

Research on Application of Emerging Technologies in Smart Airport

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Abstract: This paper analyzes the connotation of smart airport, researches on the information construction of smart airport, and puts forward the necessity of applying RFID technology, sensor network technology, intelligent technology, nanotechnology and other Internet of things technology as well as intelligent video analysis technology to the construction of smart airport. The application of emerging technologies will improve the logistics efficiency, and promote the automation, visualization and intelligent management of smart airport.

Keywords: smart airport; information construction; Internet of things technology; intelligent video analysis technology

1. Introduction

Smart airport is an airport with a high degree of perception, interconnection and intelligent ability. Through the Internet of things, cloud computing, big data, mobile Internet and other technical means, an intelligent system based on digital system is established to achieve real-time, accurate and sufficient access to airport service and management information, and to sort, analyze, process and use it, so as to improve the airport operation efficiency, improve the quality of service and management, optimize the management decision-making, improve the ability of emergency response [1-3].

At present, more and more attention has been paid to the construction of "smart airport", and effective attempts have been carried out in some areas. Some large airports have also carried out systematic smart airport construction planning, involving many business areas and construction contents. But on the whole, the construction of smart airport focuses more on a single airport, and the cooperation between airports is insufficient. This paper attempts to focus on the connotation of smart airport and the construction of smart airport informatization, and puts forward the application scheme of Internet of things and intelligent video analysis technology in smart airport.

2. The Application of Internet of Things Technology

The Internet of things is a kind of network that connects any object with the Internet according to the agreed protocol through radio frequency identification, infrared sensor, global positioning system, laser scanner, gas sensor and other information sensing equipment to exchange and communicate information, so as to realize intelligent identification, positioning, tracking,

monitoring and management. In short, the Internet of things is the "Internet of things". According to the ITU report, the Internet of things has four key application technologies: RFID technology for labeling things, sensor network technology for sensing things, intelligent technology for thinking things, and nanotechnology for miniaturizing things.

2.1. RFID Technology

RFID technology is a kind of sensor technology. It is a non-contact automatic identification technology that integrates wireless identification technology and embedded technology. It is one of the technologies of Internet of things information collection layer. It has a broad application prospect in logistics management. RFID is divided into three types: passive, semi passive and active. RFID system consists of electronic tag, reader and control system.

2.2. Sensor Network Technology

Sensor network technology is an interdisciplinary technology, which is composed of a large number of cheap micro sensor nodes deployed in the monitoring area. It is a multi hop self-organizing network system formed by wireless communication. These sensors can cooperate with each other, self network, sense, collect and process the information of the perceived object in the network coverage area, and send it to the observer. Sensor, sensing object and observer constitute the three elements of wireless sensor network. This technology has been widely used in the Internet of things industry chain.

2.3. Intelligent Technology

Intelligent technology is a kind of technology that can replace human's repetitive mental work. It realizes human's repetitive mental work by computer software technology. It is in order to effectively achieve a certain expected purpose, using various methods and means of knowledge. At present, intelligent technologies with important application value include deep learning, autonomic computing, machine learning and data mining, cognitive Informatics and so on.

2.4. Nanotechnology

Nanotechnology is a science and technology that uses single atoms and molecules to make materials, and studies the properties and applications of materials with structure sizes ranging from 1 to 100

nanometers. It is based on many modern advanced science and technology, and is the product of the combination of modern science and technology. At present, the research and application of nanotechnology mainly focus on microelectronics and computer technology. Smart airport will make full use of emerging and mature technologies to achieve real-time information interaction, collaborative decision-making and process integration, which can significantly improve the airport operation efficiency and security level. There are a large number of equipment in the airport. A passive RFID tag is pasted on the equipment. The tag has memory, which can record the purchase time, scrap time, installation time, responsible department, inspection times and other information of the equipment. The Internet of things platform will set up an electronic file for each device, store it in the database server, and have the function of expiration alarm. Through radio frequency identification technology, sensor technology and mobile communication technology, the airport logistics distribution business can be automated, informationized and networked. In the airport logistics, the Internet of things, sensors and Internet are organically combined to realize the automation, visualization and intelligence of airport logistics through scientific management means. The application of Internet of things in airport logistics can reduce logistics cost, improve logistics efficiency and accelerate the development of airport logistics industry.

3. The Application of Intelligent Video Analysis Technology

The application of intelligent video analysis technology has a wide range of applications, including some simple ones, such as line mixing detection, entry detection, departure detection, etc., which are completed by intelligent analysis of front-end cameras; some complex ones, such as face recognition, aircraft type recognition, human feature recognition, etc., which are completed by intelligent analysis of back-end servers. Therefore, the application of intelligent video analysis in smart airport needs to combine two modes: front-end camera intelligent analysis and back-end server intelligent analysis. The system is generally composed of IAAs, PAAS and SaaS. IAAs is the infrastructure layer of the system, including cameras, servers, storage and network devices. Cameras are divided into front-end intelligent cameras and ordinary cameras according to whether they have intelligent analysis function. Different types of cameras are selected according to different application scenarios and installation environment. The server can be divided into video management server, storage server, video gateway server and intelligent analysis server.

PAAS is the platform layer of the system, including video management platform and intelligent analysis platform. The functions of video management platform

include centralized management of cameras, unified control and distribution of video streams and unified distribution of user rights. The function of intelligent analysis platform is to complete high complexity intelligent video analysis based on camera video stream, and provide powerful image and data support for application layer. SaaS is the application layer of the system, including video analysis and alarm, video scene splicing, video intelligent retrieval, data intelligent analysis and other applications.

Video analysis alarm is the use of front-end and back-end intelligent analysis of data, according to the set alarm rules, when the data and rules match, the corresponding alarm information will be generated. Video large scene splicing is to splice the video images of several independent cameras into a panoramic image, which is mainly used in airport runway monitor.

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Data intelligent analysis uses the data of front-end and back-end intelligent analysis, applies DM, OLAP and other data mining analysis engines to analyze the security situation of the whole airport, and finally shows the security situation of the whole airport in the form of cockpit.

4. Conclusion

This paper analyzes the connotation of smart airport, focusing on how to apply RFID technology, sensor network technology, intelligent technology, nanotechnology and other Internet of things technology as well as intelligent video analysis technology to the construction of smart airport. The application of emerging technologies will improve the logistics efficiency and promote the automation, visualization and intelligent level of smart airport.

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