Research on Intelligent Information Processing Based on Neural Network

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Abstract: In recent years, the level of science and technology in China has been continuously improved. As a relatively advanced information technology, intelligent information processing technology has been widely used, and has become a hot topic of more and more scholars. This paper analyzes the key technologies of intelligent information processing based on neural network, including technology of access interface extension, technology of network topology structure and technology of data organization structure. The application cases of neural network technology in intelligent information processing are also given to provide some references for the relative researchers.

1. Introduction

Artificial neural network is a kind of information processing system designed to imitate the structure and function of the physiological neural network [1]. Its birth dates to the end of the nineteenth Century to the beginning of twentieth century. After several generations, hundreds of scientists have been working hard to achieve the results of the work today. From the point of view of information processing, neural network is the abstraction of human brain neuron network, forming different networks by different connection ways, and establishing some information processing model worker. Many artificial neurons are connected to a neural network with certain rules, and the connections between neurons and the distribution of the weights of each connection are used to represent specific information. The neural network distributive storage information has high fault tolerance. Each neuron can operate and process the received information independently and output the results. The network has the capability of parallel computing, and the real-time performance is very strong. The processing of information by neural network has the characteristics of self-organizing and self-learning, which is convenient for association, synthesis and popularization. The neural network is widely used in artificial intelligence, pattern recognition, control engineering, signal processing, associative memory and so on with its superior performance. Artificial neural network technology has many problems such as slow convergence, premature convergence and falling into local optimal solution when solving the optimal solution. Many scholars have improved artificial neural network technology from parameter adjustment and neural network topology adjustment. Intelligent information processing technology can meet the requirements of social information processing technology. It can transform uncertain information and reliable information into reliable information through certain processing and analysis. Intelligent information processing technology can apply the information that has been acquired properly and fully. In this way, the utilization rate of information is improved, and it is undoubtedly a special information processing technology [2].

2. Key Technologies of Intelligent Information Processing Based on Neural Network

2.1 Technology of Access Interface Extension

As the system is accessed in browser, we need to access the core database. Here we use artificial

neural network technology to extend the system data access interface, and format data to improve readability. In the system, we use a standard artificial neural network format, in which the message is divided into two parts of the header and the body of the message. System management is mainly the system administrator to maintain the system, including user authentication, data maintenance and system security management. The system user authentication module, as users of the system include expert users, and is responsible for screening to determine the scoring operation on the evaluation factors of evaluation factors; the administrator, responsible for system maintenance and data entry, modify and delete operations; ordinary users, so the system needs of user authentication and identity to complete the corresponding operation, ensure that system security. The background maintenance module of the system is mainly used to complete the database export and software maintenance operation. The system security management module mainly manages the user privileges of the system. Evolutionary algorithm is an algorithm formed by drawing lessons from the laws of heredity and natural selection in biology. It plays a guiding role in many fields. The basic principle of genetic algorithm is the inheritance model of the biological natural imitation, the implementation of process optimization of search in the whole process, the genetic algorithm has the special research object, genetic algorithm is the individual, some of the individual selection, crossover and mutation operation of genetic algorithm has certain advantages in practical the application, as the operation of this method is relatively simple, suitable for parallel processing of information [3].

2.2 Technology of Network Topology Structure

To ensure the safety of the system, we use two servers: one is the server used for data storage, and the other is the server for user request processing [4]. The system can be divided into internal network users and external network users. The intranet users are accessing the system in the internal LAN, aiming at the administrator of the learning system, and the external users are the users on the Internet, aiming at online learning learners. The firewall is set up between the server and the inner network, the inner network and the external network to ensure the security of data transmission and the database. This topology can effectively guarantee the safety and stability of the system, its advantages include: artificial neural network structure of three layers to separate business processing and data processing server, maintenance and upgrade of the system is conducive to the protection of the system, data security; distributed network layout, have different access modes for different the user, multi-channel access method can effectively avoid the incompatible situation, the availability of the system is improved. The neural field calculation of theoretical framework, concepts and theories with flat manifold simplex and complex as the representation and encoding mechanism structure of neural network model, the complex edge chain structure decomposition, forming a hierarchical neural network for understanding, modular structure, positioning mechanism. In the nonlinear and non-Euclidean space, the learning theory framework based on the whole structure approximation is proposed. On this basis, dual correction learning algorithm and topology-based approximation correction learning algorithm are proposed respectively. The neural approximate logic not only has fuzzy logic value, but also the logical operator is fuzzy.

2.3 Technology of Data Organization Structure

The selected database needs a good data organization structure, which enables the whole system to invoke the data needed by management quickly, conveniently and accurately, and improve the performance of the whole system. To meet the above requirements, the system uses a neuron database. Neuron database is an object -- relational database. It provides an open, comprehensive and integrated information management method, and data storage is transparent. There is a high-performance database as the foundation, also need good database structure, database structure design will directly affect the efficiency of the system and the realization of the design effect, good data structure makes the system has fast response speed, improve the integrality and consistency of data, greatly improve the performance of the whole system. To adapt to the information processing requirements in the information age, the current information processing technology is developing towards intellectualization, from the information carrier to the information processing links, widely

simulating human intelligence to process all kinds of information. Intelligent information processing is a cutting edge interdisciplinary subject in computer science. It is applied oriented comprehensive subject. Its goal is to deal with massive and complex information, and research new and advanced theories and technologies. The research of intelligent information processing covers basic research, application basic research, key technology research and application research. It not only has high theoretical research value, but also has great significance for the development of the national information industry and the whole social economic construction and development. Investigate and analyze user's business activities and data usage, find out the type, scope and quantity of data used and their communication in business activities. In the demand analysis, the system is analyzed by the top-down, stepwise decomposition method, and the results of the analysis are graphically described by the data flow chart.

3. Applications of Intelligent Information Processing Based on Neural Network

3.1 Applications in Library Information Processing

Mobile library information acceptance situation integration relies on the established fusion rules and fusion mechanism. It extracts information reception situation unit based on user needs and provides personalized information services for different users. The mobile library information receiving situation fusion is receiving information fusion situation of different dimensions of sub elements of development, extension and innovation, information fusion application results in the situation to accept user information demand, information search and information acceptance process, users get the desired results. Technology context integration is embodied in the organic integration of different mobile terminals in different time and space to achieve different mission situations, which provides strong guarantee for mobile library's information service in different application scenarios. The integration of resource situation and resource fragmentation and re combination is manifested in the integration of resource integration and reorganized form of aggregation, which provides users with targeted resource protection. Based on resource situation and technology scenario, we integrate information service of resource context and technology scenario to provide users with one-stop information service and precise personalized information service. Mobile social networking is based on the introduction of technology context, new media, micro media, self-media and all media in mobile library, enabling mobile library to integrate user to user, user and mobile library, and mobile library interaction. Social situation integration, the realization of social economic, cultural, political and legal systems and other factors of integration, forming a different social situation dimension. User context, with different users' preference and interest in different resources, and the clustering of user groups with the same interest preference forms different user contexts. The information acceptance situation fusion of mobile library inherits the sub data type, fusion method, fusion process, fusion target and fusion presentation of information acceptance situation.

3.2 Applications in Medical Information Processing

The non-convexity of the neural network is that it has multiple minima, i.e. system has more than one stable equilibrium state, this attribute will diversify the evolution of the system in dealing with many problems, both sources of information is not complete, but also contains false decision rules sometimes conflicting, sometimes out of nowhere that has brought great difficulties to the statistical information of the traditional method, and neural network can deal with these problems well, and gives a reasonable identification and judgment. We use neural network and multiple regression to compare the results of numerical prediction to get the conclusion that the predictive value is closer to the actual incidence. We use artificial neural network to predict the concentration of cyclosporine blood and get the exact value. We have explored the use of artificial neural network to solve some of the information problems in medicine. It is concluded that the neural network is a good way to deal with medical information. We use artificial neural network model to simulate the incidence of coronary heart disease, and the conclusion is close to the actual clinical situation. Artificial neural

network may not be able to replace the human brain, but it has expanded the knowledge and ability to control the external environment: its unique nonlinear adaptive information processing capability which has been successfully applied in intelligent control, combinatorial optimization, prediction and other fields, has become a unique information processing discipline. Artificial neural network is developing deeply on the way of human cognition, and it is combined with fuzzy system, genetic algorithm and evolutionary mechanism to form computational intelligence. It has become an important direction. Based on modern neuroscience research achievements, scientists can simulate complex information in medicine, crisscross, interactive and complex etiological functions, and study more concise and effective methods for disease prevention, control and treatment.

3.3 Applications in Marine Information Processing

The neural network is also widely used in the ocean, including the prediction of sea waves, the classification of sea waves and so on. These are of great significance in the development of the national economy and the construction of sea defense. From the development of foreign countries, the neural network has been used to simulate the parameters of the waves in the last few years. The traditional prediction model requires a supercomputer to calculate the tide, wind and wind direction, which can be used for rapid numerical simulation and prediction on the raspberry pie. The system uses depth learning to train data sets and uses different sets of data to observe a wider range of physical environments. Research on the prediction of IBM member that wave height and direction accurately is a valuable resource for many marine based industries. From the domestic research and development, the main use of human neural network to carry out a sea wave prediction. Since the sea surface temperature is also sampled continuously according to the order of time, it is a time series data. The specific methods are as follows: to obtain the different points of the year's sea surface temperature and to normalize it. The processed data are segmented according to the different length, and the corresponding piecewise time series data are obtained. The piecewise time series of one point is used as the input of the model, and the piecewise time series of the other point is used as the model to train the model. If the loss of the validation set can continue to fall to a certain range and eventually tend to be stable, it shows that the model is well trained. To test the trained model, the input of a test set point segmentation of time series data, predict the segmentation of time series data corresponding to the data with the original data, the correlation coefficient calculation and error calculation to judge between the two points of the sea temperature and whether there is a certain correlation.

4. Conclusion

Neural network technology has been a very long history, but in recent years, the progress of neural network is very rapid. The research shows that this technology has wide application potential in many areas, such as intelligent simulation and information processing in prediction, pattern recognition, automatic control and other fields. The application of neural network technology in hydrology and water resources is becoming more and more. Many research shows that neural network technology has significant advantages such as large scale parallel processing, distributed storage, self-adaptive, fault tolerance and so on. This technology can effectively solve the problem of precise modeling, high nonlinearity and various uncertainties in intelligent information processing.

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