

Research on Artificial Intelligence Technology for Internet of Things Application

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Abstract: with the popularization of 5g network, the application space of Internet of things technology will be further expanded, but there is still no major application breakthrough. Starting from the probability of artificial intelligence, combining with the change of information semantic understanding in the process of Internet development, and combining with artificial intelligence technology, this paper discusses the application of artificial intelligence technology to the Internet of things. It is believed that the main work of Internet of things research and development in the future should be based on big data analysis of Internet of things and Internet information fusion, and the realization of the world of Internet of things with artificial intelligence technology Context understanding of.

1. Introduction

In the foreseeable future, the popularization of low latency 5g network and IPv6 technology will transform the traditional Internet of things into the Internet of things, from simple sensor network construction to the network connection of various physical objects, thus making the realization of the Internet of things possible. According to IDC prediction and analysis, in 2020, the number of intelligent devices connected to the Internet will exceed 30 billion, of which the data related to human life will account for a large proportion. The Internet of things is no longer limited to the field of industrial manufacturing, but relying on people's monitoring needs for their own health conditions to enter the homes of ordinary people. With the gradual improvement of all kinds of infrastructure related to the Internet of things and the continuous improvement of Internet of things technology, the massive data generated by the Internet of things has become an important means of production for all businesses. How to better collect and process these data is another important issue in the evolution of Internet of things technology. At present, the research on the Internet of things is still focused on the construction of communication network, with the purpose of developing and building a low delay, low power, wide coverage and standardized Internet of things. These researches are conducive to the promotion of the construction of the Internet of things. However, due to the lack of combination with big data analysis and other data application technologies, there are still no landmark applications in the field of the Internet of things As a result, the Internet of things industry still has great growth space.

2. The Concept of Artificial Intelligence and Related Technology Analysis

Artificial intelligence is a new and important branch of computer application science. The most important algorithm of artificial intelligence is to obtain a deep learning network which can replace human to complete the corresponding work by simulating human's thinking process and through a lot of data training. The design of artificial intelligence algorithm integrates information science, cognitive science, psychology, system science and other disciplines, and has made great breakthroughs in pattern recognition, automatic programming, image recognition, game decision-making and other fields, but there is still not much progress in writing, emotional exchange and interaction, scientific research and innovation. According to Professor Nielsen of Stanford University, artificial intelligence is more an algorithm designed through the representation, acquisition and use of a certain knowledge, which is also the reason for its better performance in pattern recognition and other applications. According to Professor Winston of Massachusetts Institute

of technology, artificial intelligence is a subject that enables computers to realize the work that only human can do through algorithms. Through studying the rules of human decision-making activities, it designs relevant software and hardware structures, and finally constructs an artificial intelligence system with specific intelligent behaviors.

Natural language processing technology is a key technology in artificial intelligence technology, which mainly includes machine translation, semantic understanding, speech recognition and speech synthesis. Among them, semantic understanding, speech recognition and speech synthesis technology have been widely used in intelligent speaker and other products, and achieved good results. In addition, these technologies are also widely used in search engines and content promotion systems, and have been strongly supported by businesses. Although artificial intelligence has made a great breakthrough in natural language processing, most people still have concerns about the application and popularization of actual voice control products. On the one hand, people yearn for the convenience of work and life brought by artificial intelligence technology, on the other hand, they are worried about the loss of artificial intelligence technology caused by the use of some illegal elements. Nevertheless, AI technology still has a very strong application potential, and it is still worth further research and development of new AI application products by relevant scholars and enterprises.

3. Technical Analysis of the Combination of Artificial Intelligence and Internet of Things

3.1 Analysis on the Development Stage of Internet of Things

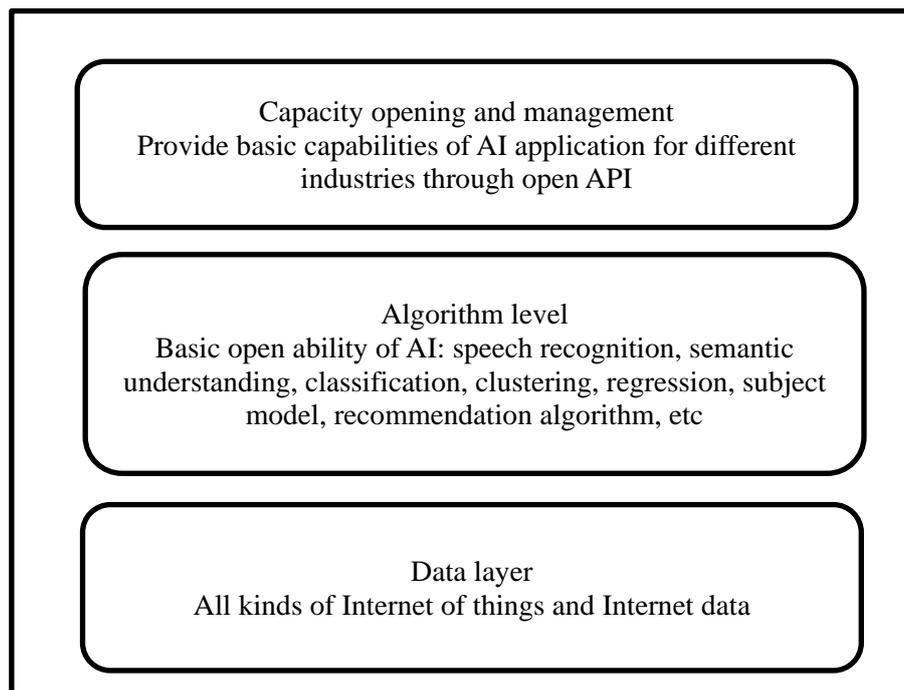


Fig.1 Abstract Architecture of Internet of Things Information Processing Platform Based on Artificial Intelligence

The development of the Internet, including the mobile Internet, has always been to provide information transmission services, and the specific information application is an important path of its value-added. Information transmission itself may not have much value, but the change of information application efficiency has great value. The same is true for the development of the Internet of things. In the early stage of the development of the Internet of things, the first thing is to improve the relevant network infrastructure, solve the networking problem of sensors, so that the specific information of observation products can be fed back to the corresponding servers in time through the Internet of things, and the servers will collect, analyze and store it uniformly. In this stage, we mainly focus on

improving different sensors and analyzing the data collected through the Internet of things. Because the Internet of things can use less bandwidth in the past, the decision-making behavior generated by the data collected through the Internet of things still needs to be executed by people. However, with the popularization of 4G and 5g networks and the application of artificial intelligence cloud computing and other technologies, the Internet of things has begun to have the role of transmitting control information, and the semantic expression and analysis of control information has become the main direction of the research and development and application of the Internet of things at this stage. In this stage, the Internet of things will usher in rapid development, and its specific architecture is shown in Figure 1.

3.2 A Comparative Analysis of the Application of Internet of Things and Internet in Semantic Understanding Technology

The Internet of things and the Internet have a greater commonality. Their construction aims to make information better and faster collected and transmitted in some form. They do not produce value by themselves. All the added value is mainly focused on the application of information transmission, which makes the Internet of things and Internet technology have a greater dependence on semantic understanding technology to varying degrees. For example, the Internet has gone through three stages in data content sharing. The first stage is the era of portal websites passively accepted by users. In this era, portal websites provide users with the experience of using such as newspapers and televisions. Users can hardly choose the information they are about to receive. They can only get better information browsing experience through their secondary screening of information. The second stage is the stage of classified navigation website, which subdivides different portal websites according to users' usage habits and web page functions. Users can get better content selection experience by using the similar way of Library classified catalogue, so as to facilitate users' further use. However, the results of classified navigation are manually classified and sorted out. When there are not many categories of websites, the user experience is better. However, in the era of exponential growth in the number of websites, the manually classified portals still can not meet people's personalized needs, which also spawns the search engine technology represented by Google. The search engine will enter the website according to the keywords of the website and the number of users' views. Row automatic classification, in modern times it will also use artificial intelligence combined with user habits to accurately locate the site, so as to promote the information users may want according to user habits. The Internet of things is still in the manual analysis of the sensor feedback information in the semantic understanding, and the information fed back through the Internet of things still needs to be manually involved in order to solve the corresponding problems. Compared with the Internet, it is in the second stage of semantic understanding.

3.3 Defects of Semantic Understanding Technology Application Research in the Current Stage of Internet of Things

As the Internet of things is in the second stage in the application of semantic understanding technology, its main application still belongs to the basic application of semantic definition, standard reference of the Internet of things terminal, and it still focuses on better transmission of information to better express the sensor. Therefore, its semantic understanding technology is mainly based on ontology, and it is also weak in practical application. Its specific defects are that there is no unified information description standard for information transmission of the Internet of things, and there are a large number of sensors in the application of the Internet of things. Each kind of information transmitted by these sensors is described by different standards, and corresponding semantics needs to be redesigned for different standards. Understanding the system is a big test for the application of the Internet of things. In addition, Internet of things information does not have the same context environment as Internet information. The correlation calculation of Internet of things information may lack the required parameters, which further increases the difficulty of semantic analysis. Finally, the main work of semantic understanding technology in the current stage of the Internet of things is still to collect data information of related entities with more unified standards. There is also no unified standard for the unified description of control information, which also needs further in-depth study.

How to collect more easily understood information and how to make control information more easily understood by devices is the next research work of the Internet of things.

3.4 Internet of Things Information Understanding System Based on Internet Information Understanding

At present, the understanding and application of Internet of things information is completed through Internet of things gateway. For example, the gateway of the Internet of things in a certain field describes the device information based on the description method of ontology, which makes the mutual understanding of the information between the Internet of things in different fields become a problem. In order to solve the problem of semantic interaction between different ontology builders, the following conditions must be met: identifying the computing model and corresponding algorithm that describe the corresponding relationship of the same object, function and feature in different fields; forming a large number of corpus resources; learning the appropriate feedback learning algorithm, learning the reasons for the success of various understanding and operation actions, as well as the positive and negative feedback in the real world . Therefore, the core of understanding and application is to integrate the semantic information of Internet of things and Internet information in the future, that is, the semantic understanding of Internet of things should be based on the understanding and application of Internet semantics. For example, for a new Internet of things request, it first calculates the functions to be completed by the request, calculates the functional entities mentioned therein, and identifies their related conceptual domains. The concept domain obtains the operation steps to complete the function and the collection of relevant Internet of things terminals or data to be collected. Then, different terminal combinations in different Internet of things fields can be called to complete this function. After the function is completed, record the effect, time and evaluation after completion. Records are unmarked to Internet of things entities in different fields. Over time, the most appropriate terminal combination in the world of Internet of things can be called for similar function requests in the future. The main steps are as follows:

First of all, according to the meaning of information resources, the projection relationship between information and objects in the Internet of things is established. Through the mapping between entities and labels, objects in the Internet of things have context semantic resources such as naming, expression and operation control steps based on unified standards. Secondly, the method of entity recognition and semantic correlation calculation is established by big data analysis technology of artificial intelligence. Then, through the introduction of semantic resources, the understanding and concept extension model of the physical terminal of the Internet of things is established. In order to realize the function of combining with the concept description method of the network world, a semantic extension method belonging to different application fields should be further established. Finally, the device context is constructed by identifying the name of the corresponding entity and combining the acquired semantic resources and reverse standards.

4. Conclusion

With the advent of the Internet of things era, the application of Internet of things information will inevitably push Internet of things technology to another climax, and the combination of artificial intelligence technology and semantic understanding technology is an important driving force of this climax. In the development stage of Internet of things application, artificial intelligence technology will occupy a place, among which the most difficult and key technology is the innovation and application of semantic understanding technology. The fact that it is far more complex than Internet semantic resources is a big problem that hinders the development of Internet of things semantic resources. By comparing the application research and development of semantic understanding technology in the Internet age, this paper puts forward the research and development direction of semantic understanding technology in the Internet of things era. The main work in the future should be based on the big data analysis of Internet of things and Internet information fusion to realize the context understanding of the world of Internet of things, such as device context, environment context, computing context and user context.

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