Intelligent Analysis and Research of M2M Technology Application Process

Hong Li
Guangdong Peizheng College
Guangzhou, China
Email: honglhappy@126.com

Abstract. M2M technology is to use different types of mechanical equipment and electronic equipment to establish communication and information exchange technology. M2M technology provides one of the integrated solutions of data acquisition, transmission, analysis and management for all walks of life, realizing the control process and more automation of industrial process. The main application fields include logistics management, positioning and navigation, electric power, agriculture, urban management, urban safety, enterprise safety, environmental protection, pollution monitoring, water and soil detection, production monitoring, equipment management.

1. Technical description of 1 M2M application system
The basic structure of M2M technology can connect with other systems or central systems in different locations. This connection allows the central system or the main system to collect or send data to the M2M system at each remote location for processing. M2M technology can be used to create an integrated network for IOT systems in different regions.

M2M technology is the interaction between local and remote technology components, which can develop new information sources. With the continuous improvement of robot technology and other innovative technologies, the enhanced telemetry technology of M2M technology is also improving. Innovative technologies make the monitoring, classification and distribution of data more automatic and efficient. M2M application market is growing rapidly. With the deepening of communication equipment, management software and other related technologies, the cost of M2M products is decreasing, and M2M system business is gradually becoming mature.

M2M applications include home applications, industrial applications, retail and payment, logistics and transportation industry, electronic machinery, urban informatization and medical industry.
2. Depth analysis of M2M system

M2M system in the application process, through the application of mobile communication technology and equipment, constantly innovate the application mode, automatic communication between machines and equipment. In a narrow sense, M2M only represents the communication between machines. When people refer to M2M, it refers to the communication between non machine equipment and other equipment or system through mobile communication network. It should be extended to the connection and communication between man to machine, machine to man, mobile network to machine.

M2M is not a simple data transmission between machines, it is an intelligent and interactive communication between machines. Even if there is no real-time signal, the machine will actively communicate according to the established program, and intelligently make a choice according to the obtained data, and issue the correct instructions to the relevant equipment. Intelligent and interactive become the characteristics of M2M which is different from other application systems.

The machine has the function of data transmission, instead of human control and operation, to realize the intelligent management and service of equipment.

Data acquisition components are installed on the key parts of the equipment, and the operation data of the equipment is input to the control center through the network. Realize the real-time monitoring of equipment operation status.

Four technologies related to Internet of things

The potential market of M2M is not limited to communication industry. As M2M is the integration of wireless communication and information technology, it can be used for two-way communication, such as long-distance information collection, parameter setting and instruction sending. M2M technology can have different application schemes.

M2M technology is to effectively control the equipment through mobile communication, so as to greatly expand the boundary of the application system, create a more efficient operation mode, and create a new operation mode.

The integration of informatization and industrialization is a high-level and deep combination of informatization and industrialization, which means to drive industrialization by informatization, promote informatization by industrialization, and take a new road of industrialization; the core of the integration of informatization and industrialization is the support of informatization and the pursuit of sustainable development mode.
M2M is a kind of network application and service with the intelligent interaction of machine terminal as the core. By embedding wireless communication module in the machine and using wireless communication as access means, it provides customers with comprehensive information solutions to meet their information needs in monitoring, command and scheduling, data acquisition and measurement.

The goal of M2M technology is to make all machines and equipment have the ability of networking and communication. M2M application communication protocol is an application layer protocol designed to realize the data communication between M2M terminal equipment and M2M platform, and between M2M platform and M2M application.

3. machine equipment of M2M system
Machine includes M2M hardware, communication network and middleware.

A M2M hardware
(1) Embedded hardware
Embedded into the machine, so that it has the ability of network communication. Data module is embedded in wireless mobile communication network.

(2) Assemblable hardware
In the industrial application of M2M, there are a large number of equipment and instruments that do not have the ability of M2M communication and networking. The refitted hardware is designed to meet the network communication ability of these machines. The implementation forms are also different, including the I / O device that collects data from the sensor, completes the protocol conversion function, and sends the data to the connection terminal of the communication network.

(3) Sensors
Sensors can be divided into ordinary sensors and intelligent sensors. Intelligent sensor is a kind of micro sensor which has the ability of sensing, computing and communication. Sensor network composed of intelligent sensors is an important part of M2M technology. Intelligent sensors with communication ability constitute wireless network, which cooperatively perceive, collect and process the information of sensing objects in the geographical area covered by the network, and publish it to users. It can also transmit information to remote it system through GSM network or satellite communication network.

(4) Identification mark
Identification mark is like the ID card of each machine and commodity, so that machines can identify and distinguish each other.

B communication network
Communication network is the core of M2M technology framework, including Wan, wireless mobile communication network, satellite communication network, Internet, LAN, Ethernet, WLAN and personal area network.

C Middleware
Middleware consists of two parts: M2M gateway, data collection and integration components.
Gateway is the data transmission scheduling of M2M system, which obtains the data from the communication network and transmits the data to the information processing system. The main function is to complete the conversion between different communication protocols.

![Figure 3 Schematic diagram of hardware composition of M2M system](image)

Data collection and integration components are designed to turn data into valuable information. The original data is processed and processed differently. Carry out data analysis and data processing, make abnormal situation report and workflow, complete data warehouse and data storage.

4. Conclusion
This paper analyzes and studies the system model based on M2M, analyzes the application process of M2M algorithm, designs and constructs M2M application model. The traditional algorithm is compared with the latest research results. Carry out intelligent information processing, strengthen the R & D and industrialization of communication network technology. It focuses on intelligent information processing and object to object communication technology, and solves the key technical problems of mobile communication and network, positioning, multimedia communication and navigation. Research on RFID and sensor network technology to form a first-class M2M product capability and a relatively complete industrial chain.

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