1.

It can be seen from Figure 1 that the implicit data and normal data of landscape distribution are collected for the collection of 3D image garden landscape data, the data is then entered into the data for distribution, and the necessary conclusions are drawn based on the data created landscape [17].

3.2.2. 3D Image Simulation Landscape Feature Analysis Function. The three-dimensional modeling system analyzes the filtering process to see if the data meets the planning standards, including the refinement of the landscape design [18]. This analysis process is the guarantee of the data accuracy of the design rationality judgment model, and it is also the key to improve the judgment accuracy, as shown in Figure 2.

According to the analysis process in Figure 2, the overall image and local image of the landscape are represented by X and Y, respectively, the number of feature points of the landscape image set M and each image in X and Y is counted, and the pixel positions of the overall image and local image X and Y projected on image h are calculated. The camera matrix corresponding to the two-dimensional coordinate points projected on the image on the landscape image is used to mark the coordinate positions of the projection points of the three-dimensional image feature points on the landscape scene plane. Assuming that any point X_{k1} and Y_{K2} in the three-dimensional features X and y of the landscape image have been obtained, the coordinates of all feature points in X_{k1} and Y_{K2} are obtained by looking for the approximate transformation F. The transformation f is composed of the translation vector Z, the rotation matrix R, and the scaling factor s [19], and F is evaluated and converted into the minimum target function. Using the calculation flow in Figure 3, the translation vector Z, rotation matrix R, and scaling factor S of landscape image feature data are obtained.

From Figure 3, the translation vector Z, rotation matrix R, and scaling factor s can be obtained, from which the characteristic data of the whole landscape image can be obtained, and the rationality of landscape design can be judged on this basis.

3.2.3. Simulation Model Based on Rationality Judgment of 3D Image. According to the data characteristics obtained above, a three-dimensional image garden landscape design rationality judgment model is constructed, and the three-

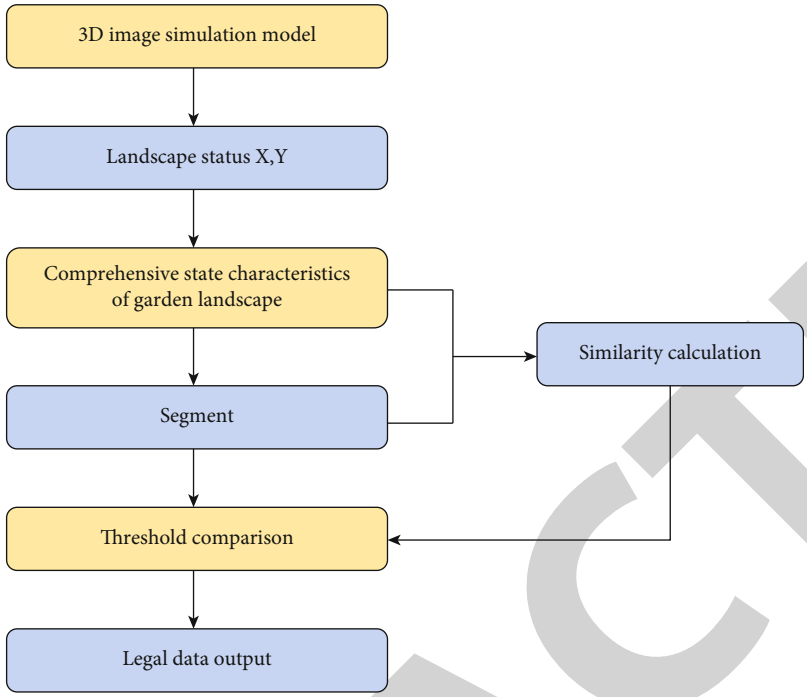

Figure 2: Flow chart of landscape state feature analysis.

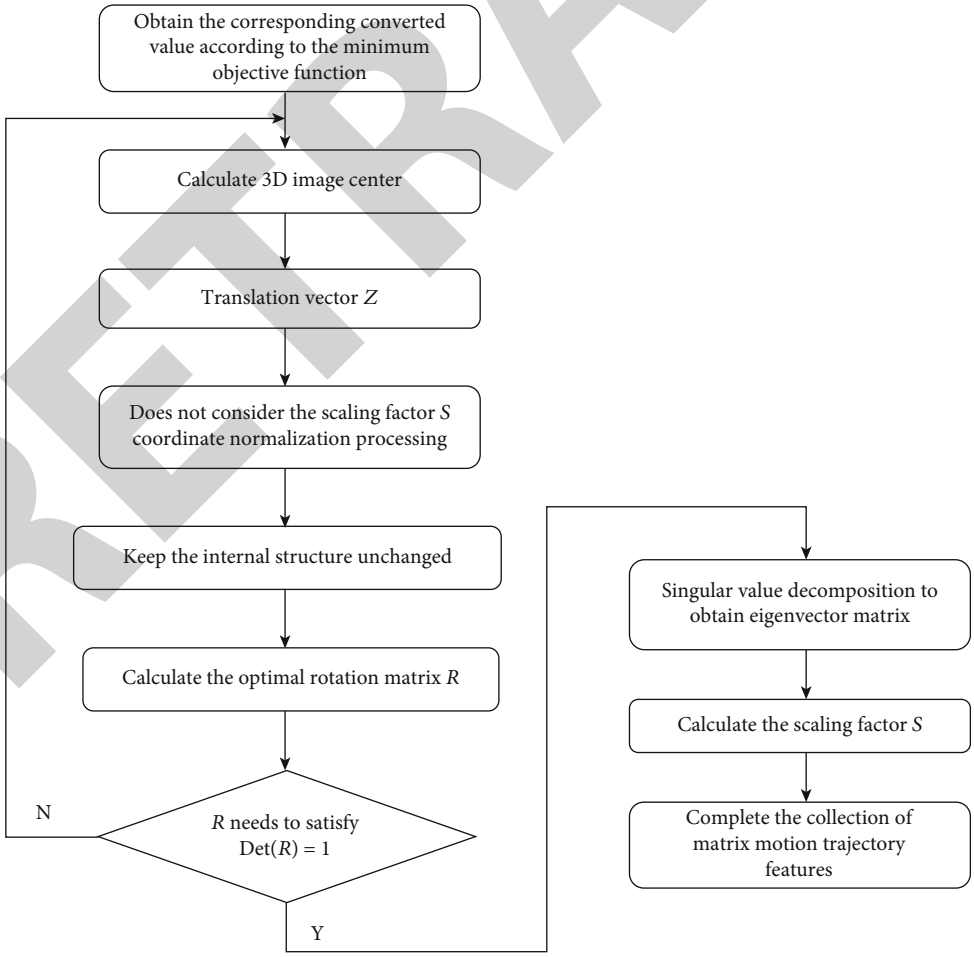

Figure 3: Calculation process.

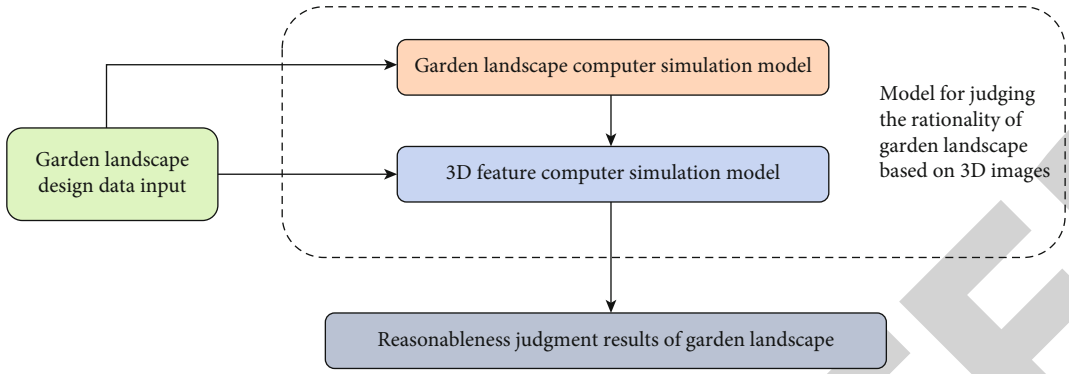

Figure 4: 3D image simulation judgment model.

dimensional visualization method is used to display the landscape design rationality judgment results [20]. Taking the landscape design data as input, the simulation characteristic parameters are determined, and finally, the rationality judgment results are obtained. The construction of the model is shown in Figure 4.

It can be seen from Figure 4 that the model for judging the rationality of landscape design based on 3D image simulation mainly includes two parts: one is the computer simulation model of landscape; the other part is a three-dimensional feature computer simulation model, which can be used to obtain the inertia factor of simulation judgment. Using this model, the obtained inertia factors are judged positively by introducing the dynamic forward judgment and reverse judgment methods, and then, the reverse judgment of each characteristic structure is obtained, and finally, the rationality of landscape design is judged.

3.3. Experiment. In order to measure the viability of a landscape design, it is necessary to conduct an experiment to verify the accuracy of the three-dimensional image structure. Under the environment of Windows 8, construct the analysis platform of the 12th phase image model of the three-dimensional figure 76 of garden landscape distribution rationality. The three-dimensional images are reasonably collected, identified, and analyzed, and the objective function values of different matrices are calculated. If the cost of the work is large, the determination and analysis of the garden landscape is more accurate. If the cost of the work is small, it shows that the decision of the optimal view of the landscape is not correct.

4. Results and Discussion

4.1. Result and Analysis of Matching Number and Matching Rate of Image Feature Points. The advantages of landscape design are compared with triangular models and depth measurement models. Whether or not the number of design points can filter the accuracy of the design triangle is important in how to fit the corresponding points of the landscape photos. At the same time, these two filtration methods are used to compare the necessary numbers and speeds of landscape elements. The results are shown in Table 1.

Table 1: Matching number and matching rate of three-dimensional image feature points by two judgment methods.

Group/group	Traditional method		3D method	
	Matching number/piece	Matching rate (%)	Matching number/piece	Matching rate (%)
A	540	30.25	890	75.28
B	350	25.61	530	63.16
C	360	24.32	550	60.12
D	320	27.02	470	74.32
E	280	21.34	430	60.15
F	256	30.16	365	79.38

As can be seen from Table 1, the number and comparison of landscape images obtained by standard measurement depths is less than the three-dimensional image simulation method used in the sentence. The tuning process is also very simple. The process of simulating three-dimensional images corresponds to the height of the structural elements, which proves the total validity of the visualization. Based on the comparison results in Table 1, two methods are used to compare the simulation results of three-dimensional landscape maps. It can be seen that the classification of the garden landscape using the three-dimensional simulation method is appropriate. The main reason when determining the highlights is to adjust with high precision and the details are aggregated and distributed. The model details will be evaluated according to the characteristics of the diagram and the conclusions of the appropriateness of the garden landscape design will be based on the results of the analysis.

4.2. Comparison Results and Analysis of Judgment Rate and Accuracy. Collect data in the landscape environment, and analyze the judgment rate of the traditional method and the method in this paper, as shown in Figure 5.

As seen in Figure 5, the visual value of the process always increases gradually over time in the range of 0~10 but is always lower than that of three-dimensional simulation. During the interval between 10 and 15, the cost of the process always starts to decrease. In the next phase, the process always floats up and down, and the speed is only about 1/2

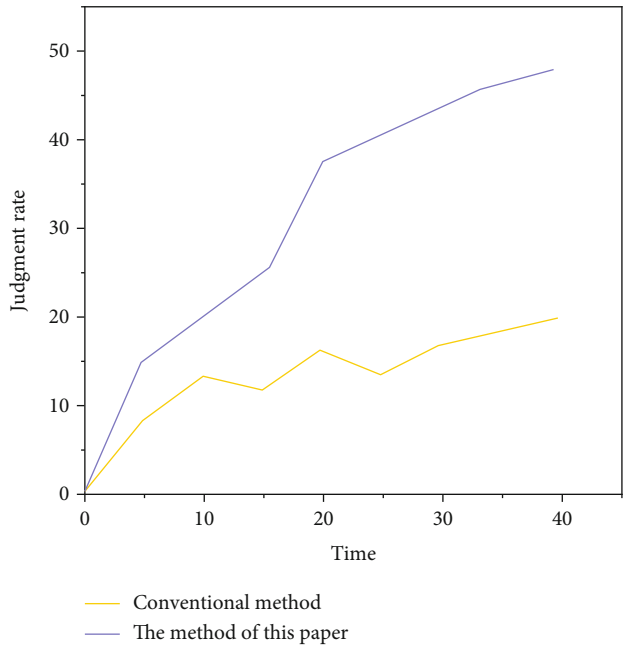

Figure 5: Comparison results of two methods for judging speed.

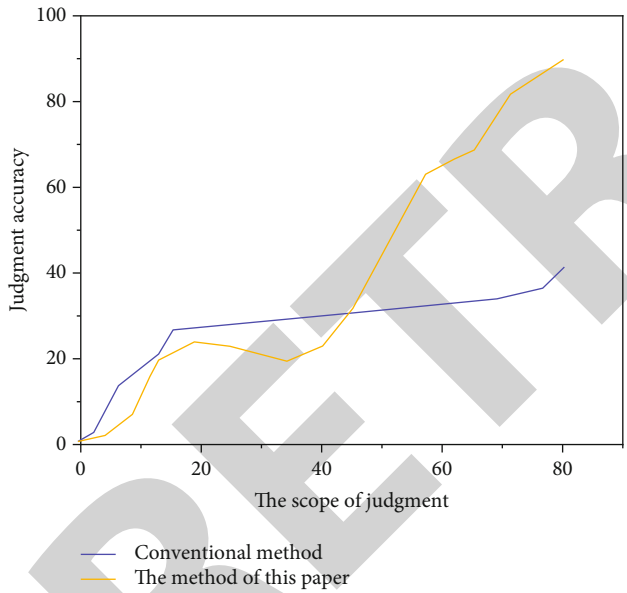

Figure 6: Comparison results of judgment accuracy of two methods.

of the fastest estimate for a 3D image model. This shows that the pace of use of the traditional method of assessing the optimal landscape of a garden is slow and sluggish. The speed of 3D image simulation method is faster. The comparative results of the accuracy of the conclusions are shown in Figure 6. As seen in Figure 6, there are slight differences between the conventional procedures used to measure the quality of the construction. It can be seen from Figure 6 that when the judgment range is less than 20%, there is little difference in the accuracy of the rationality judgment of landscape design between the traditional method and the method in this paper. The truth of the judgment is always higher than in this way. When the detection range is 20%~45%, the accuracy of the standard is always higher than this model. However, as the scale has gradually expanded, the accuracy of the three-dimensional image simulation method used in this paper has gradually improved to 89%, when the process is always in place around 40%. Therefore, the process of drawing conclusions based on the modeling of 3D images is more accurate than the model of measuring the quality of landscape design.

The number and contrast of landscape data obtained by depth measurements are usually less than the three-dimensional imaging modeling method used in this paper, and the value of landscape optimization is slower and slower. The fact that the three-dimensional simulation method is faster to adjust the characteristics and filtration speed proves that this filtration method is efficient.

5. Conclusion

This article presents 3D sensor landscape model based on image sensors, which contain 3D image model to evaluate the best view of the landscape. This method can extract and analyze landscape design data, reduce the error of the conclusions, and improve the speed with simple filter steps. Attempts to identify the results of the experiment have shown that this method is effective and capable of making high decisions, which is an important theoretical basis for the application of classifications properly. In particular, there is no significant difference in the accuracy of the traditional process used to measure the efficiency of landscape design when the filtration rate is within 20%, and the accuracy of the process is always higher than in this way. When the detection range is 20%~45%, the accuracy of the standard is always higher than this model. However, as the expansion has been gradually expanded, the accuracy of the three-dimensional image simulation method used in this paper has gradually improved, and the standard has been kept around 40%.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Acknowledgments

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