

# Application Analysis of 5G Internet of Things Technology

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**Abstract:** The Internet of Things is the Internet of all things. It is the core aspect of building a Smart Earth in the future. The development of 5G has brought explosive growth to the development of the Internet of Things. This paper briefly introduces the Internet of Things and 5G, and comprehensively analyzes the advantages of 5G, including: extremely high data transmission rate, higher security, and wider application range. Combined with the advantages of Internet of Things technology and 5G technology, the Internet of Things technology in the 5G era is bound to have a blowout growth. At the same time, IoT technology will encounter unprecedented challenges in the 5G era. Cost, security, technical support and other issues are the key to the popularization of IoT applications.

## 1. Introduction

With the development of communication technology, the society of interconnection of everything once imagined in science fiction films has gradually approached life from the ideal. On June 6, 2019, the Ministry of Industry and Information Technology officially issued a 5G license, which marks the first year of 5G in China. In the 5G era, IoT applications will appear in a more diversified and flexible form, making people's life and work more convenient and comfortable.

## 2. 5G and IoT

### 2.1 5G

5G is the latest communication technology that has been developed and put into commercial use. [1] Compared with the previous generation of 4G, 5G technology has a lot of technological innovations. The most obvious one is the data transmission rate, which can reach up to 10Gbit/s, which is 100 times higher than the 4G-LTE cellular network technology. In other aspects, including the efficiency of spectrum use and capacity, the efficiency and quality of communication have been greatly improved, and the network delay and power consumption have become lower, the application of more scenarios, the coverage of the service is broader. These technological innovations will bring great changes to life and work.

### 2.2 IoT

The core and foundation of the Internet of Things is the interconnected network, which extends and expands on the basis of the Internet. A network that connects any item to the Internet of Things and carries out information exchange and communication in accordance with the agreed protocol to realize intelligent identification, location, tracking, monitoring and management. Into the perception layer, network layer and application layer, perception layer is the core of the Internet of Things technology, is a key part of the information collection, through the qr code device read and write and read, RFID tags and labels, camera, GPS, sensor, M2M terminals,[2] gateway and other technical information of the goods and equipment acquisition to the superior network layer to complete the exchange of information.

### **3. Internet of Things technology supported by 5G**

#### **3.1 High speed data transfer**

The most significant feature of 5G technology is that it has a very high data transmission rate and a very low time delay, and it can achieve real real-time data transmission, so that the data in the transmission layer of the Internet of Things can reach the application layer extremely quickly through the network layer, while the data fed back from the application layer can reach the transmission layer extremely quickly through the downlink, so as to communicate and control items.

#### **3.2 Higher security**

In the era of Internet of Things, once problems occur in Internet of everything communication, huge losses may be caused. [3]Therefore, security is of great importance. Especially in the case of high speed, instantaneous information theft will have a huge impact. 5G includes dense network technology, which can fully improve the connection reliability and security of the network and well guarantee the application of the Internet of Things.

#### **3.3 Wider application range**

5G brings more possibilities to the Internet of things technology and enables more ideas to be realized. For example, with the development of virtual reality technology, 5G+VR technology can provide a full set of solutions of network, platform and equipment, enabling the perception of objects and communication control to truly perceive everything and greatly improve the experience.

### **4. Application scenarios of the Internet of things in the 5G era**

#### **4.1 Smart home**

Smart home system is a kind of living environment for people. It is equipped with smart home system on the platform of residence to realize more safety, energy saving, intelligence, convenience and comfort in family life. Imagine a future in an ordinary working family. After work, you ride in a driverless car, click on the Settings of the mobile terminal, the air conditioner and humidifier at home start to run, and when the car is near the garage, the garage door will open automatically. Home when I opened the door, with the aid of magnetic door or infrared sensors, the system will automatically open the corridor lights, at the same time open the electronic door locks, security, the machine will open the home lighting and curtains to meet your return home, air conditioning and humidifier just adjust temperature and humidity to set comfortable value, water heater also began to work, after being put down his outfit, a comfortable hot bath to wash away the day's work tired, sitting on the sofa with the remote control or intelligent mobile terminal equipment control all of the home. With the development and popularization of 5G technology and Internet of things technology, the popularization of equipment and technology is bound to make its development trend, and the above scene is bound to become a daily life of ordinary people.[4]

#### **4.2 Internet of Things for vehicles**

With the vehicle in motion as the object of information perception, V2V, V2R, V2I and V2H are realized with the help of the new generation of information communication technology, so as to improve the overall intelligent driving level of the vehicle, provide users with safe, comfortable, intelligent and efficient driving experience and traffic services, and improve the traffic operation efficiency and the intelligent level of social traffic services. In the era of 5G, real-time, safety and reliability of communication between vehicles and other objects have been greatly improved, breaking through the shackles of the development of the Internet of things in vehicles, greatly promoting the development of driverless cars, and making the Internet of Things for vehicles more widely applied in real life.

### **4.3 Smart city**

Smart city is the product of the combination of digital city and Internet of Things. It is regarded as the direction of urban development in the information age and the trend of civilization development. It is an important aspect of smart earth strategy and an aspect of a country's comprehensive strength. Smart city includes smart logistics, smart transportation, smart medical care, smart public services and other aspects. The development and popularization of 5G technology will have a spurt of development and growth in these aspects. 5G+ cloud computing and 5G+ big data will be applied to the construction and development of smart cities to jointly create comfortable and convenient living cities.

## **5. Problems faced by Internet of things applications in 5G era**

### **5.1 Technical limitations**

For battery technology limited, mainly in the ideal of all furniture and appliances in the Internet of Things application is more and more small, the difference between all the household is intelligent, including stool to sit by the tea table, etc., used could not have all the household connected home power, can be to battery power, and now the battery technology application of home center is not mature enough, resulting in the Internet of Things home only partially implemented, and comprehensive implementation is still a big challenge.

### **5.2 Security issues**

This is a problem that cannot be avoided. In today's life, everyone may be attacked by hackers when using the Internet. When the Internet of things is really popular and everything is connected to the Internet, although the development of 5G technology can avoid some security holes, it is undeniable that when a hacker attacks your refrigerator and door, everything will not be so optimistic.

### **5.3 Cost**

With the continuous development of technology, general chips, processors, sensors, and so on are dropped to an acceptable low level, but to universal access to the Internet of Things technology, the cost is still a big problem which cannot be ignored, everything in the traditional sense of the things should be by RFID, sensor connected to the Internet, such as this for an ordinary family, is still hard to bear. Similarly, production standards vary from company to company because standards are not uniform. Various products are difficult to communicate and compatible. [5]Integrating the Internet of things market is also an extremely expensive undertaking.

## **6. Summary**

The concept of the Internet of Things is a convergent and integrated innovation launched on the basis of many practical applications. It is a generalization and improvement of the already existing networked, intelligent and automatic systems with interconnection of things. The application of the Internet of Things into daily life is an inevitable trend. In the development and popularization of Internet of Things technology, many problems will be encountered, such as the above costs, security, technology and other aspects. However, with the continuous improvement of all kinds of science and technology in the 5G era, the cost of chips will be reduced again. For better development, unified standards will be issued for communication between platforms, new communication encryption technology will be developed to ensure the reliability of real-time connection.

The speed and security advantages of 5G communication network will greatly promote the application and development of the Internet of Things. The Internet of Things will be deeply combined with the 5G communication network and be more widely applied and developed. In the application of Internet of Things communication technology, 5G network has the advantages of

high stability of technology application, high efficiency of operation and comprehensive operation. At the same time, based on the analysis of the theoretical application characteristics of 5G network technology, the application of 5G network Internet of Things communication technology is bound to spread to every ordinary person's home, and the intelligent earth jointly built by Internet of Things and Internet will become a reality.

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