

Research on the Application of 5G Communication Technology under the Internet of Things

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Abstract: With the continuous improvement of social science and technology, Internet computer technology has gradually expanded its application in all walks of life. In this era, the convenience of 5G communication technology for people's production and life has gradually been valued by people. With the vigorous construction and layout of 5G technology in China, its technical characteristics of high-speed transmission and low delay are endowed to the Internet of things industry, which will accelerate the development process of the industry, promote the expansion of industrialization scale, and bring a breakthrough and far-reaching impact on the industry. 5G technology provides a good progressive environment and space for the Internet of things, and the Internet of things also provides a practical basis for the development of 5G technology. Based on this, this paper studies the application of 5G communication technology under the situation of Internet of things.

1. Introduction

At present, Internet information technology has been widely used in people's life and work, bringing greater convenience. Similarly, Internet information technology is in a state of rapid development, and the progress of Internet information technology has also promoted the reform and development of mobile network technology. The progress and reform of these technologies have also affected people's real life. At present, the application and promotion of 5G communication technology has made a qualitative leap in people's lives. In the past, 4G communication technology has been widely used in the Internet of things, and has become an important part that people cannot lack in their lives. With the emergence and development of 5G technology, it has brought more benefits to the Internet of things technology. Therefore, the application and popularization of 5G communication technology are also expected in the development of the Internet of things industry. Based on this, this paper explores the application of 5G communication technology under the situation of Internet of things, hoping to provide reference for relevant research.

2. Overview of Internet of Things and 5G Communication Technology

2.1. Internet of Things

The Internet of things, simply speaking, is the connection between a substance and a substance, that is, the so-called network. Network is a very common means of transportation, which includes sensor technology. Through it, the transportation department can understand the situation of each road in real time, so as to effectively understand the specific situation of the road. In the whole process of work, if the content of traffic control can be combined with the whole workflow, the overall situation can be effectively controlled when an emergency occurs. The application of network technology is increasingly widespread, and it plays an increasingly important role in the construction of intelligent cities and related environmental monitoring work. From the perspective of future development trends, the Internet of things will make greater efforts to promote China's social development. Combined with specific content, its role in future development is discussed.

2.2. Concept and Advantages of 5G Communication Technology

The fifth generation mobile communication technology, referred to as 5G communication

technology, represents the highest level of modern communication technology. With the rapid development of the world economy, Internet technology has also been constantly updated and improved to meet the needs of modern people's life and production. 5G technology came into being in this environment, and it has made outstanding contributions in meeting people's use needs.

Firstly, the network speed is fast. Compared with traditional communication means, 5G communication technology can better solve the problem of network delay, improve the running speed of the network, facilitate people's life, reduce the traffic loss caused by network loading, and reduce unnecessary resource waste. In terms of mobile phone personal property protection, 5G technology has also made technical updates, which greatly improves the safety and reliability of personal property. Secondly, the network peak rate is high. Under normal circumstances, during the operation of the network, due to the instability of the network operation, the highest speed peak and the lowest speed peak will be generated during the operation, which is called the peak rate. 5G communication technology has increased the peak rate of previous 4G communication technology by at least 10 times, greatly improving the speed of network transmission. Thirdly, the network data traffic increased. With the continuous economic growth in recent years, people rely more and more on mobile networks, which makes the use of mobile networks expand rapidly, and people have higher and higher requirements for their functions. Therefore, the traditional mobile network technology has been far from meeting people's use needs, while 5G technology can carry a larger amount of data flow, which greatly meets people's needs for data storage and dissemination, so that people can better realize the upload and download of data and maintain the stability of the network. Fourthly, the number of networking devices has increased. In the application of communication technology, the number of networking devices directly affects the speed and quality of communication. The more the number of networking devices, the higher the speed and stability of information transmission, the better the quality, and the higher the network coverage. Therefore, compared with traditional communication technology, 5G communication technology has greater storage capacity of data information, faster network transmission speed, and relatively lower cost, which greatly meets the production and living needs of modern people. The emergence of 5G communication technology has been widely valued and expected, and will greatly enrich and change our lives.

3. Application of 5G Communication Technology under the Internet of Things

3.1. Integrated Deployment of Edge Cloud and 5G Network

In order to achieve the effect of 5G interconnection of all things, operators are mainly based on CT thinking, that is, service-oriented architecture, in determining the core network design model. In the future, 5G will provide a service-oriented framework, which will support the separation between the control plane and the user plane, be more flexible in deployment, realize the intersection of network functions, and further weaken the access network and other functions. This service-oriented framework design mode has obvious advantages, which can realize the efficient utilization of network resources, improve network capacity, and speed up the replacement of network framework. After the introduction of virtualization technology, the software and hardware decoupling of traditional core network elements is realized. The service-oriented structure defined by 3GPP divides the whole network function into different self-management and self-contained network function services, which can be decoupled from each other, and can also be upgraded and elastic independently. Moreover, the standard interface and network function services can realize interoperability, and can be instantiated and deployed through orchestration tools based on different needs. In the service-oriented framework, there are many network elements, such as AMF, SMF, etc. each network element can interact with each other quickly and optimize based on business needs, which has more flexibility advantages than the working mode of 4G EPC framework. The communication between traditional core network elements is point-to-point mode, which is also a mode of mutual coupling. In the network function service under the 5G core network framework, this communication mechanism will be decoupled to the producer and consumer mode. Producers

will not care about the identity and location of consumers, and consumers are also the same. In terms of interface decoupling between the two sides of communication, this communication mechanism has strong applicability.

3.2. SDN Technology Analysis

SDN technology refers to software defined network technology. SDN technology is not only composed of one network technology, but also a general term formed by the analysis and reorganization of a variety of network technologies. SDN technology is also a relatively cutting-edge and innovative network technology in the current development of network communication technology. The design principle of ESD technology is to retain the original data forwarding function in the original communication software, and then developers can control the whole network terminal by controlling the individual network. Moreover, in the whole 5G network technology, based on SDN technology and combined with other network technologies, the flexibility of various program instructions can be increased. This can not only improve the efficiency of network application to a great extent, but also improve the accuracy of operation and save a lot of human resources.

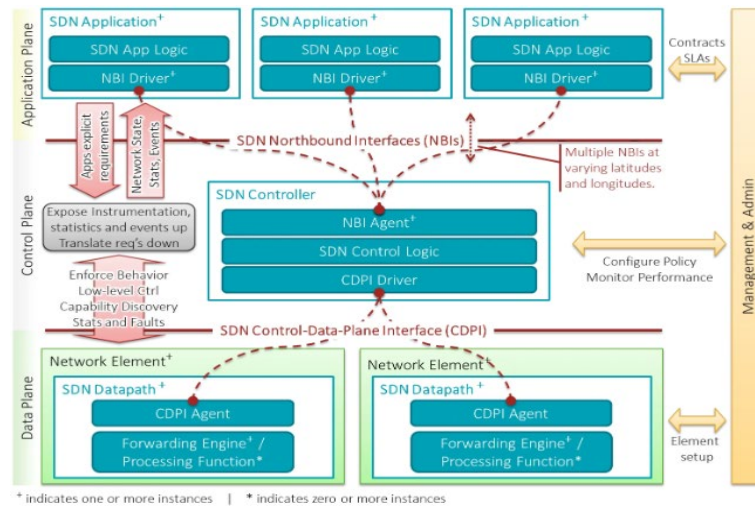


Figure 1 SDN network framework.

3.3. New Air Interface Technology

5G NR is a global 5G standard based on the new air interface design of orthogonal frequency division multiplexing. It is a technological innovation based on 4G and a very important foundation of cellular mobile technology. The research and development of 5G new air interface technology has improved the efficiency of resource reuse in space, code and other fields, and achieved the effect of energy conservation. Orthogonal frequency division multiplexing (OFDM), after optimization, can convert high-speed data into orthogonal subcarriers. Because of its low data complexity and high spectral efficiency, it is widely used in 4G systems. However, with the advent of 5G era, the problem of insufficient flexibility of OFDM has become increasingly apparent. In order to meet the personalized business needs of 5G communication system for resources, the length and width of different word carrier bands also need to be developed accordingly. Based on the low delay characteristic of 5G technology, a wide word carrier band is required in the frequency domain to make other system services consume a very small transmission time interval in the time domain and obtain a very short symbol period. Especially in large-scale application scenarios, the data volume of a single sensor is at a very low level, and there are further requirements for subcarrier bandwidth, symbol period and transmission time interval, so that the network can intelligently meet the requirements of different services.

3.4. Dense Network Technology

Relevant departments should effectively strengthen the research and application of dense network technology, which is mainly manifested in two aspects. On the one hand, an appropriate

number of antennas are set outside the Acer station to effectively expand its outdoor space, effectively increase its system capacity and further improve the flexibility of the system. On the other hand, set up an appropriate number of dense networks outdoors, constantly strengthen the coordination and cooperation between various network nodes, and effectively improve the accuracy of adjacent nodes, so as to achieve the fundamental purpose of improving signal-to-noise ratio gain. Therefore, the rational use of dense network technology can effectively increase the network space, realize the dynamic change of time, and further expand the coverage area of the network, so as to give full play to the internal advantages of the network.

3.5. AI Intelligent Algorithm

Using AI algorithm to complete industry data recognition is also a widely used recognition method. In fact, there will be obvious differences in business characteristics for different industry categories. For example, in the field of the Internet of vehicles industry, the IOT network card and the general industrial Internet will show great differences in data indicators such as information transmission cycle, transmission delay, transmission rate and so on. In this case, the staff can combine the existing work experience and accumulated data, build the index feature base according to the industry category, and apply clustering and AI algorithms to complete the intelligent classification and recognition of the whole industry. After the completion of industry data processing and classification, staff can directly build large databases belonging to different industries according to the characteristics of social industries. For example, a big Internet of things energy database can be formed in the field of new energy industry, a big Internet of things vehicle database can be formed in the field of vehicle industry, a big Internet of things intelligent transportation database can be formed in the field of public transport, and a big Internet of things intelligent medical database can be formed in the field of medical and health industry. Internet of things databases in different industries can better promote the construction and development of the industry, so as to achieve in-depth research and development in the industry.

4. Conclusion

With the rapid development of the Internet of things, 5G communication technology has many advantages in the process of practical application. It can not only effectively improve the reliability and effectiveness of the network, enhance the transmission effect of data information, and break the limitations of traditional work, but also enhance the application effect of communication technology in the field of Internet of things to a certain extent, and will no longer be affected by traditional communication technology. In the process of future development, 5G communication technology should be reasonably applied in the field of Internet of things to comprehensively improve the application level of communication technology in the field of Internet of things, so as to form a good working mode and system.

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