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Retraction

Retracted: Architectural and Landscape Garden Planning Integrated with Artificial Intelligence Parametric Analysis

Security and Communication Networks

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This article has been retracted by Hindawi, as publisher, following an investigation undertaken by the publisher [1].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. Wang and L. Chen, "Architectural and Landscape Garden Planning Integrated with Artificial Intelligence Parametric Analysis," *Security and Communication Networks*, vol. 2022, Article ID 8577269, 9 pages, 2022.

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Research Article

Architectural and Landscape Garden Planning Integrated with Artificial Intelligence Parametric Analysis

Yanxia Wang[1,2] and Leiyi Chen[3]

[1]*School of Architecture and Art, Hebei University of Engineering, Handan, Hebei 056038, China*
[2]*Handan Key Laboratory of Building Physical Environment and Regional Building Protection Technology, Handan, Hebei 056038, China*
[3]*Garden Brigade, Yuhua, Shijiazhuang, Hebei 050000, China*

Correspondence should be addressed to Leiyi Chen; 201772117@yangtzeu.edu.cn

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Parametric design, driven by digital technology, has sparked extensive research and debate in the domains of architecture and urban planning, offering a new approach to issue solving. Architecture and landscape architecture, like architecture and urban planning, are disciplines that are part of the artificial environment. Architectural landscape design has begun to be influenced by parametric design. This study presents a more technical parametric design technique of architectural landscape design that involves artificial intelligence parametric analysis and proposes an architectural landscape planning and design method that incorporates artificial intelligence (AI) parametric analysis. This is a new discipline of concurrent design that complements and expands architectural landscape design methodologies and is based on artificial intelligence methods. This study integrates artificial intelligence parametric design theory and methodology into architectural landscape design and presents a parametric method appropriate for landscape architecture design based on architectural landscape architecture characteristics.

1. Introduction

Relying on the continuous advancement of computer and digital technology, under the influence of programming linguistics, complexity theory, chaos theory, non-Euclidean geometry, system theory, and emergence theory, architectural landscape architecture design presents the characteristics of complexity and diversity. More and more complex architectural landscape projects are built around us, and parametric design methods have played a great role in this process. This may be a new design revolution brought about by technological innovation following modernism and postmodernism. At the same time, the landscapes generated by these parametric design methods show extremely high convergence. The so-called parametric design is to parameterize the result of the design. Through analysis, a certain factor that affects things is found, and then, they are qualitatively and quantitatively analyzed for data. The computer is input to compile the program to form the internal connection with the result, and the arithmetic unit is used to substitute the different values of the influencing information factors to construct the method of different information models of the output [1–5].

The development of a digital model based on a set of preprogrammed rules or algorithms known as "parameters" is known as parametric modeling (or parametric design). That is, rather than being manually edited, the model or components of it are automatically generated by internal logic arguments. The parametric design was applied earlier in the industrial field and subsequently made achievements in the aerospace and marine fields. With the vigorous development of computer technology, it was not until the 1980s that breakthroughs in parametric design helped designers. Advances in the quasiscientific field of plant and animal morphology have promoted innovations that can be applied to construction practices. Parametric design has gradually set foot in the fields of architectural design, urban planning, and landscape. It opens up a lot of possibilities for the scheme design so that the complicated problems in the traditional design can be simply solved [6–10]. Parametric architecture is defined by the following elements: rejecting homogeneous utilitarianism by combining complexity and variation. Urbanism, interior design, an architectural marvel, and even fashion are all shared priorities.

The speed of development of the construction industry in the field of parametric design is amazing. This success is largely attributable to the pioneering role of pioneering firms such as the British Architectural Alliance College, the University of California, and the UN studio in this field in the past few decades. At the same time, using parametric design as a medium, under the dual promotion of advanced philosophy and the prevalence of computer-aided design, has stimulated the rapid development of more advanced architectural ideas such as digital modeling, building information modeling theory, digital design, and nonlinear architectural design. Architectural landscape architecture is a highly interdisciplinary specialty, and the related theoretical research and application for parametric design in the landscape are relatively late compared to architectural design [11–15].

A new method of architectural landscape design is constructed from the perspective of parametric design, and new fields on the basis of traditional architectural landscape design methods are expanded. This study attempts to introduce parametric design into the architectural landscape architecture industry, combine it with today's hot artificial intelligence cameras, and provide a new idea for its planning and design that caters to the development of the digital age. By analyzing the essence of parametric design, ideological and theoretical basis, and its application in architectural landscape design, the framework of the parametric design method for architectural landscape architecture is designed. Through specific data, it verifies the feasibility and scientificity of parametric analysis integrated with artificial intelligence in planning and design for architectural landscape architecture, which provides a reference for future parametric design. The parametric design method is a model in which all environmental information is quantified after qualitative and quantitative analysis, input into a computer, and the final output information is constructed through computer algorithms. This method is relatively scientific, and it can have a complete set of analysis and evaluation reports, making the design more scientific and complete. Therefore, the addition of parametric thinking will have a profound impact on the entire architectural landscape architecture industry.

2. Related Work

The literature [16, 17] applied the parametric method to the graduate course of landscape urbanism and has formed a set of unique theoretical methods, which have been demonstrated and discussed on actual plots. Literature [18] realizes the control of urban development by constructing artificial ecology across different scales. Its mode of thinking is to use parameterized software to build an abstract operating system. The course is completed in four semesters in the form of a studio and is also designed in four different stages, namely, site indexation, sensitive system, network city, and self-realization. Literature [19] discussed and studied the latest achievements and trends in the development of digital landscapes, showing the frontiers of international digital landscape research. Literature [20] creates and uses identifiable data information to automatically manage building data. When the building progresses to the next stage, these data can be automatically identified, and these databases constitute the building information model. Now some BIM software can automatically manage some data in the landscape design process, but the current BIM software and standards are still designed for architectural models and are not good at landscape design. Regarding the development trend of landscape architecture parametric design, the literature [21] has a more in-depth study on landscape architecture parametric design, expounding the digital technology that can be applied in environmental cognition, design construction, and design evaluation by means of diagrams. It proposed a digital design strategy suitable for the development of landscape architecture and proposed that the digital landscape architecture design is scientific, objective, and able to rationally recognize and analyze things. Parametric design belongs to the category of digital design. Therefore, parametric design is suitable for application in landscape design. Literature [22] proposed the concept of digital landscape design and related concept pedigrees, summarized the characteristics of digital landscape design, and proposed an application software platform that can perform digital design, including parametric design software. Literature [23] introduces the practical application of parametric design in landscape design and puts forward problems of parametric design for landscape architecture, which is more limited, difficult to participate in the whole process of parametric design, and lack special software. It puts forward the specific application content of parametric design in landscape planning and layout, landscape construction, and construction management. Combined with the case, the rule matrix method is used to produce a variety of schemes for selection, and the method of parametric design applied to small- and medium-scale landscape design is explored.

Literature [24] summarized the development direction and strategy of parametric design in landscape architecture and summarized the application of parametric design in two aspects in landscape architecture. This design method is a change in the way of design thinking, is to directly link the design influence factor with the design plan, and is to control the result generation. Literature [25] defines parametric diagrams, that is, the factors that affect the design are regarded as parametric variables. The factors that affect the design can be site characteristics or human behavior requirements. The relationship between the parameters is constructed through certain rules and algorithms, and the calculation is performed on the relevant software platform to finally form a diagram. Literature [26] believes that landscape architecture design should be the study of the logical relationship between influencing factors, and the logical construction of algorithms and programming is used to replace subjective feelings with this logical construction. The parametric illustration is a dynamic process and a logical construction process, which provides an open design method for landscape garden design. Literature [27] reveals the historical evolution process of natural concepts by analyzing the philosophical background of parameterization, pointing out that parameterization is an inevitable product that adapts to the conditions of today's technology and productivity. Parametric design is to construct logic and finally solve design problems, which is also in line with the natural development trend. Literature [28] proposes three directions of computer-aided landscape design. Finally, a logic construction process method based on programming is formed, which changes the way of the traditional design process. From data management, data calculation, and how to construct the logic to solve any problems in the planning and design process and programmatically solve the problem, the literature [29] introduced a higher technical method through nonlinear parameterized design. Combining it with simpler construction technology makes it easier to carry out parametric design to the implementation stage, which has a greater impetus for the application for parametric design in landscape architecture. Reference [30] takes the parametric design idea as the guide, uses Grasshopper software as the platform, discusses the parametric layout of the exhibition garden, and proposes the concept of parametric layout and its design process. Reference [31] defined parameter selection in particle swarm optimization. Reference [32] introduced the industrial revolution, the Atlantic magazine. Reference [33] noted on biomimetic geometry approach to generative design. Reference [34] investigated the data-driven flower petal modeling with botany priors.

3. Method

This study proposes an architectural landscape planning and design method that incorporates artificial intelligence parametric analysis. Its core is an IPSO-BP network, which takes architectural landscape garden-related parameters as input and outputs garden planning and design plans. This network combines the BP algorithm with an improved particle swarm optimization (IPSO), which can effectively improve network performance.

3.1. Particle Swarm Optimization (PSO). In PSO, suppose in D-dimensional target space, first M particles are initialized to form $T = \{X_1, X_2, \ldots, X_M\}$. Among them, X_i is the position of i^{th} particle, and v_i represents the speed of i^{th} particle. The individual extreme value for particle searched so far is denoted as P_i. In the particle swarm, global extremum searched is denoted as P_g. Then, the i^{th} particle updates speed and position:

$$v_i^{k+1} = v_i^k + c_1 r_1 \left(P_i^k - X_i^k\right) + c_2 r_2 \left(P_g^k - X_i^k\right), \tag{1}$$

$$X_i^{k+1} = X_i^k + v_i^{k+1}, \tag{2}$$

where k is the iterations, learning factors c_1 and c_2 are constants, and r_1 and r_2 are random numbers between $[0, 1]$.

From a sociological point of view, the first part of formula (1) is the previous velocity, which is the effect of the previous velocity and direction. The second part is self-cognition, which represents experience and encourages particles to fly to the best position. The third part is group cognition, which represents information sharing and mutual cooperation.

To improve convergence performance, the concept of inertia factor is introduced in literature [31], and the new velocity update formula is as follows:

$$v_i^{k+1} = w v_i^k + c_1 r_1 \left(P_i^k - X_i^k\right) + c_2 r_2 \left(P_g^k - X_i^k\right), \tag{3}$$

where w is a non-negative number, called inertia weight, which is used to balance global search and local search. When w is larger, the global search is stronger. When w is small, the local search is strong. Therefore, choosing an appropriate w is very important to improve the search speed and convergence accuracy. The flowchart for standard PSO is illustrated in Figure 1:

Additionally, we start the standard PSO and then randomly initialize the population. Subsequently, we evaluate the fitness of each particle and update particle individual optimal value and global optimal value. In the end, the velocity and position of a particle are updated and termination conditions are met as shown in the above figure.

Generally, the termination condition is set as follows:

(1) The algorithm reaches preset maximum iteration algebra.

(2) The algorithm finds a sufficiently good solution.

(3) No solution improvement was found in a certain number of iterations.

(4) The normalized particle radius is close to 0.

(5) The slope of the objective function is close to 0.

3.2. Improved PSO. PSO has the following three problems.

(1) Parameter setting:

In PSO, the choice of inertia weight and learning factor parameters has an influence on results. However, there is no reliable conclusion about the selection of these parameters at present.

(2) Early maturity:

It is easy to fall into the local extreme value, or the diversity of particles quickly disappears, causing premature convergence.

(3) Stability:

The result of each optimization algorithm may be different, and sometimes, the difference can be very large. This leads to the instability of the algorithm optimization results. The existence of these problems causes the particle swarm algorithm to sometimes not get good results and makes the application of the algorithm to have certain limitations. Setting appropriate inertia weights and learning factors can greatly improve performance.

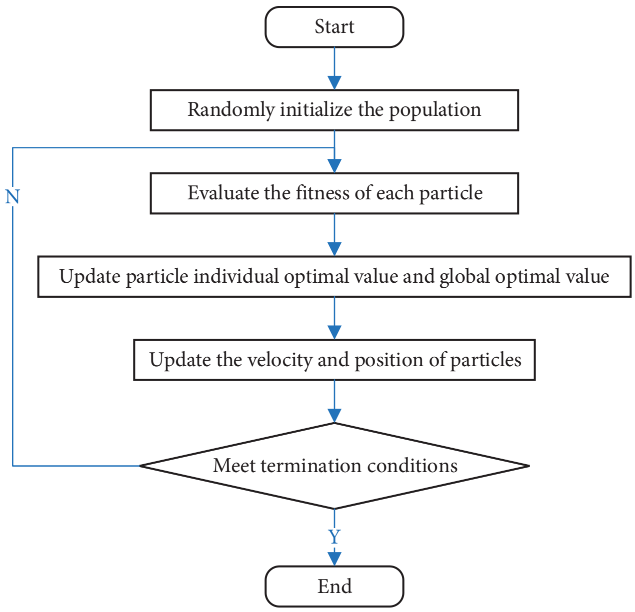

Figure 1: Standard PSO flowchart.

In speed update formula (3), the inertia weight usually takes a certain constant. It is not possible to utilize the feedback information to adjust the relevant parameters in the update equation, resulting in unsatisfactory experimental results. Research has shown that bigger inertia weights are better for global search, whereas smaller inertia weights are better for local search results. In the initial search stage, the algorithm uses a higher inertia weight and has a powerful global search capability. There will be less iterations needed to find the best solution as a smaller inertia weight is employed in the later stages to increase local search capability. As a result, the inertia weight is linearly reduced as the number of algorithm iterations increases. The calculation formula is as follows:

$$w(t) = \frac{k_{\max} - k}{k_{\max}} \left(w_{\max} - w_{\min}\right) + w_{\min}, \tag{4}$$

where k is iteration, and $k_{\max}$ is maximum iteration.

The learning factor strategy is dynamically adjusted. In optimization methods, it hopes individuals have a large self-cognition part and a small group recognition part in the initial stage of the algorithm. In the later stage of the algorithm, there should be a small self-cognition part and a large group recognition part to facilitate the algorithm to converge to the global solution. Therefore, the acceleration coefficient can be dynamically adjusted during the evolution process, so the calculation formula of the learning factor selected in this study is as follows:

$$c_2 = c_{\max} - \left(c_{\max} - c_{\min}\right) \frac{k_{\max} - k}{k_{\max}}, \tag{5}$$

$$c_1 = 4 - c_2, \tag{6}$$

where $c_{\max}$ and $c_{\min}$ are the initial and final values of c_1.

In reality, elementary particle swarm optimization's optimization power is mostly derived from the interactions and mutual influences among its individual particles. The particle itself does not have a mutation process. When the algorithm removes the interaction and mutual influence between the particles, the algorithm's capacity to optimize will be severely hampered. A sine wave motion trajectory can be seen in the early stages of the particle swarm optimization process as the convergence speeds are quick. Other particles will swiftly migrate closer to a particle that has found its present ideal position. In this case, the local optimum's ideal site, the particle velocity rapidly falls to almost zero. When the particle swarm can no longer evolve, it might be regarded to have converged on a solution. The algorithm does not always converge to the global extremum (such as when optimizing complex multimodal functions). Premature convergence or stagnation is a term for this. When this happens, the particle population becomes very concentrated and lacks diversity. The particle cluster will be unable to jump out of the convergence point. This phenomenon is undesirable.

This study adopts a strategy to improve the particle swarm algorithm. The first step is to calculate the mathematical expectation E and the average absolute deviation σ of M particle fitness values. The second step is to set the local optimal test value $n = 0.01E$ and compare the size of σ and n. If $\sigma < n$, the algorithm falls into a local optimum. In the third step, if the algorithm falls into local optimization, the deviation between fitness and expected value is calculated, particles are reassigned whose deviation is less than n and not the global optimum, and the rest of the particles are kept unchanged. In the fourth step, the two parts of particles form a new group and enter the next iteration. The loop is repeated until the global optimal solution is found.

The particle swarm algorithm is improved to pass the local optimization test, and some particles are replaced to increase the diversity of particles. This effectively avoids the problem of the algorithm falling into the local optimal value and also retains the best global particles of each generation. Therefore, the performance of finding the global optimal value is much higher than the basic PSO algorithm.

In PSO, dynamic adjustment for the inertia weight and the learning factor can improve convergence speed and accuracy. But it cannot solve the problem that the algorithm tends to fall into a local minimum in a later stage for convergence. Therefore, it is also necessary to perform a local optimal test during the algorithm iteration process to avoid the algorithm from falling into the local optimal value. Based on this, this study combines the above two aspects to improve the standard PSO and obtain a new improved PSO.

The algorithm steps are given below.

(1) Initialization parameters:

Learning factor c_1 and c_2, weight factor w, population size, and maximum iterations. Randomly set initial velocity and position.

(2) Calculate the fitness.

(3) Judge the individual optimal value.

(4) For each particle, compare its current fitness value with the last individual optimal value P_i. If current fitness is better than P_i, let P_i take current fitness; otherwise, the individual optimal value is still the original P_i.

(5) Judge the global optimal value.

(6) Determine whether the algorithm falls into a local optimum.

(7) Reassign parameters.

(8) Check termination conditions.

3.3. Improve BP Network with IPSO. Particle swarm algorithm and neural network are two approaches of optimization with different mechanics. Many different optimization issues can be solved using these techniques. However, both of these optimization approaches were developed by mimicking or disclosing natural occurrences or processes, so there must be some connection between the two of them after all. Combining both and using their strengths in a more effective optimization strategy are, therefore, achievable. The particle swarm method and neural network can be combined in two ways. Using the particle swarm algorithm's global search capacity, one can optimize the neural network's topology, weights, and thresholds of connections. Particle swarm and BP algorithms can be combined to increase the generalization and learning performance of the neural network, hence increasing the overall search efficiency of the neural network. The second approach is to incorporate a neural network into the particle swarm algorithm and leverage the neural network's superior learning capabilities to boost the algorithm's optimization performance, hence increasing the algorithm's convergence speed and decreasing computation workload. Although the characteristics of a neural network and PSO are very distinct, they are not in conflict and are highly complementary to each other. The combination between them will not show conflicts or redundancy because they have the same characteristics. On the contrary, if they are combined in a proper way, they can often complement each other and promote each other to get better results. Therefore, it is feasible to use PSO to optimize the BP network.

Particle swarm algorithm is an emerging swarm intelligence algorithm, and it has many advantages to optimize neural networks.

(1) The particle swarm algorithm directly uses the fitness function of the objective function to optimize. Gradient information of the error function is not required, and it is not affected by whether the error function is continuously differentiable and has wider adaptability.

(2) Particle swarm algorithm is a random optimization method. In the beginning, the search is started from a group of multiple points. Its global searchability is strong, and it can find global optimal value, which can prevent the BP network from falling into a local minimum.

(3) During the whole search and update process of the PSO method, the current optimal solution is followed in a one-way flow of data. The global optimal solution may be reached faster if all particles converge.

(4) The particle swarm algorithm can not only optimize connection weights and thresholds but also optimize network topology and effectively improve the overall search performance.

Optimizing the BP network with PSO is mainly to replace gradient correction with the iteration of PSO. The structure for the BP network is illustrated in Figure 2.

The PSO search is mostly based on changes in speed and position in several dimensions. In a BP network iteration, the position vector of each particle in the swarm corresponds to the weights and thresholds that are being updated as part of the neural network learning process. It is determined by the number of connection weights and thresholds in a neural network, and the neural network output error of a specific training sample set is used as the fitness function for the dimensionality of particles. The less the inaccuracy in the neural network, the better the particle's performance will be in the search. To reduce the network's output error, the particles travel and search in the weighted space. The weights of the network are updated by varying the particle speed. Thus, in order to reduce the number of errors, the particle swarm optimization algorithm looks for and trains the neural network's weights and thresholds in this manner. The current global optimal particle is the one that has the minimum error across each iteration. The iteration and algorithm come to an end when the training procedure is repeated until the required error is generated or the number of computations surpasses the predetermined number. In the end, we arrive at the final set of weights here.

The algorithm steps of utilizing PSO to optimize neural networks are as follows:

(1) Initialization parameters. Including the BP neural network topology, set the maximum velocity $v_{\max}$ and minimum velocity $v_{\min}$ of the particles. Randomly generate the velocity of each particle in the interval $[v_{\min}, v_{\max}]$. Then, set the initial inertia weight, learning factor, population size, and the number of iterations.

(2) Calculate the fitness value of the particle and determine the individual extreme value and the global extreme value of the particle. For each particle, compare its fitness value P_i with the individual optimal value P_i'. If $P_i < P_i'$, then $P_i' = P_i$, and record the current best particle position. For each particle, compare its fitness value P_i with the global optimal

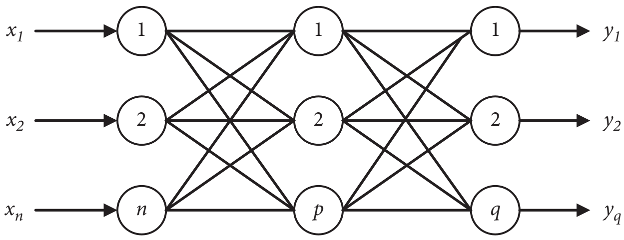

Figure 2: The structure of BP.

value P_g. If $P_i < P_g$, then $P_g = P_i$, and record the current best particle position.

(3) Update the speed and position of each particle, and determine whether the updated speed and position of the particle are within the limited range.

(4) Check the stop condition of the algorithm iteration. If it does, stop the iteration and output the weights and thresholds of the neural network; otherwise, go to step 2.

4. Experiment and Discussion

4.1. Dataset. We conduct tests with two self-created datasets, ALA and ALB, respectively. Each dataset contains training samples and test samples of different sizes. The specific sample distribution is shown in Table 1. The 10-dimensional architectural landscape design requirement index parameters are used as the input for each sample, the specific indicators are listed in Table 2, and the output is the appropriate architectural landscape design plan. Precision and recall are the employed evaluation metrics.

4.2. Evaluation for Network Convergence. Whether the neural network converges is an important evaluation index for the designed network. If the neural network fails to converge, then the designed network has defects. To verify that the designed network designed can effectively fit and converge on the training data, this study analyzes the training loss of the network. The experimental results are illustrated in Figure 3.

As the number of iterations increases, the loss of the network gradually decreases. When the epoch is equal to 30, the network loss basically reaches the lowest point. Subsequently, increasing the number of iterations has no effect on the loss, indicating that the network has reached convergence. This demonstrates that the network created for architectural landscape design is both possible and effective.

4.3. Evaluation for Hidden Layer. In the BP network, the hidden layer is a crucial processing layer, which can extract deep features. In the hidden layer, the number of nodes is variable. The number of hidden neurons should be proportional to the size of the input and output layers. The number of hidden neurons should be 2/3 of the input layer's size plus the output layer's size. The number of buried neurons should be fewer than the input layer's size. In order to explore the impact of different hidden layer nodes on network performance and search for the best hidden layer node number, this study conducts comparative experiments on different hidden layer node numbers. The results are illustrated in Table 3.

Table 1: The detailed information of datasets.

Dataset	Training set	Test set	Total
ALA	1038	528	1566
ALB	2093	891	2984

Table 2: Architectural landscape design requirement index.

Item	Index
X_1	Overall layout
X_2	Peripheral coordination
X_3	Lighting design
X_4	Planting design
X_5	Peripheral connection
X_6	Green design
X_7	Waterscape design
X_8	Regional feature
X_9	Persistence
X_{10}	Shape modeling

It can be seen that at the beginning, as the number of hidden layer nodes increases, network performance has gradually improved. When the number of nodes in the hidden layer is 5, the best performance can be obtained. But subsequently, if the number of nodes further increases, then improvement for network performance is very limited, because the training data are not enough to support the network parameters. Therefore, in the network designed in this study, the number of hidden layer nodes is set to 5.

4.4. Evaluation for IPSO. This study uses the IPSO to optimize the BP network. To verify that the IPSO algorithm can improve the performance of the BP network, a comparative experiment was carried out in this study. The network performance is compared when IPSO is not used (that is, the traditional BP network) and the network performance when IPSO is used. The experimental results are illustrated in Figure 4.

With the introduction of IPSO, the best performance improvement can be obtained. Compared with the traditional BP network, the IPSO-BP method can obtain performance improvement of 3.2% precision and 2.6% recall on the ALA dataset, and the performance improvement of 2.8% precision and 2.4% recall on the ALB dataset. This proves that the combination of the IPSO algorithm and the BP network can effectively improve network performance.

To further prove the superiority of IPSO compared with the traditional PSO method, this study also carried out additional comparative experiments. The performances of using the traditional PSO algorithm and the IPSO algorithm to optimize the BP network are compared. The experimental results are illustrated in Figure 5.

Compared with the PSO-BP network, the IPSO-BP method can obtain the performance improvement of 1.9% precision and 1.5% recall on the ALA dataset, and the

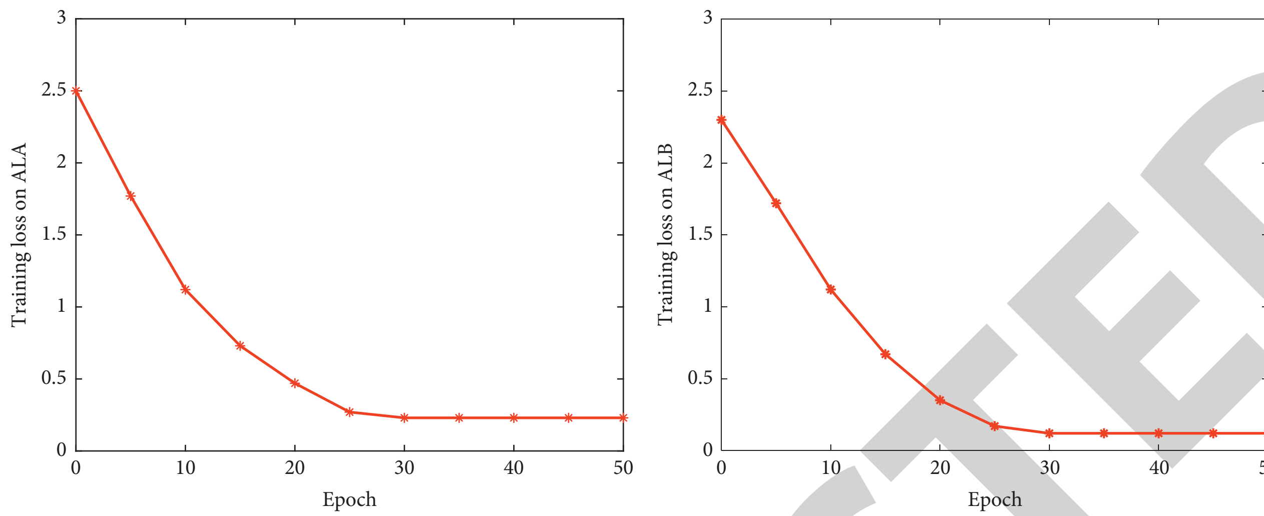

Figure 3: The training loss on two datasets.

Table 3: Evaluation for the hidden layer.

Number	ALA		ALB	
	Precision	Recall	Precision	Recall
3	93.2	91.4	94.1	92.7
4	94.8	92.9	95.6	93.4
5	95.7	93.9	96.9	94.5
6	95.8	93.8	96.9	94.6
7	95.7	93.9	96.8	94.6

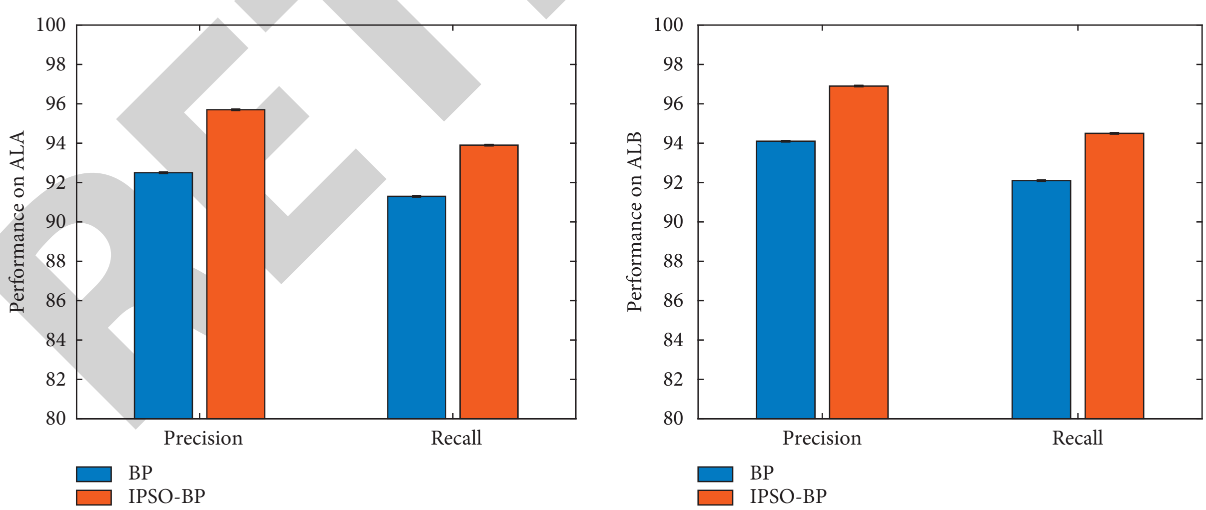

Figure 4: Comparison of BP and IPSO-BP.

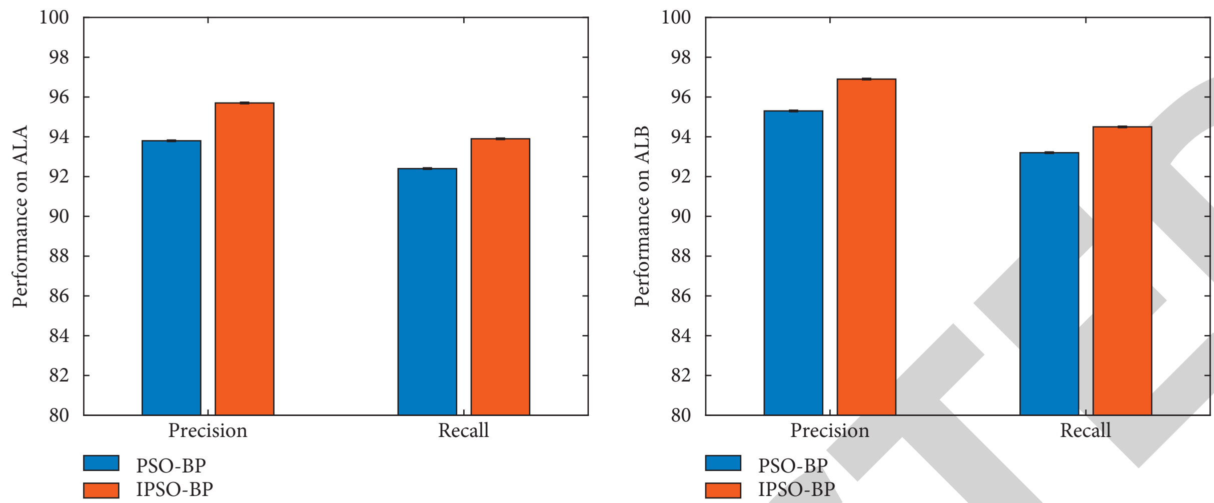

Figure 5: Comparison of PSO-BP and IPSO-BP.

performance improvement of 1.6% precision and 1.3% recall on the ALB dataset. This shows that compared with the original PSO, the improved IPSO can make the BP network obtain a higher performance improvement.

5. Conclusions

Parametric design, which is driven by digital and computer technology, has a wide range of applications in the field of architectural landscape architecture. This study explores a more technical parametric design method for architectural landscape design, combining artificial intelligence with architectural landscape planning and design, and developing an architectural landscape planning and design method that incorporates artificial intelligence parametric analysis. This is a new branch of design that is an extension of architectural landscape design methodologies and is based on artificial intelligence technologies. This study combines artificial intelligence parametric design theories and methods into architectural landscape design and proposes a parametric method suitable for landscape design based on the characteristics of architectural landscape design.

The work done in this study can be divided into three aspects:

(1) Based on the BP network, a method of architectural landscape planning and design combined with artificial intelligence parameter analysis is designed. This method takes the relevant parameters of architectural landscape architecture as input and outputs the optimal landscape architecture design plan.

(2) The dynamic adjustment strategy of inertia weight and learning factor is adopted to balance the searchability of the particle swarm algorithm, and local optimal testing strategy is introduced into the algorithm to increase the diversity of particles. Then, the improved particle swarm algorithm is combined with the BP network to further enhance the neural network's ability to design and plan architectural landscapes.

(3) The system experiment proved the validity and feasibility of the architectural landscape planning and design method combined with artificial intelligence parameter analysis.

Data Availability

The datasets used during the current study are available from the corresponding author on reasonable request.

Additional Points

The contributions of this study are as follows: (1) Based on the backpropagation (BP) network, a method of architectural landscape planning and design integrating artificial intelligence parametric analysis is designed. This method takes the relevant parameters of architectural landscape architecture as input and outputs the optimal landscape architecture design plan. (2) The dynamic adjustment strategy of inertia weight and learning factor is adopted to balance the searchability of particle swarm algorithm, and the local optimal test strategy is introduced into the algorithm to increase the diversity of particles. Then, the improved particle swarm optimization (PSO) is combined with the BP network to further enhance the neural network's design and planning capabilities for architectural landscape architecture. (3) The systematic experiment proves the validity and feasibility of the architectural landscape planning and design method integrated with artificial intelligence parametric analysis.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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