

# Discussion on the application of Internet of Things technology in smart city in the era of big data

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**Abstract:** Social development progress, the continuous growth of the economic level and the iteration of science and technology, makes the scale of modernization of Chinese cities continue to expand, while the wide application of information technology and Internet network, makes the infrastructure inside cities and people's quality of life have improved obviously. The application of the concept of modernization helps the construction of smart city, the Internet of Things technology under the background of big data as an important feature of smart city, all kinds of new technologies have gradually become an indispensable part of People's Daily life and work, bringing great convenience for people's clothing, food, housing and transportation. This paper mainly starts from big data, Internet of Things technology and the connotation of smart city, analyzes the problems existing in the construction of smart city at the present stage, and expounds the practical application of smart city for reference only.

**Key words:** Big data; Internet of Things technology; Smart city

A smart city is a concentrated embodiment of urban intelligence and wisdom, which not only represents the economic development level of a region, but also reflects the application level of science and technology and Internet technology in the city. Compared with traditional urban construction, smart cities can meet the needs of People's Daily life and social development. Big data technology and Internet of Things technology represent the symbol of smart city, in order to achieve the rapid development of this city construction, we must continue to improve the level of technology application, and give full play to the functional role in order to adapt to the rapid development of urbanization.

## I. Overview of the connotation of big data, Internet of Things technology and smart city

### 1. Connotation of big Data

With the practice and application of information technology and network technology, a large number of data containing information in different fields are derived. Such structured data and semi-structured data converge to form the concept of big data. After information collection, screening and processing, big data technology is finally summarized into the database. The processing of data will consume a lot of time, manpower and cost, and it requires the use of computing technology to complete the data calculation, and effectively improve the calculation speed and accuracy. Big data technology almost covers most of the data information required for the construction of smart cities, and plays a very important role in the construction and application of smart cities, especially for future urban development and data derivation, which can integrate data characteristics and information transmission rules to complete accurate prediction.

### 2. Overview of Internet of Things technology

In essence, the Internet of Things technology is based on network technology, People's Daily needs, and information transmission

It is a new type of technical means. According to the functional characteristics of the division of materials, supplies, resources, services between the trading platform, the current stage of the Internet of Things technical services gradually cover all the needs of people's production and life, and this technology can also analyze the law of people's demand, so as to make targeted adjustments.

### 3. Overview of the connotation of smart city

The construction of smart cities is the core carrier of development characteristics and technological innovation in the new era, and it is also the core carrier of information

Technology and network technology as the premise to complete the collection and analysis of basic information, so as to meet the needs of people's smart city. The construction and development of smart cities cannot be separated from the application of information resources. Data sorting and analysis should be carried out around the core of people, so as to meet the needs of social development. On the contrary, smart city intelligent means are mainly reflected in the application of information technology and Internet of Things technology, which can also provide greater convenience for People's Daily work and life. Nowadays, cities are not only a gathering place for people to live, but also a center for advanced technological innovation and development.

## II. Problems in the construction of smart cities

### 1. Collection and integration of heterogeneous data

Because of the different data resources and types, the key problem facing the construction of smart cities is the collection and integration of heterogeneous data. The data may be scattered in different parts, such as transportation, meteorology, environmental protection and other fields, choosing their own systems and data, there are essential differences. Even the sub-systems of the same department may have some differences, which will complicate the process of data collection, screening and fusion. For this reason, it is critical to integrate such data scientifically and transform it into more valuable information.

## 2. The connectivity and compatibility of iot devices

The Internet of Things is a key technology to support the construction of smart cities. In the actual operation process, the connectivity and compatibility of iot devices have become a key problem. Because of differences in manufacturers, industry benchmarks and protocols, some devices are difficult to communicate or have to be set up repeatedly to communicate. The gap between old and new technologies and Settings can also create compatibility challenges that reduce system performance. These issues are already constraining the efficiency of iot adoption and seriously hindering the further advancement of smart cities.

## 3. Data security and privacy protection of large-scale network equipment

With the practice and application of physical network equipment in the new era, data security and privacy protection have gradually become the focus of attention. Smart city construction mainly relies on Internet of Things devices to complete all kinds of data collection, screening and processing. Smart meters, environmental sensors, traffic signal controllers and other data are transferred to each cloud platform, and such data contains users' personal privacy, such as behavior patterns, daily living habits and travel arrangements. If appropriate safeguards are not taken, private data can be accessed by purposeful attackers, resulting in widespread data breaches. A large number of iot devices provide a point of attack for potential attackers, and once a device is compromised, it can cause the network to break down, posing a threat to the smooth operation of smart cities.

# III. The application of Internet of Things technology in smart cities in the era of big data

## 1. Application of Internet of Things technology in smart government affairs

First, online public services. Urban governments use online service platforms such as the Internet of Things and cloud computing technology to provide one-stop services for urban residents, which mainly include various documents, market supervision, tax inquiries and other items, so that residents can handle related tasks without leaving home. The smart platform of integrated Internet of Things technology should integrate the resources of different departments, and provide more targeted service content for the people with the help of the platform's self-identification and tracking services. Second, public security monitoring. The scope of urban public safety management continues to expand, and the management difficulty is increasing. In order to improve the effectiveness of public safety supervision, government departments can use Internet of Things technology to build a public safety management platform and strengthen the supervision of all kinds of public safety. For example, in the process of food safety supervision, the government can use RFID technology to build a food safety traceability system, which is convenient for relevant personnel to grasp the links of crop sowing, livestock slaughter, agricultural product processing, and so on, to clarify the flow of different product types, and to achieve real-time supervision of food literacy and flow direction; For the control of fire safety, the public safety management platform integrates the risk information, road monitoring information, weather information and fire equipment distribution information within different cities, etc., which can understand the danger at any time, facilitate the fire department rescue decision-making command, and provide the necessary data support.

## 2. The application of Internet of Things technology in intelligent emergency response

First, the perception layer. For the setting of the perception layer in the intelligent emergency platform, it is necessary to configure the corresponding basic equipment such as sensors, microcontrollers, and infrared detectors. Among them, the sensor should include temperature sensor, liquid level sensor, pressure sensor, etc., for real-time monitoring of temperature, humidity, pressure and liquid level and other indicators. The sensing layer shall adopt the form of standard data access, and actively collect the data of the working environment, production equipment, personnel behavior and production links of various industries, so as to realize the automatic perception and behavioral early warning of major hazards and accident hazards. Second, the data layer. The data of the intelligent emergency platform should comprehensively use big data analysis technology, complete the classification and integration of the basic data within the industry, and facilitate the query and use of various data resources. Business data is subordinate to danger source data, hidden danger data, license data, network public opinion data, etc.; Basic data includes information data, spatial data and model data. Third, the support layer. The support layer of the smart emergency platform includes domain framework services, basic services and tool sets. The domain framework service mainly includes permission management, business support system, content management, user management, etc. Basic service includes process service, security service, GIS service, data resource service and so on; The tool set mainly includes the performance of front desk display, background business development, operation management, security management, etc. Fourth, the application layer. The application layer of the intelligent emergency platform needs to provide computer terminal or mobile phone operation, and the platform and the medical system, fire protection system, weather system and unmanned aerial vehicle system are linked with the command center. If there is an emergency between regions, the platform can use the Internet of Things technology to obtain the corresponding emergency rescue equipment, determine the distribution location of the rescue equipment, and conduct remote dispatch for the rescue equipment to achieve joint rescue operations.

## 3. The application of Internet of Things technology in smart medical treatment

Based on the background of the era of big data, hospitals can also use the Internet of Things technology to complete the construction of digital hospitals, set intelligent medical platforms for comprehensive medical service needs, and gradually promote the transformation and upgrading of medical services to the direction of wisdom, which helps to improve the management effectiveness and service level of hospitals. The application of Internet of Things technology in smart medical care is mainly reflected in four aspects:

First, make an appointment. The hospital sets up the Internet registration function on the smart medical platform, and can use Internet

technology, mobile communication technology and RFID technology to make an appointment in the electronic terminal to solve the problem of waiting for a long time to register in the traditional diagnosis and treatment. The smart medical platform accurately demarcates different areas, such as departments, treatment areas, doctor information, etc., to facilitate patients to register according to their own needs. In the online registration, the platform automatically records the patient's name, age and other personal information, and the patient directly presents the information to the doctor in the treatment area after entering the hospital, thus saving the patient's treatment time and improving the treatment efficiency.

Second, electronic medical records. For patient medical record management, the hospital can use RFID technology to identify the patient's medical card and understand the basic information of the patient, so as to facilitate the doctor to collect the changed past medical history, test results, treatment plans and other contents, and automatically generate a more complete electronic medical record. When the patient needs to go through the hospitalization procedures, only need to carry the medical card information or identity documents, in the inpatient department can check in, the inpatient department comprehensive information number to obtain the patient's medical information, quickly for the patient to go through the hospitalization procedures, to achieve the rapid transfer of information between the inpatient department and the outpatient department, improve the efficiency of medical services.

Third, intelligent nursing. During the patient's hospitalization, the hospital can use graphic code technology and RFID technology to integrate and store patient-related information to form a unique QR code corresponding to the patient. Medical staff can quickly obtain patient information and provide corresponding nursing services by scanning the QR code. In measuring body temperature, measuring blood pressure, measuring heartbeat and other routine items, sensor technology can be used to timely transfer the measurement data to the database, to achieve real-time monitoring of the patient's indicators data. When the nursing staff transfuses and dispenses drugs to the patients, they can check the doctor's order and medication plan in time by scanning the patient's QR code to avoid work mistakes.

Fourth, drug tracking supervision. Drug supervision is an important work related to patient drug safety, in the smart medical environment, the hospital can use the RFID technology tag function to track and record the whole process of drug circulation information, including doctor prescribing, drug distribution, nurse administration, patient medication information, in each circulation link has the relevant person in charge to approve drug information, to achieve the tracking and control of drugs. Before the nurse injects the drug for the patient, the nurse can scan the RFID tag on the drug to obtain the drug batch, dosage, usage and other information, and then inject the patient after checking the information to ensure the safety of the drug.

## Conclusion

The continuous development of society and the improvement of economic level make modern technological means more intelligent. For the application of big data technology and Internet of Things technology, it can meet the needs of social development in the new era, and at the same time, it can also sum up the integration and practice of urban internal resources. Constantly strengthen the data construction of functions and systems between different areas of the city, realize the information sharing of different departments, and then improve the construction and development of smart cities, and transform the urban modernization toward intelligent and intelligent direction, which will help realize the scientific and technological progress of human civilization.

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