

# *Intelligent Analysis and Processing Technology of Financial Big Data Based on Neural Network Algorithm*

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**Abstract:** In modern society, with the continuous development and application of emerging technologies such as computer technology, network computing and artificial intelligence, financial data analysis has become an important part of enterprise management. By analyzing the traditional accounting workflow and big data theory, and combined with the actual situation, this paper establishes an effective and accurate algorithm model. Firstly, this paper analyzes the definition and characteristics of financial big data, and then this paper studies the intelligent analysis technology based on neural network algorithm. Then, based on the algorithm, this paper designs the operation framework of financial big data intelligent analysis and processing technology, and carries out simulation experiments on the framework based on the algorithm. Finally, the experimental results show that the execution time and delay time of the algorithm are maintained at 2-3 seconds, and the occupied memory size is also maintained at about 3%. This shows that the neural network algorithm fully meets the needs of intelligent analysis of financial data.

## 1. Introduction

The emergence of big data has a great impact on the traditional financial analysis technology. In the fields of Internet, cloud computing and Internet of things, enterprises make decisions through data mining [1-2]. With the continuous development and maturity of computer network and communication industry, some achievements have been made in the theoretical research of artificial intelligence. The effective use of neural network technology can improve work efficiency, reduce cost and reduce the probability of data loss. Therefore, it is of far-reaching significance to study how to make better use of neural network model to solve the problems existing in financial management [3-4].

Many scholars have begun to explore neural network algorithm and model modeling. Some scholars have built a prediction model based on artificial neural network based on the adaptive method of artificial neural network. The system is a multi-level nonlinear system based on computer to realize the functions of intelligent calculation, automatic control and decision processing. At the same time, it can also improve the financial management level and

comprehensive strength of enterprises by optimizing and analyzing the data [5-6]. Other scholars proposed that enterprises should establish a big data prediction system based on neural network model. Other scholars have discussed the traditional pfinis algorithm and the improved OMP technology in different types of sample information extraction methods in accounting database. Other scholars have made great achievements in financial analysis based on the combination of traditional financial software and artificial neural network [7-8]. The above research has laid a research foundation for this paper.

With the development of computer and communication technology, financial analysis has become an important management tool for enterprises. In the traditional sense, accounting information processing is operated manually. It is found that there are many unsafe factors in financial data in practical work. After deeply studying the theoretical knowledge of neural network algorithm, this paper obtains the intelligent analysis and processing model of financial big data based on neural network algorithm, and puts forward some improvement schemes. This paper also combines financial analysis and prediction to improve the efficiency and effect of enterprise decision-making.

## **2. Discussion on Intelligent Analysis and Processing Technology of Financial Big Data Based on Neural Network Algorithm**

### **2.1 Financial Big Data**

#### **2.1.1 Definition**

Financial data refers to the assets, liabilities, cash flow and other information of an enterprise. In the traditional sense, it is generally believed that "financial big data" is the analysis and research of these large number of repetitive businesses. But in fact, this is not the case. In the era of big data, we can use computer technology and network communication to collect, store and analyze a large number of unstructured and huge accounting information resources. At the same time, we can also obtain more relevant information about the business status of enterprises from the database. Financial data analysis is the core work of the enterprise. It mainly includes the collection, sorting, analysis and processing of various internal data of the company by various departments of the enterprise, as well as the comprehensive management and control of these financial related data [9-10].

#### **2.1.2 Features**

(1) Financial data is diverse. In the process of traditional accounting information analysis, enterprises need to collect a large number of original data, which are collected through paper materials. Due to its complex structure and large quantity, it is cumbersome and disorderly manual input for enterprises. However, with the rapid development of computer technology and network technology, manual processing is difficult gradually eliminated.

(2) Financial data is real-time. It means that when enterprises collect and analyze big data, they can reflect the results in time, timely and accurately obtain the relevant contents of enterprise financial statements and accounting information, and feed back these information to decision makers [11-12].

(3) The financial data are accurate. When the results cannot be seen with the naked eye or the product quality problems cannot be seen directly, manual operation is required to make up for the defects or avoid losses. For some special cases, the analysis and processing required must also be

accurate. This requires accurate data acquisition and decision-making in the process of data collection and transmission. Make reasonable decisions accordingly.

## 2.2 Intelligent Analysis Technology Based on Neural Network Algorithm

### 2.2.1 Neural network algorithm

Neural network is based on artificial neuron. It uses its information processing ability to share knowledge in computer and human brain. Artificial neural network is an information processing system which is abstracted and simplified by biological neural network and connected by a large number of simple artificial neurons. It has a strong self-learning, self-study and automatic adaptation system[13-14]. This network is a mathematical algorithm model. By adjusting the connection weights and other parameters between a large numbers of internal neurons, it can intelligently learn and train the input and output sample data, mine the potential relationship between input and output, and has the ability to calculate and predict new samples and obtain the prediction results. Neural algorithm can be used to predict the change trend of unknown parameters (inputs) in the model without any external factors to modify the model parameter values, so as to obtain the optimal results. And because the network structure is simple and easy to implement and can complete information acquisition well, it has a wide application prospect in the field of enterprise financial management. As an artificial intelligence technology, neural network has been widely used in pattern recognition, control and optimization, prediction and intelligent information management, space science and so on.

Input vector of artificial neuron:

$$P = [P_1, P_2, P_3, \dots, P_r]^T \quad (1)$$

Weight vector of neuron:

$$W = [W_{1,1}, W_{1,2}, W_{1,3}, \dots, W_{1,R}]^T \quad (2)$$

The neuron has a bias value  $B$ , which is added to the weighted sum of all inputs to form a net input  $n$ :

$$N = W_{1,1}P_1 + W_{1,2}P_2 + W_{1,3}P_3 + \dots + W_{1,R}P_R + B \quad (3)$$

Neural network is a nonlinear system based on biological brain. In the process of learning, we will constantly change the original mathematical model to make it suitable for complex, multi-dimensional or discontinuous problems. Neural network has strong adaptive ability, fault tolerance and good parallel processing function. It can simulate the human brain nervous system to automatically identify and select unknown information. It can store a large amount of data in different types of occasions to meet a variety of control needs. It is one of the most important topics in the field of artificial intelligence[15-16].

### 2.2.2 Improvement of Intelligent Analysis Technology

The focus of neural network algorithm research is how to apply the model to financial analysis, not just for one aspect. In the traditional enterprise management accounting system, due to the lack of comprehensive and in-depth data mining, processing, analysis and utilization, it requires a lot of human, material and financial investment and low efficiency, which can not meet the requirements and needs of computer technology development in the era of big data. At the same time, it can not effectively use the existing network structure to realize information sharing and efficient integration

of information resources. Therefore, introducing a training sample set into the artificial neural network to simulate the information processing process of human brain neurons, or establishing a model to complete the work with computer instead of human input machine, which can effectively solve the above problems and reduce the error rate, time and cost. These technologies can also be used to realize enterprise financial analysis and control, so as to improve decision-making efficiency and economic benefits.

### 3. Experiment

#### 3.1 Financial Big Data Intelligent Analysis Framework

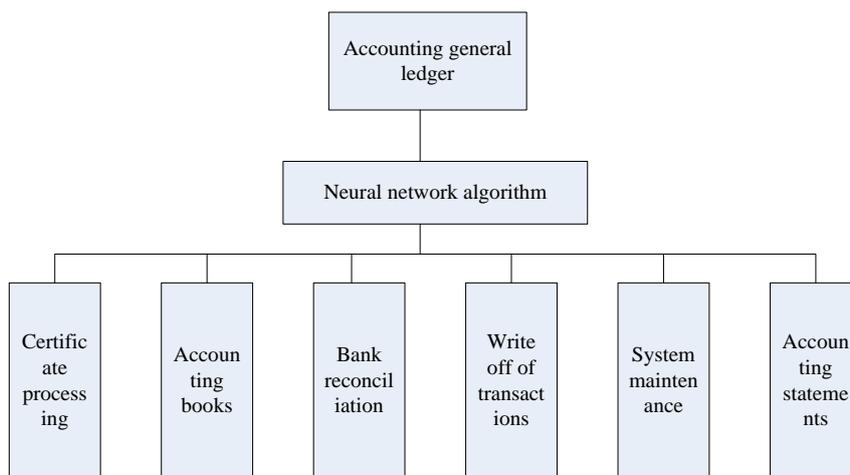


Figure 1: Intelligent analysis framework of financial big data

In the traditional financial analysis, the data is very complex, huge and cumbersome, and the characteristics of rapid changes in internal information and external environment and great uncertainty make it difficult to analyze comprehensively and accurately. Intelligent financial big data processing framework based on neural network algorithm (as shown in Figure 1) will solve the above problems. The model realizes prediction by training a large number of input and output sample sets. The design of neural network algorithm is to process the data, input it into the computer, and then automatically calculate the results by the computer. The main purpose of financial analysis is to collect, classify and retrieve various types of information within the enterprise Mining is to extract valuable or potentially useful or unused information with high importance from massive unstructured data, store these effective, unimportant or even invalid original data in the database in some way, obtain reliable analysis results through this method, and make decisions according to the results.

#### 3.2 Collection of Financial Intelligence Analysis Database

Financial data analysis is an important work in enterprise management. It can not only provide reliable basis for decision-makers, but also help managers formulate the next development strategy. Financial data analysis is a complex work. It needs to establish a large number of data warehouses, but enterprises will also have various problems due to different types and sizes on a large scale. So we need to classify this information. Centralized processing mode can be adopted for some financial data with important value and non quantifiable characteristics. For some specific projects or products, it can also realize the contact and communication between various departments within the enterprise and different industries through data warehouse.

### 3.3 Performance Test Steps of Neural Network Algorithm

The performance test of neural network algorithm includes two aspects: simulation operation and experimental verification. (1) Simulation. Firstly, the neural network model is tested. In the training process, the sample data needs to be used to calculate the required function value through the output results of the input layer and other neurons. Secondly, the neural network parameter optimization and learning algorithm performance evaluation are used to test whether the neural network has good performance indicators. (2) Through the training of the model, an artificial neuron calculator is obtained. The system uses the computer to analyze and process the obtained results after establishing the mutual connection, mutual connection and certain proportional relationship between the data input and output. At the same time, the input samples can also be used as the output object and the training sample set Function value to represent the operation status and parameter changes of each node in the network.

## 4. Discussion

### 4.1 Performance Test and Analysis of Neural Network Algorithm

Table 1 shows the performance test data of neural network algorithm.

Table 1: Test data

Number of tests	Executive time(s)	Delay time (s)	Occupy storage space (%)
1	3	2	3
2	2	1	2
3	3	2	3
4	4	2	4
5	3	1	3

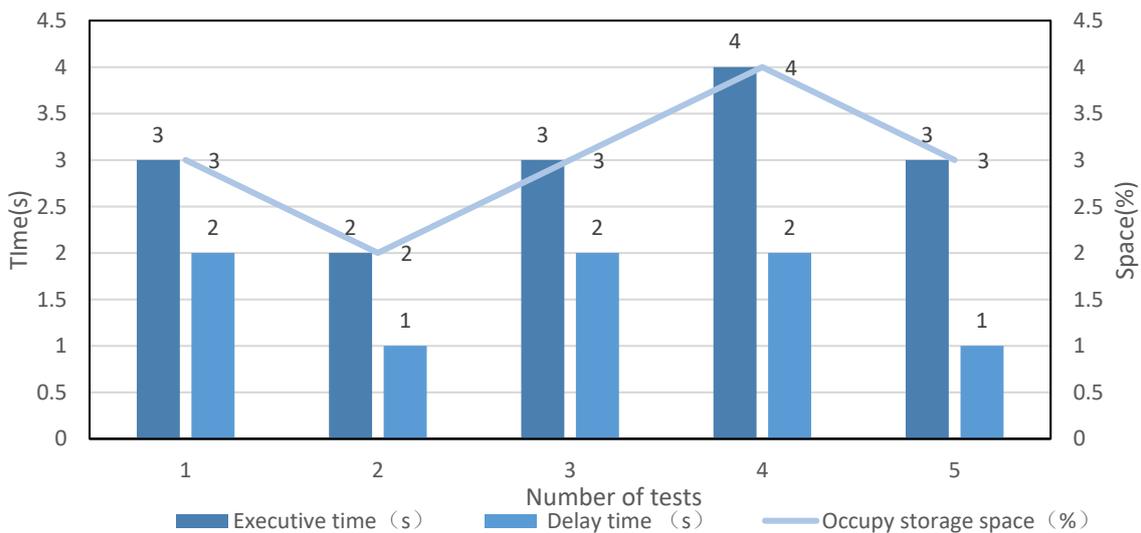


Figure 2: Algorithm performance test

The performance test of neural network algorithm is a system engineering. In practical application, it needs to be simulated and analyzed. Generally, we can do it manually. However, due to the subjectivity and many uncertain factors of the manual method. Therefore, in order to achieve the expected goal, we must go through repeated experiments to get the best method. Therefore, it is

necessary to select the appropriate type of computer program running time, memory size and input and output device capacity according to the specific requirements to complete the algorithm performance test, and finally get the best training algorithm model and parameter values. As can be seen from Figure 2, the execution time and delay time of the algorithm are maintained at 2-3 seconds, and the occupied memory size is also maintained at about 3%. This shows that the neural network algorithm fully meets the needs of intelligent analysis of financial data.

## 5. Conclusion

This paper mainly studies the intelligent analysis and processing technology of financial big data, and optimizes the financial information of enterprises through neural network algorithm, so as to improve the decision-making ability of enterprises, reduce business risks and reduce labor costs. Firstly, this paper studies the application of neural network algorithm in financial analysis and prediction, and introduces the data processing method under the traditional manual mode. Secondly, combined with the actual situation of enterprises, an intelligent optimization model based on big data is proposed. Finally, the simulation results show that the system has good performance.

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