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Retraction

Retracted: Research on Tourism Resource Evaluation Based on Artificial Intelligence Neural Network Model

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope
(2) Discrepancies in the description of the research reported
(3) Discrepancies between the availability of data and the research described
(4) Inappropriate citations
(5) Incoherent, meaningless and/or irrelevant content included in the article
(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets 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 own 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.

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[1] G. Li and J. Cheng, "Research on Tourism Resource Evaluation Based on Artificial Intelligence Neural Network Model," *Advances in Meteorology*, vol. 2022, Article ID 5422210, 9 pages, 2022.

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Research Article

Research on Tourism Resource Evaluation Based on Artificial Intelligence Neural Network Model

Gang Li[1] and Jinlong Cheng[2]

[1]*Kyrgyz National University, Zhengzhou Business University, Zhengzhou 451200, Henan, China*
[2]*Luoyang Normal University, Luoyang 471934, China*

Correspondence should be addressed to Jinlong Cheng; chengjinlong@lynu.edu.cn

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The rational evaluation of tourism resources and the discovery of valuable potential tourism resources are important foundations for promoting the development of tourism industry. This paper systematically reviews the development history of China's ethnic tourism resource evaluation, analyzes the three different stages of tourism resource evaluation changes and their basic characteristics, and conducts research on tourism resource evaluation based on artificial intelligence neural network model to avoid the influence of subjective factors on the evaluation results to the greatest extent. This paper uses the literature comparison method, theoretical analysis method, and expert consultation method to construct an evaluation index system containing 5 primary indicators and 12 secondary indicators on the basis of which an evaluation model is designed focusing on the error values in the evaluation model, and the evaluation model is applied to the evaluation of tourism resources in several major cities, and its evaluation results and error ranges meet the requirements.

1. Introduction

The right appraisal of tourism resources is critical to the effective development of tourism destinations and the attraction of tourists to these places. Development methodologies, resource types suited for development, and other critical issues that must be addressed in the process of tourist practice are some of the most important considerations [1, 2]. Early on, geography and forestry scholars concentrated on the evaluation of tourism resources, and they gradually developed a series of classification and evaluation systems, theories, and methods, beginning with the physical and objective properties of natural resources. Some other scholars assessed tourism resources from both supply and demand perspectives, which is the method of determining the potential value of tourism resources in terms of tourists' demand, which was developed in the late 1950s. Land assessment approaches were therefore gradually introduced and improved upon in the 1980s and 1990s [3–7]. This resulted in the establishment of more mature evaluation systems that were applied to the development and management practices of tourism resources during this period. The initial development of domestic socioeconomic and tourism industries, the expansion of the domestic tourism source market, and the increase in tourists' experience requirements all occurred during this time period. As a result, the evaluation of tourism resources development is no longer a single technical evaluation, but a comprehensive technical evaluation and experiential evaluation of tourism resources from various aspects such as aesthetics, transportation, market, and location based on the absorption of information evaluation. Because of the increasing diversity and richness of tourism development, the evaluation of tourism resource development has gradually shifted from the perspective of the supplier to that of the demander, with greater attention paid to the dynamic demand of the tourism market as well as the introduction of the concept of tourism attraction; among them, more tourism scholars and tourism development practitioners are studying and evaluating tourism resources and product development in the twentyfirst century [8, 9]. As a rule, throughout the past 60 years, evaluation of tourism resource development has followed a three-stage process: element evaluation, complete evaluation, and social evaluation.

The appraisal of tourist resources is a process that is constrained by a number of elements and is heavily influenced by subjective judgments. The precision with which tourism resource evaluation results are produced has always been a matter of debate, owing to the large number of variables and high nonlinearity present in each evaluation model [10, 11].

For the purpose of error analysis, the artificial neural network model is a reverse operation method. It has a high level of fault tolerance. In an iterative process, the nonlinearity can effectively prevent the buildup of errors, which is extremely useful in terms of lowering the operation error rate. At the same time, the model can make full use of the adaptive ability of the neural network, which helps to improve the intelligence of the operation overall. Some researchers have developed 25 evaluation indicators for the BP neural network model based on the features of tourism resources, and they have applied the corresponding evaluation indicators to the evaluation of red tourism resources [12–17]. Other researchers have looked into the relationship between the error size and the evaluation outcomes [18, 19].

By conducting a systematic review of the comprehensive process of conceptual understanding and evaluation of tourism resources at home and abroad, this paper aims to demonstrate the characteristics of different periods of tourism resource development, from elemental evaluation to comprehensive social evaluation, in the context of socioeconomic development, and to further analyze the key driving factors and influence mechanisms behind the transition from elemental evaluation to comprehensive social evaluation [19]. It appears that, as a result of the dynamic evolution of tourism resource evaluation theories, methods, and perspectives both at home and abroad, the understanding of tourism resource development and evaluation is gradually deepening, and tourism development is increasingly integrated into the framework of tourism market development and social change [20–24].

Consequently, this paper examines and analyzes the process and mechanism of domestic tourism resource evaluation; on the one hand, it examines the evaluation and concept of tourism resource development from a dynamic perspective and understands the relationship between tourism development goals and different stages of socioeconomic development [25–27]. On the other hand, in the face of future tourism development, how to fully consider the needs of tourists who require different types of services is examined and analyzed. The direction of evaluation is really significant [28].

Artificial neural network as a new technology, with its own nonlinear mapping and learning classification and real-time optimization as pattern recognition, has been widely used in various evaluation problems, creating a new way of thinking for us to study problems such as nonlinear classification. In order to overcome the subjective influence of human factors on the evaluation results, as well as to establish a comprehensive and reasonable comprehensive evaluation index system, this paper introduces artificial neural networks into the evaluation system. The model has self-organizing and self-learning functions, and by training the network, it can make rank evaluation of tourism resources.

1.1. Our Contribution. The BP model is introduced into the evaluation system, which overcomes the subjective influence of human factors on the evaluation results and establishes a comprehensive and reasonable comprehensive evaluation index system.

We have organized the tourism resources, which is convenient for the modeling and use of BP model and is helpful for the establishment of electronic database of the resources in the future.

The experiment proves that the BP neural network model can evaluate the tourism resources more accurately and effectively, and it is a simple, fair, and objective evaluation method.

2. Dynamic Process and Characteristics of Tourism Resources

2.1. Concept and Connotation Development of Tourism Resources. During the early stages of tourism development, an often used concept is tourism resource, which refers to the general word for all natural and human resources that can be utilized for the development of tourism, which is a complex and inclusive broad system. During the late 1970s, experts in geography and economics were the first to enter the field of tourist research, which was primarily centered on the objective physical qualities of tourism resources for growth and evaluation. Since then, tourism has grown exponentially in China. Later, as more disciplines entered tourism research, a comprehensive definition was gradually developed from the perspective of the subject of tourism and the market concept. It is now believed that all material and nonmaterial factors that can motivate and attract tourists and satisfy their tourism needs, as well as those that can be exploited and generate economic, social, and environmental benefits, can be regarded as tourist resources.

In order to keep pace with the advancement of domestic and international research and the development of the practice of tourism resource assessment, the evaluation of tourism resource value gradually shifts away from emphasizing development practices and toward emphasizing meeting the needs of tourists and the marketplace. To put it simply, tourism resources are attractive to tourists in the shape of their objects, and their expressions have apparent commercial undertones, whereas the term tourism attraction can more intuitively explain its key characteristics. As a result, the term tourist attraction can eliminate some of the ambiguities introduced by the term tourism resource, and the concept of tourism attraction (object) is broadened, with greater emphasis placed on the attraction it creates for tourists. Tourism attraction (object) is defined as follows. According to some experts, tourist appeal is comprised of all of the aspects that draw tourists away from their normal environment, including the landscape they see, the activities they participate in, and the experiences they recall from their travels. However, according to some academics, an attraction can be defined as the sum of all of the elements that draw people to a tourist location. Alternatively, some researchers view tourism attraction as a system composed of tourists and landscape markers, and they design a tourism attraction system composed of features such as tourists, core attractors, and markers to attract visitors. As several researchers have pointed out, tourism attractors are sites that have been built to meet the demands of tourists, and knowing natural and human resources and the image that tourists have of these resources is vitally important for tourism planning. Overall, the difference between tourism attractions and tourism resources is that the former places greater emphasis on the notion that tourism resources may only be classified as tourism attractions if they are accepted and attractive to tourists, while the latter does not. It goes without saying that the attractiveness of a tourism attraction cannot exist without the participation of tourists and the dissemination of information through various media, and it requires a variety of symbols and publicity to be recognized by tourists, including transportation, signage that is easily understood, advertising, and marketing, among other things.

The improvement of the expression and conceptual connotation of tourism resources and the introduction of the concept and theoretical perspective of tourism attraction have resulted from the development of domestic tourism research and its convergence with international research. When it comes to tourism attractions (objects), the term is most often used in conjunction with tourism resources, which include traditional natural and human resources, but it can also refer to a broader range of objects of tourism activities, such as man-made landscapes, festivals, and special events. One advantage of this approach is that it preserves all inherent characteristics of tourism resources while emphasizing all aspects which are attractive to tourists. It is also more realistic in terms of implementation. Tourism and daily leisure resources can also be grouped together for the sake of convenience in research operations, and these are referred to as recreation resources. While the definition of recreation resources is similar to that of tourism resources, the connotation of recreation resources will be slightly richer and more diverse than the connotation of tourism resources. Similar to the development process of the concept and connotation of tourism resources, the process and characteristics of tourism resources and tourism attraction evaluation also show significant differences depending on the period and stage of social development, and each stage of the evaluation process of tourism resources in China will be explained in detail below. The concept and connotation of tourism resources are developed through a series of stages.

2.2. Technical Evaluation Stage of Tourism Resource Elements (1970s to 1980s). The stage of experience and comprehensive evaluation is mainly to initially understand the concept and connotation of tourism resources, etc. Tourism resource evaluation and tourism development evaluation were both topics covered in the early work, with the former focusing on value judgments of resources and the latter including nonresource aspects such as development circumstances. There was some ambiguity in terms of the notion and connotation. The tourism industry, which is constrained by the effect of market development, is in the stage of supply determining demand. The system of definition and classification of tourism resources has not yet been fully developed. At this stage, tourism resources are primarily evaluated on a technical basis, with a strong emphasis on the physical and objective characteristics of tourism resources themselves. In this study, the evaluation is carried out using single or multiple element combinations, with a focus on practicality and an emphasis on quantitative treatment of evaluation, and it is intended to serve as a reference basis for the development of tourism resources by attempting to establish uniform standards for the classification and judgment of tourism resources. This stage does not consider factors such as tourist preferences, the natural environment in which the resources are located, or their position in the social system, and the background properties of the resources determine whether they can be converted into tourism resources and what type or level they can be classified as. The tourism supply determines demand behavior in the tourism market at this stage.

2.3. Experiential and Comprehensive Evaluation Stage (1980s to 1990s). At this period, the evaluation of tourism resources was more concerned with a hierarchical and comprehensive technical review from the perspectives of nature, human history, and aesthetics than it was with a more specific technical evaluation. While evaluating the tourism resources themselves, a wider evaluation system such as ecological environment, social and economic environment, transportation, and tourist source market has also been gradually established. In order to keep up with the rapid development of China's tourism industry and the expansion of both international and domestic tourism markets, the comprehensive and experiential evaluation stage no longer focuses solely on the conditions of tourism resources themselves but also on the incorporation of multidisciplinary experiences of tourism resources (for example, aesthetic experience) into the comprehensive evaluation of tourism resources. When considering tourist resource development, it adds to a more comprehensive understanding of tourism resources and encourages the entire integrated development of tourism destinations in terms of transportation, culture, and socioeconomics.

2.4. The Social Construction Stage of Tourism Resource Research (Since 2000). It is important to emphasize not only scientific evaluation of the relative objective physical attributes of tourism resources in the previous technical evaluation stage but also the creation of new symbolic values and attractions based on mainstream social values, in-depth excavation of cultural attributes, and the use of new technologies and marketing techniques to promote the overall sustainable development of tourism. Travelogues, mass media, the construction of the attraction's image during the development process, institutional certification, and other means help to construct a certain symbolic value for the tourist attraction, and tourists consume this symbolic value and respond to the social ideals represented by the symbols of the tourist attraction through tourism consumption and tourism experience. The development of societal values and ideals occurs in a dynamic and cyclical manner throughout history, and the social construction of the symbolic significance of tourism attractions is similarly a dynamic and cyclical process. While museum tourism is a popular form of tourism in the Western world, it is just recently becoming more popular in China, owing to the country's various stages of social development and the gradual acceptance of such tourist attractions. There is now, however, a phenomenon of partial over-consideration in the field of tourism attraction as a symbolic form to gain approval from others, which leads tourism suppliers to develop and build a variety of tourism resources, tourist landscapes, and tourism products that satisfy the hunting and consumption psychology of tourists. Researchers, governments, and development agencies should pay close attention to and reflect on the phenomena of excessively catering to tourists' show-off mentalities, ignoring the objective natural, economic, cultural, and ecological conditions of tourist destinations, paying too much attention to media marketing and neglecting the quality improvement of scenic spots, depending on tourist resources and neglecting the creation of a good atmosphere for tourist experiences, and so on.

3. Method

3.1. ANN. Artificial neural networks (ANNs) are capable of approximating any continuous nonlinear functions with any precision, and they also have the potential to learn and adapt to new situations when faced with a complicated and unpredictable situation.

A typical neuro structure is shown in Figure 1.

In Figure 1, $X_1, X_2, \ldots, X_n$ represent the input of each neuron layer, $W_1, W_2, \ldots, W_n$ represent the weight of each neuron, b represents the bias of each layer, f represents the activation function, X_i represents the input from the neuron of i, and Y represents the output. The number of nodes in the input and output layers is determined by the actual requirements, and the layers are connected by a vector of weights. The hidden layer neurons comprise an adder and an activation function, which are both included in the input and output layers. A linear or nonlinear activation function is used to process the information that has been transmitted from the preceding layer in order to produce the output value of the neuron.

Pretend that there are K layers in the neural network, excluding the input layer (the number of layers $k > 1$), and that there are $m_0, m_1, \ldots, m_k$ nodes in each layer from the input layer all of which are connected to the output layer (the number of nodes in each layer is greater than one). The input vector has a dimension of m_0, and the output vector has a dimension of m, as defined by these formulas.

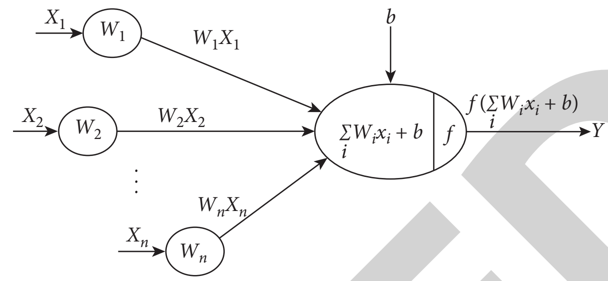

Figure 1: The structure of ANN.

Output layer:

$$X^{(0)} = \left[X_1^{(0)}, X_2^{(0)}, \ldots, X_{m0}^{(0)}\right]^T, \tag{1}$$

where $X^{(0)}$ is the output vector and $X_1^{(0)}, X_2^{(0)}, \ldots, X_{m0}^{(0)}$ are elements of the output vector.

Input layer:

$$Y^{(K)} = \left[Y_1^{(K)}, Y_2^{(K)}, \ldots, Y_{mK}^{(K)}\right]^T, \tag{2}$$

where $Y^{(K)}$ is the input vector and $Y_1^{(K)}, Y_2^{(K)}, \ldots, Y_{mK}^{(K)}$ are elements of the input vector.

The weight matrix and bias vector for each layer are as follows:

$$\begin{aligned} W^{(1)} &\in R^{m_1\times m_0} b^{(1)} \in R^{m_1\times 1}, \\ W^{(2)} &\in R^{m_2\times m_1} b^{(1)} \in R^{m_2\times 1}, \\ &\ldots, \\ W^{(K)} &\in R^{m_K\times m_{K-1}} b^{(1)} \in R^{m_K\times 1}. \end{aligned} \tag{3}$$

For hidden layer, we have

$$\begin{aligned} \text{net}_i^{(1)} &= \sum_{j=1}^{m0} W_{i,j}^{(1)} X_j^{(0)} + B_i^{(1)}, \left(1 \le i \le m_1\right), \\ \text{net}_i^{(1)} &= W^{(1)} X^{(0)} + b^{(1)}, \\ \text{net}^{(1)} &= \left[\text{net}_1^{(1)}, \text{net}_2^{(1)}, \ldots, \text{net}_{m1}^{(1)}\right], \\ Y^{(1)} &= \left[Y_1^{(1)}, Y_2^{(1)}, \ldots, Y_{m1}^{(1)}\right]. \end{aligned} \tag{4}$$

For k-th layer,

$$\begin{aligned} \text{net}_i^{(K)} &= \sum_{j=1}^{mK-1} W_{i,j}^{(K)} Y_j^{(K-1)} + B_i^{(K)}, \\ \text{net}_i^{(K)} &= W^{(K)} X^{(K-1)} + b^{(K)}. \end{aligned} \tag{5}$$

This can be accomplished by doing a forward layer-by-layer calculation on the $\text{net}_i^{(K)}$ and $Y^{(K)}$ values of each layer of the network, as well as the input and output vectors of each layer. It is possible to acquire the input value and output value of each neuron.

This paper's neural network comprises four layers: an input layer, an output layer, and two hidden layers. The number of neurons in each layer is defined by an isometric series, and the number of neurons in each hidden layer is determined by an isometric series. Because the sampling

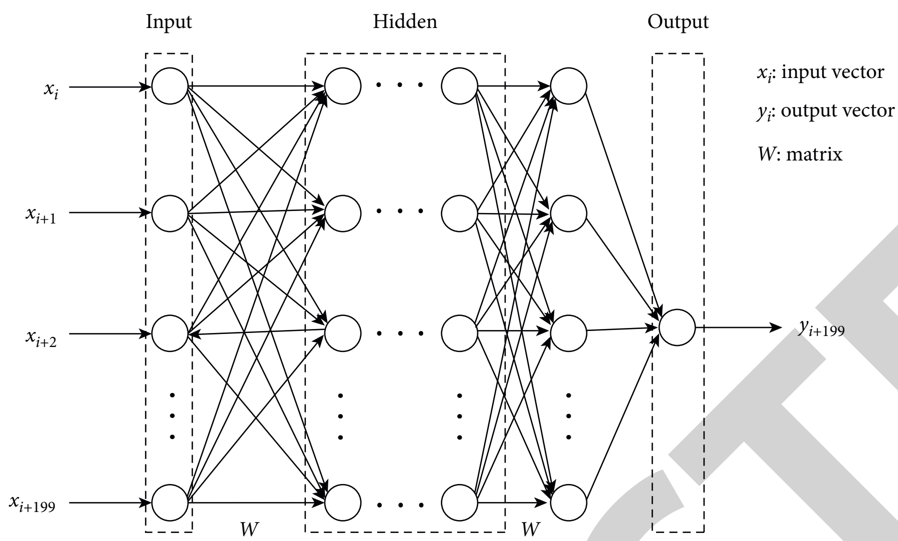

Figure 2: The structure of our ANN.

frequency of the sensor is 10 Hz and because the vertical wave has the greatest influence on the buoy motion, only the vertical wave data are used as an input parameter, resulting in a total of 200 neurons in the input layer, which is the maximum number of neurons that can be used in the input layer.

A critical question to address once the number of nodes in the input layer and the number of nodes in the output layer have been discovered is how to maximize the number of nodes in the hidden layer and the number of hidden layers after those numbers have been determined. Experimental evidence indicates that if the number of nodes in the hidden layer is too little, the network will not be able to perform the necessary learning and information processing functions. If there is an excessive number, the opposite is true. It will not only significantly increase the complexity of the network structure but also increase the likelihood that the network may fall into local minima during the learning process, resulting in a network with a very sluggish learning speed overall.

In general, one to two hidden layers are sufficient for a small dataset, and the neural network employed in this paper has two hidden layers, with 34 and 6 neurons in each layer, respectively. The first three layers employ the ReLU function, and the fourth layer employs a linear function.

Figure 2 shows the basic structure of the established neural network.

3.2. Evaluation Index System Establishment. The purpose of this study is to develop a tourism resource evaluation index system that is based on the principles of independence, quantification, and comprehensiveness, and that incorporates three analytical methods: the literature comparison method, the theoretical analysis method, and the expert consultation method.

Following a review of relevant literature, various types of literature are classified according to the statistical method used to identify them. For the most part, the theoretical

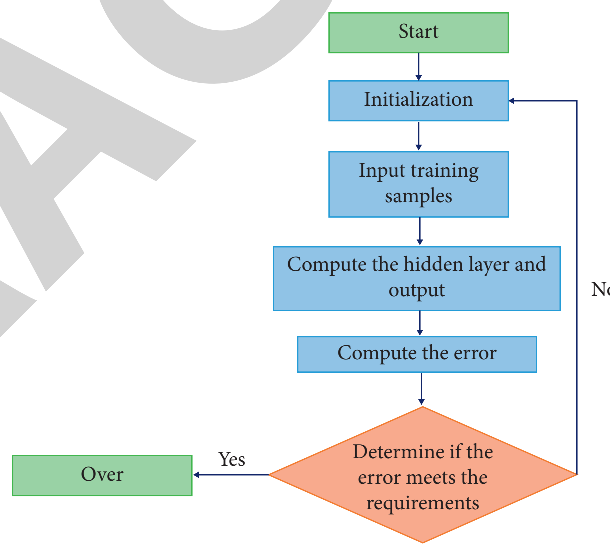

Figure 3: The flow of our method.

Table 1: Tourism resource evaluation index system.

Primary indicators	Secondary indicators
Historic	C1: historical status C2: relationship with important people C3: political significance
Artistic	C4: cultural heritage role C5: architectural integrity C6: artistic ornamentation
Regional	C7: transportation C8: economic level
Resource scale	C9: landscape market C10: portfolio of attractions
Hospitality level	C11: level of accommodation C12: dining level

Table 2: Weight distribution of each indicator.

Index	Weight
C1	0.12
C2	0.13
C3	0.02
C4	0.05
C5	0.20
C6	0.11
C7	0.12
C8	0.05
C9	0.02
C10	0.14
C11	0.03
C12	0.03

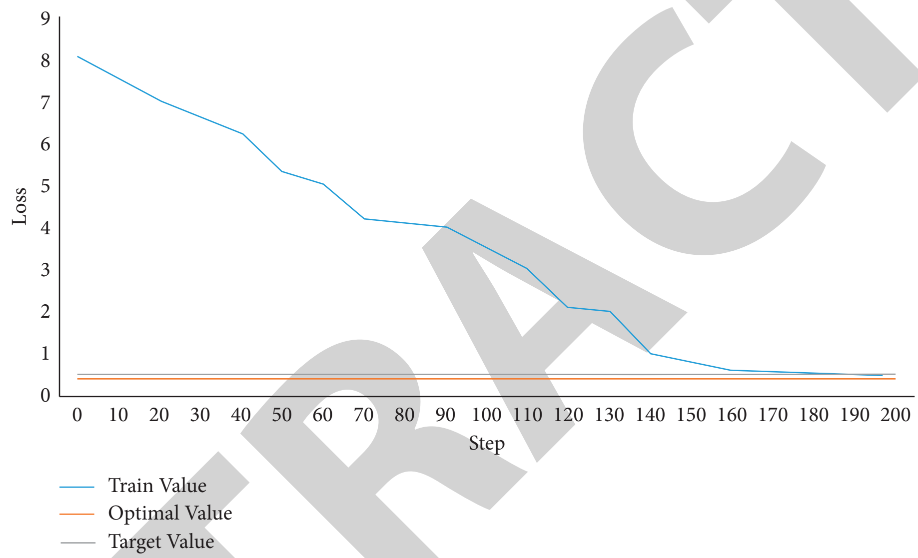

Figure 4: The iteration curve.

analysis technique begins with an examination of the elements that influence tourist resources, after which six assessment indexes are selected based on three influencing aspects: resource value, attraction scale, and tourism conditions. Figure 3 depicts a system of theoretical analysis assessment indexes for evaluation. The tourism resource evaluation index system illustrated in Table 1 was developed by combining the literature comparison approach with the theoretical analysis method, as well as by interviewing experts and soliciting their comments and ideas.

Combined with expert advice, the weight coefficients of each evaluation index in the quantitative evaluation of tourism resources were determined, and the weight distribution of each index is shown in Table 2.

4. Model Evaluation Result

The grade division is based on the size of the output value of the output layer, according to the weight distribution of the 12 evaluation indicators, and finally the evaluation value of tourism *i* resources of each city is calculated, and the closer the value is to 1, the higher the evaluation of tourism resources in the area is. Twelve pairs of sample data are selected, and the data have been normalized by the percentage system. A three-layer BP neural network is established, and MATLAP, a high-performance numerical computation visualization software program, is selected, with 6 neurons in the hidden layer, 1 nerve element in the output layer, and 9 nerve elements in the input layer, and the number of learning is 1000 times and the number of iterations is 500 times. The initial step size is 0.9, M is 400, the momentum coefficient is 0.9, and the allowable error is 0.001. To simplify the network structure, only 3 output nodes can be used to represent 5 state categories.

By learning the training network using the MATLAP neural network toolbox for the 10 sets of data before the test, we finally obtained and established the neural network evaluation model. The training steps and errors are shown in Figure 4. From Figure 4, the error is less than 0.001 when the training step reaches 160 steps, which is 0.00077.

The number of neurons in the input layer was set to 18, the number of neurons in the hidden layer was set to 14, and the number of neurons in the output layer was set to 1. The

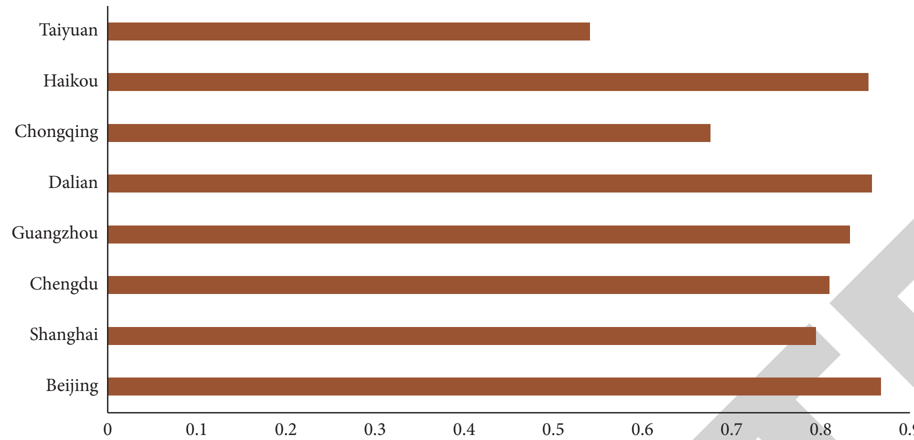

FIGURE 5: Evaluation results.

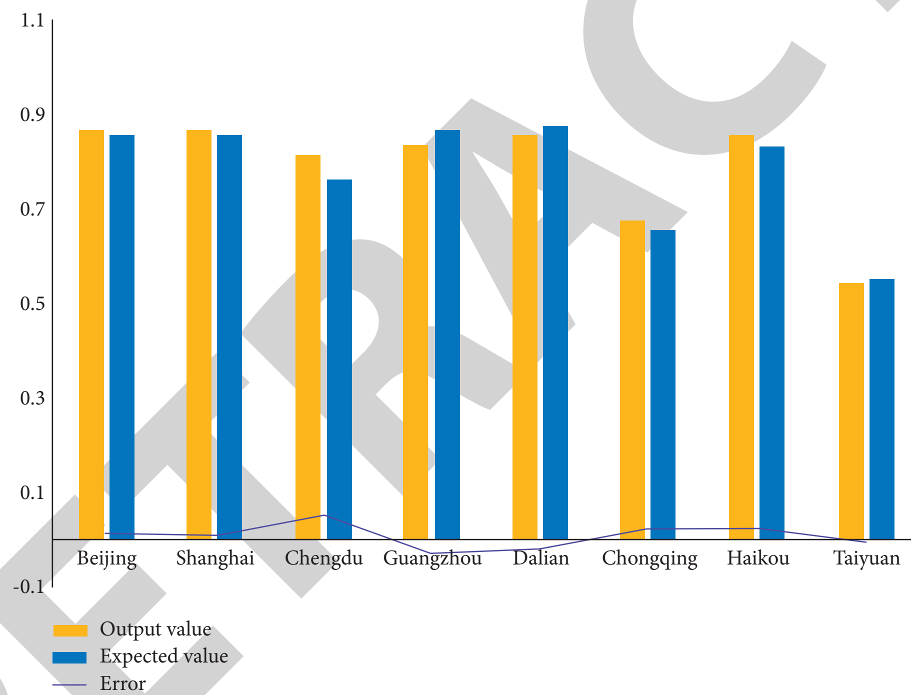

FIGURE 6: Evaluation error results.

data processing software MATLAB was used to create the ANN iterative structure. Consider eight representative tourism cities such as Beijing, Nanjing, and Guangzhou as examples. Figure 4 depicts an iteration curve of the evaluation model in MATLAB. Figure 5 depicts model evaluation results, and Figure 6 depicts an error graph resulting from the model evaluation mistake.

5. Conclusion

The characteristics of strong nonlinearity and fault tolerance of the artificial neural network model are used in this study to develop a tourism resource evaluation model based on artificial intelligence neural network model. The model is then used to evaluate tourism resources. Eight representative cities, including Beijing, have their tourism resources evaluated using an evaluation index system constructed from five primary indicators and twelve secondary indicators. The evaluation results are within the permissible range of error, allowing for the objective evaluation of tourism resources to be achieved.

5.1. Follow-Up Work. The current data did not use the method of data preprocessing; although it is said that the current evaluation model meets the current stage of engineering needs, it will be affected by outlier data or irrelevant data, so in the follow-up work, we will add the method of data preprocessing in the experiment to improve the accuracy of the evaluation model.

Data Availability

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

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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