Design Of Internal Bullet Management System Based On Internet Of Things

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Abstract

This paper puts forward a construction scheme of weapon equipment management system based on Internet of Things technology. A comprehensive equipment information management network is formed by combining various information sensing devices, such as radio frequency identification (RFID), video surveillance, temperature and humidity sensors, etc., with the internal local area network of the unit. Oracle is used as the database management tool in the system software.The structure adopts Browser/Server mode, and the system is of great significance to improve the efficiency and level of weapons and equipment management.

Keywords

Radio frequency identification, Internet of Things, Weapons and equipment management.

Quote Words

At present, the information management of military equipment and materials is a weak link in the overall information construction of our army. The current management mode of military weapons and equipment can not meet the requirements of rapid and accurate equipment support in future wars because of its problems such as manual operation, scattered locations and low management efficiency.Especially in recent years, due to the rapid upgrading of equipment, greatly improved technical content, complex supporting equipment and other reasons, the drawbacks of the traditional management mode have become increasingly prominent. Using modern information technology to realize intelligent management of weapons and equipment quality information, saving management costs and improving management efficiency has become a very urgent situation.The Internet of Things technology is used to establish a weapon and equipment management system, to establish a sound "information electronic file" for each equipment, and to provide a management platform for leaders and managers through the network. The system can not only effectively, accurately and intelligently automatically identify, collect, store and upload information of all weapons and equipment and their storage places in the whole unit,But also can be used by leaders at all levels and equipment managers to quickly inquire, count and analyze equipment information. The establishment of the digital information management system of the whole weapon equipment,It is of great significance to simplify the equipment management procedures, standardize the working process, enrich the management means, improve the efficiency of quality management and maintenance support of military weapons and equipment, innovate the weapons and equipment management mode and lead the transformation of military equipment management mode.

1. Introduction of Internet of Things and Weapon Equipment Management System

On the basis of computer internet, the Internet of Things is a network that uses RFID technology and wireless data communication technology to realize automatic identification of articles and information sharing. In this network, goods can communicate with each other without human intervention. Its essence is to connect all articles with the Internet through information sensing equipment,Realize intelligent identification and management of articles. The weapon and equipment management system based on the Internet of Things technology combines various information sensing devices such as RFID, video surveillance, temperature and humidity sensors and other devices with the campus network to form a comprehensive equipment information management

network, and establishes the corresponding equipment management database.It can realize the goals of equipment office automation, intelligent business management, scientific decision-making, real-time security and visualization of remote monitoring, thus solving the problems of low efficiency of manual management, inconvenient query of records, difficult statistical reporting, low level of security and so on existing in the original weapons and equipment.

2. Design And Implementation Of Weapon Equipment Management System

2.1 Hardware Construction Scheme

The equipment management system based on Internet of Things is mainly composed of 4 levels and 9 structures. That is, label and barcode printer, equipment (with electronic label or barcode), sensor, camera, reader/writer (RFID or barcode), network equipment, RFID middleware, database server and terminal computer.Among them, label and barcode printers, equipment and materials (with electronic labels), sensors, cameras and readers belong to the information collection layer. RFID middleware belongs to information filtering layer; The network belongs to the information transport layer; The database and terminal computer belong to the information management layer. Its composition is shown.

Equipment management system can be divided into two subsystems: equipment information collection system based on RFID technology and environmental supervision system based on sensor technology.

2.1.1 Equipment information collection system.

Equipment information collection system integrates RFID technology, barcode technology, electronic tag technology and remote active electronic tag technology. The business process of equipment information acquisition system can be divided into the following three steps:

Step 1: Numbering labels and barcodes by using label and barcode printers, and inputting information. Take the electronic tag and barcode ID number as the unique equipment entity number, paste it on the equipment entity, and then enter the original equipment information into the database according to the number.

Step 2: Read and write information through the reader. One is to install RFID reader at the warehouse location (such as the entrance of warehouse), and the other is to use hand-held RFID reader. When the equipment entity is close to the antenna coverage of the reader, the RFID system performs reading and writing operations to complete the collection and change of data information.

Step 3: Use the equipment management database to manage information. If the read information matches the database information, the information will be automatically saved in the system database, and the application software system will perform management work such as data information query, update, authorization and printing. Different management methods are adopted for different types of equipment and materials.Large-scale equipment uses long-distance, anti-collision, waterproof and wear-resistant long-distance active electronic tags for access management. Self-adhesive RFID tag technology and bar code technology are used for small equipment and parts. When the equipment is put into storage, according to the information of each batch of incoming goods,The management system uses the barcode label printer to generate the barcode or label of the goods managed in the warehouse. The RFID label on the packing box contains the quantity information of the goods in the box, and the RFID label on the shelf contains the information of the goods on the shelf and the corresponding relationship with the shelf. When the RFID tag information on the packing box is put into storage for inspection, firstly, the barcode identifier identifies the articles in the packing box.After being processed by the management system, the corresponding RFID tags are generated and then read by the fixed RFID reader, thus ensuring the RFID application environment in the warehouse. When the equipment is out of the warehouse, use the PDA card reader of the handset or the fixed reader to read the information of the out-of-warehouse items one by one, and then upload the information.

2.1.2   Environmental supervision system.

The environmental monitoring system mainly uses sensors and video camera technology to monitor the environment of warehouses, repair shops, gun factories and other places in real time in terms of temperature, humidity and on-site operation. In case of abnormal state, such as over-high warehouse temperature and invasion by unknown persons, the alarm device will give an alarm automatically by receiving and feeding back information,It can also adjust the temperature and close the access channel. The schematic diagram of environmental supervision system is shown.

As the core equipment of environmental supervision system, sensor equipment has special temperature and humidity sensors and active electronic tags with temperature and humidity sensing functions in the market. In order to integrate the software and hardware of the system better, the electronic tag of temperature and humidity is proposed as the terminal of the monitoring system.In this way, RFID readers can be used uniformly to receive the status of field temperature and humidity and equipment identification information. Put the electronic tag of temperature and humidity and the fixed reader in the warehouse (choose whether to install the camera equipment as required), and confirm the connection of other lines. During normal operation, the reader-writer transmits the received information to the monitoring center,And then the information is transformed into intuitive information through the software of the monitoring center. (The camera equipment transmits the live images collected in real time to the monitoring center, and can store the corresponding video data).Large-screen LCD screens shall be installed in relevant places as required, and the screens shall dynamically display the current environmental temperature and humidity, rules and regulations of equipment personnel management, date and time, notification arrangement and other information. A small screen LCD screen is installed at the warehouse stacking position to display the relevant information of each stacking position. When the equipment gives an alarm, the searchlight in the area where the alarm occurs will automatically turn on.Linkage with the monitoring system of the monitoring center, at the same time, the image of the alarm area will automatically pop up in the monitor of the monitoring center.

2.2 Software structure design and its function introduction.

The system uses Oracle as the database management system tool as the background, and Java development tool software as the foreground of data operation, which is the man-machine interface management software for communication between users and computers. The system realizes the detailed design of each functional module by programming in PC platform and Windows series operating system environment. A Browser/Server structure is adopted in the design,Make the software system have good performance, ease of use and man-machine interaction ability. According to the demand analysis, the system consists of user management, department management, equipment management, environment management and data maintenance functional modules. Design the software structure diagram as shown.

1) user management function. Log in to the system with different identities, such as system administrator, operator (storekeeper, repairman, security clerk, etc.) and ordinary users, etc. Different identities are granted different use rights by the system. For users with illegal rights, some functions of the system will not be displayed, so use restrictions will be strengthened to ensure the security and confidentiality of system management.

2) Department management function. Check the basic information and funds of the department, and update the information of the unit in time when the unit changes.

3) Equipment management function. Equipment management function is the core part of the whole system, which includes equipment viewing, basic information management, label management, quality management, equipment strength management and so on. Equipment basic information management: check the current status and factory information of equipment. Users can manage the equipment according to its current status.Equipment strength management: all equipment is listed in the equipment preparation strength, so you can view the strength information of each equipment and add and modify it. Label management: to bind existing weapons with labels. Equipment quality

management: it mainly includes functions such as equipment maintenance, equipment grading, equipment handover, and warehousing management.Manage the dynamic information of equipment, query the items according to the tag ID or barcode number on the equipment, and find out the name, serial number, type, repair times, quality grade, delivery time and delivery time of the items. Generate all kinds of statistical reports and strengthen the dynamic management of equipment information. According to the dynamic incoming and outgoing information,Automatically generate inventory of inventory equipment quantity, and control the equipment inventory, which is beneficial to timely adjust the distribution of equipment and materials. The equipment tracking and positioning function can be realized. After the system is implemented, it can visually monitor the flow of equipment and materials in each library of each subordinate unit and position the target at present, thus improving the effective control of equipment and materials from the perspective of space.

4) Environmental monitoring function. It can obtain and save all kinds of information about the scene in real time. According to the situation, take corresponding control measures. Realize all-round visual remote management.

5) Data maintenance. The system can maintain and update the original input information of the database. Relevant equipment data information can be printed at any time according to actual needs. At the same time, it has the backup function. As the information of equipment is very important data, once the system has problems, it will have very serious consequences. Therefore, the backup function of the system is set here.Be able to back up data in time.

When the user logs in to the system, select the user name and enter the user password. If the user fails to return to the login interface, the user will automatically exit the system after more than 3 verifications. The main interface of the equipment management system after logging in is shown in Figure 1.

Figure 1 Main interface of equipment management system

3. Concluding Remarks

This paper mainly discusses the hardware and software implementation scheme of weapon equipment management system based on Internet of Things technology, introduces the details of system hardware construction in detail, depicts the structural block diagram of system software, and analyzes the basic functions that each management module should have.Combining the collection of equipment information with the monitoring of relevant environmental information to form an equipment management system is a typical case of the application of Internet of Things technology in equipment management. After the system is popularized and applied, it will greatly save the cost

of equipment quality management, improve the management efficiency and lead the transformation of equipment management support mode.

Acknowledgements

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