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The Application of the Internet of Things in Intelligent Logistics Management

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Abstract: Starting from the application of the Internet of Things in intelligent logistics management, this paper first analyzes the main characteristics of intelligent logistics, including information, networking and intelligence, and then expounds the important value of the Internet of Things in intelligent logistics management, such as improving logistics efficiency, reducing logistics cost, optimizing resource allocation and so on. On this basis, the paper puts forward the key points of the application of the Internet of Things in intelligent logistics management, including the construction of the Internet of Things perception layer, building the Internet of Things network layer, improving the application layer of the Internet of Things, strengthening data analysis and mining, and paying attention to the security protection of the Internet of Things for reference.

Keywords: Internet of Things; Intelligent logistics; Application; Value

Introduction

In recent years, with the deepening development of economic globalization and the rapid rise of e-commerce, the modern logistics industry has ushered in a new opportunity for development. At the same time, the logistics industry is also faced with many challenges, such as diversified service demand, high time requirement and great cost pressure. In the new round of scientific and technological revolution and industrial transformation, the development of the Internet of Things technology has injected new impetus into the intelligent logistics management, and has become an important driving force to promote the transformation and upgrading of the logistics industry. Through the intelligent perception, accurate identification and comprehensive interconnection of people, objects and equipment in the process of logistics, the Internet of Things realizes the digitalization, networking and intelligence of all links of logistics, and effectively improves the efficiency and level of logistics management.

1. The main characteristics of smart logistics

1.1 Informatization: the comprehensive collection and sharing of logistics information

Through the advanced information technology and equipment, the real-time monitoring and data collection of the whole chain of goods from production, storage, transportation and distribution are realized^[1]. The massive data is processed and analyzed to form valuable information resources. All relevant parties can realize information sharing through a unified information platform and break the information island. Logistics enterprises can optimize decisions to improve operational efficiency; customers can check the status of goods at any time to improve service experience; Regulatory authorities can realize whole-process supervision and ensure logistics security.

1.2 Networking: the interconnection of all logistics links

By building a logistics network covering the whole country and even the world, the close connection between suppliers, manufacturers, distributors, retailers, consumers and other parties is realized. With the help of the Internet, the Internet of Things and other technologies, each node in the logistics network can exchange information in real time and operate together. For example, retailer sales data can be passed immediately to the manufacturer for adjustment of production plans; real-time location information of transport vehicles can be passed to the warehouse for precise arrangement of handling operations. The network breaks the relatively independent situation of each link in the traditional logistics, making the whole supply chain become a highly coordinated organic whole.

2. The application points of the Internet of Things in intelligent logistics management

2.1 Build the Internet of Things perception layer to realize real-time collection of logistics status

The perception layer of the Internet of Things is the basis of intelligent logistics management. It, through various sensors and identification devices, realizes the real-time perception and data collection of the states of items, equipment and the environment in the logistics

process^[2]. In the storage process, temperature and humidity sensors can be used to monitor the warehouse environment to ensure suitable storage conditions for goods; radio frequency identification (RFID) technology is used to automatically identify and track goods to realize real-time inventory management. In the transportation link, the GPS positioning system can be used to track the position of the vehicle in real time, use the acceleration sensor to monitor the driving state of the vehicle, and monitor the state of the goods in real time through the camera. In the distribution link, the intelligent handheld terminal equipment can be used to record the distribution information and realize the traceability of the whole distribution process. These sensing devices constantly collect and transmit data, forming the "nerve endings" for logistics management. Through these equipment, logistics managers can grasp the location, status, surrounding environment and other information of goods in real time, greatly improving the accuracy and real-time of logistics management. The construction of the Internet of Things perception layer needs to pay attention to the following points: First, the appropriate sensing devices should be selected according to the characteristics of different logistics links. For perishable goods, temperature sensor, burglar alarm. The second is to ensure the reliability and durability of the sensing devices, to ensure that they can work stably in a variety of environments. Third, we should pay attention to the cost control of the perception equipment, on the premise of ensuring the function, as far as possible to reduce the cost, improve economic benefits. Fourth, the standardization and compatibility of sensing devices should be considered to facilitate the data exchange and integration between different systems.

2.2 Build the network layer of the Internet of Things to build the highway for logistics information

As the link between the perception layer and the application layer, the network layer of the Internet of Things undertakes the important task of reliable and efficient transmission of massive data. In the intelligent logistics system, the construction of the network layer has a decisive influence on the overall operation efficiency and reliability.

The construction of the network layer requires the fusion of various network technologies. In the local area, wired or wireless LAN technology can be used for fast data transmission; in the wide area, advanced mobile communication technology can be used to ensure real-time data transmission of mobile objects such as vehicles and goods; consider satellite communication technology for remote areas or special environments. These technologies cooperate with each other to form a wide coverage, high-speed and reliable data transmission network.

The design of the network layer should focus on the following aspects: one is to ensure the high reliability and low delay of the network, to ensure that the real-time data required for logistics management decisions can be timely and reliably transmitted; the second is to focus on the scalability of the network to adapt to the data growth and new equipment access brought by the development of logistics business; the third is to properly handle the heterogeneity of the network, effectively manage various communication technologies, and realize seamless data transmission.

2.3 Improve the application layer of the Internet of Things and promote the intelligent decision-making of logistics management

The application layer of the Internet of Things is the core of intelligent logistics management. It is responsible for the processing, analysis and application of massive data sent from the perception layer and the network layer, and finally realizes intelligent logistics management and decision-making. The perfect application layer can transform the raw data into valuable information and intelligent decision-making, which greatly improves the efficiency and quality of logistics management. In the construction of the application layer, it is necessary to develop a powerful logistics management information system first. This system should include warehouse management, transportation management, distribution management, order management and other subsystems, which can fully cover all links of logistics management. The system should have the function of data visualization, presenting complex data in the form of intuitive charts to help managers quickly grasp the key information. Through the use of artificial intelligence, machine learning and other technologies, the system can make intelligent analysis and prediction based on historical data and real-time data. For example, the system can automatically generate the optimal replenishment plan based on historical sales data and current inventory status; optimize distribution routes in real time according to traffic conditions and distribution requirements; and can also predict equipment failure and arrange maintenance in advance to avoid accidental downtime.

2.4 Pay attention to the security protection of the Internet of Things to ensure the safety and reliability of logistics information

Internet of Things devices, such as sensors, RFID tags, etc., are often widely distributed and vulnerable to physical attacks. Therefore, measures are needed to protect the physical security of these devices, such as the use of anti-blocking design, encryption chips, etc. At the same time, attention should be paid to the identity authentication and access control of devices to prevent unauthorized devices from accessing the system.

IoT data may be eavesdropping or tampered with during transmission, so encrypted transmission technologies such as SSL / TLS pro-

protocol are needed to ensure the confidentiality and integrity of data transmission. In addition, it is also necessary to establish a secure network architecture, such as using a firewall, intrusion monitoring system, etc., to prevent network attacks.

The logistics system contains a large amount of sensitive information, such as customer information, goods information, etc., which requires strict data protection measures. This includes data encryption storage, access control, data backup and recovery, etc. For cloud storage and cloud computing services, special attention needs to be paid to data privacy protection and cross-border transmission issues. The security of the application systems is equally important. It is necessary to test the logistics management system to find and fix potential security vulnerabilities.

3. Epilogue

The deep integration of the Internet of Things technology and intelligent logistics management has opened a new chapter in the development of the logistics industry. In the future, we should keep up with the pace of The Times, accelerate the application of the Internet of Things technology in intelligent logistics management, constantly innovate logistics modes and management methods, and promote the transformation and upgrading of the logistics industry to the direction of digitalization, networking and intelligence. Only with an open vision, innovative thinking and collaborative actions, and actively embracing the Internet of Things technology, can we continuously improve the management level of intelligent logistics, provide more high-quality and efficient logistics services for economic and social development, and promote the high-quality development of the logistics industry.

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