Lecture Notes in Electrical Engineering 1133

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Frontier Computing on Industrial Applications Volume 3

Proceedings of Theory, Technologies and Applications (FC 2023)

Springer

Lecture Notes in Electrical Engineering 1133

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Jason C. Hung · Neil Yen · Jia-Wei Chang
Editors

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ISSN 1876-1100 ISSN 1876-1119 (electronic)
Lecture Notes in Electrical Engineering
ISBN 978-981-99-9415-1 ISBN 978-981-99-9416-8 (eBook)
https://doi.org/10.1007/978-981-99-9416-8

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Application of Parametric Generation Technology in Landscape Architecture Planning and Design

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Abstract. Parameterization is developed on the basis of the development and application of computer technology to a certain level. Driven by digital technology, parametric design has started and discussion in the fields, providing a new way of thinking to solve problems. It is the process of using parametric generation technology to design and plan landscape architecture. This is a technology to generate different types of landscapes from a set of parameters defined in the form of mathematical equations. Parametric generation technology has been used in landscape architecture for many years, but it has not been widely used until recently due to its complexity and high cost. However, with the development of computer capabilities and software tools, it has become an affordable solution for creating landscapes and other applications, such as urban design.

Keywords: Landscape architecture · Parameterization · Generation technology · Planning and design

1 Introduction

With the development of the times, human beings continue to develop and consume nature, which has caused a serious ecological crisis. The living environment of human beings and other creatures has been damaged. At the same time, the development of urban projects has caused the destruction and disharmony of the urban landscape. As one of the three pillar disciplines of residential environmental science, landscape architecture plays an important role in improving the living environment, maintaining the natural ecological environment, and promoting the sustainable development of human beings and cities, As an important part of public open space, it can provide good ecological environment and habitat conditions for human beings and other creatures, and can inherit excellent traditional culture, continue the memory of places, and highlight local characteristics [1]. Professor Wang Xiangrong once said: "The positive significance of landscape architecture does not lie in what form and landscape it creates, but in its positive role in social development". Therefore, landscape architecture is of great significance to natural ecology and human settlements. The design method of landscape architecture is the basis to ensure the role. The design process architecture is the and

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J. C. Hung et al. (Eds.): FC 2023, LNEE 1133, pp. 1–7, 2024.
https://doi.org/10.1007/978-981-99-9416-8_1

technology and humanistic arts. It requires not only the objective factors of the site, such as terrain, vegetation, road traffic, etc., but also a certain art form to carry and express the site culture and humanistic values [2].

The logic of computer design software itself is to find the key to solving problems through programming. The logic of programming and landscape architecture design complement each other, affecting the design field, and it enables human beings to have unprecedented ability in dealing with complex environmental problems. BIM, parametric design, algorithm generation and other digital technologies have begun to be applied to the disciplines and industries of architectural design, urban planning and other related fields. Computer technology has gradually changed from auxiliary drawing to auxiliary design, and the technology has also become increasingly practical [3]. The relevant design software based on computer technology itself is an accurate program synthesis under the programming logic. Therefore, using computer technology can help us analyze and establish design logic more accurately and form more scientific design results.

2 Related Work

2.1 Research on Parametric Design of Landscape Architecture

In recent years, under the continuous exploration of many domestic scholars, parametric design has been gradually applied. It is hoped that parametric design, a new method, can be introduced into landscape architecture design, change the thinking of landscape architecture design, and make bold innovations in design methods. Based on parametric design, data and facts, the design is carried out through a logical concept of system theory, so as to make the design results more scientific and reasonable. In the research on parametric design of landscape architecture, scholars from Tsinghua University, Beijing Forestry University and Tongji University have studied the parametric design method [4].

The application of parameterization in the whole design process in China is mainly realized in small scale. For example, in the parameterized layout design of an exhibition park, a parameterized design is carried out for a smaller scale exhibition park. However, overseas countries have been able to use a variety of parameterized design theories and software platforms for different scales of practice. On the basis of combing the examples and theories of parametric design at home and abroad, this paper sorts out a whole set of parametric design process of landscape architecture, which can be used for reference.

2.2 Landscape Parametric Design

The design method is to analyze and digitize the terrain, hydrology, soil, vegetation, space, economy and culture and other factors that affect the design on the relevant software platform. The parameter information attributes shall be unified during data processing to facilitate the determination of parameter relationships later. These data information will be input into the established parameter relationship as parameters, and the design system will be constructed. After calculation and constant adjustment of parameters, the design results that are suitable for the site will be obtained. This is an innovative design method from top to bottom. In the parameterized design method of landscape architecture, the influencing factors analyzed in the earlier stage effectively control the generation of design results, and make the parameter factors interact through the setting of parameter relations and rules [5]. At the same time, the process of formulating the parameter relationship is also the process for designers to discover and understand the logical structure and spatial order of the internal regularity of landscape design. Therefore, landscape parametric design is a design generation based on logical construction.

The traditional design method of landscape architecture emphasizes inspiration design, and the design results lack integrity and relevance with the preliminary design analysis. The parametric design method generates the design by relying on the parameter relationship between the influencing factors. The influencing factors directly control the generation of the design results. With the adjustment of the parameters, the design results will change constantly. This is a dynamic process, and the design results are also generated dynamically, It is no longer the only design result.

3 Advantages of Parametric Design Applied to Landscape Planning and Design

(1) Changes in design thinking
The traditional design method is that the designer constructs a design phrase in his mind based on the preliminary analysis, and then starts to design. However, the later design is always disconnected from the preliminary analysis, and the same is true in the later modification process. The designer modifies the content of the scheme, but has ignored the data of the preliminary analysis. However, the parametric design process is bottom-up. First, we refine parameters according to the design requirements, and calculate them through the set rules. The generation of the results is dynamic. If the design results are not what we want, we can change the parameters or adjust the rules to affect the generation of the design results. Parametric design is that the influencing factors of preliminary analysis directly control the generation of design results through system rules. Parameters, parameter relationships and design results form a system that is interrelated. The parameter factors of preliminary analysis are always related to the design results, which makes the design more precise and sustainable.

(2) Improved design efficiency
Parametric design process is a dynamic design process. Different parameter inputs will form different design results, which can provide customers with a variety of alternatives. In traditional design, every alternative is a repetition of the design process. The key of parametric design is to establish parameter relations. The establishment of parameter relations indicates that the construction of the design system has been preliminarily completed. Therefore, changing the parameter relations in this design system will output a variety of design results. The number of design schemes only depends on the number of input parameters. At the same time, most of the time, the scheme design is improved and improved after communication with Party A, and it is refined and deepened on the basis of the general plan. However, each revision and deliberation is a repetition of the previous design process. In parametric design, the design process is realized through the parameter relationship system. If it is necessary to modify the design results, the design results can be changed by re judging the parameter factors or adjusting the parameter values; If the desired result cannot be obtained only by modifying parameters, you can add the required design script to the design relationship to improve the parameter relationship, which can also play a role in modifying the design result. In this way, the design becomes faster and more efficient. However, the premise of parametric design is that it is required to fully consider various factors and their relationships in establishing parameter relationships, and it is necessary to build rigorous logical relationships.

(3) Advantages of parametric software application
At present, there are many kinds of parametric software, and parametric software has advantages in landscape planning and design. For example, grasshopper, processing, rhinoscript, etc. can be used to establish parameter relationships; Particle flow in MAYA software can be used for fluid simulation. ArcGIS can analyze terrain, landform, water body and other influencing factors, and digitize these factors. These parameter software can process a large amount of data in terms of parameter data or parameter relationship determination, and form scientific data results, which improves the scientific nature of the design.

The architecture is shown in Fig. 1.

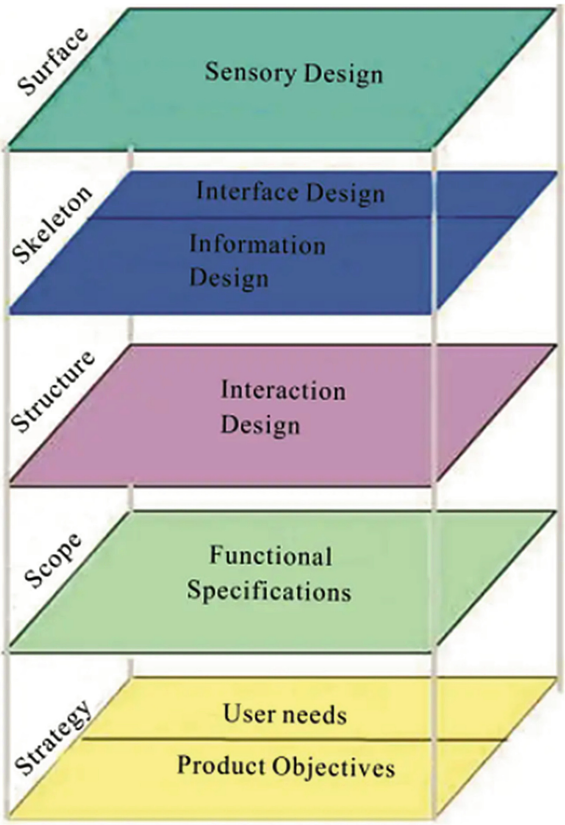

Fig. 1. Parametric Design Framework of Landscape Architecture

4 Application of Parametric Generation Technology in Landscape Architecture Planning and Design

Parametric generation technology is mainly based on the digital technology platform, relying on computers to establish scale parameter indicators. The generated design results can build a perfect and effective landscape planning system while having a modern art form, making the landscape planning more scientific and artistic. The application of parametric generation technology will break the structural oneness and apply it to landscape architecture planning and design in a more scientific experience mode. Landscape architecture planning and design is a "bottom-up" design process, which includes structural elements such as location information, natural factors, preliminary design and in-depth expression. Parametric generation technology can scientifically and accurately conduct location analysis through computer intelligent algorithm, which makes designers avoid the restriction of objective factors and greatly improve their work efficiency [10]. In the process of practical operation, We can carry out reasonable location regulation based on individual subjectivity to realize the combination of sensibility and rationality in the real sense.

Parameterization, also known as parametric quantitative design, is to establish a derivative relationship between the model and data. That is, based on the formation of the design thinking logic, the parametric model is constructed according to the numerical value. The application of the parametric generation technology can form a chain reaction by adjusting a single numerical value, that is, the generation result will change according to the change of the numerical value. As shown in Fig. 2, two different location planning models are generated based on different values.

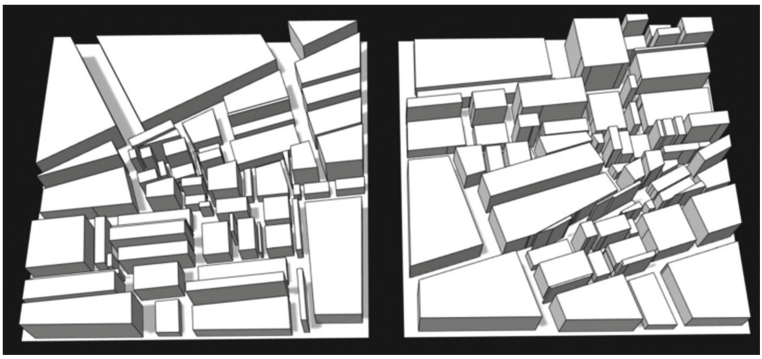

Fig. 2. Parametric landscape architecture planning model

It can be seen that the application of parametric generation technology has improved the scientificity of planning and design, made model modification more convenient and saved a lot of time. In terms of platform selection, designers can use different parametric design software according to personal task settings, such as using GIS for data analysis in the early stage of design, including some large-scale terrain, landform, slope and aspect analysis; Using GRASSHOPPER to model landscape topography and regional landscape sketches can also give complex skin texture to special-shaped structures. Of course, for the application of parametric generation technology, we should not blindly pursue visual perception, but should combine regional culture and modern science and technology to balance the relationship between modern and classical, science and art.

5 Conclusion

The parameterized design method of landscape architecture provides designers with an open and dynamic view, which is a change in design thinking. It enables designers to deal with complex landscape architecture design systems with a changing and discovering vision. On the other hand, parameterization enables landscape architecture design to gain a more scientific, objective and rational understanding and the ability to analyze the operation and development of things. The development of parametric design method in the landscape architecture industry is a long-term and long process, which represents a trend of landscape architecture design in the future. This requires the joint efforts of designers in the industry and software developers outside the industry to constantly

practice and improve the parametric design method, so that it can become an operational system of theory. At the same time, parametric design methods and related software development should be gradually introduced in college education.

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Evaluation Method of Skilled Personnel Based on Factor Analysis and BP Neural Network

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Abstract. Skilled talents are the core of any organization; They are the people who make or break the company. A successful enterprise depends on the skills and knowledge of its employees. Therefore, it is very important to select the right employees for your company. One of the most common ways to assess an individual's skills and knowledge is through the Assessment Centre. However, this method has some disadvantages, such as time-consuming, difficult to evaluate specific skills, and methodical errors when using different methods to measure certain skills. The evaluate technicians, and determine the most effective method to select technicians. The goal is achieved by using model to analyze the data obtained from companies with high demand for employees with specific skills. Factor analysis was used to evaluate technicians according to age, education level, gender, experience and other factors. The skill level of personnel is determined by using Bp neural network. The results show that both methods can identify some suitable candidates, but there are differences between them.

Keywords: Talent evaluation · Factor analysis

1 Introduction

The personnel department is the core of any organization. It plays in determining business and efficiency. A good management system depends on a strong and effective personnel department. To achieve this goal, you need to select qualified individuals for employment positions. This means that you need to have a process to determine who should be hired to which position. Without an effective evaluation method, you will not be able to effectively manage human resources. Is it for recruitment? Or promotion? Or year-end evaluation and performance appraisal? Before conducting talent evaluation, enterprises must be clear about the purpose and specific application scenarios of talent evaluation [1]. They should fully understand the needs of each position in the enterprise, especially the characteristics of each position, the needs of people and the focus of evaluation. Whether it is recruitment or team assessment, these contents will be important references. Only in this way can we ensure that we have a definite aim and that good steel is used on the blade. The traditional selection method has a strong subjectivity and randomness, which often leads to the adverse consequences of employees being unfit for their jobs and

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J. C. Hung et al. (Eds.): FC 2023, LNEE 1133, pp. 8–13, 2024.
https://doi.org/10.1007/978-981-99-9416-8_2

overstaffing. The use of talent evaluation technology can fully understand the quality of people, so as to select people according to the situation and match people with jobs. When enterprises need to recruit talents from outside, they can master the quality of candidates through talent evaluation, so as to select the best candidates. When an enterprise needs to make personnel adjustment internally, talent evaluation can be an important reference for such adjustment, which is conducive to making the best use of talents [2]. Therefore, aiming at the above problems, this paper studies the evaluation method of skilled talents.

2 Related Work

2.1 Trend Analysis of Technical Talents Evaluation

In order to correctly the evaluation of technical and skilled talents, we also need to have a clear understanding of the talent evaluation mechanism. Talent evaluation mechanism includes systematic talent evaluation system, evaluation institution, evaluation standard, evaluation content, evaluation object, etc. Therefore, it can be considered that the talent evaluation mechanism is a socialized mechanism based on occupational classification and post analysis, relying on professional talent evaluation institutions, setting scientific and reasonable evaluation standards, building practical evaluation indicators, and using multiple evaluation techniques and methods to reasonably measure and evaluate the level and ability of professional talents. Since the 18th National Congress, the Party and the state have paid more attention to talent evaluation than ever before, and the evaluation of technical and skilled talents has also shown a new trend of development, mainly including: first, the clarity of strategic objectives. The fundamental goal of talent evaluation is to form a good talent development orientation through evaluation, tap talent potential, stimulate innovation vitality, and help the development and allocation of human resources. In the new economic development situation, the core strategic objective of China's evaluation of technical and skilled talents is to focus, give play to the role of the "baton" and wind vane of talent evaluation, stimulate the innovation and creativity of technical and skilled talents, improve the ability to tackle key technologies in key areas, and promote high-quality economic development. Second, the evaluation subject is diversified. From the context of historical policy documents of talent evaluation, we can find that the subject of talent evaluation has gradually moved from official to diversified, socialized and market-oriented [3]. This trend is formed with the basic establishment of the enterprise's decision-making power, the expansion of the employees' independent employment space and the gradual growth of the labor market. In fact, talent evaluation has become one of the important contents of human resource service industry. According to statistics, various human resources service institutions provided 28.418 million person times of talent evaluation services in 2017, an increase of 11.8% year on year. Third, the evaluation object is subdivided. With the development of market economy and the continuous refinement of social division of labor, China's talent structure is becoming increasingly complex [4]. Only scientific classification of talents can ensure the rationalization of the development of evaluation standards and the setting of indicators. In fact, promoting the reform of talent classification and evaluation is one of the important trends of the national talent evaluation reform, which is in line with the requirement of "professional expertise". Especially for technical and skilled

talents, only by subdividing the evaluation objects can we respond to the demand for talents from industrial development in a timely manner, can we focus on each other in the talent evaluation link, and feed back the talent evaluation orientation to the talent training link, so as to help the national talent training reform.

2.2 BP neural Network

BP one of the more mature neural networks currently developed. It is also that compares the awesome nonlinear differentiable function for weight correction and adjustment. It can withstand rigorous mathematical logic deduction and is widely recognized in many pattern recognition books and many data compression papers. The main feature is the forward transmission of input signals, Back propagation of error. The essence of the learning algorithm of BP network. There are three layers of network structure, including [5]. A typical network structure can be composed of the following parts, as in Fig. 1:

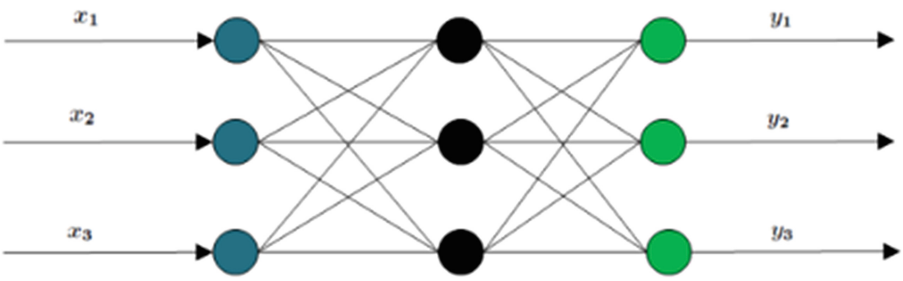

Fig. 1. Structure of network model

In the neural network, we have many activation functions to choose from, but we still choose to use the sigmoid function here. Why do we choose this function? Because I have collected a lot of resources. If we use some other activation functions or give up using activation functions directly, but how many times we use hidden layers, we finally get a linear function. But after using nonlinear sigmoid functions, this problem will not occur. Our network can also fit nonlinear functions.

3 Skilled Personnel Evaluation Method Based on Factor Analysis and BP Neural Network

Applying BP theory to the competency of skilled talents can simplify the process, and ultimately achieve the goal of improving the efficiency of talent evaluation. In the process of creating the model, the network model needs to have a good generalization ability, that is, the network model constructed must be able to have a strong tolerance for various samples. Therefore, the network structure, the number of neurons, the initial value, the target error, the learning algorithm and other factors must be considered when building the network model.

The general steps to evaluate the skilled talents are: select a scientific and reasonable evaluation method, measure the indicators of each skilled talent, and comprehensively obtain the level of competency of scientific and technological talents. According to the mapping network existence theorem, the linear or nonlinear mapping. According to the above BP neural network structure characteristics, scholars usually use a BP neural network containing a hidden layer in practical applications can meet the needs of research. Based on this, when building the evaluation model of skilled talents, this one hidden layer. When building the model, it only needs to set the optimal. The BP neural network structure of skilled talents is shown in Fig. 2.

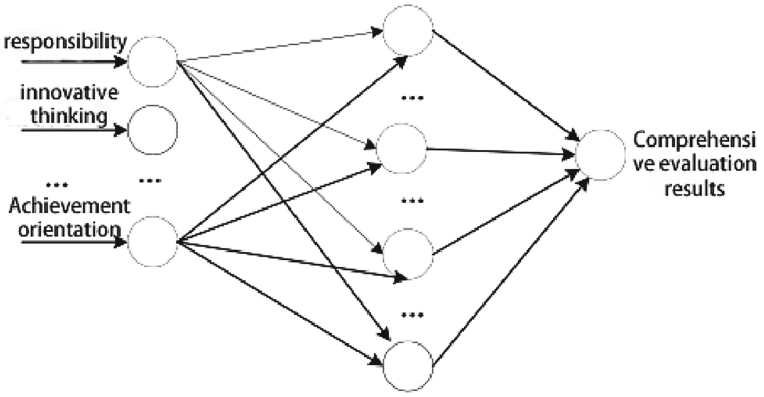

Fig. 2. BP Neural of Talent Evaluation Model

After the BP neural network structure is determined, the next step is to design the network layers, parameters, training methods, etc. of the model to form a complete evaluation model for skilled personnel.

This paper studies the evaluation of skilled talents, drawing on the selection method of transfer function in previous scholars' research on talent evaluation and personnel post matching evaluation. When studying talent evaluation.

Training function: It is training according to the specific requirements of the research problem itself and the size of training samples. Considering that the training samples for the evaluation of skilled personnel studied in this paper are relatively small, the gradient descent algorithm with adaptive adjustment, and the traingda is selected accordingly.

The setting of error value will directly affect the effect of network training. If the error value is not selected properly, the network may converge too quickly, the network may be unstable, or it may not converge all the time. Therefore, the selection of error value is very important. If the error value is set too large, rapid convergence may occur in the network training process, and the number of training times and training time will be greatly reduced. If the error value is set too small, the convergence speed will slow down, but the learning effect will be a little better than the case of large error value. Through experimental verification, the error the skilled personnel evaluation model established in this paper is 0.001, that is, when the error value reaches 0.001, the network stops training and outputs the results.

4 Training Sample Establishment

The evaluation index of skilled personnel in this paper includes qualitative index and quantitative index. Due to the selection of different index measurement methods, the dimension of the index measurement data obtained is quite different and not comparable. BP can better identify the number between 0 and 1. The original data of each evaluation index should be standardized first, and the data should be standardized to the number between 0 and 1, so that the data can be comparable, thus improving the network performance and training efficiency.

The evaluation indicators constructed in this paper tend to be consistent on the whole. The larger the number of patent licensing and scientific and technological projects, the better the evaluation results. For qualitative indicators, the higher the score, the better the scientific and technological talents' performance measured by the evaluation indicator, and the higher their competence in the job.

The sample training programming code is shown in Fig. 3 below.

```
net = newff(minmax(P),[12,1],{'logsig','purelin'},'traingda')
net.trainParam.show = 1000;
net.trainParam.lr = 0.01;
net.trainParam.epochs = 5000;
net.trainParam.goal = 1e-3;
[net,tr] = train(net,P,T);
```

Fig. 3. Sample training programming code

5 Conclusion

Skilled talent evaluation is an important link in enterprise management and human resource development. Currently, commonly used methods such as grading and balanced scorecard have certain limitations. Therefore, factor analysis and BP neural network based skilled talent evaluation methods have emerged. The factor analysis based evaluation method for skilled talents mainly focuses on the multidimensional attributes of skilled talents, transforming various indicators into a few comprehensive factors, thereby achieving simplification and effectiveness improvement of evaluation indicators. The BP neural network, on the other hand, establishes a neural network model to achieve adaptive nonlinear transformation of input data, thereby achieving precise positioning and optimization of the evaluation model for skilled talents. This skill talent evaluation method based on factor analysis and BP neural network has the advantages of high accuracy, strong comprehensiveness, and wide application, and has been applied

in many enterprises, institutions, and research institutions. In the future, this evaluation method will continue to develop and promote further scientific and systematic talent evaluation work.

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Design of Oscillation Controller for Camera Damping System Based on Particle Swarm Optimization

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Abstract. The damping system will oscillate during the operation of the adjusting camera, which is not conducive to the operation stability of the adjusting camera. Therefore, in order to suppress the oscillation, the corresponding controller can be designed with the help of particle swarm optimization algorithm, which will be studied in this paper. Firstly, the basic concept and application advantages of are introduced. Secondly, the controller design is carried out around the controller design idea. Finally, the optimize the control and the simulation. The simulation the controller optimized is more prominent in damping oscillation suppression effect.

Keywords: Particle swarm optimization · Adjust the camera · Oscillation controller for damping system

1 Introduction

As an important device in modern power grid system, the main function of the adjusting camera of power grid operation. However, the damping system oscillation phenomenon may occur during the operation of the adjusting camera itself, which will lead to the instability of the adjusting camera itself and indirectly lead to the instability of the power grid. In the face of this situation, people initially tried to deal with it by means of constant pressure control, but soon found that constant pressure control means could not suppress the damping generated during system oscillation, indicating that other damping suppression means should be adopted on the basis of constant pressure control. It is under this background that the oscillation suppression controller of damping system was proposed. The damped oscillation of the adjusting camera mainly refers to the regional oscillation and inter-regional oscillation occurring in the power system. Such oscillation images generally have a large frequency difference, which is the main reason that the constant voltage control cannot be effective. However, the oscillation controller of the

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J. C. Hung et al. (Eds.): FC 2023, LNEE 1133, pp. 14–19, 2024.
https://doi.org/10.1007/978-981-99-9416-8_3

damping system can suppress the damped oscillation by means of parallel compensation to maintain the voltage amplitude. At the same time, the damping system oscillation controller also has good robustness, which makes it applicable to different structure and form of the camera adjustment system. However, at present, in the research on damping system oscillation controller, the proposed oscillation controller models of damping system are nonlinear models, so the realization of the controller is very difficult, so it is adopt design the controller, particle swarm optimization algorithm is a good choice.

2 Basic Concepts and Application Advantages of Particle Swarm Optimization

2.1 Basic Concepts

Particle algorithm, which originated in 1995, and was invented by Eberhart and kennedy. Particle algorithm is created by the inventor inspired by the foraging behavior of birds [1]. That is, through observation, the inventor learned that the foraging behavior of birds is actually a goal optimization process, and its basic process is as follows: Each bird does not know the exact location of the food, but it knows how far away it is from the food. The best way to find food under this condition is to first identify the location of the bird closest to the food in the flock, and then search the surrounding area of that bird. And then expand and expand and eventually find food. According to the mechanism of this process, particle swarm optimization algorithm (PSO) should be developed [2]. The basic model of this algorithm mainly consists of four elements, namely foraging range, search range, birds and food, as in Fig. 1.

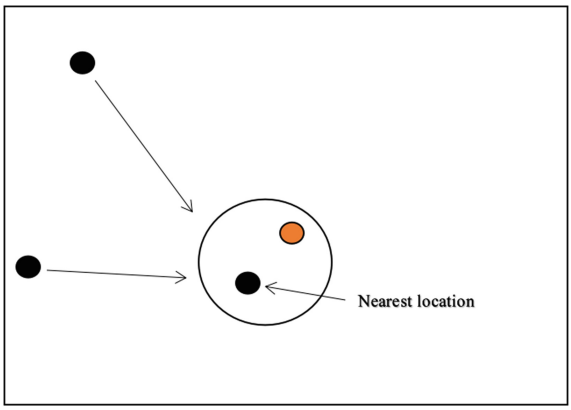

Fig. 1. Particle optimization model

(In the picture, the black circle is the bird, the orange circle is the food, the large border is the foraging area, and the white circle is the search area).

As can be seen from Fig. 1, when the nearest bird to the food is identified, other birds will move closer to this bird, and then quickly find the food in the surrounding area of

this bird, and so on. On this basis, the four elements of foraging range, search range, birds and food are brought into the algorithm, and the four elements will be converted into other elements, as shown in Table 1 for details.

Table 1. Elements after foraging range, search range, birds and food conversion in the algorithm

Before conversion	After the conversion
Range of feeding	Global scope
Scope of search	Local range
The bird	The particle
Food	Optimal solution

It is worth mentioning that the basic particle swarm optimization algorithm model is not complete, which ignores the update of the moving speed and position of each particle. Therefore, in the subsequent development of the algorithm, researchers improved the model and got a new particle swarm optimization algorithm model, which is the main reason for the wide application of particle swarm optimization algorithm in modern times. Particle movement and position update elements are added to the improved model, and specific parameters can be confirmed by formula (1) in the algorithm.

$$v[\,] = v[\,] + c1 * rand() * (pbest[\,] - prsesnt[\,]) + c2 * rand() * (gbest[\,] - present[\,]) \quad (1)$$

Usually c1 is equal to c2 is equal to 2.

2.2 Application Advantages

Particle algorithm the optimization, in addition to other optimization algorithms, such as genetic algorithm, the two algorithms have many similarities in the head, such as the basic operation steps and some rules of the two are the same, see Table 2 for details. However, PSO has its own unique application advantages compared with other optimization algorithms in different scenarios. This paper will compare PSO with genetic algorithm [3].

In Table 2, individual fitness values have different meanings in genetic algorithm. In the individual fitness value refers to whether the moving speed of particles conforms to the mean moving speed of particle swarm, which is translated into the foraging behavior of birds, that is, whether the flying speed of a bird in the flock enables it to enter the search area before the food is eaten. If it fails to enter the search area before the food is eaten, it means that the bird's fitness value is low; otherwise, the fitness value reaches the target [4]. And so on. In genetic, the adaptability of an individual of the previous generation to the environment. If an individual does not adapt to the environment, he will be eliminated by the population. In such a cycle, good genes can be inherited to the previous generation. It can is a method to purify the particle swarm through the individual fitness value, and then use the optimal to find the optimal solution [5]. Controller design.

Table 2. Common points of basic operation steps and some rules between PSO and genetic algorithm

The serial number	Steps and Rules
1	The population is randomly initialized
2	All individual fitness values are calculated. The fitness values are directly related to the distance between the optimal solution
3	The population can be replicated according to the fitness value
4	Stop when the termination condition is met, otherwise return to the second step

2.3 Power System Model Construction

According to the controller design idea in this paper, the controller design must be specific, so the power system model should be built in advance. The model design work is mainly completed on the modeling software. During the process, the main function of the adjusting camera is to adjust the voltage, and the adjustment method is to adjust the reactive load of the protection conforming. Therefore, in the model design, it is assumed that the power system detects the conforming voltage changes, and compensation is needed to ensure that the voltage amplitude of the bus is stable in a reasonable range, and the single-machine system is infinite. The input mechanical power of synchronous generator is 1, and the model is shown in Fig. 2.

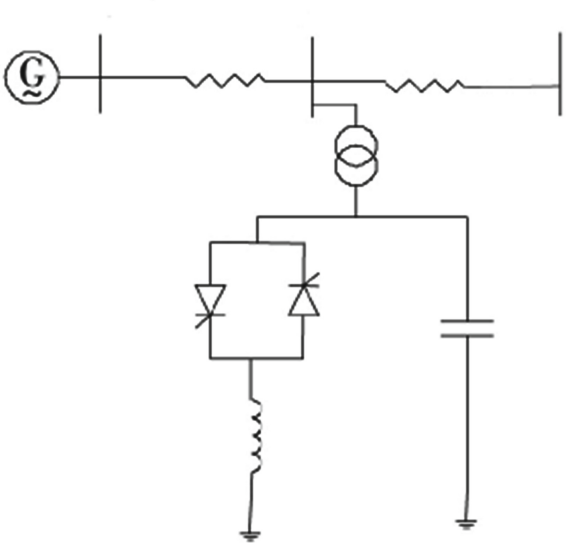

Fig. 2. Power system model

(G in the figure is the generator).

2.4 Controller

According to Fig. 2, the controller is designed in this paper. The control logic of the controller is as follows: when the tuning camera is connected to the single-machine infinite bus system, preset control parameters are adopted to control it, so as to make the voltage change and damping oscillation may occur. In the face of this situation, the gain parameters of the additional damping controller, the time constant of straightening and the time lead and lag are selected as the control, and adjusted according to the standard values in the automatic logic, so that new oscillation damping can be generated in the original system. The new oscillation damping will impact the other oscillation damping and then cancel each other out. Combined with this logic, the controller in this paper is a two-stage controller, the first stage is mainly used to output the velocity deviation signal, which can set the total power of the system at the specified position, and then compare the total power with the existing mechanical power at the set point to obtain the error integral of the two, and then multiply the error integral with the 1/M standard parameter to obtain the velocity deviation signal. In this process, the output velocity deviation signal can replace the measured velocity deviation signal, which means that the adjusting camera may not be able to get the conventional velocity deviation signal at the current position. The structure of the second stage is very similar to that of the PSS, including the lead and lag compensator.Therefore, the function can effectively improve the damping performance of the power system oscillation, so as to generate phasor torque with velocity deviation. Then, the lead and lag compensator can be used to offset the damping oscillation. It should be noted that the parameters of the lead lag compensator must be set in the second-level operation, otherwise it will not be fully compensated due to the phase shift and velocity deviation between the compensation control signals.

2.5 Algorithm Optimization

The specific optimization methods are as follows: Because the characterized by global search for the best solution, strong adaptability, fast convergence and high accuracy, the algorithm can quickly calculate the actual required oscillation values of the new damped oscillation, and ensure that the oscillation values of the old and new damped oscillation are equivalent, indicating that the algorithm can play an optimization role. In the conventional value control parameters is first set as the initial parameter of particle swarm optimization, and different parameter groups are optimized in the specific search space. During the optimization, the fitness of each particle swarm and each particle within the particle swarm should be judged by means of performance evaluation for the purpose of updating. In this paper, the ITAE performance evaluation index is selected, and the control logic is introduced after programming, so that each particle in the controller will appear two states of adaptation and inadaptation, to achieve particle swarm and particle individual update. In this way, if the particle swarm in a certain search space is composed of several particles, formula (1) should be adopted to calculate the velocity of each particle. This process will be repeated continuously, and the specific number depends on the total number of particles in the particle swarm. For example, there are N particles in the particle swarm, then formula (1) will be repeated for N times to ensure the completeness of the calculation results. After completion, because of the fast speed

of the adjusting camera can quickly understand the changes, promote the particle swarm update, so the optimized controller has a better damping suppression effect.

3 Conclusion

The camera damping system is a mechanical system composed of the camera lens, pan head, and bracket. Its main purpose is to reduce the impact of vibration and shaking during shooting and improve the quality of photography. Vibration control of camera damping system has always been a research hotspot. At present, the design of oscillation controller based on particle swarm optimization algorithm has become an effective solution. The main idea of the design of the camera damping system oscillation controller based on particle swarm optimization is to introduce the particle swarm algorithm into the vibration controller, and achieve accurate control of the vibration system by optimizing the controller parameters. In addition, this method can be easily combined with other controller design methods to further improve the vibration control effect. In general, the design method of the camera damping system oscillation controller based on particle swarm optimization is an effective vibration control method, which can help the research of the camera damping system, and has broad application prospects in other fields of vibration control.

Acknowledgements. Study and application of adaptive optimization and oscillation suppression of distributed condenser in high proportion new energy area (NO: 522807210008).

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