

Explore the Specific Application of Artificial Intelligence in the Computer Network

Haoran Zhu¹, Haiyan An²

1. Shandong First Medical University, Tai'an, 271000, Shandong China

2. Taishan University, Tai'an, 271000, Shandong China

Abstract: Artificial intelligence is a development product under the background of network information technology, which can effectively solve the problems of network information data processing, and can also improve the security of computer information. In the process of sustainable development of computer technology, determining the advantages of artificial intelligence will help to improve the level of comprehensive technology, the efficiency of the use of artificial intelligence technology, and meet the core needs of modern social technology development. This paper mainly focuses on the specific application situation of artificial intelligence in the computer network.

Keywords: Computational; Artificial intelligence; Application

Introduction

At present, the application prospect of AI in various industries is very broad, and significant progress has been made in many fields, such as healthcare, financial services, transportation and transportation, energy and agriculture, and it continues to drive innovation and change. In the computer network, the introduction of artificial intelligence technology is like the implantation of intelligent brain, and the data and information accepted by the network platform, do a good job of comprehensive processing and analysis, but also can effectively improve the level of computer network data and information processing. Artificial intelligence is a development product under the background of network information technology, which can effectively solve the problems existing in network information data processing and improve the security of computer information. In the process of sustainable development of computer technology, determining the advantages of artificial intelligence will help to improve the level of comprehensive technology, the efficiency of the use of artificial intelligence technology, and meet the core needs of modern social technology development.

1. Overview of AI related

1.1 Definition of artificial intelligence

Artificial intelligence (Artificial Intelligence, AI) is the ability of a computer system to perform tasks that usually require human intelligence. This includes functions such as understanding natural language, visual perception, learning, reasoning, problem solving, and decision making. AI aims to simulate, replicate, or transcend certain aspects of human intelligence^[1].

1.2 Classification of artificial intelligence

AI can be divided into two categories: weak AI (Narrow AI or Weak AI): this AI is specific for specific tasks or areas, it can show even higher human intelligence in specific tasks, but may not perform well on other tasks. For example, voice assistants (such as Siri and Alexa) are weak artificial intelligence that answer questions and perform tasks, but do not have a wide range of intelligence. The other is strong artificial intelligence (Artificial General Intelligence or Strong AI): this artificial intelligence has a general intelligence similar to human intelligence, which can understand and solve problems in a variety of different fields, and has the ability of independent learning and self-improvement. Strong AI has not yet been achieved, and is a long-term goal of current AI research.

2. The core significance of artificial intelligence in computer network technology

2.1 Ensure the security of big data processing technology application

Artificial intelligence (AI) needs to pay special attention to security when dealing with big data, because it involves a large amount of sensitive information and, if not properly protected, may cause serious privacy and security issues. Here are some key measures to ensure the security of AI big data processing applications: Data encryption: Use strong encryption algorithms during data transmission and storage to ensure that data is not easily stolen by unauthorized visitors. End-to-end encryption is used to ensure a secure transmission of the data between the source and the destination. Access control: Implement strict access control policies, and only authorized people have access to sensitive data and AI systems. Use authentication and authorization mechanisms to ensure that only legitimate users have access to the AI system^[2].

Monitoring and auditing: Implement real-time monitoring and audit mechanisms to track data access and processing. Record critical operations for traceability and investigation in case of safety incidents. Safety training: Safety training for users and administrators of AI systems to improve their awareness of safety best practices and reduce human error. Teach teams how to handle sensitive information and respond to potential security threats. Vulnerability management: conduct regular vulnerability scanning and security evaluation of the AI system, and fix the vulnerabilities found in time. Follow vulnerability disclosure best practices and work with security researchers to solve problems. Privacy policy and compliance: Compliance with relevant regulations and privacy policies, such as GDPR, HIPAA, etc., to ensure legal processing and protection of user data. Conduct a compliance audit to ensure that the AI applications meet the legal requirements. Emergency response plan: Develop and test an emergency response plan to take prompt action to reduce losses in the event of a safety incident.

2.2 Improve the intelligence of the artificial neural network

Artificial neural network in artificial intelligence (AI) is a computational model inspired by biological neural networks and used to simulate how the human brain works. Artificial neural network is widely used in computer network technology, which mainly combines people's thinking mode and brain mechanism for the next operation. To carry out the processing of basic information and data, the artificial neural network is highly compatible. Improving the intelligence of artificial neural networks requires a variety of methods and technologies, including the following improvements: More complex network structures: design deeper and more complex neural network structures, such as deep neural networks (Deep Neural Networks, DNNs) and recurrent neural networks (Recurrent Neural Networks, RNNs). These networks have more levels and neurons and can learn and represent more complex patterns and abstract concepts.

Transfer learning: The neural network trained on one task is applied to another related task. This way can borrow previously learned knowledge and accelerate the learning of new tasks. multimodal, self-supervised learning: Using reinforcement learning techniques to train neural networks to learn and improve decisions in an interactive environment. This is important for building intelligent proxy programs (such as self-driving cars and robots); while enabling neural networks to handle multiple sensory inputs, such as images, text, and audio. This helps to build intelligent systems with more perceptual and understanding capabilities. It can also allow neural networks to learn from unlabeled data to reduce dependence on annotated data. This helps the network to adapt to the new data in a broader context. Dynamic adjustment of neurons and connections: enabling the structure of the neural network to be dynamically adjusted during learning to adapt to different tasks and environments.

Attention, long-term memory mechanism: allows the network to focus on important parts when processing data, which helps improve understanding and decision-making; introduce long-term memory mechanisms such as long-short memory network (Long Short-Term Memory, LSTM) to handle sequence data and long-term dependencies. Interpretability and interpretability: To study how to make the decision-making process of neural networks more interpretable, so that it is easier to understand and debug the behavior of the network.

3. Specific application of artificial intelligence in computer network technology

3.1 Application in network security management

3.1.1 Intelligent Firewall technology

Intelligent Firewall Technology is an advanced network security technology designed to provide more intelligent, adaptive and efficient firewall protection. It combines the basic functions of traditional firewalls, such as package filtering and access control, with advanced analytic, learning and automation capabilities to better identify, predict and defend against various cyber threats. Smart firewall can deeply analyze packets in network traffic, not only check protocols and ports, but also identify application layer protocols and content. This helps prevent application-layer attacks and malware propagation. It uses behavior analysis to monitor abnormal patterns

in network traffic. By learning the normal network behavior, the intelligent firewall can detect abnormal activity, such as large-scale data transmission, a large number of login failure attempts, etc. Intelligent firewalls can integrate information from multiple threat intelligence sources, timely understand known threats and attack patterns, and use them for traffic analysis and defense. It can automatically learn the behavior of networks and applications, and adapt it to new threat and attack patterns. This helps to improve the adaptability and accuracy of the firewall. In addition, smart firewalls can implement more refined access control policies based on the identity and features of users, devices, and applications, which helps reduce attack surfaces and improve network security. Intelligent firewall technology is constantly evolving to adapt to the evolving ways of cyber threats and attacks^[3].

3.1.2 Intelligent spam mailbox control technology

Intelligent spam mailbox control technology is an advanced technology used to identify and filter spam mail. It combines machine learning, text analysis, rule engine, and real-time monitoring to improve the accuracy and efficiency of spam detection. Intelligent spam mailbox control technology uses machine learning algorithms, such as naive Bayes, support vector machine, deep learning, etc., to train spam detection models. These models can be classified according to the text content of the message, sender information, and email title. And can extract and select email features, such as keywords, email header information, URL links, etc., to help the model to better identify spam. Continuously monitor new mail traffic and update spam detection models in real time to respond to new spam policies and variants. Smart spam mailbox control technology also maintains blacklists (spam sender) and whitelists (trusted sender) to help identify spam and legitimate mail. Anti-fraud methods can also be used to detect spam, including detecting false identities, fraudulent practices, and phishing attacks.

3.2 Application in the neural network

Neural network is a computational model inspired by biological neural systems that includes artificial neurons and hierarchical structures used to simulate and process complex information. The artificial neural network based on artificial intelligence can simulate the normal operation mode of the human brain. Compared with other application systems, the artificial intelligence network has good acceptance and fault tolerance. The artificial neural network can accurately identify the input mode with noise and distortion, and the efficiency of detection in the computer network can improve by combining with various detection systems. The main advantage of the artificial neural network for the huge data and information application is the low-value density data analysis, which mainly includes two modes: noise input and distortion input. Researchers use the method of detecting detection to ensure the security of computer network management, and the use of artificial neural network can analyze the huge data information in the background of big data^[4].

References:

- [1]Li Fei. Optimization strategy of computer network security technology in the big data environment [J]. Computer and Information Technology, 2020,28 (5): 66-68.
- [2]Zhang Yang. Application of artificial intelligence in computer network technology [J].Electronics, 2022,51 (01): 244-245.
- [3]Liu Huaxin. Application strategy of artificial intelligence in computer network technology [J]. Modern industrial economy and Information Technology, 2022,12 (08): 148-149 + 152.
- [4]Yao Fang. The Application of Artificial Intelligence and Computer Network Technology Analysis [J]. Journal of Anyang Institute of Technology, 2022,21 (06):88-90 + 125.

About the author:

Haoran Zhu (1969-), male , Han nationality, Tai'an, Shandong Province, graduate degree, master's degree, main research direction: computer.