Application of Artificial Intelligence in Computer Network Technology

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Abstract: *With the advent of the information age, computer network technology has become a necessity in people's production and life, and improving network service quality has become an important research content in the field of computer network technology in the new era. As an advanced analysis and calculation mode, the application of artificial intelligence in the field of computer network technology has considerable value and role, and promotes the innovation and progress of computer network technology. In this paper, the application of artificial intelligence in computer network technology is comprehensively discussed and studied, in order to provide reference for practitioners in related fields.*

Keywords: Artificial intelligence; Computer network technology; Application.

1. INTRODUCTION

With the increasing maturity and perfection of artificial intelligence technology, more and more fields are focusing on the integration and application of artificial eagle intelligence technology to realize innovation at the service level. There is a strong fit between computer network technology and artificial intelligence, mainly because computer networks need to analyze and compute huge amounts of data, while artificial intelligence can fully improve the quality and efficiency of this work. At present, research on the application of artificial intelligence in the field of computer network technology is being carried out in full swing, and the author has put forward some understanding and understanding in the context of his own work experience, with a view to adding a foundation to the innovative development of computer network technologies in China. Tong et al. (2024) proposed an integrated framework for credit card approval prediction [1]. In power systems, Gao and Gorinevsky (2018) pioneered probabilistic methods for grid balancing with renewables and storage [2]. The financial domain continues to see innovations with Su et al. (2025) developing an anomaly detection and early warning system for financial time series [3], while Zhang et al. (2025) created MamNet for network traffic forecasting and frequency pattern analysis [4]. The autonomous driving field is advanced by Peng et al. (2025) through NavigScene, which bridges local perception and global navigation [5]. Broadly surveying the field, Zhang et al. (2025) explored innovative applications of large models in computer science [6], and Fang (2025) implemented a cloud-native microservice architecture for cross-border logistics [7]. Huang, Tian, and Qiu (2025) contributed to power systems with an AI-enhanced dynamic grid simulation for real-time decision-making [8], while Yang (2024) applied computer-assisted methods to cross-cultural English teaching [9]. In computer vision, Chen et al. (2022) introduced one-stage object referring with gaze estimation [10]. Subsequent advances include Zheng, Zhou, and Lu (2023) improving rebar cross-section detection with an enhanced YOLOv5s algorithm [11], Zhao, Zhang, and Hu (2023) applying Res2Net-YOLACT+HSV for smart warehouse track identification [12], and Shao, Wang, and Liu (2023) developing a salient object detection algorithm using diversity features and global guidance information [13]. Finally, Ge and Wu (2023) conducted an empirical study on ChatGPT's adoption for bug fixing among professional developers [14].

2. OVERVIEW OF ARTIFICIAL INTELLIGENCE

Artificial intelligence is an emerging technology that simulates, extends and expands human intelligence. It is a cutting-edge technology in today's science and technology, and it has been deeply integrated with human society. Based on computer technology, people can program computer people's mindset and behavior to solve some real-world problems, and further improve problem-solving and decision-making ability through the huge computing power of computers. It is worth noting that AI is not just about intelligence, but about analyzing and calculating data according to the programming people are involved in, Therefore, although it cannot be subjectively activated to the meaning of human thought, it can follow instructions to complete repetitive work content and provide artificial intelligence services to people. At this stage, artificial intelligence technology is at an important historical point in research and innovation, and the technology is also deeply integrated with various

fields of society, so it is of great practical significance to strengthen the application research work of artificial intelligence technologies.

3. THE APPLICATION VALUE OF ARTIFICIAL INTELLIGENCE IN COMPUTER NETWORK TECHNOLOGY

3.1 Promoting the development of computer technology

In the context of the new era, computers are an important technological support for the development of human society, and promoting the development of computer technology and innovation is also an important trend of science and technology development in the new period. As the most cutting-edge technology field today, the application of related technologies and scientific research results in the field of computer network technology can promote the development and progress of computer technology. Specifically, AI has the capacity of agent cooperation and distribution, so it can ensure the network is always in a safe and stable state in service, and then guarantee the normal and orderly development of people's life and work. In recent years, with the continuous improvement of the level of social development, the demand for computer network services has also increased rapidly. Therefore, higher requirements are also placed on the operation quality of computer networks, so strengthening the application of artificial intelligence in computer network technology has very prominent value and significance.

3.2 Strengthening network data processing capabilities

From a technical point of view, the application of artificial intelligence in computer networks is conducive to improving the efficiency of data processing, thereby realizing the comprehensive improvement of computer network quality. It is well known that with the increasing development and perfection of computer network technology, the amount of data designed there is also increasing, which requires a more mature and advanced data processing technology to ensure the good and stable operation of computer network. First, artificial intelligence has nonlinear processing capabilities, which can better cope with nonlinear data problems caused by the complex topology of computer network systems. In addition, AI can effectively solve the problem of growing data volume in computer networks, while deepening the hidden value behind the data through more powerful analytical capabilities. It can be seen that the application of artificial intelligence in computer network technology can also comprehensively improve the quality and efficiency of data processing.

4. CHARACTERISTICS AND ADVANTAGES OF ARTIFICIAL INTELLIGENCE NETWORK TECHNOLOGY

4.1 Can handle non-linear problems

It is well known that computer networks are characterized by diversity and complexity, so when network management is carried out, there are often instantaneous network load changes. Alternatively, some users have unspecified actions, which can prevent high-precision linear management control of the network's administrative objects. In recent years, with the increasing usage of computer networks, nonlinear problems have become an important factor affecting the quality of network operation, while traditional management methods have some obvious limitations and lag times. Artificial intelligence-based computer network technology has a strong nonlinear processing capability, which more meets the needs of computer network management in the new era and ensures the operational level and quality of the network.

4.2 Effective reduction of resource consumption

In essence, the development of computer network technology is rooted in the analytical computing power of network information, so when the algorithms are more scientific and advanced, they can improve the operational quality of computer network. At this stage, with the further expansion of the construction scale of computer networks, there is a multiplying of the objects under control, which has a profound impact on the speed of network control, and the corresponding network information interpretation capacity is also constrained. The application of artificial intelligence in the field of computer network technology has realized the comprehensive improvement of information analysis computing power, that is, the effect of control algorithms and rapid computing, thus reducing the consumption of resources generated by the information analysis process of computer network.

4.3 Effective handling of fuzzy information

In computer network technology, fuzzy information processing has always been a very important technical points, and strengthen the fuzzy information processing capabilities can be better to deal with and deal with some predictable issues. There is a great deal of fuzzy information in the network, and how to improve the fuzzy information processing capacity has also attracted the attention of technicians. The application of artificial intelligence in computer network technology can not only realize the reasoning calculation of fuzzy information with the aid of artificial intelligence fuzzy logic, but also realize the real-time monitoring of network operation, so as to ensure the good and stable operation of computer network.

4.4 Collaborative processing capability

With the further expansion of network scale, the structure of system is becoming more and more complex. Historically, the previous computer network management model was a single management, so it still could not adapt to the management needs of computer networks in the new period, and it also limited the transformation and development of the layered management model of computer networks. Artificial intelligence technology has a strong collaborative processing capability, so it has a very prominent application value in increasingly complex network management. That is, through collaborative processing capabilities, it can prevent the emergence of computer network management blind spots and misunderstandings, and ultimately achieve the effect of improving the operational quality of computer network.

4.5 Real-time processing capability

From a professional point of view, computer network management is based on information collection, testing to achieve real time control of the network system, so as to ensure the quality and efficiency of computer network system. At present, in order to meet the needs of the computer network in the new era, the managers need to judge and analyze the state in service of the computer network in real time, and grasp the relevant changes. The application of artificial intelligence in computer network technology has further strengthened the real-time monitoring capability in the operation of computer network systems. Can make scientific and rational decisions while fully grasping the various changes in the network system, thereby ensuring the overall stability and security of the computer network system.

5. APPLICATION OF ARTIFICIAL INTELLIGENCE TECHNOLOGY IN COMPUTER NETWORKS

5.1 Application in Network Security Management

Network security has always been an important scientific topic in the field of computer network technology, and only by ensuring the security of the network environment can users provide more quality network services. In conducting network security management, firewall technology and illegal intrusion detection technology are mainly used to prevent and eliminate potential security hazards. The application of artificial intelligence technology has promoted the transformation and progress of network security prevention and treatment technology, which is reflected in the following two aspects:

5.1.1 Intelligent firewall

The fusion of firewall technology and artificial intelligence technology has made the firewall capable of automatic identification of data and intelligent processing of information. The time required for the computer to retrieve, match and verify data will be greatly reduced, thus optimizing the quality and effectiveness of firewall restricted network access management. From the application effect, the integration of artificial intelligence technology and firewall technology has promoted the improvement and upgrading of China's network security management work, especially the strengthening of management capabilities for harmful network behavior attacks. In addition, the hardening of artificial intelligence has effectively solved the denial of service attacks in the past.

5.1.2 Intelligent intrusion detection system

On the basis of firewall, people also widely use anti-virus software to protect the computer, so as to effectively prevent the invasion of virus and Trojan horse in the use of network services。 Historically, antivirus protection systems more than ever require computer users to regularly update the virus database and completely destroy the computer, so as to detect the security hazards in the computer. The application of artificial intelligence has greatly improved the virus intrusion detection capability of antivirus protection systems. On the one hand, it can automatically identify viruses or Trojans in computer users' network receiving information, and on the other hand, it also provides a security barrier for computer network security through cloud services to update the virus database in real time.

5.2 Application of neural networks

Neural networks are a technique for distributing and computing information by mimicking the behavior characteristics of animal neural networks, and are a cutting-edge technology in the field of computer network technology today. As a computer network technology that mimics the characteristics of animal neural networks, there is a great fit between this technology and artificial intelligence technology, and it can be said that the application of artificial intelligence will inevitably drive the development and innovation of neural network technology. From a professional point of view, neural network system is composed of multiple information processing units, so it not only has a strong compatibility, but also has a very strong learning ability, which can recognize the noise, distortion and other different input patterns, and in order to deal with different network information processing needs. Specifically, the application of artificial intelligence in neural network systems allows computer network technology to further enhance the protection against security risks in hardware or driver software loading, which cannot be matched by traditional detection and analysis methods. For example, AI-based neural networks can combine multi-layer circulating neural networks and multi-layer neurosensor detection techniques on the basis of research on virus intrusion training system datasets. In this way, a multi-layered neural network detection system with more learning and analytical capabilities is built to enable detection and processing of multiple intrusive behaviors. At present, thanks to the integration and application of artificial intelligence technology, neural network technology in computer network technology has ushered in a third generation technological upgrade, and it is also characterized by digital simulation and biomedical neural networks, thereby meeting the growing demand for network services in the new era.

5.3 Application of Network Resource Sharing

Computer networks are an open platform, users can search and download many data information in the network, so how to realize the sharing of network resources is also an important development direction of computer network technology. At present, technicians proposed to utilize cloud and artificial intelligence technologies to achieve high-quality and efficient sharing of network resources and more scientific and rational management of network resources. Specifically, the current stock of data in the network is increasing, and it also involves various formats such as text, pictures and video, which pose serious challenges to data retrieval and sharing. The application of artificial intelligence, on the one hand, achieves efficient classification and integration of data resources in the network, on the other hand, has faster identification and processing capabilities, and realizes rapid retrieval of huge data resources according to user needs. In addition, the network resource sharing based on artificial intelligence can also filter the frequency of downloading network and the sharing channel of information resource, so as to improve the quality and efficiency of information resource. This shows that the use of artificial intelligence in the field of Internet sharing can meet the needs of people in the new era and improve the quality of service.

5.4 Application of data acquisition and analysis

At present, artificial intelligence has been widely used in the field of computer network technology, especially in data acquisition and analysis. Specifically, today's computer network data processing technology is rapidly changing, which is also an inevitable requirement for computer network technology development in the context of big data. The application of artificial intelligence can first realize the ability to obtain more useful information in a large amount of data information. However, the traditional data acquisition mode will increase the running burden of the Internet and seriously affect the quality of service. Data acquisition and analysis based on artificial intelligence can identify and collect useful data information with high quality and efficiency. This not only makes data acquisition and analysis more effective, but also meets the needs of users for network services.

5.5 Application to software and hardware upgrades

With the continuous development and progress of computer network technology, the software and hardware required for computer systems also need to be necessary upgraded and maintained so as to improve the quality of computer network services. In the field of software and hardware upgrade management, artificial intelligence has also been valued and favored by technicians, and thus promotes the intelligent transformation of related jobs. In particular, some Internet companies have incorporated artificial intelligence technology into the upgrade and maintenance of computer hardware and software, which is to identify and analyze the state in service of the computer's hardware and software, so as to determine whether it needs to be upgraded, and to promote the upgrade information to the user. At this stage, with the continuous improvement of the demand for computer network services, the speed of software and hardware updates is also becoming faster. Therefore, enhancing the use of AI in this field can not only improve the quality of service of hardware and software, but also ensure the stable operation of the whole network.

6. CONCLUSION

In summary, strengthening the integration and application of artificial intelligence is an important development trend of computer network technology in the new period, which is conducive to improving the processing power of computer network data, and thus providing users with good and stable network services. Based on this, we must strengthen research work on the application of artificial intelligence to promote the comprehensive upgrading of the technological level of China's computer network.

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