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A Comprehensive Analysis of Neural Network Technology in the Suitable Application of Research Based on Risk Management

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ABSTRACT

The term "neural network technology" refers to an algorithmic application that mimics human thinking by constructing the overall structure from components like connecting arcs and neurons. Neural networks can be used in financial risk management early warning work based on several neurons and specific rules for processing input signals according to several neuron data transfer approximation function layers. This allows the neural networks to process the business's financial information quickly and to analyze the specific situation of the business's finances thoroughly. According to the financial enterprise's financial risk system design, the neural network serves as the core of the financial risk management early warning method for empirical analysis in this paper, which is based on an understanding of the structure of neural networks. The final results demonstrate that the constructed information management system is highly efficient and automated, allowing it to support businesses' financial management effectively.

INTRODUCTION

Computer science, psychology, neuropsychology, biology, and other fields are connected to artificial neural network technology. The fundamental idea behind artificial neural network technology is to mimic the human brain's response to external stimuli and construct the same network structure as the human brain's response to stimuli to express the human brain's routine operation. The M-P neuron model was proposed by physiologists PittsW.A. and McCullochW. S. of the University of Chicago in the United States through empirical research in the early 1940s. This Model has positively impacted the development of contemporary science and technology. 1.2.3]Neural networks are now more mature, a theoretical system that is close to perfect has been constructed, and there are many potential applications. The neural network has some unsolvable problems, such as extremely easy fall into local extreme value, too slow convergence rate, complex network structure, etc. Still, it can approximate any nonlinear mapping relation under sufficient hidden layers, as determined by integrating and analyzing the research results of scholars worldwide. Therefore, Darren C. Moodyj et al. developed a neural network algorithm with improved performance: proposed a brain organization structure with spiral framework capabilities as the centre agreeing to the multivariable contrast esteem in their exploration in the last part of the 1980s, including the information, stowed away, and result layers. Joined with the commonsense application, outspread odd capability brain organization can pass the comparing hub after consistent capability,

however on account of adequate hubs, so the brain organization can precisely pass judgment on the pattern of consistent capability by ascertaining the precision, everything being equal.

Combine all of the recent enterprise financial situation analysis and actual work on the enterprise's financial and accounting data as the basic content based on monitoring and early warning research sensitivity index change to accurately predict the financial crisis that may or will occur at a later stage. To get a complete picture of the company's financial situation, the early warning model of financial risk management must be used with numerous financial and non-financial indicator systems. 4.5.6]The most common types of models are currently the unitary decision model, the multiple linear regression model, the neural network model, and so forth. This paper studies a brain network as the centre of monetary gambling, the board early admonition strategy. The neural network model is based on how the human brain thinks to warn of financial risks from a practical research perspective. Since the artificial neural network equal data handling

abilities, contingent upon the underlying mathematical information is low, can tackle the inconvenience of customary information measurable investigation, to have the autonomous ability to learn can whenever as per the new information update model construction, logical change of weight worth and limit boundaries in the model, information to anticipate requests all the more rapidly and adjust to various circumstances; accordingly, in the current mechanical advancement and improvement, it has, step by step, become ana significant piece of monetary gamble advance notice in the monetary field.

METHOD

A. Neural Network Because it combines knowledge from computer science, medicine, biology, and other fields, artificial neural networks have produced excellent outcomes in numerous fields. Since neurons are the smallest component of a neural network, they must collaborate with other neurons to form various hierarchical structures, thus connecting to form the network's overall structure. Figure 1 depicts the analysis according to the structural diagram below;
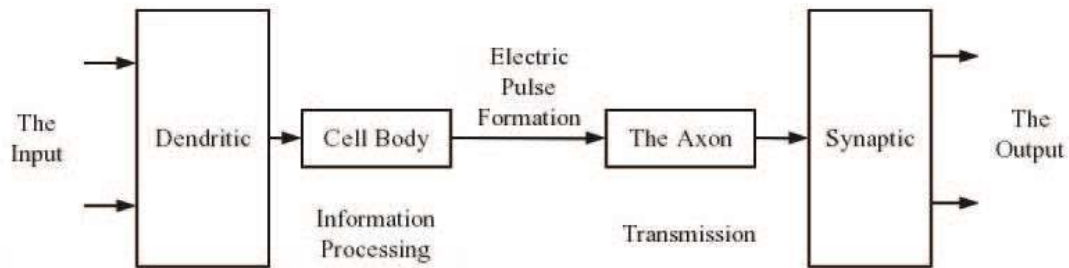
Figure 1. Structure diagram of neuron

B. Financial Warning: When studying the early warning method of financial risk management, we must first clarify the concept of financial risk. The neural network is the overall working characteristic of the network formed based on the work of multiple neurons.[7.8] B. Financial Warning: Financial risk is the crisis brought on by an organization's failure to timely repay debts, which may result in financial failure or difficulties for the organization. Such monetary and monetary issues will adversely influence the endurance and improvement of the endeavor. By and large, the undertaking benefit from ordinary to non-benefit Model, and afterwards, to misfortune model is a slow process, the third stage is no unmistakable point, so specialists and researchers in the meaning of the monetary emergency, challenging to decide the compelling and precise definition, generally the venture is separated into two sorts of states: "state"

refers to the current financial crisis, and "normal financial state." In addition, financial risk, early warning management theory in enterprise management, financial accounting, marketing, statistics, financial management, and other fields, will utilize a blend of subjective and quantitative examination investigation was done on the data about the monetary venture, joining from chromatography investigation and silver way know the endeavour monetary circumstances and working way; in the examination strategy, the monetary status of undertakings in earlier years is clear, and the future improvement of endeavors is anticipated impact in light of getting monetary examination reports. Therefore, to obtain an enterprise risk index through big data analysis and mining, early warning financial risk management should not only carry out long-term planning but also store a large amount of data related to enterprise

157

business activities and business direction. Since non-statistical methods like GA, ANN, and others were being used to study financial risk management early Warning during the rapid growth of the computer industry, this paper focuses primarily on the neural network as the core of the financial risk management early warning method.

C. Early Admonition Framework

Joined with the investigation of the framework's useful structure graph displayed in Figure 2 underneath should be visible that the general framework activity incorporates the organization equipment stage and programming working framework while information reports, business processes, activity logs and authorization control isn't just the fundamental condition for framework capability activity, yet in addition, a powerful reason for guaranteeing framework security execution. It is divided into the system's strategic planning, core business, and basic business.
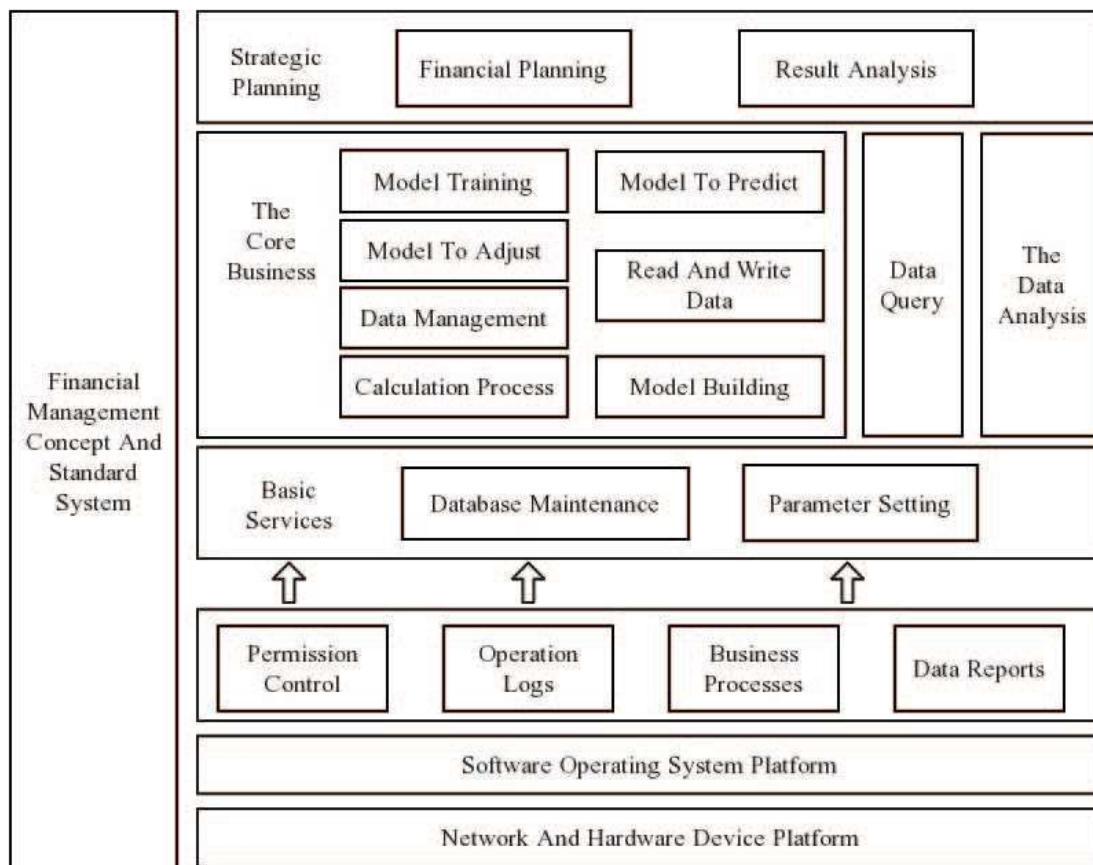

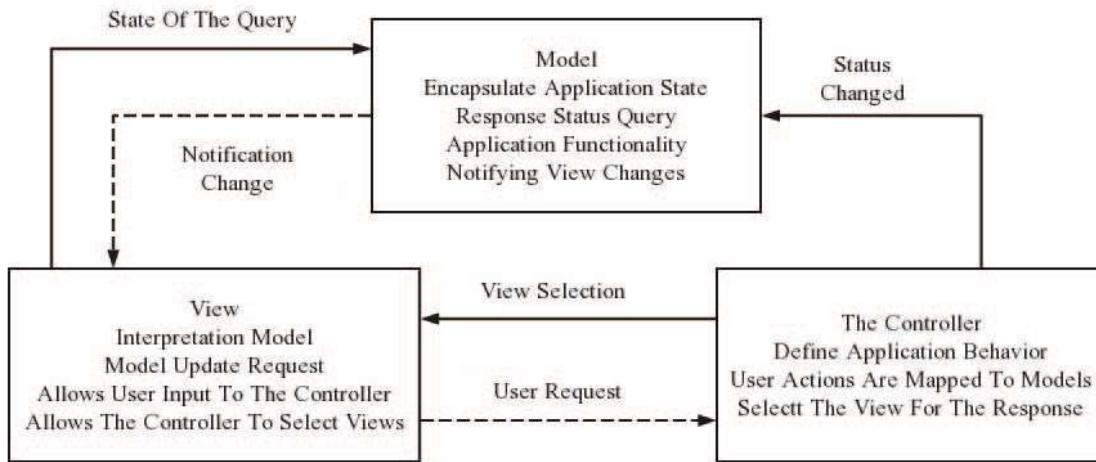Figure 2. System functional structure diagram

158

Figure 3. System software hierarchical division structure diagram

Parameter setting and database maintenance functions are found in the basic business layer, among other things. The former is primarily used to adjust the system's network server, database server, and other software parameters to ensure efficient operation. At the same time, the latter must manage and store sample data and forecast system results. Center business capabilities include figuring processes, Modelforecast, information the executives, information perusing and composing, and so on. In this layer, the construction of the forecast model can be made freely as indicated by different capabilities, and model preparation forecast, and the result can be finished. As the high-level capability of the framework, the key

arranging layer understands the real capabilities on the premise of different capabilities, principally helping to undertake clients to offer key help for early monetary advance notice, explicitly including monetary preparation and result examination. System development, on the other hand. Platform technology and the layered design of software systems should be studied together. This paper proposes a J2EE software system for early Warning of financial risk management and a JSP+Servlet+Hibernate technology combination mode with the J2EE platform as the core. The product-ordered progression division depends on the MVC configuration

159

design and the particular construction is displayed in Figure 3 above:

On the other hand, programming. Good programming and clear corresponding codes are necessary for the system's various functions to be carried out. In this paper, the brain's capability and the organization model are taken, for instance, and the application of capability and acknowledgement are examined. The product framework order separated by the above research will be planned as displayed in Figure 4 below [9.10]:

The design Model can be found in the model creation function's page layer. The JSP page is fundamentally used to enter the upsides of the boundaries expected for the model creation.

The ModelServlet class, which carries out the business logic operations created by the Model following the createModel method, is included in the design of the logical layer. The information access is planned with ModelDAO class and the model continue strategy is utilized to finish the determined handling of the Model.

The client JSP page is used to input the necessary model-creation parameters, such as element value, neural network hierarchy division, weight, and rule generation method, among other things.

The page structure is submitted to the Model Make technique for the ModelServlet class for compelling handling. This technique will join with the article epitome in the body when the client boundaries are finished and utilize the model perseverance technique for the ModelDAO class to store theModel in the data set. A success message is displayed on the client following the total saving of the Model. Figure 5 depicts the corresponding program code as follows:

RESULT ANALYSIS

This paper employs MATLAB software for simulation analysis to further demonstrate the research system's application performance. Twelve of the 35 sample collection tables sent out for data collection were ultimately recovered. The Purelin function was chosen as the excitation function for the output layer, while the log-Sigmid function was regarded as the excitation function for the hidden layer. The outcomes of the final data processing are presented in Table 1 below. In the meantime, tests numbered1 to 6 was viewed as preparing content, and tests numbered 7 as check content. A three-layer BP neural network is built into the financial

160

risk management early warning system examined in this paper. The input layer has 15 nodes, the output layer has one node, and the number of nodes in the hidden layer is controlled between 6 and 14. A neural network model is constructed using the MATLAB software platform in this paper. The error is effectively tested by adjusting the number of hidden layer nodes using consistent parameters.

Model error is reduced, and convergence is enhanced when there are 14 nodes. When there are fifteen nodes, the error of the Model can reach 0.00764189. The study of the learning rate of the system network demonstrates that this performance directly affects the convergence performance and stability of the network. At the same time, it is demonstrated that the operation effect of the financial risk management early warning system is better when the number of implicit nodes reaches 14.[11]

As a result, the main focus of this paper is on determining whether or not the network error exists, and the learning rates of neural networks are 0.02 and 0.05. While the learning rate arrives at 0.02, the organization blunder bend seems to have clear swaying and the learning rate is higher. The error does not reach the predetermined target when the learning rate reaches 0.05, so the learning rate is now lower. Therefore, the financial risk management early warning method is superior in the system examined in this paper when the learning rate of the neural network reaches 0.01.

CONCLUSION

In conclusion, enterprises pay more attention to using neural networks to optimize financial risk management and early warning methods. In the construction of operating systems, from the financial field, risk management, and neural network, three theoretical perspectives to identify and evaluate. This is all part of the modern economy's innovation and development. The final results demonstrate the effectiveness of the neural network as the primary early warning method for financial risk management.

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