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The application of artificial intelligence in computer network technology in the data age

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Abstract: With the rapid progress of China's social, political and economic development, the level of science and technology is also continuously improving, and China has also entered the era of big data. In the context of this era of big data, the rapid development of China's economy has also promoted the progress of artificial intelligence technology. The integration of artificial intelligence into China's computer network technology is conducive to the healthy growth of China's network technology. Based on this, this paper briefly analyzes the application of artificial intelligence in computer network technology in the era of big data.

1. Introduction

In today's digital era, the application of artificial intelligence in computer network technology is not only the engine of data processing and transmission, but also the key to network security and management. The era of big data has opened up unprecedented possibilities for the application of artificial intelligence in the field of networking, pushing data processing to a whole new level. The application of artificial intelligence not only makes computer network technology more intelligent and efficient, but also changes the way we process information and our perspective. From intelligent firewalls to artificial immunity technology, the integration of artificial intelligence continues to shape the security and stability of network systems. This ubiquitous influence demonstrates the profound significance of AI in network technology, leading us into a new digital era.

2. The era of big data and artificial intelligence

2.1. The era of big data

With the continuous expansion of the frequency and coverage of big data technology, the era of big data has brought great convenience to people, who can grasp the world's information with just one touch, and shopping has become easy to complete without going out. These changes are driven by the powerful data processing platform and efficient data processing technology of big data technology, and the era of big data realizes real-time statistics, analysis, processing and prediction of massive data. In the era of big data, people can use technologies such as data mining and artificial intelligence to conduct in-depth analysis of new knowledge and laws, and accurately apply

them to various fields such as industrial production, agricultural development, and urban construction. This analysis and application method not only improves the social production efficiency, but also greatly optimizes the social governance model. In this era, all sectors of society have found more efficient and intelligent ways to solve problems, thus driving society to continue to develop in a smarter and more sustainable direction.[1]

2.2. Artificial Intelligence

The operation of artificial intelligence needs to rely on the fields of computer science, linguistics, and logic, through effective integration to simulate the response of computers to human intelligent behavior, and promote computer innovation similar to human brain intelligence to achieve higher-level applications. Although artificial intelligence and big data technology are different in terms of research focus, they are extremely closely related in practical application. The processing of big data requires the help of artificial intelligence technology; Moreover, the development of artificial intelligence is also inseparable from the thinking and decision-making framework built by a large amount of data. In other words, the more information big data provides, the better AI will perform. Therefore, artificial intelligence is a key product of the era of big data, and the two complement and promote each other. This relationship is not only reflected in the technical level, but also integrated into all aspects of social development and application innovation, providing a solid foundation for the construction of an intelligent society in the future.[2]

3. The advantages of using artificial intelligence in computer network technology

3.1. High speed of information and data transmission

In computer networks, the application of artificial intelligence technology not only realizes real-time online communication of data based on the characteristics of the network itself, but also breaks the limitations of time and space. Its application in computer networks makes full use of the advantages of computer processing and communication, significantly improves the speed of data transmission, and shows the characteristics of dynamic change. In the past, due to the instability of the system and the security of the network, computers often had unexpected situations when transmitting information. However, the use of AI technology in computer networks has changed the situation. Artificial intelligence can comprehensively predict and control the environment of computer network information transmission, enhancing the stability of the network. In addition, after artificial intelligence technology is applied to computer networks, it can also comprehensively process unknown information and has a high level of information processing capabilities. This convergence of technologies not only improves the speed of data transmission, but also improves the reliability and security of the network environment. In the process of information transmission, the introduction of artificial intelligence technology makes the computer network more intelligent and efficient, providing a more reliable guarantee and better processing power for information transmission.[3]

3.2. Simplify the operation of system models

The integration of artificial intelligence technology into computer networks maximizes the accuracy of data processing. AI technology processes both known and unknown data holistically and then builds data models. In computer networks, fuzzy logic applications are common, and artificial intelligence technology intelligently processes data according to its own advantages in these situations. Artificial intelligence has the ability to effectively deal with uncertainty in

management, and can flexibly design information processing strategies to maximize the efficiency of network information processing and simplify the operation of system models. In addition, artificial intelligence technology in computer networks has enabled the collaborative operation of humans and machines. The relevant staff can adapt the way AI technology is processed to better adapt to human needs. When AI technology receives new instructions, it can enhance the connection between senior, middle and low-level managers, and collaborate according to the instructions issued by various management. This kind of integration makes network management more intelligent and efficient, effectively improves the flexibility and accuracy of management and operation, and provides stronger support for the operation of computer networks.[4]

3.3. Artificial intelligence has strong reasoning skills

AI technology has been praised for its superior reasoning capabilities. When computer networks are applied, artificial intelligence technology can deduce multiple pieces of information from the characteristics of one information, and can skillfully integrate high-level acquired information into network management. Even if there is a problem in the process of processing network information, artificial intelligence technology can simulate the working thinking of human beings to solve it, fully demonstrating its excellent reasoning ability. In addition, AI technology can quickly search for information by relying on its own reasoning ability. This technology has become indispensable in today's computers. Its reasoning ability allows it to process information and solve problems efficiently, which is highly compatible with the requirements of computer networks. Artificial intelligence technology not only has a high degree of reasoning ability, but also can flexibly use limited network resources. The application of industrial intelligence technology has become one of the indispensable technologies of modern computer network. The powerful nature of its reasoning capabilities provides network management with an efficient means of problem solving, making the network more intelligent, fast and reliable in processing complex information.[5]

4. The necessity of the application of artificial intelligence in computer network technology in the era of big data

4.1. Improve the quality of computer network management

In the actual application of computer network technology, network management is an extremely complex and trivial task. Traditional computer network technology management often relies on manual operation, which not only consumes a lot of time and energy, but also human operation often leads to unavoidable errors, thus having a negative effect on the quality of computer network technology management. In this context, the advantages of AI are important to replace some complex management tasks. The application of artificial intelligence in computer network management can greatly improve the efficiency and quality of management, automate complex tasks, reduce the burden of manpower, and reduce errors caused by human operations. It not only improves management efficiency, but also ensures the stability and reliability of network operation. Moreover, AI technology has the ability to learn Xi and adapt to the environment, and can continuously optimize management strategies and deal with abnormal situations. Compared with traditional manual management, it can better adapt to changes in the network environment and adjust strategies in time to meet various challenges. Therefore, the application of artificial intelligence in computer network management is a necessary means to improve the quality of management, reduce the error rate, and bring more efficient and reliable solutions to network management.

4.2. Enhance computer network security

Although computer network technology has the advantages of fast transmission, immediacy and efficient processing of information, its application in the complex Internet environment is easily affected by human and objective factors, resulting in frequent problems such as data loss and damage. The emergence of these problems has seriously affected people's daily life and work. Through the application of artificial intelligence, the practical application of intelligent firewall, intelligent anti-trash system and artificial immunization technology effectively ensures the security of system operation. The application of artificial intelligence technology in network security makes up for the shortcomings of traditional security methods. Intelligent firewalls identify and block malicious attacks, and monitor and prevent cyber threats in real time. The intelligent anti-trash bin system can intelligently filter spam information and reduce the possibility of cyber attacks. Artificial immunization technology simulates the human immune system to quickly identify and respond to cyber threats, providing a more comprehensive security guarantee. The application of artificial intelligence technology effectively improves the security of computer networks and provides a reliable guarantee for the operation of network systems. Through intelligent protection methods, it successfully resists threats and attacks in the network, and reduces the risk of data leakage and loss. Therefore, the application of artificial intelligence in the field of network security has become an important means to ensure the security of computer networks and protect user information, and provides effective support for the stable operation of the network environment.

5. Practical application of artificial intelligence in computer network technology in the era of big data

5.1. Smart Firewall

Intelligent firewall technology is the most representative artificial intelligence in computer network technology. In practical applications, intelligent firewall technology mainly collects and processes network data information through an intelligent identification system, and uses a built-in filtering system to automatically and efficiently filter out risk and valueless information. Intelligent firewall technology not only greatly reduces the burden of network information processing, but also significantly improves the security of the system. The intelligent firewall technology in practical application effectively reduces the spread of viruses and hacker attacks in the network, and provides a solid guarantee for the security of computer network systems. Its autonomous filtering and identification capabilities enable it to quickly and accurately identify and block potential threats, protecting network systems from malicious attacks and sabotage. Intelligent firewall technology not only reduces the burden of the network, but more importantly, provides a solid security protection for the healthy operation of the computer network, fundamentally improves the network security, effectively guarantees the integrity of data and the privacy and security of users, and provides a reliable guarantee for the stable operation of the network environment.

5.2. Intelligent intrusion detection technology

Intelligent intrusion detection technology is a technology that conducts in-depth research on the internal information of the network under the Internet technology and computer security monitoring system, which can comprehensively detect whether the data has been illegally tampered with or processed, and detect other potential hazards that may affect the security of the computer network. Intelligent intrusion detection technology realizes the centralized control of network technology, which is an important means for the application of artificial intelligence technology in computer

networks. The workflow of technical intrusion detection covers the collection of all kinds of data information, automatically filters out the information that is not accepted, and feeds it back to users in a timely manner, so that they can take precautions in advance to minimize the damage of unsafe information to the computer network. For the identified dangerous information, the system will conduct in-depth analysis and formulate corresponding protection strategies to prevent similar harmful information from appearing again, so as to further improve the security of system information resources. In addition, the practical application of intrusion detection technology can comprehensively and efficiently monitor the operation of computer network systems. If a system is at risk due to a personal operation or cyber attack, technology can take immediate action to deal with it effectively, thereby improving the security of the system in an all-round way. The application of intelligent intrusion detection technology in computer networks not only provides security protection, but also provides a powerful means for the prevention and solution of network security problems. Its intelligence, timeliness and accuracy provide reliable support for the healthy operation and security of the network system.

5.3. Intelligent anti-spam mailbox system

Email is widely used in daily life and work, however, users are often plagued by a large number of spam emails. These spam emails not only seriously affect users' work and life, but also pose a threat to network information security. In order to solve this problem, artificial intelligence and computer network technology have been successfully combined to create an intelligent anti-spam mailbox system. The intelligent anti-spam mailbox system uses artificial intelligence technology to automatically identify, filter, and effectively classify and process spam emails. Through the use of intelligent algorithms, the system can identify the characteristics and patterns of spam and quickly classify them, so that users can focus more on getting truly valuable information when using the mailbox. The emergence of the intelligent anti-spam mailbox system not only significantly improves the user experience, reduces the waste of time and energy in dealing with spam, but also improves the level of network information security, provides users with a more refreshing and safer e-mail environment, and reflects the practical and efficient application of artificial intelligence in computer network technology.

5.4. Data Mining Techniques

In the era of big data, data mining technology is one of the key technologies, and it is also an artificial intelligence technology widely used in computer networks. The core concept is to obtain the host link information through the network connection, and use data mining technology to deeply understand and master the intrusion information and rules of the host communication information, and then store these information and rules in the database. Once the host is invaded by external intrusion, the system can use the database information to compare with the input information to efficiently judge the security of the external intrusion information, so as to ensure the security and stability of the system operation. The application of data mining technology realizes the intelligent protection mechanism of network security and ensures the timely identification and response of the system to potential incursions. Through data mining technology, the system can detect and respond to potential threats more quickly and accurately, greatly reducing the risk of external attacks on the system, and then providing reliable support for the security of the computer network, ensuring the stable operation of the system and the safe transmission of data.

5.5. Artificial neural networks

In the era of big data, one of the most widely used technologies of artificial intelligence in computer networks is artificial neural networks. Its principle imitates the operation mode and thinking mode of the human brain, which can process and manipulate relevant data in a basic way, and has a certain degree of fault tolerance and compatibility in information processing. Moreover, the biggest advantage of artificial neural networks is their strong learning and Xi capabilities. Artificial neural networks can learn Xi advanced information processing technology according to environmental changes to predict and manage the changing network environment in an all-round way. In the era of big data, artificial neural network technology can also be used to protect the security of the network environment, and excellent application results have been achieved. Its learning Xi ability and fault tolerance enable it to quickly adapt and respond to changing network conditions, providing a strong guarantee for the network system and ensuring that the network still maintains an efficient and stable operation state in the face of changing environments.

5.6. Artificial immunization technology

Artificial immunization technology is of great significance for the improvement of network system security. By mimicking the operation of the human immune system, artificial immunity technology can more comprehensively and intelligently identify and defend against various invasion threats, providing strong support for the healthy operation of network systems. Artificial immunization technology solves the shortcomings of intrusion detection technology in the identification of viruses in network systems. The technology mainly includes clonal selection, gene pool, and negative selection. There is still great potential for the construction of gene banks. The mutation pattern of gene mutation and the recombination of gene chips can effectively identify the invading virus, prevent the invasion of the virus, and effectively prevent the invasion of the virus, so as to ensure the security of the network system. One of the ways in which a network system detects viruses is by negative selection. The system can proceed to the next step only after running the negative selector, otherwise the system stops its operation. Although the development of artificial immunization technology is still immature, its broad application prospects and value have attracted much attention. Its application potential in the field of network security is huge, and it is worthy of in-depth research and discussion.

6. Conclusion

To sum up, in computer network technology, the application of artificial intelligence in the era of big data presents a diverse and powerful appearance. From the combination of the era of big data and artificial intelligence to the practical application in computer networks, technologies such as data mining, intelligent firewalls, and intelligent intrusion detection have shown great potential. The use of these technologies not only improves the efficiency and security of network transmission, but also changes the way we process information. The role of artificial intelligence technology in network security and management is becoming more and more important, and intelligent protection and identification mechanisms make network systems more resistant to attacks. However, these technologies still need to be refined and evolved to adapt to the changing cyber landscape and increasingly sophisticated threats. The era of big data has provided a broad stage for the application of artificial intelligence in computer network technology, and its prospects are still full of infinite possibilities. Through continuous innovation and application, we can make better use of these technologies, build a safer and more efficient network environment, and promote the integration and development of technology and society.

References

[1] Huang Qiongbiao.Brief analysis of the application of artificial intelligence in computer network technology in the era of big data[J].Chinese Science and Technology Journal Database (Full Text Edition) Engineering Technology, 2023(4):4.
[2] Diao Weiping, Guan Zhicong. Application of artificial intelligence in computer network technology in the era of big data [J].Wireless Internet Technology, 2022, 19(11):104-106.
[3] Ding Ning.Research on the application of artificial intelligence in computer network technology in the era of big data [J].Digital World, 2020(2):2.
[4] LI Si, LIU Chaoyu. Discussion on the application of artificial intelligence in computer network technology in the era of big data [J].Continental Bridge Vision, 2023(1):46-48.
[5] ZHAO Hanqing, DUAN Jingfeng, LUO Jialun. Research on the application of artificial intelligence technology in big data network security defense[J]. Network Security Technology and Application, 2023.