ABSTRACT: With the rapid development of Internet, people are not satisfied with sharing information only on the local network; instead, they intend to maximize the use of various types of network resources in different regions in the world. Intelligent network increasingly has strong demand and put forward new demands on intelligent routing protocol. Intelligent routing protocol model not only need to have self perception, self-learning, self decision and self configuration ability, but also with the business model, modulation, power control, spectrum sensing technology and joint optimization. This paper designs a routing algorithm and routing mechanism as the research content, to the user’s QoS (Quality of Service) communication demand, energy saving, load balancing as the optimization objective, the optimization theory, multi-objective decision, machine learning and intelligent search algorithm based on the theory of research on intelligent routing protocol in wireless ad hoc networks. Therefore, routing technology has become a crucial part of network technology, and it has become the most important network equipment. On the basis of relevant domestic and foreign theories and researches, in view of the existing problems, a computer network routing configuration method based on intelligent algorithm was proposed in this paper; meanwhile, the feasibility of the method was verified by simulation experiment.

Keywords: Intelligent algorithm, Computer network, Router configuration

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1. Introduction

Hu et. al. [1] in 2011 put forward that with the development of network information technology, Internet has played a more and more important role in people’s life. It not only changes people’s way of life, but also changes people’s way of thinking. Tchaikovsky A G [2] in 2013 proposed that routing protocol is an important part of network layer, which is also the core technology. However, the traditional network routing protocol determines the routing by using the shortest path. This method lacks ability to adjust the parameters. At the same time, it cannot make corresponding adjustment with the change of the user’s demand. Lin Y K [3] in 2011 thought that the key of the communication lies in the communication between systems and
necessary functions of shared data. These essential functions and the sequence of their occurrence are the basis of communication. In order to make use of cognitive radio technology in intelligent routing in self-sensing ability, design the collaborative spectrum sensing algorithm and consider the spectrum sensing results. Based on the load balancing routing protocol in cognitive radio application scenarios in wireless adhoc networks, the design of innovative distributed channel estimation and excitation spectrum sensing algorithm based on the premise ensure the false alarm rate and improve the detection probability of the algorithm. And the algorithm of load balancing innovation proposed considering spectrum stability, based on the Cos security performance in Multi Strategy routing in different network environment and dynamically adjust the routing metric weights, improves the routing efficiency of cognitive radio environment. Dipsomania-Twinkies E [4] believed that they can actually communicate only when the systems of two ends reach a consensus on the way of communication. Systems of both ends must comply with the same rules and procedures in the application of obtaining the data and packing the data through the network transmission. Lin Y K [5] pointed out that router plays a significant role in computer network, and it is also a bridge of computer network. Through it, we can not only connect different networks, but also select the path of data transmission and block the illegal access.

Based on this, according to relevant domestic and foreign theories and research results, the routing configuration of computer network is studied. Section 2 discusses the working principle and main functions of the router. Section 3 proposes computer network routing configuration method based on intelligent algorithm in order to tackle the existing problems. Section 4 analyzes the effectiveness. The research process and conclusions are summarized in section 5.

2. State of the ART

2.1 Working Principle of Router
Router is a network device to connect multiple networks or network segments. It is able to translate the data information between different networks or network segments to enable them to read each other’s data. Meanwhile, it can select the route of information transmission at high speed. In this way, the communication speed can be remarkably enhanced, the communication load of network system can be significantly reduced, the network system resources can be obviously saved and the flow rate of network system can be greatly improved. Finally the network systems will be effective [6].

The devices in the network communicate with each other using their network addresses. IP address is the “logical” address which has nothing to do with the hardware. Router transmits data merely according to the IP address. The structure of the IP address has two parts. One part defines the network number, and the other part defines the host number in the network. At present, the sub net mask is adopted to determine the network address and host address in the IP address. Sub net mask is 32bit, which is the same as the IP address; besides, these two are totally corresponding. According to the regulation, the corresponding part of the number “1” in the sub net mask is the network number in the IP address, and the number “0” is the host number. A complete IP address is the combination of the network number and host number [7]. The network number must be identical to the host IP address in the same network. This network is called the IP sub net. Communication can only be carried out between IP addresses with the same network number. To communicate with the other IP sub net host, it is required to get out through a router or gateway on the same network. IP address with different network number cannot directly communicate, even if they are connected. Routers have multiple ports to be used to connect multiple IP sub nets. The network number of the IP address of each port is required to have the same network number as the IP sub net it connected. Different ports have different network numbers and different corresponding IP sub nets. In this way, host of each sub net will send IP which requires going out to the routers through its own sub net IP address [8].

2.2 Main Functions of Router
Routing actions include routing and forwarding. Routing determines the best path to the destination, which can be achieved through the selection of algorithm by routers. In order to determine the best path, routing must start and maintain the routing table that contains the routing information to choose algorithm. The routing information is not the same due to the routing algorithm. Routing algorithm fill in the table with different information collected. According to the table, the relationship between next-hop and destination network will be passed to the routers. Routers exchange information for routing upgrade. Routing table should be updated and maintained to properly reflect the topology changes of the network. Finally the optimal path is determined by the router based on measurement [9].

Forwarding transmits information packet by using the optimal path. Router firstly looks up in the routing table, and judges whether it knows how to send packets to the next site. If the router does not know how to send a packet, the packet is usually
discarded. Otherwise, the packets are sent to the next site according to the corresponding table entries in the routing table. If the destination network is directly connected to the router, the router will send packets directly to the corresponding port. This is the Routing Forwarding Protocol. Routing Forwarding Protocol and Routing Protocol are two concepts of mutual cooperation and mutual independence. The former uses the routing table maintained by the latter. At the same time, the latter distributes routing protocol data packets based on the function provided by the former [10]. The following figure is the configuration of the router.

Working principle of the intelligent firewall are trying host host connection to the network, the common use of an IP address, and the outer net host connection to Intranet hosts must be through the gateway is mapped to a network host, inside and outside the router according to specific application automatically make the internal and external network host communication directly, or let the application proxy service agency service program, this method not only effectively ensure the network security, can also play a packet filter efficiency. In terms of technical characteristics, intelligent firewall is mainly to make use of statistical probability and decision-making intelligence, memory, method of data, which can identify and reach the purpose of access control. Compared with the traditional firewall, the firewall should not ask whether release every process access to the network, only uncertain process has network access behaviour. To request user assistance, it effectively overcomes the traditional firewall from the users to use their judgment in misjudgment measurement. The errors are due to the manually modifying filtering rules and defects and the program cannot run normally.

3. Methodology

3.1 Exponentially Weighted Moving Average Algorithm

Exponential weighted moving average algorithm is an output algorithm based on output value in the historical process to estimate the current value[11]. This algorithm has been widely used in daily life. We can analyze the parameters of the path. Then we carry out a comprehensive estimation to obtain the current evaluation value according to the parameter history evaluation and the current time value. Exponentially weighted moving average algorithm is an evaluation algorithm with simplicity and efficient storage. It can be combined with the historical data and the weighted index; meanwhile, it has the characteristics of rapid response to major changes. It is often used as a sensitive detector in many statistical process control applications. In dynamic system, the state characteristics of the system need to react by monitoring data of the neighboring sensor nodes. Therefore, it is very important and necessary to give more attention to the monitoring data of the neighboring sensor nodes.

The exponential weighted moving average value of T moments is set. The average value of the previous data is sometimes used as an initial value. The weighting factor is between 0 and 1, which indicates the weight coefficient of the historical survey value. The more the value is close to 1, the weight of the past measured value is lower. When it is equal to 1, the slip value at the moment of t is equal to the sample value at the moment of t. We do not consider the impact of the past; instead, we regard the current information as the weight. It can be seen that the exponential weighted moving average value at the moment of t, in fact, is the weighted average value. Weighting coefficient is a geometric progression. The more recent the data is, the greater the weight coefficient will be. The more distant the data is, the smaller the weight coefficient will be, and the sum of weights equals 1.
Because the weighting coefficient is consistent with the exponential law; in addition, it has the function of moving average data, and it is called exponential weighted moving average.

Exponentially weighted moving average algorithm is a commonly used method of sequence data processing. In the field of communication, it is mainly used for estimation and smoothing of the network state parameters. From the angle of signal processing, it can be seen as a low pass filter. By controlling the weighting coefficient, the smooth form of the signal is provided by eliminating the short-term fluctuations and retaining the long-term trend of development.

3.2 Comprehensive Average Evaluation Algorithm

In the initial stage of the network, a series of route discoveries and route establishments are carried out. During the initial period of the process, the parameters of the path changed greatly, which led to the large deviation of assessment by using the exponential weighted moving average algorithm. It cannot follow the change of the actual value. In order to improve the convergence rate of the evaluation and to maintain the long-term stability of the process, an integrated average evaluation algorithm is proposed in this paper. Security vulnerability scanning is also to ensure the safe operation of the intelligent computing systems is the important safety precautions, mainly through the way of simulating actual vulnerabilities. The target system, database, workstation, server and software application platform are inspected for security vulnerability item by item. To develop the security scheme, information security and data maintenance system are targeted for security vulnerabilities.

In the exponential weighted moving average algorithm, once the weighting factor is determined, it will not change with the number of evaluation in the whole evaluation process. In view of this situation, the coefficient is set and initial assessment value is selected after the comprehensive average evaluation algorithm actually starts. Here the average value of the previous data is used as an initial value. Then we calculate the weighted coefficient of the first evaluation. If at this moment there is a current value input, the first assessment value calculated will be stored in it as an array. After that, we calculate the weighted coefficient of the next evaluation and start the next assessment test until there is no current value entered and no further evaluation is required.

4. Result Analysis and Discussion

In the global information service highly developed today, human habits rely on communication services on social security, economic, and other aspects of life support. However, the ordinary people ignore the vulnerability of natural disaster and the communication network. When the earthquake, hurricane, nuclear leakage and other emergencies with the infrastructure are destroyed the power and emergency communication equipment of people will go out of action. The traditional communication network depends on the infrastructure, high operation cost and low robustness, where the network reconstruction time is long. Because it is at the initial stage of evaluation, the convergence rate of integrated average evaluation algorithm is faster than the exponential weighted moving average algorithm. In order to compare the performance of the two algorithms, we only intercept the time delay of the initial stage to analyze, and we carry out the simulation as shown in Figure 2.
Wireless adhoc networks, free mobile node arbitrary, network topology change in unexpected time. Because the static routing requires manual configuration and obviously have been not suitable for this situation[12]. At present, many forms of dynamic routing protocol have been proposed by researchers, these routing should stimulate the protocol and the type or response type, and should collect information through the management message routing. The different routing metrics are designed considering the throughput, delay and routing load, safety and other factors. However, the existing dynamic routing often do not have the ability of intelligent wireless network environment and the changes of the dynamic response is relatively backward[13]. Two algorithms are used to evaluate and deal with the time delay of the same group. The results of the test are shown in Figure 3.

![Figure 3. Overall comparison](image)

As it is shown in the graph, in the initial stage, the convergence rate of the composite average evaluation algorithm is significantly improved when compared with that of the exponential weighted moving average algorithm. At the initial stage, we mainly focus on the current values. Intelligent computing, as a branch of artificial intelligence system and a kind of experience of computer programs, has intelligent collection, identification, thinking and control function. It can assist people to deal with all kinds of problems, and it is an indispensable tool in people’s life and work. Important information in order to avoid the user data loss and system self-destruction is required, and it is necessary to study the reasons of the existence of the current computer network security vulnerabilities. A variety of security vulnerabilities, firewall, information encryption, access control, security vulnerability scanning, intrusion detection, and resolution of port, the data backup and a series of preventive measures, provide a safe running environment in the intelligent computing systems environment. To ensure the security of the intelligent computing systems, standard and steady operations are organized. Therefore, it is able to converge quickly, and the final simulation curves of both of them coincide with each other. The comprehensive average evaluation algorithm does not affect the stability of the system, and it only changes the speed of response.

5. Conclusion

On the basis of relevant domestic and international research studies and in view of the existing problems, a computer network routing configuration method based on intelligent algorithm was proposed in this paper. Meanwhile, the feasibility of the method was verified by simulation experiment. The results indicated that the comprehensive average evaluation algorithm proposed based on exponentially weighted moving average algorithm does not affect the stability of the system, and it only changes the speed of response.

In the research of the paper, the consideration of the situation is relatively simple. Other factors that may affect the outcome of the system have not been considered. Therefore, there might be a certain deviation of the actual situation. It is necessary for us to make up for these deficiencies in the following research.

References


