

Artificial intelligence based computer network technology

Shi Yuanmin

Changzhou Institute of Light Industry Technology, Changzhou, Jiangsu, 213000, China

Abstract

As the product of the mutual infiltration of the various disciplines such as the control theory, information theory, system theory, computer science, physiology, psychology, mathematics, philosophy and so on, the research field of the theory and application of artificial intelligence technology covers almost all the areas of human activity. In recent years, the rapid development of computer network technology produces and drives a batch of new scientific research fields. Among them, the application of artificial intelligence in the computer network technology is a hot topic which is academically and technically strong and can bring obvious economic benefit.

Keywords: artificial intelligence, computer network technology, network security, network management.

1 Introduction

With the progress of science and technology, people's demand for computer networks changes unceasingly. The simple function of the numerical calculation and problem solving has been unable to meet the requirements of the computer network technology. The computer to provide more intelligent and personalized service is the new demand people put forward to the computer network technology under the environment of the rapid development of the computer and the network technology. The current problems that computer network technology has, especially in the safety aspects, also emphasize the necessity for the application of artificial intelligence in the computer network technology.



2 Introduction to the artificial intelligence

Artificial intelligence is a word which was proposed in the Dartmouth society as early as 1956. It is a combination of psychology, linguistics, physiology, computer science, and other disciplines, and is the challenging comprehensive technology. Its purpose is to make machines obtain artificial intelligence, to complete complex tasks instead of human beings, and improve the work efficiency. Therefore, it is also known as the machine intelligence, and its English name is Artificial Intelligence, referred to as AI.

The research contents of artificial intelligence mainly involves: problem solving, logical reasoning, proof of the theorem, natural language understanding, automatic programming, expert system, machine learning, artificial neural network technology, robotics, pattern recognition, machine vision, intelligent control, and other theories. So far, in the 55 years of development history, the artificial intelligence research has experienced three stages of development by leaps. These are described as follows:

The first stage: the realization of machines instead of people to complete part of logical reasoning, i.e. problem solving. Representatives of the technological breakthroughs are machine theorem proving and expert system (expert system, referred to as ES);

The second stage: realize the interactive work between intelligent system and the environment, and develop intelligent robot. It can take the initiative to obtain useful information according to the change of environment and complete part of thinking tasks including uncertainty instead of humans.

The third stage: emerge the intelligent system based on data mining and become a research hotspot in the field. Data mining is a kind of process extracting useful information from a large amount of incomplete and fuzzy data. It includes data warehouse, qualitative and quantitative exchange model, visualization technology, knowledge representation methods, and research content. The application of data mining technology greatly improves the self-learning ability of the machines. The artificial intelligence technology is in the high-speed development stage.

As artificial intelligence is a multidisciplinary applied technology, its development is closely related with the subject, especially the development trend of computer technology has decisive effect on the development of computer technology, and the development of computer technology also relies on artificial intelligence. Especially in recent years, there is an interactive development relationship between the computer network technology and the artificial intelligence. In the following, we focus on the application of artificial intelligence in the computer network technology.

3 Characteristics and advantages of artificial intelligence technology

Artificial intelligence is a new intelligent which is compared to a relatively natural and human intelligence. It completes the operator's instructions through



the simulation of human intelligence activities. Artificial intelligence has the ability to deal with uncertain information, to understand the local and the global state of the system resources state and to track their changes, timely process the information, and provide the required information to the users on demand. In addition, artificial intelligence has the outstanding writing ability and can integrate resources and share and transmit in different users. Especially, the combination of multiproxy writing distributed artificial intelligence to the network management greatly improves the network management performance. In addition, intelligent treatment of artificial intelligence to the network is also reflected in the ability of learning and reasoning. The use of artificial intelligence for the management of the network not only can improve the efficiency of information processing but also can store the information by virtue of the “memory” and from the information database. On this basis, the information is comprehended, summarized, and explained, and finally the advanced information is produced, which will improve the network management level. Therefore, the use of artificial intelligence for the management of computer network is more of a smart and capable secretary for managers, which not only can follow the instructions to complete the task but also can innovate the way to complete the task flexibly and look for a fast and effective way to improve the management efficiency.

4 The existing problems of the network technology

With the expansion of the computer application domain, the problem of network information security has been paid more and more attention to. The network control and network monitoring have become two major functions the users are most concerned about in the application of the network management system. But the network controller and the network monitoring function are established based on the timely and accurate acquisition and processing of the information. The data transmission through the network mostly has the irregular and discontinuity features. Early computers can realize the data logic analysis and processing, but cannot determine the authenticity of the data. To filter out the real and effective information from a mass of information emphasizes the realization of intelligent computer network technology. The breadth and depth development of computer application requires that the user’s security information needs the network security management to provide a reliable guarantee. The development of software technology and the increase of the network crimes make the computers without more sensitive observation and rapid reaction ability difficult to truly curb violations of user information security violations. In order to realize the network security management, we should establish the management system based on the sensitive response, scientific and perfect intelligent artificial intelligence technology, automated data collection, fault diagnosis, and timely performance of the online analysis. When the computer network breaks down, we are able to respond quickly and accurately, and take corresponding measures to restore the normal computer network system. Artificial intelligence can establish a scientific network defense and management system in the computer network, to ensure the security of all kinds of network information of users.



5 The application of artificial intelligence in the computer network technology

The application of artificial intelligence in the computer network technology to the larger extent meets the needs of the people's hope that the computer can provide a more intelligent, personalized service demand for the users. The intelligent demand of computer network technology is mainly reflected in three aspects of the intelligent human-computer interface, intelligent information service, intelligent system development and support environment. These demands fully promoted the process of the application of artificial intelligence in the computer network technology, especially the application of artificial intelligence in the management and evaluation system, the network security and intelligent human-machine interface, and other major aspects.

5.1 The application of artificial intelligence in the network security management

Artificial intelligence is applied widely in computer network technology. In the field of the network security management, the application of artificial intelligence is mainly reflected in three aspects, the intelligent firewall technology, intrusion detection technology, and the intelligent antispam system which has the protection function to users' mailboxes.

There is a great difference between the intelligent firewall system and other defense systems. The intelligent firewall is the use of intelligent recognition technology. For example, methods of memory, statistics, probability and decision-making are used for data recognition and processing, which will reduce the large calculation of computers to match the inspection process, improve the efficiency of harmful behaviors for network discovery, and realize the interception and restricted access functions of harmful information. The security efficiency of the intelligent firewall system is obviously higher than that of the traditional defense software, which will effectively solve a total of the denial of service problems most commonly occurring in the common defense software, and effectively curb the spread of the virus and the intrusion of the advanced applications.

The intrusion detection is an important part of computer network security management technology, is also the most crucial link which will guarantee the network safety, and is the core part of the firewall technology. Computer network intrusion detection function will directly affect the security of system resources, confidentiality, integrity, and availability. The intrusion detection technology mainly forms the final report by data acquisition, data screening, classification and treatment, and then timely reflects current network security state information to the users. At present, artificial intelligence is widely used in the invasion detection work of the expert system, fuzzy recognition system, and artificial neural network system.

Intelligent antispam system uses the spam protection technology that the artificial intelligence technology developed. The technology can effectively monitor customers' mails on the basis of the security that does not affect the customers'



information, the mailbox spam is an open type scanning and provides information for the classification of the spam, to remind users of early treatment or unfavorable information that may harm the system, in order to ensure the overall safety of the e-mail system.

5.2 Application of artificial intelligence in the network management and system evaluation

Specifically, the development trend of intelligent network management is mainly realized by introducing the development of telecommunications technology and artificial intelligence technology. In addition to the use of the computer network security management, we can also use the expert knowledge and problem solving techniques of artificial intelligence to manage the integrated computer network. The transient and dynamic features of the network increase the network management difficulty; therefore, the modern network management is also facing network management development direction. Among them, the expert decision support method is a kind of method which is established based on artificial intelligence theory and can be widely applied in management information system. The expert system is an intelligent computer program, and can summarize experts' knowledge and experience with the formation of resource input system, and then use many experts' wisdom with the combination of the system of specific domain in dealing with problems. For the computer network management and the evaluation system, many computer network management expert systems can be used to deal with the network management and the system evaluation. Problem solving mainly refers to solving the management activities, due to the deviation between the unintended effect of accidents caused by or with the expected effect. The problem solving techniques can help managers to quickly find a solution to the problem by searching. These techniques can be used in artificial intelligence to reduce network management and maintenance workload, and improve work efficiency target.

5.3 Agent technology of the artificial intelligence promotes the improvement of the level of the information service network

The full name of the agent technology of the artificial intelligence is the artificial intelligent agent technology. It is a kind of software entity consisting of several parts of domain knowledge base, explanation extrapolator, the database, the communication of each agent. Processing new information through the domain knowledge base each agent has gives its explanation and reasoning mechanism to judge the surrounding environment. When an agent gets a task, we can use the convenient communication network to realize the mutual communication between the various agents to complete the tasks. Agent technology of the artificial intelligence can automatically search for information and transmit it to the location specified by the users according to user defined criteria.

Agent technology can provide more humanized and personalized service to users. Through the use of agent technology, when users find information or browse the web page, through the information filtering and sorting, they can



quickly find useful information to save time. In addition, the technology also can realize the efficient set of the information into the knowledge domain library, to help information retrieval and management. We can also realize the mining of knowledge by fuzzy technique to provide navigation services. Agent technology can provide the schedule settings, e-mail processing, books, music, and film and television program selection, online shopping services, which will greatly facilitate people's daily life.

Agent technology of the artificial intelligence has the characteristics of independence, learning, collaboration, personalization, intelligence, and sociality. Through the use of this technology, the computer can automatically perform the work assigned by people, greatly improve the computer use, and promote the level of the information service network.

6 Conclusion

As the extension of the human intelligence function, the intelligent technology system has broad application prospects. It is no exaggeration to say that it will quickly penetrate into all technical aspects of computer network. The computer network in twenty-first century is the intelligent network. Artificial intelligence has a very good application prospect in the computer network and human interface. On the premise of the human rational division of labor, we can use the multimedia intelligent human-machine interface to carry out human-machine friendly communication, to realize the human-machine combination, and human-machine collaborative work. With the constant perfection and development of artificial intelligence technology itself, and the increasing demand in the application of computer network technology, the application of artificial intelligence in the computer network technology will be wider and wider, to play a greater role in the promotion of safety management of computer network and system rating work.

References

- [1] Xiong Ying, Artificial intelligence and its application in computer network technology. *Technology and market*, **02**, 2011.
- [2] Zhang Kaifei, Application of artificial intelligence and its future prospects. *Journal of Lvliang College*, **04**, 2010.
- [3] Lian Shiyong, *Introduction to Artificial Intelligence Technology*, 2nd ed. Xidian University Press, 2002.
- [4] Chen Bin, Application of artificial intelligence in the computer network technology. *Technology & Market*, **12**, 2010.
- [5] Zhang Bin, Discussion on the application of artificial intelligence in the computer network technology. *Software*, **33(11)**, pp. 265–266, 2012.

