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Relationship between Marine Resources growth and Marine Economy Based on Neural Network

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Key words: Neural Network Marine Resources, Marine Economy, Resource growth

Abstract: With the rapid growth of China's economy, people pay more and more attention to marine resources. In the process of growth and utilization, how to deal with the relationship with the marine ecological environment is also a great challenge for us. In this paper, the domestic and foreign research and analysis on protecting the marine environment, carrying out large-scale marine engineering activities and promoting sustainable fishery production are carried out, and classified and summarized. Through the establishment of models to predict the factors affecting the coastline of the coastal seabed zone and their change rules in different stages, according to the historical data of marine resources, artificial neural networks(NN) are constructed using NN algorithms to study the regional water and soil conservation planning and growth measures based on the marine ecological environment. Finally, the model is simulated and tested. The test results show that the marine resource growth model based on neural algorithm has short data processing time and low delay time, which indicates that the algorithm can meet the operational requirements of the marine resource model.

1. Introduction

With the rapid growth of economy, people pay more and more attention to marine resources. However, many problems have been found in the growth and utilization of the ocean [1-2]. For example, a series of problems such as lack of scientificity and sustainable growth concept have hindered the research on the interaction force and relationship between the sea, land and air. Moreover, due to China's current lack of attention to the protection of the marine ecological environment and the imperfection of relevant domestic laws and regulations, the coastal ecological damage in some regions in China is serious, and these phenomena have also attracted widespread attention [3-4].

The research of domestic scholars mainly focuses on two aspects. One is to conduct in-depth discussions on the relationship between marine resource growth and marine economy. Some

scholars believe that the focus of growth should be on how to plan the National Coastal Zone scientifically and reasonably and how to use limited space to solve the maritime traffic problem. Some scholars proposed to start with the protection of the environment [5-6]. Second, based on domestic and foreign literature, combined with the actual situation of China, some new research methods are constructed. The in-depth discussion and analysis of the relationship between marine resources growth and marine economy by foreign scholars mainly focus on its concept, model establishment and classification, and related theories. The concept of "sustainable growth" proposed by foreign scholars mainly refers to the premise and purpose of protecting the ecological environment. Through continuous practice, it has been proved that this theory can guide human society to realize the transformation of green GDP growth mode, and at the same time, it also shows that the coordinated growth of environmental resources growth and marine economy is of great significance [7-8]. Therefore, this paper studies the relationship between marine resources growth and marine economy based on NN.

The relationship between marine growth and marine economy is very close and complex. Therefore, how to effectively coordinate the contradictions, interactions and interactions between them is particularly important. This paper will mainly discuss the application of NN in different stages. Firstly, the research background is introduced. Secondly, the domestic and foreign knowledge and growth of artificial NN and its related theories are elaborated. Thirdly, the current situation and future direction of China's marine resources growth and utilization are analyzed, and the research ideas and methods are proposed. Finally, the marine spatial database is established based on BP NN.

2. Discussion on the Relationship between Marine Resources growth and Marine Economy Based on NN

2.1. Relationship between Marine Resources growth and Marine Economy

In the process of growth and utilization of marine resources, due to the excessive exploitation of nature by human beings, serious environmental pollution has been caused, resulting in the destruction of the ecological balance. With the rapid growth of population and economy, the discharge of domestic garbage and sewage is increasing. At the same time, with people's increasing attention to natural resources and the growing awareness of protecting the ecological environment, more and more countries begin to pay attention to the sustainable and healthy growth of marine biodiversity and its related industries. There are also many irrationalities in the growth and utilization of marine resources, such as excessive exploitation, which leads to a large number of waste dumps and serious ecological damage in the sea [9-10]. The relationship between marine resources growth and marine economy is mutual influence, complementary and indivisible. The relationship between marine resources growth and marine economic growth can be divided into: (1) coordinating growth, utilization and protection to promote the common interests of all parties in the region. Through rational and effective use of land and strengthening environmental protection measures, sustainable and scientific exploitation of resources can be realized. (2) People's degree of environmental damage and protection have been enhanced. To a certain extent, there is an interdependence between the improvement of people's living conditions and the improvement of their working and living quality and economic growth. On the one hand, it is necessary to ensure the production of human society and the normal material and cultural needs of the people. In China, due to the narrow coastline and sparse population, a large number of land resources are idle in coastal areas. For those cities that have rich freshwater resources but can't fully develop and use them, it will undoubtedly increase the difficulty and cost of exploitation. On the contrary, if these lands can be used as the basis to develop the marine economy, it will bring them more and more

benefits and better social benefits, as well as greater benefits and income for the country [11-12].

2.2. Impact of Environment on Marine Economy

The growth of the marine environment is closely related to the marine economy, and the main factors affecting its growth are: (1) the natural environment plays a great role in the local ecological environment, such as natural disasters such as typhoons and earthquakes, which will cause huge losses. (2) Water and soil loss and pollution are serious. In China, a large amount of sediment enters the river channel every year due to the shortage of water resources, which may bring us economic losses and even threaten the safety of people's lives. At the same time, seawater intrusion due to the balance of seawater loss is also one of the important reasons. In addition, many resources in the ocean are non renewable resources. The growth and utilization of marine resources have an important impact on social economy, ecology and environmental benefits. Develop and utilize sustainable growth to promote regional sustainable growth. In marine resources, due to its own characteristics of non renewable and vast territory, as well as multiple generations and complex land sea interaction, it is inseparable from human activities. Moreover, with the growth of population and the improvement of productivity, people pay more and more attention to a series of influencing factors such as environmental problems brought by the process of economic socialization. Therefore, the growth and utilization of marine organisms can not only improve the ecological environment, but also promote sustainable economic growth [13-14].

2.3. NN Algorithm

Artificial NN is developed on the basis of biological neural system. It can simulate human brain neurons to deal with complex non-linear problems and adjust their functions through continuous learning and adaptation. Its basic model is shown in Fig. 1.

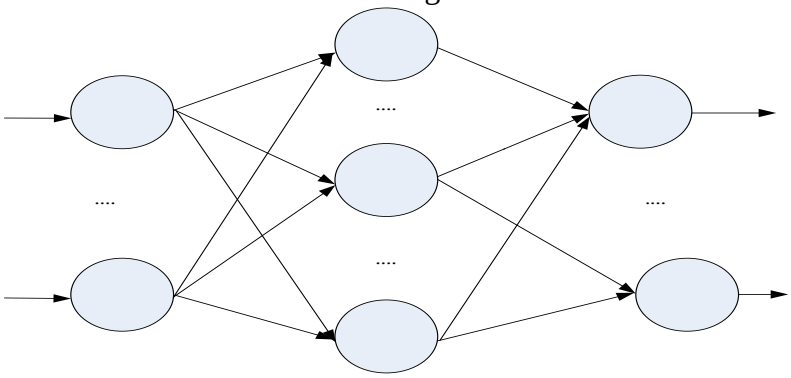

Figure 1. NN algorithm model

First of all, it is necessary to determine what correspondence exists between the input vector and the output data set. Secondly, it is necessary to determine whether the number of samples connected by each node is consistent with the input vector and transfer these results to the next NN. Finally, a certain number of training units are set in each NN to calculate the weight changes under the effect of different parameter values on the objective function.

$$u_k = \sum_{i=0}^{m} w_{ki} x_i \tag{1}$$

There are two different nodes in the network, input node and computing node. The input node only receives signals, and the computing node is the unit neuron. So the final mathematical

expression of the unit neuron is:

$$y_k = \varphi\left(\sum_{i=0}^{m} w_{ki} x_i\right) \tag{2}$$

It is mainly used for processing data with specific regularity and more complex functional relationships. The basic idea is to use the training sample set to predict. This method obtains the optimal solution or approximates the optimal node position in the problem domain by converting the input information into the output value, and then determines the weight vector unit according to the selected NN structure [15-16]. The training process of NN is to analyze and calculate sample data, classify them, and then output them, so as to achieve a new algorithm to simulate the artificial human brain [17-18]. Fig. 2 is the calculation flow of the NN algorithm.

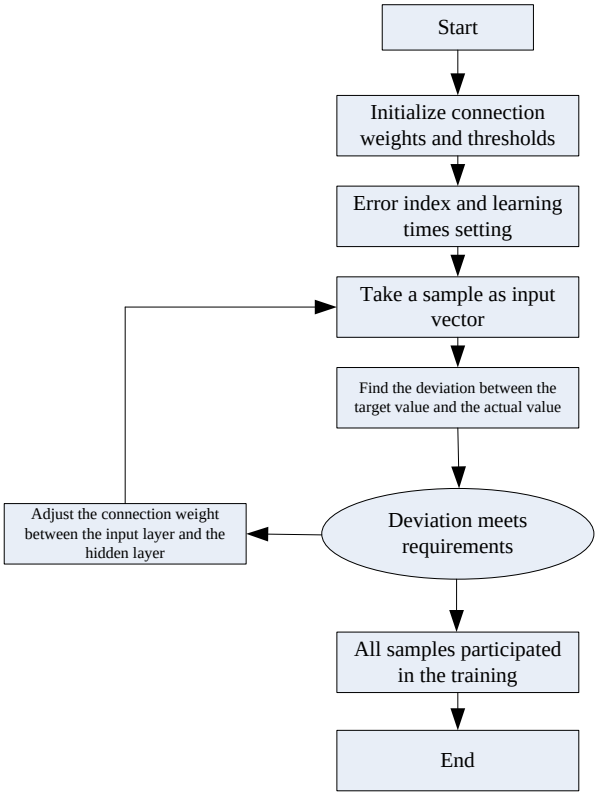

Figure 2. NN algorithm process

3. Experimental Process of the Relationship between Marine Resources growth and Marine Economy Based on NN

3.1. Model Structure of the Relationship between Marine Resources growth and Marine Economy Based on NN

NN (neuron) is a typical nonlinear mapping. It can process, classify and predict a large amount of data in complex systems through its powerful, simple and highly parallel. In practical application, we need to build a model to solve real problems. Since the growth of marine resources involves knowledge and technology of many disciplines, and other factors have a great impact, this paper uses artificial neural algorithm to build a set of nonlinear mapping relationship diagrams (as shown in Fig. 3) about the economic growth mode and growth trend under the growth and utilization of marine resources. In order to better understand the relationship between the growth of different

marine resources and marine economy, we can adopt a variety of methods to achieve its research. The first is classification based on NN model. By simulating the process of human intelligence exploration, a large number of data sets and knowledge bases are obtained. Using these data processing technologies can effectively solve the complex nonlinear functions and uncertainties encountered in practical problems, so that people can better use various scientific theories and methods to analyze and solve problems, and can identify, judge and predict different types of information.

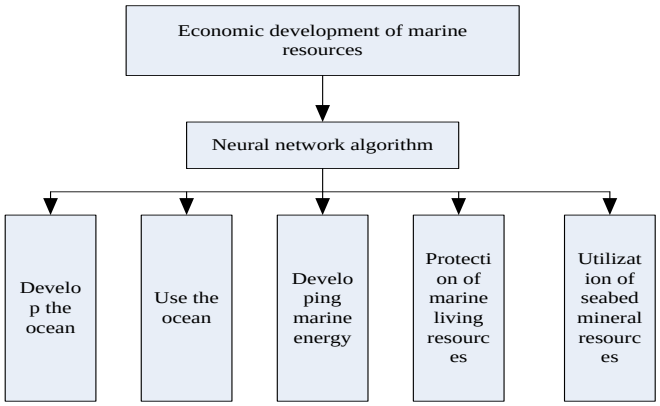

Figure 3. Growth and utilization model of Marine resources based on NN algorithm

3.2. Performance Test of Marine Resources Growth Model Based On NN

The ocean resources growth model based on NN layers different layers in performance, each layer contains a training unit, and each two neurons are independent of each other, so that the required data can be obtained through learning and simulation. For the upper system, it has high complexity, and we need to consider the links between the nodes in each layer. At the same time, in order to ensure that the NN can deal with complex, huge and uncertain types of problems in complex non-linear problems, it can obtain more satisfactory results. In order to improve whether the model test results are consistent with the actual situation, further research work is needed to verify whether the method can effectively predict the target value and optimize it to get the best effect. At the same time, the advantages and limitations of NN in data mining should be considered.

4. Experimental Analysis of the Relationship between Marine Resources growth and Marine Economy Based on NN

4.1. Performance Test and Analysis of Marine Resources growth Model Based on NN

Table 1 is the performance test and analysis data of marine resource growth model.

Table 1. Performance test of the NN algorithm

Test times	Data processing time (s)	Data processing delay time(s)	Account for memory(k)
1	3	2	3534
2	3	1	3456
3	4	2	3423
4	5	3	3564
5	4	2	3245

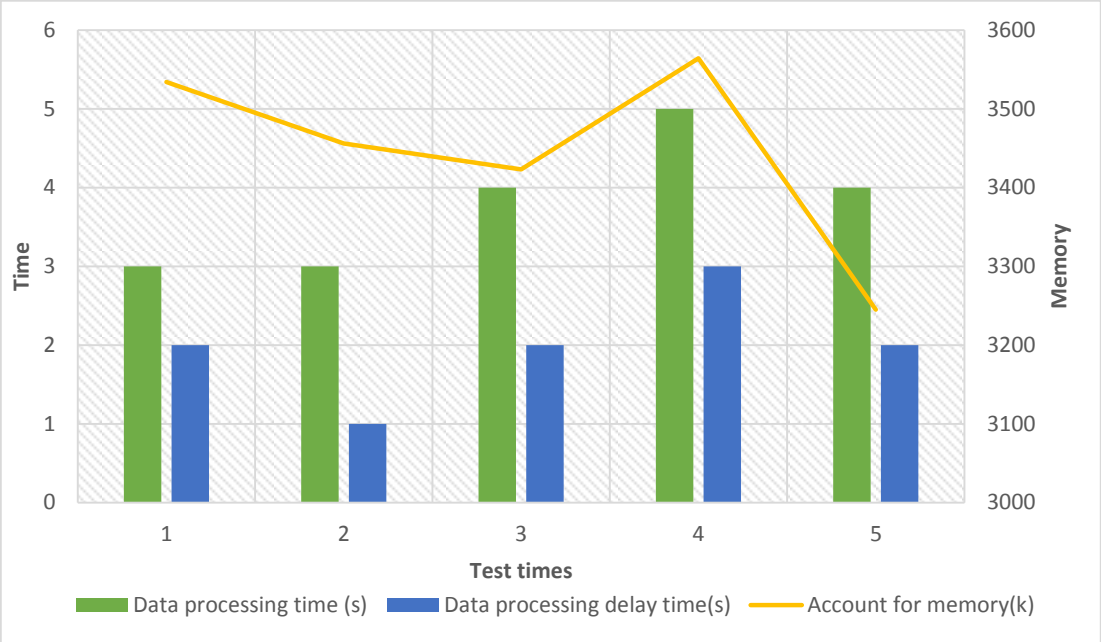

Figure 4. Performance test of the marine resource growth model

Before designing the system, the training sample of NN should first analyze the original data set and take it as the input variable. In order to ensure the accuracy and reliability of the test results. We need to first select appropriate learning nodes from the training set to complete the initialization process, and then establish a simple and effective NN sample set that is easy to operate, easy to calculate the output information, and can simulate a variety of topology structural features according to the interdependence between different types of models. Through the NN model, we can obtain the information of river area and coastline length change in each region, The artificial NN algorithm is used to obtain the objective function value and threshold value, determine the parameter range, training speed and accuracy requirements of the objective function, extract and classify the data features, and divide the area according to different types of ocean nodes. It can be seen from Fig. 4 that the marine resource growth model based on the neural algorithm has short data processing time and low delay time, which indicates that the algorithm can meet the operational requirements of the marine resource model.

5. Conclusion

With the growth of marine resources, marine environmental problems are becoming more and more serious. In this paper, the algorithms of NNs at home and abroad are studied. Taking China as an example, this paper introduces the principle, characteristics and application status of biological information processing in seawater based on NN technology, establishes the nonlinear relationship analysis between hydrogeological characteristics and sedimentation laws by using gray correlation model, and proposes the method and limitations of using BP algorithm to predict carbon and nitrogen content in Seabed Sediments, which provides reference for the growth of marine resources and marine economy.

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Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Conflict of Interest

The author states that this article has no conflict of interest.

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