



APPLICATION ANALYSIS OF NEURAL NETWORK IN COMPUTER NETWORK SECURITY EVALUATION

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Introduction

The continuous development of computer technology has brought great convenience to people's life and production, and also changed people's way of life. While enjoying the convenience of computer technology, the security of computer network has attracted people's attention. Criminals invade the computer network through holes in the computer network or in the form of viruses, steal materials and spread harmful information, etc., which have seriously affected the security of the computer network [1]. Computer network security is the use of advanced network technology, network control measures to fully ensure the availability of all kinds of data in the computer network environment, the integrity of all kinds of data information, all kinds of data confidentiality. Computer network security can be divided into logical security and physical security. Among them, logical security mainly refers to the need to fully ensure the security, integrity and availability of all kinds of data on the network. Physical security means to take physical means to fully protect the relevant equipment of the computer, so as to avoid physical damage to the computer during operation [2]. Neural network is an algorithm mathematical model that imitates the behavior characteristics of animal neural

network and carries out distributed parallel information processing. By adjusting the inter-connection relationship between a large number of internal nodes, the purpose of information processing can be achieved [3]. The basic working process of neural network is to realize the user's requirements by constructing the relation between the internal nodes of the structure section of the mathematical model. Neural network system has a powerful learning function, which can automatically identify the information input by users, summarize and conclude the rules between the information and operate automatically. The neural network can also make predictions based on the identified information, which can provide scientific reference for people's decision-making and planning. Therefore, this paper will build a computer network security evaluation model based on neural network and analyze the application of neural network in computer network security evaluation.

Keywords: Neural network; Computer networks; Safety evaluation; Application analysis

2. A Computer Network Security Evaluation Model based on Neural Network is Established

Establish computer network security evaluation index system

Computer network itself is very complex, and there are many factors affecting computer network security, in order to further strengthen the evaluation of computer network security, need to establish a perfect computer network security evaluation system. Based on the actual process of network security comprehensive evaluation, this paper divides network security into five aspects, including management security, environment security, hardware security, software security and data security. Using Delphi method to determine the network security comprehensive evaluation index system. Through systematic analysis, the evaluation index is preliminarily formulated and classified, the evaluation index consultation table is compiled, the opinions of experts are consulted, and the indexes are screened. The series that formulates index importance degree, divide for 5 commonly, the quantity value of 5 levels takes 1, 2, 3, 4, 5 respectively, quantity value is smaller more important. Ask an expert to undertake appraisal to the importance degree of index according to formulary way. In the proposed indicator system, there are two indicators at a certain level, and experts are invited to review the degree of concentration and dispersion of statistical experts' opinions on each indicator. The concentration degree of expert opinions

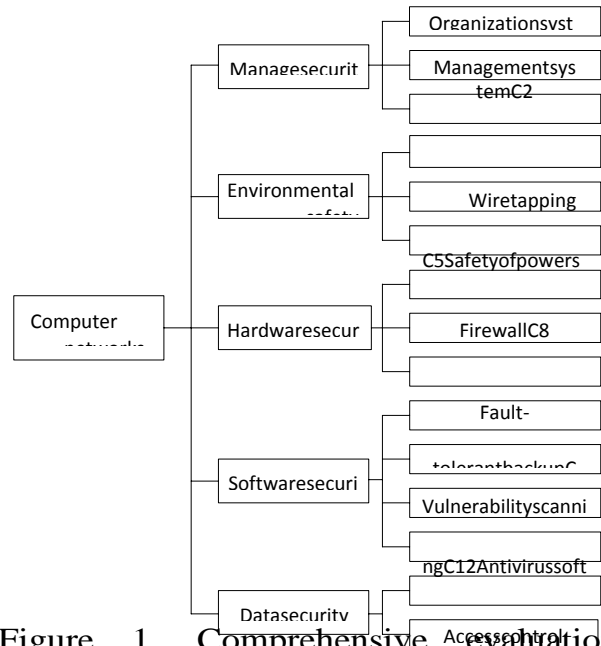


Figure 1. Comprehensive evaluation index system of computer network security

Network security is the target layer (A), and the first-level index layer (B) is composed of management security, environmental security, hardware security, software security and data security. The secondary index layer (C) consists of organizational system, management system, security education, anti-electromagnetic leakage, anti-wiring eavesdropping, security power supply, intrusion detection, firewall, fault-tolerant backup, operating system, application software, vulnerability scanning, access control, data backup and other indicators. According to the established computer network security evaluation index system, the neural network structure of the security evaluation model is determined.

Determine the structure of the neural network

This paper chooses BP neural network composed of input layer, hidden layer and output layer. The number of input nodes of BP neural network is consistent with the number of computer network security evaluation indexes. 15 evaluation indexes are set in the computer network security evaluation

system established above, and the number of neurons in the input layer of BP neural network is 15.

The BP neural network selected in this paper adopts a single hidden layer, and the number of nodes in the hidden layer has a great influence on the performance of the entire computer network. If the number is too small, the nonlinear mapping and fault-tolerant performance of computer network will be seriously affected. If the number of nodes is too large, the learning time of the network will be greatly increased and the learning efficiency will be affected [6]. Therefore, the number of hidden layer nodes should be selected reasonably according to the empirical formula. The empirical formula for calculating the number of hidden layer nodes .

Complete computer network security evaluation

In order to evaluate the security of computer network, AIS technology is used to generate identification detector, and the output of neural network is identified and retested. AIS is a simulation of the biological immune system, to identify the damage to the computer network. The process of detecting matches is shown below.

4. Conclusion

Neural networks have attracted much attention because of their simplicity and maneuverability. This paper studies the application of neural network in computer network security evaluation, designs a model, and compares the model with the traditional model, proves the superiority of the design model. In the future, researchers should be aware of the advantages and limitations of neural network, and combine neural network with other advanced methods to better apply it to computer network security evaluation.

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