

# Research on the Application of Artificial Intelligence in Computer Network Technology in the Context of Big Data Era

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## Abstract

The comprehensive development of science and technology has led to the gradual maturation of the concept of artificial intelligence, which is widely used in various fields, and it is gradually integrated into people's daily life and work to provide people with quality services, which also marks the entry of human beings into the era of big data. Based on this, this paper starts from big data and artificial intelligence, and clarifies the value of artificial intelligence applied in computer network technology. Based on the background of the current big data era, the article explores the advantages of AI application and summarizes its application development trend to provide a good reference for the development of computer network technology in China.

## Keywords

Big Data Era; Artificial Intelligence; Computer Network Technology.

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## 1. Introduction

Since entering the twenty-first century, society has entered the period of information explosion, and the openness of the network environment provides a good carrier for the generation of information, thus the concept of big data arises along with the times. Artificial intelligence is a new type of technology that is widely used in various industries to provide strong support for the survival and development of human beings. It has changed the traditional development mode, and its application in computer network technology can promote its further development, give its technology "intelligent brain", improve the data and information processing ability, and meet the development needs at this stage.

## 2. Big Data and Artificial Intelligence

### 2.1 Big Data

Big Data is actually a vast database that contains a huge amount of information content and data information. Its function is to integrate various data information in the network, use advanced technology to process it, improve the processing efficiency of data information and bring out the value of data. The characteristics of big data are more obvious, such as the massive quantity. In the current era, it is difficult to estimate the data and information generated every day, thus to obtain useful information in the massive amount of data and information, advanced technology is needed to support, so as to process the data in a highly efficient way. The variety of big data is also very rich, because the source of data information is very wide, it may originate from various industries, so different data information is more different, and there are various types of data, such as single data and packaged data. Data information must be true and reliable. With the continuous growth of data

information, how to ensure data security has become a hot concern. Only by ensuring storage security can we ensure that data information can play its own value, which needs to continuously improve the level of data information processing technology to provide people with quality services.

## 2.2 Artificial Intelligence

Artificial intelligence refers to the simulation of human thinking through the use of advanced technology, the use of technology to give machines the same thinking, to achieve the machine simulation of human thought and behavior, so as to provide people with quality services. At this stage, artificial intelligence is widely used in various industries, such as medical industry, machinery industry, construction industry, electrical industry and so on. This brings greater convenience to people and enhances social productivity. There are more types of artificial intelligence technologies, such as image function, which is more widely used in daily life; such as voice recognition, face recognition, etc., which can be applied in some important contents to ensure the safety of information content. Network system is also a common type, in practice in the field of life is relatively rare, it is widely used in the business field, such as enterprise inventory management, the use of its technical advantages can effectively improve the level of inventory management, drive the economic efficiency of enterprises to improve and support the development of enterprises. Intelligent recognition is also a type of technology, such as the technology is common in smart wearable devices, enriching the content of people's daily life and improving their living standards. The following figure can clearly represent the type of artificial intelligence technology, as shown in Figure 1.

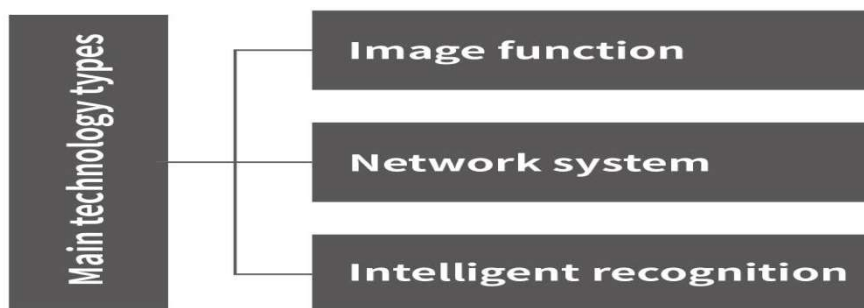


Figure 1. Main technology types of artificial intelligence technologies

## 3. The Value of Artificial Intelligence Applied to Computer Network Technology in the Context of Big Data Era

In the current era, computer has become an indispensable product in people's daily life. The stability and security of computer network has also been the focus of people's attention, if its stability is not enough, this will lead to the computer in the process of running prone to system crashes, which not only affects the user experience, but also may cause the loss of a lot of important data, and even cause serious economic losses. If the computer network itself is poorly secured, this is vulnerable to the attack from Trojan horse virus in the network. Some illegal intruders may steal a large amount of user personal information or account information, which will bring greater trouble for users, so it is especially important to strengthen computer network monitoring and management. With the continuous development of the times, the Internet of things in intelligence and information technology and other aspects of comprehensive promotion, which has led to the promotion of the importance of network security, such as the traditional network in the security protection technology level is relatively low, which causes the computer can only simply prevent ordinary viruses, for the higher level of technology is not enough to prevent the hidden virus. The lack of computer network system's own ability to process large amounts of data will affect the overall security of the computer, through artificial intelligence can effectively improve the current situation and enhance the security of the computer network. For example, a security management system can be automatically generated,

which can collect information on computer operation data, analyze the emergence of faults and potential faults in combination with their own operation, and thus optimize the settings for specific situations to ensure the stability and security of the network system itself and meet people's daily needs [1].

## **4. The Advantages of Artificial Intelligence in Computer Network Technology in the Context of Big Data Era**

In the background of the big data era, the update speed of various resources is accelerating, which drives the number of computer users to increase. The application of artificial intelligence can effectively improve network stability and security, strengthen the monitoring of the network and provide people with quality services, and its advantages are mainly reflected in the following aspects.

### **4.1 Timely to Deal with Problems**

The application of artificial intelligence can give full play to the advantages of its own fuzzy logic processing model, through the construction of processing models, it does not need to establish a new model to describe. For example, in the computer there is a large amount of fuzzy information, and even some of the information has obvious uncertainty characteristics, which makes it difficult for the staff to process, but by using artificial intelligence can effectively solve the problem. The use of models for targeted calculation and processing of network information, while establishing multi-layer relationships in the network to improve the efficiency of computer networks and provide users with quality services. At the same time, artificial intelligence can also improve the efficiency of resource utilization, thus reducing resource consumption and analyzing and processing network information data with minimal human cost and time resources to obtain accurate analysis results. In turn, it can reduce costs at the root and monitor the network to obtain scientific decisions.

### **4.2 Excellent Coordination Skills**

The coordination ability in computer network technology is gradually improved and shows a rapid development trend. With the rapid development of applications, their scale is also increasing and their demands are dynamic, which also increases the work pressure of network administrators. If there is improper operation, this will cause the normal operation of the computing system at this stage to be affected. By applying artificial intelligence, the traditional management mode can be transformed into hierarchical management to achieve all-round maintenance of network security, while the coordination ability between the upper and lower levels of this mode is high, and the advantages of artificial intelligence can be used to collaborate management and give full play to distributed thinking to strengthen the network management ability. Reasoning ability is also an important advantage of artificial intelligence, through the technical advantages of processing the scientific management of data information, mining the data information contained therein and the content with value, providing people with quality data information [2].

### **4.3 Significant Learning Ability**

Artificial intelligence can make use of its technical advantages to simulate human thinking reasonably, and then show strong learning ability. There is a large amount of diversified data and information in computer networks, and network managers need to further explore its value to ensure that its data and information are fully utilized to meet development needs. However, there are still certain problems in some parts of the process, for example, in the non-linear processing, its work efficiency is more obviously affected, which is not conducive to the development of various tasks. Therefore, with the advantage of artificial intelligence can effectively promote the overall learning ability, and use its special functions to solve the non-linear problems, improve the overall efficiency, so as to truly play the value of information, and constantly meet the current stage of development needs, while reducing the cost of data processing. The following figure can clearly identify the application advantages of artificial intelligence.



Figure 2. Artificial intelligence technology advantages

## 5. Application Practice of Artificial Intelligence in Computer Network Technology in the Context of Big Data Era

Application of artificial intelligence in computer network technology is of high value, which can transform the traditional technical model and adjust it according to the actual situation, reduce the manual intervention, and combine it with computer network technology can further bring out its technical advantages. This has a positive role in promoting daily network management, network information security, and network evaluation system, specifically in the following aspects.

### 5.1 Applications in Network Security Detection

Intrusion detection is the focus of computer network technology, which is directly related to the stability of the computer network itself. The use of artificial intelligence can effectively improve the ability of the intrusion detection system to prevent viruses, and intelligent protection wall with each other, can ensure the safety of user data and information and the normal operation of the computer. Artificial intelligence intrusion detection technology mainly uses the advantages of artificial intelligence to comprehensively analyze and detect the information in the computer network, classify different types of data, clarify the risk of the data itself, and achieve a unified arrangement of risk data information to ensure that data risks are further reduced. The application of artificial intelligence intrusion detection technology does not affect the normal operation of the computer, while ensuring the security of network data and timely prevention of internal misoperation or network attacks, and its security is good. The principle is the use of intrusion posture analysis, through its basic principles to determine the intrusion program, the establishment of a flexible intrusion defense system, the formation of a good defense environment to ensure the security of the computer system, its application value is high. The following table shows the classification of current algorithms with different algorithmic properties.

Table 1. Intrusion detection algorithms

Nature of the algorithm	Algorithm Classification	Algorithm Implementation
Traditional Algorithms	Primary Detection Algorithm	Matching Patterns
		Clustering
	Anomaly Detection Algorithm	Decision Trees
		Affiliation Rules
Artificial Intelligence	Artificial Intelligence Algorithms	Genetic Algorithm
		Neural Networks
		Immunization Algorithms

Intelligent firewall is also very common application, using the advantages of artificial intelligence to calculate, memory, decision processing of data, and constantly optimize data analysis to facilitate the

detection of data and reduce the chance of repeated detection. Smart firewall can effectively grasp the value of network characteristics, reasonable control of data and information, can timely find the threats in the network, all-round scanning, interception and restriction of dangerous information, enhance the computer's own security habits, while reducing the threat of hackers and viruses. Intelligent firewall can monitor the network internal organization, timely distinguish the virus information and grasp the virus status in order to achieve the protection of information security. Smart anti-spam is also a common application to monitor the computer's email inbox comprehensively. If the emails have viruses and risks, intelligent screening and targeted processing can be reasonably carried out, and the user's mailbox can be checked in a timely manner through intelligent anti-spam, and the results can be quickly provided to the user to eliminate the existing risks in a timely manner to ensure the security of the computer network [3]. Expert systems are also the focus of artificial intelligence applications, using technology to build expert databases, obtain expert experience, summarize and analyze their contents, and continuously improve computer network systems. For example, the compilation of targeted computer instructions, if there is an external invasion situation can use its instructions to determine the problem, timely find the invasion factors, according to the results of scientific processing, to a certain extent, to improve the accuracy of computer network security data detection. The following figure shows the structure of the expert system.

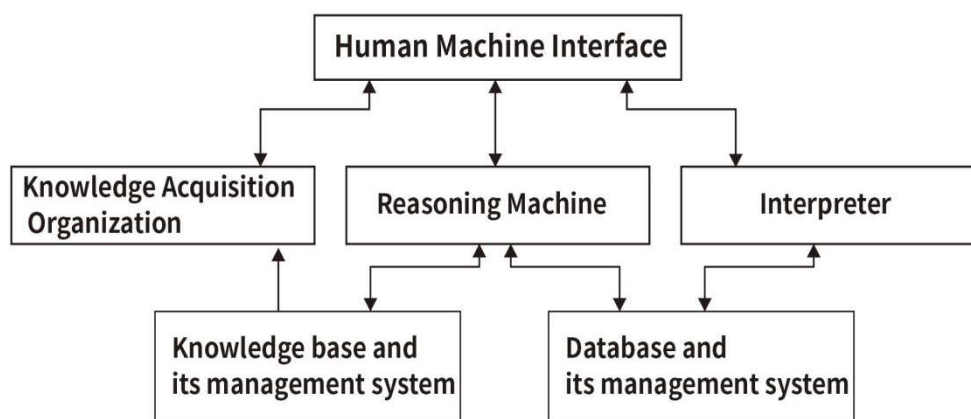


Figure 3. Expert system structure

## 5.2 Applications in Network Management Systems

In network management, artificial intelligence technology can be used flexibly to improve the stability of the network and implement intelligent development in a comprehensive manner. And use artificial intelligence to establish the degree of normality, carry out analysis of professional content and knowledge, collect the corresponding useful information, and ensure network security. In the process of computer network operation, if problems arise, the information content can be queried through its technical advantages, so as to provide good data information support to ensure the stable operation of the management system. Network security management has positive significance for the development of computer networks, but there are obvious shortcomings in the traditional management. For example, when its security is not strong, it may threaten the whole computer system, so it needs to pay more attention to the efforts to remove the existence of security risks in a timely manner. The use of artificial intelligence technology can further enhance the security of computer network systems, through the advantages of technology to intelligent identification of data information. The existence of abnormal data and information interception, minimize the danger, change the traditional purely rely on human resources management information model, reduce the time cost, to ensure the overall management level to improve [4].

### 5.3 Application of AGENT Technology in Artificial Intelligence

In the current context of the big data era, the concept of network services is constantly being innovated, which has prompted agent technology to realize the customization and personalization of network services as an important element to meet the individual needs of users. For example, by using its technical advantages through the knowledge base and explanation thruster as the carrier, the data of network users can be reasonably stored and analyzed, and by judging the user's own needs, the data that the user may need can be automatically screened and pushed to the user according to the user's request or system settings. It is also possible to use agent technology for the underlying data collection and collation, and to conduct rapid analysis through the adaptive and reasoning capabilities of artificial intelligence, to stop or reduce the impact of viruses on computer systems to the greatest extent possible, and to establish a corresponding system to ensure the stability of computer network systems. Immunity technology is also a common technology, which builds a defense mechanism in the system based on itself to avoid the system being violated and reduce the threat generated by viruses. Through its attack means and methods to deal with the perspective, strengthen its information processing capabilities, make up for the lack of intrusion monitoring and flexibility in traditional networks, enrich the data and information base, can significantly improve the level of defense of the network system itself. Artificial neural network is also the content of intelligent technology widely used in computer network systems. It can operate according to the human brain's way of thinking, through the human way of operation and thinking for basic data and information processing, using its compatibility advantage to promote the timely processing of data, the smooth implementation of various activities. At the same time, artificial neural network also has strong learning ability, can learn more advanced information processing in different network environments, while optimizing the performance of the network system itself. Such as the identification of unknown information, noise input patterns, etc. This can lead to the improvement of the overall technology level and the development of information technology [5].

## 6. Conclusion

In summary, the advent of the era of big data puts forward completely new requirements for computer network systems. This requires its overall data and information processing level to be improved, and the application of artificial intelligence technology can effectively meet this demand, thus strengthening the security of computer network operation, ensuring operational efficiency, providing users with personalized services, and strengthening overall management at the same time. Therefore, artificial intelligence technology should be actively applied in computer networks to give full play to its own advantages and develop in the direction of humanization.

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