

Integration Research on Internet of Things and Big Data

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Abstract: At present, the new generation of information and communication technologies represented by the Internet of Things, big data and cloud computing is developing rapidly. The Internet of Things technology is accelerating its penetration into smart medical, new energy and materials through continuous integration with other new technologies. "Big data" has become a hot word for people's production and life today. The ubiquitous social and commercial activities continue to produce a variety of data. This paper explores how big data affects the construction of an open IoT ecosystem, focusing on the significance of big data for the Internet of Things. The integration of big data and the Internet of Things is bound to bring the intelligence of human society to a new level, and the development prospects cannot be limited.

1. Introduction

At present, the new generation of information and communication technologies such as the Internet of Things, big data, and cloud computing are developing rapidly, and the integration of other new technologies has accelerated the popularization of smart medical, new energy, and new materials.

"Big Data" has become a hot word in people's daily production and life. It is a constant generation of data in social and commercial activities that are ubiquitous in mobile communications, website visits, microblogging, video uploading, product generation, and scientific experiments [1]. The value of researching big data is huge, especially when big data is integrated with the Internet of Things.

This paper explores the impact of an open IoT ecosystem on big data. Focus on the meaning of big data in the Internet of Things, including the open network ecosystem framework of advanced communication technologies and analytics technologies, new applications, and the discussion of big data technology architectures generated by the convergence of big data and the Internet of Things. The integration of big data and the Internet of Things will definitely raise the intelligence of human society to a new level.

2. Research Background of the Internet of Things

The Internet of Things (IOT) is called the third wave of the development of the world information industry after computers and the Internet by integrating intelligent sensing and recognition technologies with ubiquitous computing and ubiquitous networks. The earliest practice of the Internet of Things can be traced back to the Xerox network cola vending machine in 1990, and the concept of the Internet of Things was first proposed by Professor Kevin Ashton of the Massachusetts Institute of Technology in 1999. The International Telecommunication Union officially stated the concept of the Internet of Things in its ITU Internet Report 2005: Internet of Things: The Internet of Things is through radio frequency identification devices (RFID), infrared sensors, and global positioning systems installed on objects. (GPS), laser scanners and various sensors that can communicate and communicate information anytime, anywhere, any object, thus truly achieving a network of precise positioning, accurate identification, intelligent monitoring and management.

The foundation of the development of the Internet of Things is to extend and expand on the basis of the Internet. Its ultimate development goal is to achieve comprehensive sensing, reliable

transmission and intelligent processing. The network architecture of the Internet of Things can be divided into three layers: the first is the sensing layer, the main function is to collect information, information processing and other operations (through radio frequency identification devices, infrared sensors, card readers, etc.); the second is the network layer, mainly The role is to transmit information (through mobile networks, the Internet, the wide-area network, wireless networks, etc.); the third is the application layer, the main role is to complete the analysis, processing and control of information. The network layer is the link between the sensing layer and the application layer for information exchange. The application layer provides powerful resource support for the processing of various types of services through the processing and sharing of sensing information, thereby realizing the intelligence and informationization of various industries.

So far, the development of Internet of Things technology has been very extensive, such as smart city, smart medical, intelligent transportation, smart home, intelligent agriculture and other fields have used the Internet of Things. At present, China has made attempts in many aspects such as car networking, smart medical care, smart home, etc., and achieved good results [2].

3. Overview of the Internet of Things

The Internet of Things is a network of physical devices that uses embedded electronic devices, software, sensors, actuators, etc. to connect to the network. These objects can efficiently collect data and exchange data, all controlled by people or other devices.

Based on the existing network infrastructure, through the Internet of Things, the above objects can be remotely controlled or perceived, and integrated directly into the computer system from the external material world, thereby improving work efficiency and accurate accuracy of work [3]. IoT technology as a typical example of a networked physical system, we can enhance sensors and actuators in the Internet of Things. The Internet of Things has penetrated into all aspects of people's lives, such as smart grid technology, virtual power plants, smart homes, smart transportation and smart cities. Each of these can be implemented within the existing Internet infrastructure and is uniquely identified by an embedded computing system. Some experts estimate that the Internet of Things will cover about 30 billion objects by 2020. Often, the Internet of Things is expected to provide advanced equipment, systems and services connectivity that go beyond machine-to-machine (M2M) communications. These embedded device interconnects (including smart objects) are expected to usher in automation in almost all areas, while also creating advanced applications such as smart grids and expanding into smart cities such as [4].

"Internet of Things" can be applied to a variety of high-precision field operating equipment, such as cardiac monitoring implant chip transponders, automotive built-in sensors, environmental / food / pathogen DNA detection and analysis equipment, high-precision field operations in search and rescue operations Equipment can assist firefighters. Data with flow autonomy useful for the prior art is collected by these high-precision devices. Currently in the market, such practical examples include home intelligence (also known as smart home devices) such as smart lighting, intelligent temperature control (such as smart thermostats), intelligent ventilation, air conditioning (HVAC) systems; appliances such as washing machines Wi-Fi networks can be used for remote monitoring of dryers, robotic vacuum cleaners, air purifiers, ovens or refrigerators/freezers. It also includes smart cities, Apple Watches, fitness and health monitoring. In a large number of new application areas, expanding the Internet connection, the Internet of Things will also gather a large amount of data from different fields, quickly aggregate data, and increase the index, which helps to efficiently store and process data more efficiently. As one of the smart city platforms of today, the Internet of Things is also an intelligent energy management system. In 1999, the term "Internet of Things" was created by Procter & Gamble's Kevin Ashton at the MIT Automotive Identification Center.

4. Research Background of Big Data

In 2008, on the occasion of the 10th anniversary of Google, Nature published a special issue devoted to a series of technical issues and challenges related to future big data processing, including

the concept of Big Data. With the development of big data, Wikipedia gives a qualitative description: Big data refers to data sets that cannot be acquired, managed, and processed in a certain period of time using traditional and commonly used software technologies and tools. Subsequently, in December 2010, the Science and Technology Advisory Committee and the Information Technology Advisory Committee of the Office of the President of the United States submitted a strategic report on Planning for the Digital Future to Obama and Congress, which enhanced the work of collecting and using big data. The strategic height of the national will. In July 2012, the United Nations released a white paper on Big Data Government in New York, "Big Data for Development: Challenges and Opportunities," and the research and development of global big data has entered an unprecedented climax. During the two sessions in 2014, CCTV increased its application of big data analysis in news reports. In the daily "news network", a special column "Two Sessions Decoding – Two Sessions Big Data" was set up. The host explained the audience in detail. Big data is therefore called a hot topic [5].

Volume: Many factors contribute to increasing data capacity: transaction-based data stored over the years, social media streams or unstructured data that increases the number of sensors, and data collected by machines to machines. Excessive data capacity was a storage issue in the past, but as storage costs were reduced, other issues began to emerge, including how to determine the relevance of large amounts of data and how to use analytics to create value in related data.

Velocity: The speed of the data stream is very fast, because too much data has to be processed in time. RFID tags, sensors and smart meters are driving the need to handle near real-time data streams. Processing data very quickly is a challenge for most organizations.

Variety: From the formal point of view of data organization, data types can be divided into two types: structured data and unstructured data [6]. Structured data is data that can be stored in a database, such as bank transaction data, civil aviation flight information data, and the like. Non-structured data refers to data that cannot be expressed through a predefined data model or that cannot be stored in a relational database library, such as office documents, images, stock market data, financial transactions, audio, email, and video. And managing the diversity of different data is what many organizations still manage to solve.

Value: Due to the large capacity of big data, processing speed blocks, and the diversity of big data, the data density that is valuable in these big data is very low. Using big data technology, you can use these valuable data to predict and analyze future trends and patterns.

5. Integration of Internet of Things and Big Data

IoT sensing devices transmit at extremely high speeds, constantly generating massive amounts of information. Therefore, the technology of the Internet of Things to efficiently process large amounts of information in the form of real-time data streams is very important. The real-time big data analysis system includes a receiver for receiving a real-time data source of the input data stream, and an emerging mode graphics generator that processes the subset of data, which is capable of pattern recognition in burst mode and corresponding data. The subset is identified, the identified subset of data and the recognition pattern are reduced by compression, the stored database is compressed and the identified data is reconstructed, and a subset of the compressed identification data is used if necessary.

Data for IoT sensors/devices can be analyzed on a big data analytics infrastructure platform. The cloud-based IoT big data system provides a virtual IoT sensor/device platform. As an infrastructure, Cloud as a Service (Iaa S) and cloud services as Software as a Service (Saa S) provide a flexible, scalable system. Iaa S has the flexibility to handle heterogeneous IoT sensors/devices. Saa S is scalable, allowing end users to reduce computing overhead and enjoy shared IoT sensor/device data as requested by end users. SaaS also uses end-user-designated IoT sensor/device features to locate physical IoT sensors/devices and the need to service physical IoT sensors/devices. The end user requests and receives the services provided by the system through a device such as a smart phone.

The Internet of Things big data analysis can be applied to a variety of industries, such as the medical field, to monitor the patient's perception and movement response to external stimuli in real

time. Analyze the vast amount of data obtained by IoT medical/medical equipment to provide targeted value-added medical services. The Enterprise IoT Application Big Data Analytics System collects a wealth of data on product, product attributes, price and price attributes. Summarize large and complex data sets, presenting and refining information and presenting personalized recognition patterns in the user interface. The Big Data Analytics system provides a user interface to summarize personalized product information and prices, identify patterns, and generate information-related recommendations.

The big data intelligent system of the Internet of Things cloud is based on cloud-based big data analysis. It analyzes the server system of people or building-related data in a geographical area, such as local news and weather information, and analyzes data such as streets and zip codes in geographic areas. Analytical data can be used to develop control rules to control smart home devices.

Automatic control of smart home equipment, such as triggering the lights to automatically turn on when the user enters a specific time or space; activate the sprinkler system on the server side in the event of a fire; at a specific time, such as when the temperature at home is lower than the scheduled When the level is high, the indoor air conditioning system is automatically turned on; when the data analysis indicates that the user is sleeping, the sound system and lighting of each room are turned off; when the indoor equipment conflicts, the low priority equipment is turned off, and the higher priority equipment is used. Wait.

Cloud-based big data analytics can also be used in artificial intelligence devices to predict future user behavior. Device usage, device behavior, and user behavior prediction can be used to generate control rules. By comparing the collected data with the sample data table, it is determined whether there is a correlation between the collected data and the data in the data sample table. The prediction can be generated based on the correlation between the collected data and the data in the data sample table.

6. Conclusion

In short, the Internet of Things is a new frontier, and companies have been exploring it to achieve higher economic benefits. However, in fact, as time goes by, the integration between the Internet of Things and big data still has quite a few unknown development areas. These unknown factors require human beings to make scientific and in-depth considerations to promote the Internet of Things.

References

- [1] Hao Shuchi [1]. Research on the construction of smart city based on Internet of Things [J]. City Observation, 2012 (4): 62-67.
- [2] Liu Yanli [1], Chen Zhenhua [1]. Application of Internet of Things technology in equipment maintenance spare parts management [J]. Internet of Things technology, 2012, 2 (9): 79-81.
- [3] Yu Jing [1], Wang Hui [1]. The application of big data and its intelligent processing technology in the Internet of Things industry [J]. Silicon Valley, 2013 (17): 1-1.
- [4] Li Xiaojing [1], Qi Yunping [1]. Agricultural Information Resources Sharing in the Age of Big Data Technology [J]. China Science and Technology Resources Guide, 2013 (6): 41-44.
- [5] Wang Wei [1], Chai Jianping [1]. Interpretation of Big Data and Related Technologies [J]. Radio and Television Information, 2014 (2): 18-21.
- [6] Wang Wei [1]. The application of big data and its intelligent processing technology in the Internet of Things industry [J]. China New Communications, 2014, 16 (14): 79-79.