

Research on the application of big data mining technology based on neural network

Xiangchao Wang

Dongying Vocational Institute

myhon@163.com

Abstract. In the development of social construction, all walks of life have the application of data mining technology, with the continuous development of science and technology, data mining technology can not only use the hidden law to solve the problem of time, but also can grasp more valuable data in the increasingly competitive social environment. Originally, after understanding the application research status of big data mining technology, based on the application of big data mining technology with neural network as the core, empirical analysis was carried out with Guanhealth big data intelligent analysis system as an example, in order to verify the unique value of data mining technology.

Keywords: neural network; Big data; Data mining; Data prediction.

1. Introduction

Neural network is a parallel interconnected intelligence model that simulates human brain function. It has a wide application prospect in social fields, such as national defense, industry, and commerce. As the basic research direction in the field of data mining, the common contents of data forecasting include trajectory forecasting, weather forecasting, stock market forecasting, etc., which provides practical technical methods for human decision-making in various fields. With the continuous development of social economy and science and technology, people's demand for prediction is getting higher and higher, and a number of research topics have been put forward whether it is forecasting accuracy or forecasting depth. At present, multi-dimensional forecasting analysis has become a key problem that needs to be solved urgently. With the steady development of information technology, how to demonstrate the novelty of knowledge discovery is of great importance. Especially after entering the era of big data, we are in the social environment where a large amount of star information is generated every day. How to use data mining technology to analyze the continuously increasing information data, comprehensively grasp the novelty and diversity of information, and provide timely and accurate basis for practical life decision-making? [1.2.3]

Nowadays, scholars from various countries have put forward a number of special analysis and decision-making software in their research, which can not only deal with static data sources, but also analyze dynamic data information, providing technical support for dealing with high-risk or dynamic application problems in the new era. The use of computer automatic intelligent analysis of database information resources, so that the promotion of data mining technology appears a strong power. According to the analysis of the development situation at home and abroad, the market of data mining is generally in the stage of combining theoretical research and practical application, and is widely used in all walks of life, mainly to support enterprises to make key decisions and market strategies. Because of its powerful computing power and parallel processing ability, neural network can better meet the development needs of the new era. [5.6.7]

At present, data mining has been widely concerned by academia and industry, and is one of the hottest research directions in the field of international database and information decision-making,

such as preventing criminal fraud by predicting market trends in the financial field, and identifying customers and behaviors in the field of corporate marketing. Nowadays, data mining mainly focuses on the mining and analysis of complex types of data information, including the following: First, spatial data mining. Spatial database stores a large number of space-related data, and the data structure is composed of points, lines, rectangles, etc. Compared with general data information, it has the characteristics of high latitude and non-structure, and data mining technology can master spatial relationships and other meaningful patterns. Second, multimedia data mining. Multimedia database will store and manage a large number of multimedia object data. By extracting the underlying features and using the feature vector to describe, it can orderly complete content retrieval, similarity retrieval, data classification, association rule mining and other operations. Third, Web data mining. As a huge, widely distributed global information service center, the World Wide Web contains very rich hyperlink information, access and use information. Web-based data mining is to obtain the original data in the World Wide Web and mine the available knowledge information from it. [8.9.10]

Scholars in China and abroad have made excellent achievements in the study of neural networks. Professor Liao Xiaofeng et al., by summarizing the 2005 International Conference on Neural Networks held by Chongqing University, found that there are two major trends in the study of neural networks at present: on the one hand, it is developing towards a more complex neural network system in theory; on the other hand, it is constantly expanding the application scope of neural networks. Nowadays, neural networks have been widely used in image processing, pattern recognition, signal processing, business forecasting, data mining and other aspects, providing an effective basis for technological reform and innovation in the new era. Neural network and data mining are important basis for data processing. After understanding the current research and application status of relevant technical theories, this paper mainly studies the intelligent analysis method of health big data based on convolutional neural network according to the application ideas of neural network in data mining, so as to verify the effectiveness and reliability of this method. [11.12.13]

2. Method

2.1 Neural Network

As a unique artificial intelligence technology, neural network has a model structure similar to the neurons of human brain, which contains a large number of neurons, and each neuron has input, weight, activation function and output result. After the input signal is activated after the weight adjustment, multiple neurons can be connected to form a layer network after the corresponding output result is given. According to the analysis of neural network flow chart shown in Figure 1 below, neural network belongs to a learning process. The network can learn the relationship between input data through training, and ensure that the output is close to the expected value after continuous feedback and adjustment of the weight value. From the perspective of practical application, neural network has the ability of self-regulation and learning, and can replace traditional computing methods in certain cases.

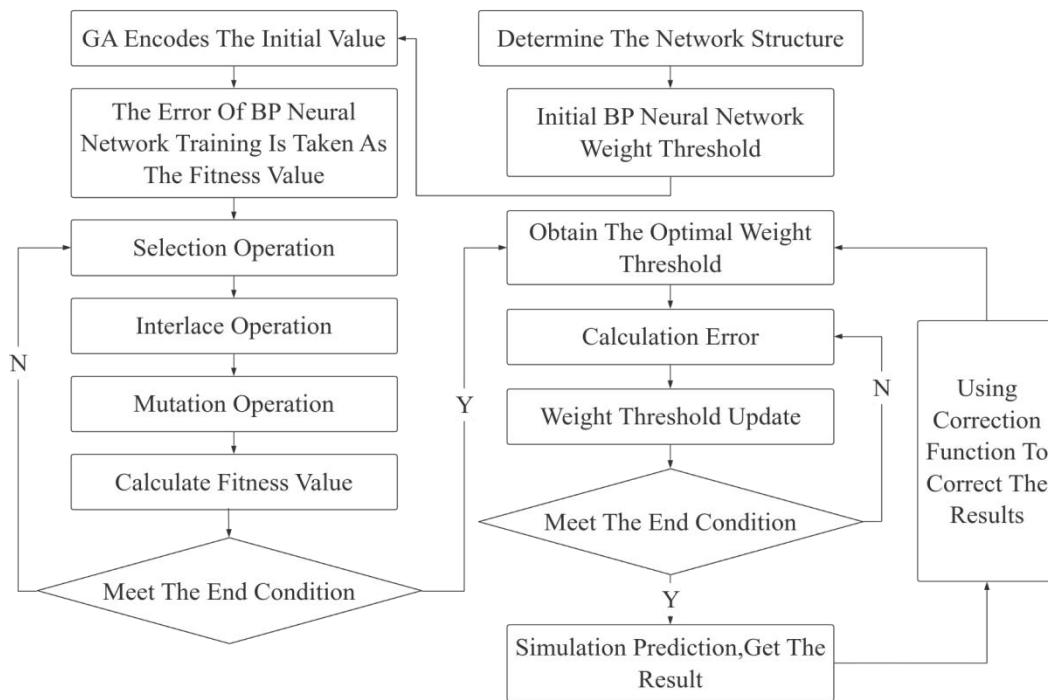


Figure 1. Flow diagram of neural network

2.2 Application analysis of neural network in data mining

Combined with the data mining flow chart shown in Figure 2 below, we can see that data mining includes data preparation, rule finding, rule representation and other links, which is not only a simple basic technology, but also a complicated and cumbersome scientific process. Its purpose is to help human beings master, investigate and apply massive data. Specific tasks include association analysis, cluster analysis, evolution analysis, etc. [14.15]

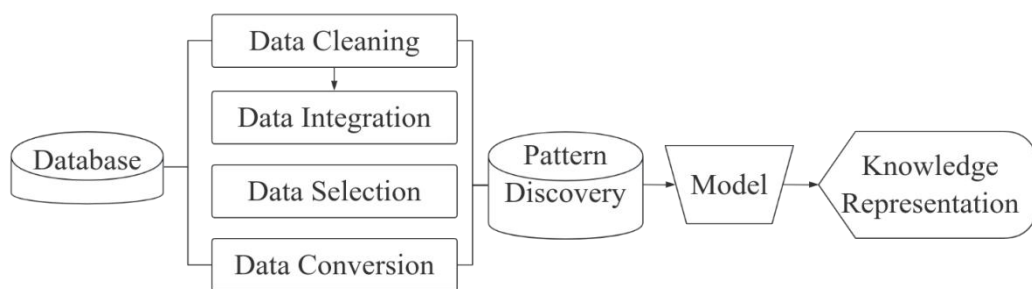


Figure 2 Flowchart of data mining

According to the data processing flow shown in Figure 3 below, the application characteristics of neural network in data mining are reflected in the following points: First, nonlinear mapping capability. Compared with traditional linear models, neural networks can handle complex data structures faster through nonlinear mapping models, such as nonlinear regression and classification problems in high-risk data Spaces. Second, robustness. Neural network has high robustness when processing large-scale data, can reduce the noise and abnormal value of data mining prediction, and always maintain the application stability. Again, parallel computation. Neural network can carry out

parallel computation in an orderly manner, including data preprocessing, data learning, data reasoning and other processes. The actual computing unit is neuron, which can process the input of multiple neurons at the same time, and complete efficient computation quickly. Finally, unstructured data processing. The neural network can process non-structured data, such as text, sound and image, which has high dimensional, complex and irregular characteristics, and can improve the efficiency and quality of data extraction by using feature representation and related data.

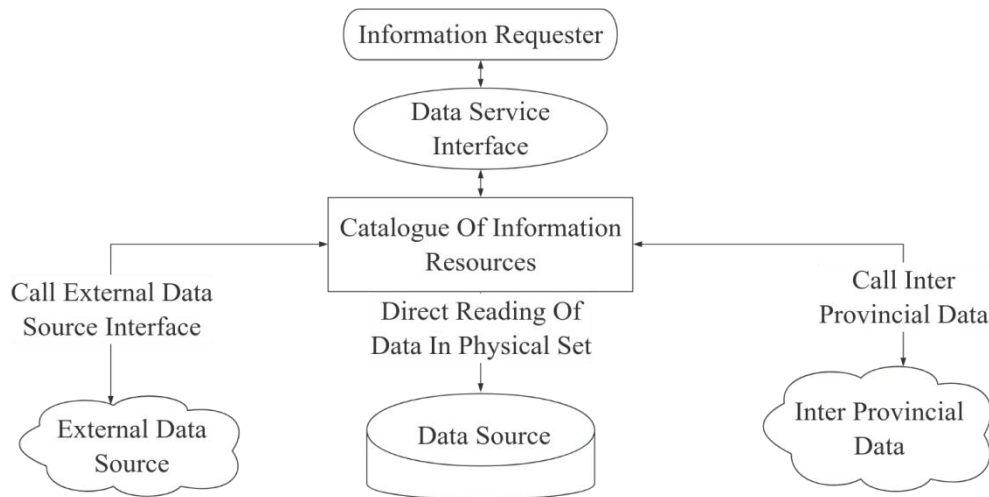


Figure 3 Data processing flow chart

The steps of applying neural network algorithm in data mining technology are as follows: First, determining the problem is the first step of data mining, which can provide a clear target for the following data extraction and data analysis; Second, as an important part of data mining, data preparation and data cleaning directly affect the quality of data mining results, and usually require data sampling, standardized processing, normalization processing, denoising and abnormal value removal. Thirdly, when constructing the neural network model, it is necessary to select the appropriate neural network structure and application algorithm, and usually operate according to the data characteristics. When adjusting the neural network hyperparameters, the complexity and fit degree of the model are considered comprehensively. Fifth, summarize the conclusion according to the results of neural network analysis, and apply the practical results to specific problems, which is a key step to realize neural network data mining.

3. Result analysis

In the steady development of China's medical industry, a large number of medical and health data are stored in the database. Due to the complex structure, rapid growth and large scale of these data, some scholars have proposed to use artificial intelligence for intelligent analysis, dig out more valuable content from it, and better serve the medical staff and the masses. To provide technical support for the reform and development of medical undertakings in the new era. Combined with the health big data intelligent analysis model built based on convolutional neural network as shown in the following figure, the database holds a large number of hospital diagnosis and treatment data information, such as doctor's consultation, physical examination, laboratory examination, treatment plan, diagnosis results, etc. The model can continuously learn and optimize itself by using historical

texts in the database. The resulting training model is used to complete intelligent analysis and risk assessment.

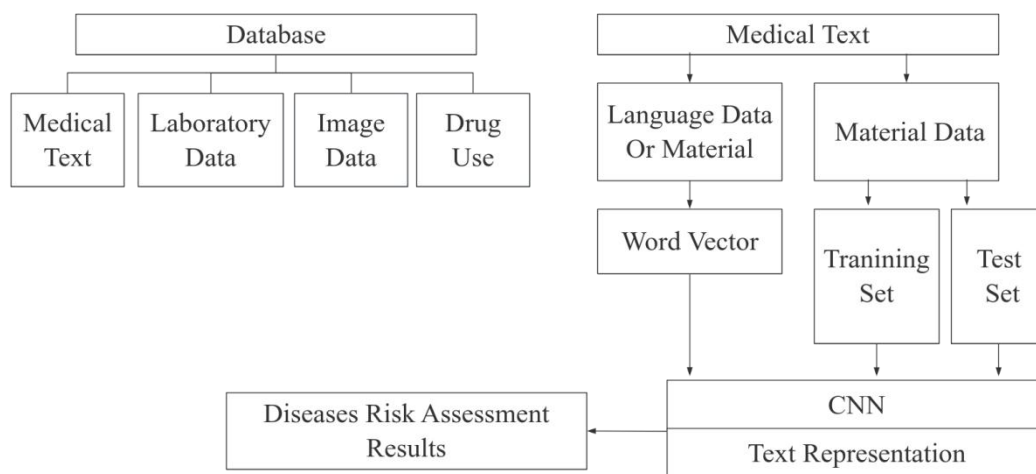


FIG. 4 Health big data intelligent analysis model based on convolutional neural network

The whole model mainly includes three parts: word vector training, CNN characteristics, learning and disease risk assessment. Among them, the word vector training model preprocesses the historical data collected from the database and treats the processed data as corpus for digital representation and effective training. CNN feature learning module will input the trained word vector to complete model learning and model training in an orderly manner, and finally get the optimal analysis model; The evaluation module will use the serial number model to analyze the newly entered data to obtain the final result. In order to verify the application value of the overall model, medical data of common chronic diseases in recent decades were randomly selected from the data of a hospital, and the data sample set required for the research was constructed for evaluation and analysis. The results of the data and corresponding disease risk assessment indicators are shown in Table 1 below:

Table 1 Experimental results

disease	data set	Accuracy (%)	Recall rate (%)	precision (%)
coronary heart disease	A1	96.3	90.4	95.7
Pulmonary infection	A2	90.8	91.3	94.2
Cerebral Infarction	A3	91.1	94.6	92.5
hypertension	A4	83.4	87.2	85.9

Combined with the analysis of the above table, it is found that the model studied in this paper is suitable for the risk assessment of a variety of common diseases, and the results of accuracy, recall rate and accuracy are more than 90%, which proves that the research method in this paper is reliable and effective, and has achieved excellent results in the current medical disease assessment and analysis. In the application of models, convolutional neural networks are more effective than traditional neural networks. The features and learning parts added on the basis of traditional multi-layer neural networks will use spatial relative relations to reduce the number of parameters and improve the application performance of algorithms. From the perspective of overall application, convolutional neural networks solve important problems in the field of artificial intelligence,

simplify complex problems, reduce the number of parameters as much as possible, and then greatly improve the performance of the algorithm. For the current medical and health big data mining and application in China, reasonable use of convolutional neural networks for intelligent analysis. It can not only provide data support for medical personnel and the people, but also provide technical support for ensuring the healthy development of the whole people, but at the same time, the medical industry and data application are also facing many challenges, so the future must continue to innovate in combination with practical needs.

Conclusion

To sum up, by integrating neural network and big data mining technology and starting from the business needs of various fields, the intelligent analysis model and application method of big data are built, which can not only show the universality and effectiveness of technical methods, but also grasp more valuable data information, and provide technical support for the innovation and development of industrial enterprises in the new era. In the future, China should continue to explore neural network and data mining technology to ensure that the construction of models and proposed methods can meet the intelligent analysis needs of different data sets, only in this way can lay the foundation for technological innovation in the new era.

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