Research on Computer Network Information Security and Its Protection Strategy Based on Secure Big Data

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Abstract. The popularity of Internet technology is getting higher and higher. While computer information network brings opportunities for social progress and industry development, it also brings many problems. In the era when big data technology is widely used, computer network information security protection is particularly important. The application of big data in different fields not only helps to improve the work efficiency in various fields, but also brings challenges to the protection technology of computer network information security. The popularization of computer information networks has created new ways and means for information crimes. The theft of network information and the theft and reselling of personal network information have seriously affected the social security. In the era of big data, it is particularly urgent and important to strengthen the protection of computer network information and protect computer network information. This paper analyzes the factors that affect computer network information security in the era of big data, and further puts forward the protection strategy of computer network information security in the era of big data era.

1. Introduction
With the advent of the Internet era, computer information technology has been popularized and popularized. The improvement of information storage technology has promoted the arrival of the big data era, and big data has been accepted and recognized by more authoritative people and industries [1]. The penetration of big data in various fields and industries creates a digital world through comprehensive perception, preservation and sharing of data. In this case, the way people look at the world and make industry decisions depends more on implementation data. The data age can provide more information on the development of the times for human beings, update the idea of keeping pace with the times, and facilitate the communication between human beings [2]. With the rapid development of electronic information technology in China, the Internet of Things is increasingly affecting people's work and life. At the same time, there are network information security problems that endanger the entire Internet of Things and even the security of system operation [3]. If the information is disclosed and used by undesirable personnel, it is bound to bring serious losses to individuals, enterprises and the country. Big data has penetrated into almost all industries and fields in our life. Computer information network has created a digital new world through the collection, storage, sharing and calculation of big data [4]. Some lawless elements have also begun to extend their clutches to the network information platform. The rampant activities of hackers have brought serious threats to the network...
information security in the context of the big data era [6]. The era of big data has changed people's way of production and life, causing great changes in society [7]. The explosion of data has brought new challenges to computer network information security. In the era of big data, our country needs to attach great importance to the computer information security. According to the characteristics of big data and network information, we should formulate a complete computer network information security management plan [8]. In addition to improving the protection of computer technology, it is also necessary to strengthen the construction of computer protection capabilities, and to strengthen the security protection of network information from personnel technology, resource protection and other aspects [9]. Under this background, many organizational decisions, methods and models for analyzing problems are increasingly realized through big data analysis, and the results under big data algorithms are used as their own reference [10]. This paper analyzes the factors that affect computer network information security in the era of big data, and further puts forward the protection strategy of computer network information security.

2. Influencing Factors of Computer Network Security in the Background of Big Data Era

2.1 The Influence of Computer Network Technology
Computer networks are characterized by openness under a wide range of application requirements, which makes computer network systems vulnerable to external attacks and leads to a decrease in security. Deep-level big data is not only a storage medium for information, but also a unified collection of multiple data types [11]. With the development of science and technology, the advantages of big data have gradually emerged and become the main development direction in economic development [12]. As a product of the development of modern information technology, the existence of big data is not only presented in the form of data information storage media, but also effectively covers a variety of data types.

After calculation, the average damage caused by computer crime is $1.6$ million. If the damage caused by traditional crimes is compared with computers, it is simply not the same. The average loss of crime is shown in Table 1.

| Crime Type          | Average loss (USD 10,000) |
|---------------------|---------------------------|
| Computer crime      | 40-160                    |
| Blackmail banks     | 2                         |
| Robbery             | 0.4                       |
| Steal               | 0.01-0.3                  |

To solve the problems in the field of network space security, it is necessary to study based on the ready-made deep learning method of image data and redesign the processing method of discrete data. Determine and calculate inspection statistics. In the hypothesis test of two independent sample ratios, the statistical data used are:

\[ e_j = -k \sum_{i=1}^{m} f_{ij} \ln f_{ij} \] (1)

You can get:

\[ W_j = 1 + k \sum_{i=1}^{m} f_{ij} \ln f_{ij} / \sum_{j=1}^{m} \left( 1 + k \sum_{i=1}^{m} f_{ij} \ln f_{ij} \right) \] (2)

Replace data with calculations:

\[ W_j = d_j / \sum_{j=1}^{m} d_j \] (3)

2.2 Improper Operation by Users of Computer Network Information
Today, when large amounts of big data are being used, new computer technologies are becoming more and more popular, and the factors affecting computer network information security are gradually diversified. The contents of data and information are diverse, mainly for communication, including
pictures and videos, etc. At the same time, there are differences with traditional single data results [13]. Users of computer network information lack awareness of security protection, and negligence in the operation process may cause the problem of disclosing users' security passwords or other security information.

In order to implement the decision-making of the decision-making level, it is also necessary to have a management level that manages the daily work and an implementation and maintenance level that is responsible for implementing safety plans and decisions. This forms a hierarchical information security organization under the direct leadership of the chief information officer. The security organization includes an organizational decision-making layer, a management control layer and an execution and maintenance layer as shown in Figure 1.

Enterprise entities and individuals need to strengthen their awareness of computer hackers. First, they must improve the computer network management system to prevent hacking and improve the automatic recognition capability of computer systems[14]. Spam is mainly spread by means of news pop-ups, mail pushes, software bindings, etc., and is technically used to make commercial advertisements, political and religious views to users [15].

3. Suggestions on Network Security Precautions in Big Data Era

Under the background of the big data era, the update rate of China's computer network technology is amazing, which brings difficulties to the security prevention and management of information data. It is inevitable that some damages will occur to computer facilities and equipment, thus causing some phenomena that affect the safety of computer information, resulting in interruption or loss of transmission of computer information. As hackers and viruses have only gradually arisen in recent years and have affected the normal operation of computers, some management systems of computer networks themselves are not aware of such potential dangers and have not made advance prevention against potential intrusions. Junk information is usually transmitted compulsorily by mail and news notification. Many enterprises steal trade secrets and important documents of other enterprises by means of this mandatory feature, and this kind of information stealing behavior is mainly carried out by spyware [16]. Spam not only seriously occupies network resources, but also affects the online
experience of computer users, and even causes the spread of bad social thoughts or creates public opinion panic. The computer network itself has relatively fixed equipment, and the network equipment cannot fully resist external infringement, which causes the computer to fail to protect itself in time when it encounters disasters and pollution.

In a computer crime transaction database, an item set is a collection of items that appear together in some transactions. And in the item set, the frequency of occurrence of other items can be inferred by the frequency of occurrence of certain items:

\[ x_i^{(0)}(k) + az_i^{(1)}(k) = \sum_{i=2}^{N} b_i x_i^{(1)}(k \in K, K = 1, 2, \ldots, n, \ldots) \]  

The association rules are like:

\[ E_{R_i}(l) = E_{Rx-esc}(l) = lE_{esc} \]

The imperfect system is the root cause of the network information security problem. First, users lack of maintenance and repair of computer network systems, which results in the destruction of network information. An act of malicious destruction of network information, including active attacks and passive attacks. For active attacks, there are certain specific features. Attacking information targets destroys the integrity of network information, which will further affect the normal use of network information. Some hackers may be in the psychology of competition and destroying ambition. They may also attack each other's computer network systems, steal information and destroy network structures, resulting in the paralysis of computer network information systems [17]. For passive attack, it is a means of network information being cracked and intercepted, which will not hinder the smooth use of the network under normal circumstances.

Computer information system is generated on certain computer system entities, which are the hardware, software, data and various interfaces of the computer itself. According to the topology discovery algorithm, the average time spent in finding all the topologies of several representative computer crime cases is counted. As shown in Figure 2.

![Figure 2 Improved Algorithm Efficiency Analysis](image)

Some of the various viewpoints on the concept of computer crime limit the subject of computer crime to a special subject, that is, computer technicians with certain computer professional knowledge. Cloud anti-virus technology refers to connecting the computer anti-virus software engine to the cloud server of the anti-virus software service provider. Cloud anti-virus service collects virus data of a large number of users and analyzes various high-risk software and information through classification and comparison. Managers of relevant enterprises need to strengthen the awareness of managers about the security related to computer network security management and maintenance, and also consider the
possible problems in the safe operation of humanoid computer networks. Once a computer virus is transmitted to one's own computer network system, it will cause serious damage, causing fatal damage and great loss of benefits to the user's network system.

The self-influence of computer network information technology is mainly reflected in the openness of computer network itself. The sharing characteristics of computer network information enable all fields and industries to fully enjoy and obtain computer network information. For computer crimes, the probability model based on energy defines its probability distribution through energy function. The energy for a state can be defined as:

$$E_{\text{total}} = kE_{\text{cluster}} = l(E_{\text{elec}}N + E_{\text{dist}}N + k\zeta_{\text{amp}}d_{\text{toBS}}^4 + E_{\text{elec}}N + \zeta_{fs} \frac{1}{2\pi} \frac{M_{1}M_{2}N}{k})$$  \hspace{1cm} (6)

Use radial basis functions:

$$k = \sqrt{\frac{\zeta_{fs}}{\zeta_{\text{amp}}}} \sqrt{\frac{M_{1}M_{2}N}{2\pi}} \frac{1}{d_{\text{toBS}}^2}$$  \hspace{1cm} (7)

By a polynomial kernel function:

$$E_{\text{total-min}} = l(E_{\text{elec}}N + E_{\text{dist}}N + d_{\text{toBS}}^2 \sqrt{\frac{2M_{1}M_{2}N\zeta_{fs}\zeta_{\text{amp}}}{\pi}})$$  \hspace{1cm} (8)

When the parameters are fixed, simplify it to:

$$S = 2L + W = \frac{c}{2f\sqrt{\epsilon_{du}}}$$  \hspace{1cm} (9)

Among the increasing number of netizens in China, some have inadvertently infringed on cybersecurity because they have failed to pay attention to online activities according to law. The parameters of the computer crime model are set to the population size. The scores of the search results are compared as shown in Figure 3.

![Figure 3 Comparison of Component Search Results Scores](image)

Both virus invasion and hacker attack are sudden. In order to prevent and control the phenomenon and degree of data destruction in advance, intrusion detection system has a strong monitoring effect on illegal entry and illegal destruction in network information system. As the current situation of hacker and virus invasion is getting worse and worse, in order to effectively make up for this, the most critical thing is to strengthen the application of data encryption technology, and to resist hacker and virus invasion through more rigorous encryption and related prevention technologies [18]. Users should
strengthen their ability to distinguish hacker's stealing behavior, and reduce the probability of successful virus and hacker invasion by optimizing firewall level and distinguishing internal and external data.

4. Conclusion
Only by improving the technical level and strengthening the relevant security awareness, can we effectively avoid potential network information leakage and other situations. For the research and application of big data has a very important practical value, improving the level of network security has become an urgent matter. Only by establishing and strengthening network security technology and a complete network security guarantee system can we have a place in the future era of data analysis. Improving the application of firewall and other related security systems, strengthening the awareness of information storage and transmission, and perfecting the computer network security management system are several important measures to enhance the information security of big data computer networks, and are the only way to go. Our country should formulate a perfect network information security protection mechanism according to the actual situation and establish a scientific network information security protection system by using relevant technical means to ensure that the computer network can better provide services for human beings.

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