Application of Internet of Things Technology in Smart City Building

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Abstract: With the development of times and social progress, smart city has received widespread attention in our country and society. Building a new type of smart city is not only the objective requirement of national development, but also the fundamental need of the city optimizing. In the process of actual building of smart city, the Internet of things technology (referred to as IOT technology) is required for a better and faster smart city development. This paper analyzes the concept of IOT technology and smart city, then researches the intrinsic characteristics of the two concepts, and finally discusses the application of IOT technology in the process of building smart city in order to provide theoretical reference for follow-up IOT technology research.

Entering the new era, China ushered in information age, and it can be said the rapid development of information technology has undoubtedly laid a solid foundation for national progress and development and provided greater convenience for mass life. Under such background, IOT technology emerged. In essence, it is an important product of information age, and it falls within the scope of the domestic industry's top five emerging strategy, while IOT technology has also provided security for a better building of smart city, and making the pace of building more faster.

So now the in-depth research and analysis of IOT technology and its application in the actual construction of smart city has become the focus of many researchers.

1. Preliminary Study of the Concept of Smart City and IOT Technology

1.1 Smart city

With the development of times, rapid population growth and increasingly heavy pressure in city have been serious impediment to the effective development of city. In order to encourage cities to achieve sustained progress, the concept of smart city was proposed and received widespread attention. The so-called smart city is built on the basis of urban core information integration system for intelligent management of urban activities, then will ultimately improve the quality of life of the social public, and promote a stable, sound, and sustainable urban development.

Of which the urban core information integration system need the communications technology for collection and effective analysis of the relevant data of the city.

It can be said that the actual construction of smart city is one of the important work of the government, other countries have also given much attention to the actual construction of smart city, so now building a smart city has been mankind’s common objective in urban development.

1.2 IOT technology

The concept of the internet of things originated in Bill Gates' book, the road to the future, in 1995 the concept did not receive widespread attention, even academia was not interested in it, until 2005, telecommunications network again made internet of things formally declared its produce. While US President Barack Obama emphasized the importance of smart planet after he took office .He suggested that the State Government must invest in infrastructure for the building of smart planet, in addition, IBM noted that the current IT industry needs the full application of IT technology in a number of industries, simply speaking, in the tunnel and the water supply system as well as the corresponding construction of roads, etc., sensors are embedded to achieve universal connection and build the physical network. In essence, IOT technology associated with things,

which contains two meanings, first, both the basis and core technologies of IOT are built on the basis of the Internet, which is a kind of network expansion and effective extension. Second, the IOT technology will expand and extend user end to many objects to achieve good communication and information exchange between these objects.

Thus, IOT technology is specifically defined as relying on sensing devices to achieve objects connection, monitoring, and the corresponding interaction to achieve advanced network management for smart monitoring and location identification [1].

2. Analysis of Characteristics of Smart City and IOT Technology

2.1 The intrinsic features of smart city

The intrinsic features of smart city are mainly concentrated in the following four aspects. The first is full awareness, that is relying on multiple intelligence system and sensing devices to achieve intelligent identification of city location, city life and the state of the corresponding urban environment, etc., then convey and well analysis the appropriate data by the internet of things and cloud computing to achieve rapid integration of data, which plays an important influence for social work and social life on the intelligent flow, and can promote more orderly and stable social development .

The second is broadband Internet, that is Wi-Fi and wired internet as well as the corresponding broadband, etc. are used to provide urban public with means of mass interaction, exchange of information and appropriate means of communication, which has become the important basic conditions of city residents' daily life and work. In general, the building of broadband Internet is ultimately to serve the public, and provide smart and convenient access to information feedback channels [2].

The third is smart integration. It is, from the essence of city life management, a more complex and huge system. During the actual construction of smart city, we relies on cloud computing and the internet of things to solve the data of the huge processing system. It can be said an important means of city management, which also unfolded true wisdom of the city.

The fourth is people-oriented. Urban development and technological innovation all take people as the ultimate service objects, so in the process of building the smart city, it is required to put people first, develop the city, secure social stability, and offer quality service.

2.2 The inherent features of IOT technology

Basically, the inherent features of IOT technology focus on the following three aspects. The first is Internet basis. Now, both initial construction of IOT and the future core of development are closely connected with the Internet, or we can say, the internet of things is a technical way for bearing information between telecommunication network and the Internet. It is possible to build an interconnected network system, including all the individually addressable things.

Compared to traditional Internet, IOT technology enjoys the distinctive flavor of the times, it is more extensive in data transmission, and better in transmission efficiency, transmission speed and the corresponding sensors, etc. [3]

The second is with intelligent. Compared to other systems, the internet of things can not only transfer data, but also analysis and process the data, simply speaking, it is actual intelligent data management. From the internet of things itself, it is the integration of intelligent processing-related technologies and sensors, relying on pattern recognition and cloud computing technologies to process data and realize the needs of diverse users, so as to achieve a simple and intelligent transport system.

The third is recognition and communication. The IOT technology system is basically a system that contains many sensors which are source of information, these numerous sources of information can provide powerful data security to promote data sharing and lay a foundation for fast and convenient communication. In addition, with different message formats in many sensors, IOT technology, with internal data recognition function, can identify the data information with different

message formats [4].

3. Building a Smart City and the Effective Application of IOT Technology

3.1 Applies to smart transportation

Nowadays, IOT technology can be used in the construction of smart transportation, which is an important component of the actual construction of the smart city. Specifically, integrated use of data communications technology, information technology and the corresponding computer control technology in the ground transportation in the daily management system may lead to a comprehensive and wide range of traffic management system to achieve efficient and accurate and the corresponding real-time traffic management .Smart transportation make existing traffic much safer and more effective, reduce environmental pollution and the corresponding traffic load, which plays an important effect on enhancing the efficiency of the domestic transportation [5].

3.2 Applies to smart grid

Today, IOT technology can be used in the construction of smart grid, which is also an important component of the actual construction of the smart city. Specifically, smart grid relies on two-way communication network, which has high speed and integration, and the use of advanced equipment and measuring sensor and the corresponding decision-making system as well as a controlled method can promote more economical and more efficient and safer grid. Smart grid is able to withstand the attack, especially meet the needs of users in the new era in electricity use and quality. It played a role in promoting access to electricity compatible with pluralism, for the power asset optimization and efficient development of the electricity market [6].

3.3 Applies to smart medical

Today, IOT technology can be used in the construction of smart medical, which is also an important component of the actual construction of the smart city. Specifically, smart medical, based on the platform of medical information health records, relying on the IOT technology to enable interactive communication of medical institutions, the corresponding medical personnel and patients. Today, many high-tech such as sensor technology and the corresponding artificial intelligence, etc. are entering into medical industry, which are able to promote more intelligent medical services, to a large extent can also guarantee the medical development, especially in the new health care reform when smart medical attracted widespread attention. Take Suzhou for example, the important achievements made in the actual construction of smart city are concentrated in on the basis of smart medical [7].

3.4 Applies to smart logistics

In addition to the above three aspects, IOT technology can also be applied to smart logistics, specifically, the current rising standards of public life and a corresponding increase in purchasing power stimulate the rapid development of the logistics industry, and in order to cope with a large logistics demand, integration is needed between traditional logistics and the information technology. Iin 2012 National Logistics Association of China and Hua Xia Internet of Things co-sponsored a new logistics concept that is smart logistics.

The current number of logistics systems possesses the technical characteristics of agility, intelligence and corresponding integration, flexibility and network and corresponding digitalization, so whether it is logistics network or the associated logistics system may include satellite positioning, database and the corresponding location identification, authentication code and other related high-tech. And based on this kind of information and electrical, optical and mechanical basis, IOT technology can make the logistics industry develop better and faster [8].

In summary, smart logistics and smart medical as well as smart grid and smart transportation are all the core elements of smart city, of course, the follow-up construction of the smart city is far more than that, the future of IOT technology will be extended to all aspects including water conservancy and tourism. IOT technology has brought important guarantee for the development of

smart city, in addition, the application of IOT technology in all aspects of city building has enhanced the quality of life of urban residents .

4. Conclusion

To sum up, compared to foreign countries, the actual construction of smart city in China is low in pace and speeds. One important reason is that the penetration rate of IOT technology in smart city is not high enough, thus the essence of deepening the building and development of smart city lies in the research and applications of IOT technology. While relying on the IOT technology, we can achieve smart medical, smart transportation, smart grid, smart logistics and smart medical, etc., which is involved in all aspects of the smart city which has a crucial influence on the development of smart city. This article focuses on the effective application of IOT technology in the actual construction of smart city to contribute to the follow-up upgrading development of the smart city.

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