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Ergonomics Research in Public Shared Facilities in Smart Scenic Spots Based on Wireless Network View

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ABSTRACT

With the continuous development of ergonomics, people are increasingly dependent on the intelligent planning of public shared facilities in smart spots. Therefore, an ergonomics study in a public shared facility is proposed based on the wireless network view. Firstly, the ergonomics model theory is briefly explained, and then the ergonomics in intelligent planning is realized by genetic algorithm, and the ergonomics model is optimized. In the verification of genetic algorithm, the convergence of the genetic algorithm and the functionality of the algorithm are tested. The test results show that the application of the algorithm greatly improves the efficiency and accuracy of the ergonomic model, which proves the research's feasibility.

Keywords: Smart Landscape, Shared Facilities, Intelligent Planning, Ergonomics

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1. Introduction

With the continuous development of wireless network technology, it has been found that the compatibility of public shared facilities and intelligent technologies in smart scenic spots is getting higher and higher. The application of intelligent technology not only brings great convenience to daily life [1]. From the perspective of public shared facilities in the smart scenic area, the application of three-dimensional intelligent technology also greatly facilitates the cumbersome workload and improves the overall work efficiency. With the continuous development of the overall science and technology, the intelligent development of public shared facilities in smart spots will surely enter a new stage [2]. The intelligent technology of the wireless network needs to be fully utilized. Ergonomics is a product of the high development of computers and the Internet [3]. As early as the 1990s, 3D ergonomics technology is applied to the development of some common simulation systems such as traditional smart spots. However, due to technical limitations, 3D ergonomics is only used for material analysis. Although a project has promoted the refined development of public shared facilities in smart spots to a certain extent, the growth of technology is not very obvious, and there is still a long way to go from intelligent assisted technologies [4]. The application of ergonomics can clearly demonstrate the decomposition of a step in the smart scene to the production workers in three-dimensional form, and provide pause or repeat presentation options at any time, so that they can make breakthroughs in manufacturing. At the same time, it is also possible to conduct a comprehensive analysis of the materials of various parts of the public facilities [5].

2. Related Work

With the continuous development of wireless network ergonomics assisted technology, it has also been continuously developed in the advancement of public shared facilities technology in smart spots [5]. In the development of ergonomics assisted technology, as early as the emergence of Internet technology in the last century, people began to think about applying 3D technology to various industries of social production [6]. With the emergence and development of 3D ergonomics technology, the overall level of intelligent planning is also steadily increasing, reflecting the characteristics of the intelligent shared public facilities intelligence and ergonomics technology complement each other [7]. Although China's ergonomics-assisted model has achieved initial results in application, it still has some disadvantages compared with traditional developed countries such as Europe and the United States. With the continuous advancement of science and technology, in recent years, the gap between the development of ergonomics and foreign technology has become smaller and smaller. With the further improvement of overall productivity, the convenience brought by the ergonomics model will gradually be reflected. [9]. In the design of ergonomic auxiliary model, based on the original algorithm, the improved genetic algorithm is added. With the addition of genetic algorithm, the structural level of the model becomes more vivid. Nowadays, some scholars have begun to use wifi algorithms for ergonomics-assisted testing, but no substantive results have been studied, but with unremitting efforts, they will certainly achieve amazing results [10].

3. Methodology

3.1. Construction of Ergonomics Model

In order to realize the design of the ergonomics model, it is necessary to construct a mutual overlapping model for the information source collection of the ergonomic model, the information source data processing and the information source information output. In the 3D model design, as shown in Figure 1, the focus is on timely feedback after processing the input system. The first step is to import the initial ideas into the wireless network solution editing, and then carry out the basic data collection. In the process of collection, the special analysis and comprehensive evaluation are taken into consideration, and then the feedback is centralized. Appropriate adjustments are made, which is a process of continuous cyclical adjustment. The establishment of this feedback loop mechanism is conducive to timely processing and feedback of process information, and accelerates the work efficiency in the design process of public shared facilities in smart scenic spots. Through comparison, it can be found that the overall level of intelligent planning of public shared facilities in smart scenic spots is more refined and deeper, while China lacks tension in this respect, which is the result of deep research, and there is still a long-term goal. The road is going. Secondly, the hardware and software requirements of the wireless network should also be considered. The application of the new technology puts a certain degree of requirements on the performance of the wireless network. Since the system has corresponding graphics and video integration and output functions, in terms of configuration, as shown in Table 1 below:

Project	Hardware constitution	The main influencing factors of the system energy
Graphics workstation	Professional graphics cards	Memory, hard disk
Collaborative design system	Data transmission line	Network status
VR system	Excellent integrated display	Data acquisition
Microcomputer	A central processor	Graphics accelerator card

Table 1. Hardware Design of Auxiliary Scenic area facilities under Wireless Network

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In Table 1, it can be seen that the operation of a good system improves the configuration of the wireless network, and not only has certain technical advantages in the graphics processor, but also considers the smoothness of the network in terms of coordination. In the aspect of virtual reality system, higher configuration requirements are put forward for the wireless network, not only the accuracy of data processing but also the investigation of the surrounding environment. Using wireless network assistance, the design concept can be displayed in the form of data and graphics, which reduces the designer's work pressure and improves work efficiency. The function of the wireless network is comprehensive. It is necessary to fully combine the simulation of the wireless network with the actual work and improve it on the basis of the wireless network. The intelligent scenic spot auxiliary system based on ergonomics assisted technology is not only simple capture processing of public facility data in the smart scenic spot, but also into the database. The system has self-learning function, which can utilize the big data processing function to bring the smart scenic spot. The daily public facilities are integrated, and the strong items and weak items in the public facilities are displayed in the smart scene through ergonomics technology, and based on their own powerful data processing capabilities, the desired effect in the smart scene will be achieved. After inputting the database, after the above series of algorithms, the intelligent scenic spot effect can be extracted from the database, and the technical means such as algorithm integration and modification of the action angle are used to carry out the design innovation and combine the constraints in the smart scenic spot, which has practicality and predictability of effect, and predicts the time to complete the completion of the smart spot based on the cumbersomeness and complexity of the smart spot. In order to enhance the consistency of each data processing, further consideration is given to combining the various data modules. The overall model diagram is shown in Figure 1.

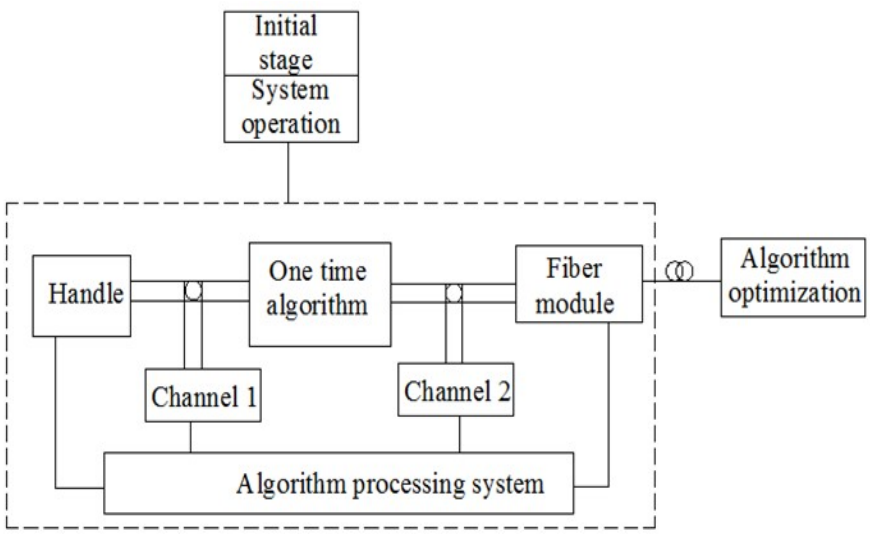

Figure 1. The technology of 3D geometric model

It can be known from the above map that the construction of the ergonomic model is very simple and conforms to the application of the wireless network intelligent technology to the smart scene. The model not only creates a data plan for smart process design, but also has a large 3D database of data, each in a 3D database that is clearly visible and provides simple and intuitive scoring like different process designs, which simplifies the cumbersome process design in intelligent process design, and realizes the level of differentiation in the process of intelligent scenic spot.

3.2. Ergonomics-assisted Model Based On Genetic Algorithm

The preprocessing of data becomes more refined, and there is no longer a general classification of data resources, but the requirements of each level are separated. The biggest optimization of the genetic algorithm is that after the data is separated, the analysis based on the whole action is reduced, but according to the actual situation and the platform between each video data transmission. In the aspect of applying genetic algorithm to platform construction, the data is mainly classified into algorithms: the target data is in the general direction, and the structure of the distributed data and the unit data body is constructed. λ represents the total amount of data, n represents the data classification, and x, y represent the horizontal quantity and the vertical quality of the data block, respectively. The specific algorithm is as follows:

$$\lambda = \frac{n\sum xy - \sum x \sum y}{\sqrt{\left[n\sum x^2 - \left(\sum x\right)^2\right]\left[n\sum y^2 - \left(\sum y\right)^2\right]}} \quad (1)$$

Firstly, through the calculation of the above formula, the number of required target data is obtained and the coding of the video teaching is carried out. The specific code is used to classify the scattered data under the jurisdiction, and the wireless network data is used to automatically normalize it for the next step. Prerequisites are provided. Based on this data encoding, for the distributed data, the y is regarded as the sum of the target data, then b is the number of distributed data, x is the number of categories of distributed data, and a is the number of unit data blocks. Through the following formula, the classification and integration scheme of distributed data is obtained.

$$\begin{aligned} y &= a + bx \\ b &= \frac{n\sum xy - \sum x \sum y}{n\sum x^2 - \left(\sum y\right)^2} \\ a &= y - bx \end{aligned} \quad (2)$$

After the integration of the distributed data is completed, the final part is divided into small data partitions based on the unit, β represents the total amount of unit data, x is the number of categories of distributed data, and y is regarded as the sum of the target data. a is the number of unit data blocks, b is the number of distributed data, and n is the dispersion coefficient. The scheduling method adopted is a weighted minimum connection method. The specific algorithm is as follows:

$$F(S_i) = k_1 \times (1 - C(S_i)) + k_2 \times M(S_i) \quad (3)$$

In this formula, the main consideration is that every database resource can be applied. S1 to Si represent the number of each independent database in this cluster system. As these databases participate in the overall data analysis, the overall computing power will also be strengthened. In addition, C(Si), M(Si), and W(Si) represent the occupancy of each data node. And once a node fails, the other nodes will be supplemented accordingly, that is, the formula is explained. When k1+k2=0, the following formula appears:

$$W(S_i) = F(S_i) \quad (4)$$

The above formula is mainly a special case when a certain database is 0, and it is also an embodiment of the self-adjusting mechanism of the algorithm. However, the node is 0, which represents the calculation of the data of the segment, and generally does not occur. Therefore, set the value of K1 to be greater than the value of *K*2. It may be assumed that the ratio of k2 to k1 is approximately the golden ratio, ie k2:k1 = 0.382:0.618. Since the floating point operation has a certain load, the approximate ratio is 0.4:0.6. That is, the value of k1 is 0.6, and the value of k2 is 0.4. The weight function expression can be expressed as:

$$F(S_i) = 0.6 \times (1 - C(S_i)) + 0.4 \times M(S_i) \quad (5)$$

Then it is needed to convert $\{V_{1,1}^{i} \cdots V_{1,10}^{i} \cdots V_{n,1}^{i} \cdots V_{n,10}^{i}\}$ to $V_j^{i'}$

$$V_j^{i'} = \sum_{k=1}^{10} \left(V_{j,k}^{i} \times 2^{10-k} \right), i = 1,\cdots 100, j = 1,\cdots n \tag{6}$$

Then map $V_j^{i'}$ to the real number V_j^i on $\{0,1\}$

$$V_j^i = 0 + V_j^{i'} \times \frac{1-0}{2^{10}-1}, i = 1,\cdots,100, j = 1,\cdots,n \tag{7}$$

In this way, the maximum value $max\ (X_j)$ and the minimum value $min\ (X_j)$ of the module index can be calculated.

For the calculation of fitness, the following formula is used for simple calculation and integration.

$$fitness\ (i) = \frac{Y_{1(i)}}{N_1} \times \frac{Y_{2(i)}}{N_2} i = 1,\cdots 100 \tag{8}$$

The selection method for selecting the genetically adaptive i generation by the screening method is as follows:

$$P^{(i)} = \frac{fitness(i)}{\sum_{j=1}^{100} fitness(j)}, i = 1,\cdots 100 \tag{9}$$

j is the individual serial number; V is the index number; C is the score of each indicator; Y is the threshold of the indicator; N is the number of nodes predicted correctly; X is the total number of nodes; After the completion of the entire basic algorithm data, the design idea is verified by outputting the three-dimensional data.

Let the new value of X_1^{t+1} after the variation of the individual $X_1^t = (x_1, x_2, \cdots x_n)$ of the t generation n dimension vector, select an argument x according to the uniform distribution characteristics, it will mutate into a uniform random number r

$$\mathrm{x}_i = \begin{cases} r, i = j \\ xi \neq j \end{cases}, j \in \{1,2,\cdots \mathrm{n}\} \tag{10}$$

The entire calculation process is shown in the following table:

Initial population	**The value of X**	**Fitness**	**Selection probability**	**Fitness expectation**	**New generation population**	**Fitness**	**Selection probabil-ity**	**Fitness expec-tation**
00001000	8	65	0.07	0.26	00001000	00001010	10	101
00000100	4	17	0.02	0.07	00000100	00011000	24	577
00011010	26	677	0.60	2.36	00011010	00011111	31	962
00001111	15	266	0.23	0.92	00001111	00001010	10	101

Table 2. Calculation results of the algorithm

The mechanism of the entire algorithm modeling model cannot only make the cumbersomeness away from the traditional 3D ergonomics, but also bring different model construction and optimize the process design. These modules are combined for analysis by neural network algorithms (See figure 2).

The algorithm-optimized data is tested, and if the stop criterion is met, the data is exported, and then the accuracy of the test data is saved and the data is saved for use. If not, return to the genetic algorithm calculation step to continue the calculation analysis. The design of this genetic algorithm is very suitable for the application of public shared facilities in Huijing District, ensuring the speed of calculation and ensuring the accuracy of the calculated data. It is a new algorithm that is successful in combination with applications.

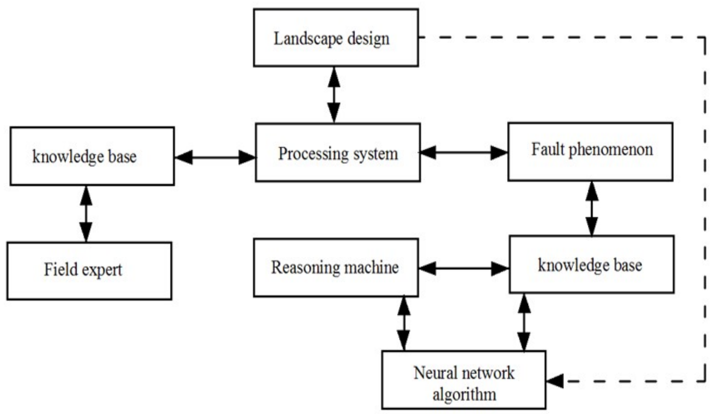

Figure 2. Pattern Fusion of genetic algorithm and Ergonomics

4. Result Analysis and Discussion

After the algorithm design is completed, the convergence of the genetic algorithm and the overall functionality are tested. The main aspects of the test are accuracy and length of calculation. The genetic algorithm of this paper is compared with the traditional algorithm in the 3D model, and the results are analyzed according to the experimental results. The advantages and disadvantages of the algorithm are improved. In the ergonomic model system, the obtained model-related processing results are displayed in the form of tabs in the output window at the bottom of the system interface window, so as to query and verify various data information, there are 5 tabs in order: feature attribute adjacency matrix, sub-adjacency matrix, feature matching result, processing element processing, design information. It is recognized that the manufacturing feature recognition module

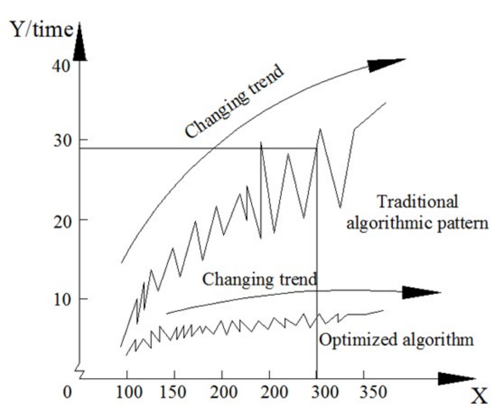

Figure 3. Efficiency testing of algorithm in feature extraction of facilities

of the model tests the geometrical information of each curved surface and its boundary of the extracted three-dimensional model to obtain the properties of each surface and its boundary: the type of the surface, the type of the boundary and its concavity and so on. By analyzing the attribute information, several facilities are combined into features of manufacturing significance. The extraction results are as shown in figure 3.

In order to facilitate the wireless network processing, according to the definition of the extended attribute adjacency matrix, the different attributes are encoded, and the extended attribute adjacency matrix of the model can be obtained, and then the child adjacency matrix is extracted and the adjacency matrix of the predefined feature attributes is extracted. The matching is performed, and finally the types of the features and related feature information of the model are obtained. The model contains 96 surfaces, so its attribute adjacency matrix is a matrix of 96×96 order. The traditional model has a large amount of data and cannot be displayed at the same time. It can be realized by using the horizontal and vertical scroll bars in the algorithm tab. For the viewing and verification of all data, the resulting nodes are arranged as shown in figure 4.

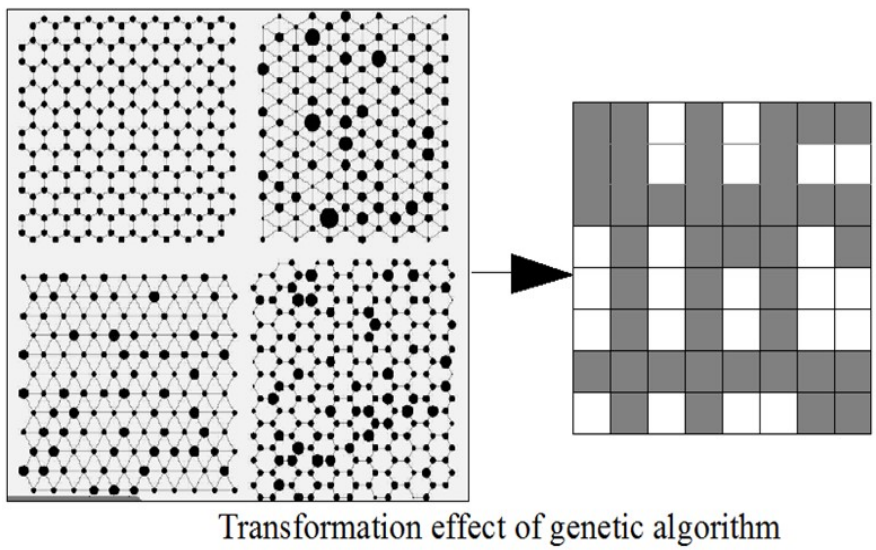

Figure 4. The results verify the Apriori algorithm

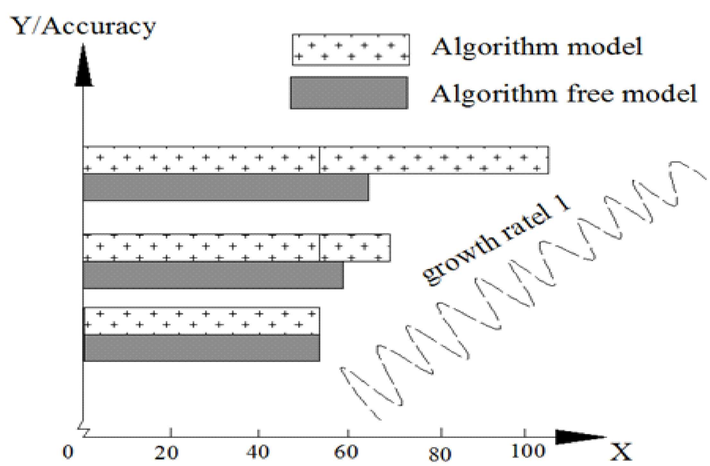

Figure 5. Results test chart for data management

It can be seen from the data in the figure that through the detailed analysis in the figure, it can be understood that after the model of the genetic algorithm is added, the experimental group with the genetic algorithm has strong data derivation ability under the influence of other interference factors. However, the data of the control group without genetic algorithm can not be carried out. It can be concluded that the data can be better managed on the basis of algorithm management. Compared with the management without algorithm, it also shows that the algorithm adapts to the environment, which can play a good role in different environments. The whole research shows that the addition of genetic algorithm has strong feasibility for data mining processing analysis. The research on basketball teaching reform of genetic algorithm is feasible. After gaining an in-depth understanding of the corresponding video transmission methods, learn their strengths and pay attention to the mistakes they made in the data splicing construction. It is of great help to design this algorithm model. With unremitting efforts, certain achievements will be achieved. The ergonomics reform in the public shared facilities of the smart scenic spots can be continuously promoted through genetic algorithms.

5. Conclusions

With the gradual maturity of ergonomics technology, the ergonomics model of genetic algorithm is added in time according to the characteristics of scenic area planning. Based on the above understanding,an ergonomics study in the public shared facilities of smart scenic spots is proposed based on the wireless network view. Firstly, according to the characteristics of scenic area planning and design, the corresponding ergonomics model is developed. By constructing the model, the effective transmission of data is realized on the basis of the planning theory of public shared facilities in the smart scenic spot. In order to make the planning of the model more targeted, based on the 3D ergonomics model, the genetic algorithm is added. The function of the genetic algorithm is to make the data arrangement of the 3D model more rigorous and provide corresponding database sorting functions. In the test process for the ergonomic model, firstly, the algorithm tests the properties of each surface and its boundary. In the test results, the experimental group with the genetic algorithm has strong data derivation ability without genetics. The data of the control group of the algorithm cannot be performed. It can be concluded that the data can be better managed on the basis of algorithm management. In summary, the algorithm research proposed in this paper is feasible.

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