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Research on the Application of IoT Cloud Computing Platform Combined with Remote Control Mechanical Equipment in Campus Security Protection

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Abstract

Smart campus security protection is an inevitable trend in the modern development of campus security protection in our country. The combined application of emerging technologies such as the Internet of Things and cloud computing breaks through the time and space constraints of the campus security protection environment and will obtain timely monitoring and efficient transmission. So as to efficiently deal with the asymmetry of information. The full integration of smart campus security protection and contemporary biotechnology methods is also an important direction for the development of campus security protection in the new era. With the continuous development of the security protection of smart campuses, a benign operation model of administrative guidance, social security, market promotion and public support has been formed, which reflects the potential and possibility of long-term development and will play a greater role in the development of social production. Great value.

Keywords: *Internet of Things, Cloud Platform, Campus Security;*

1. Introduction

In campus security protection, the big data platform is a complete big data solution that is easy to use, high performance, high reliability and high security. The system covers the complete life cycle of big data, from data collection to data storage, database, data warehouse, Data processing, operation and maintenance monitoring, service engine. The products combine with actual business needs and integrate cutting-edge technologies such as the Internet of Things, cloud computing and artificial intelligence to provide professional data application services for the industry.

2. IoT platform analysis

The sensing terminal is deployed to various industries to obtain information and data of the target object. It consists of various sensors, controllers and smart devices. The self-developed devices are mainly smart watches, smart phone APPs and IoT gateways and smart phone APPs. By configuring and adapting to industry requirements, the IoT gateway is integrated with other external devices as monitoring terminals for various industries. The universal platform provides unified equipment access, equipment management, equipment services, data storage, data services, data analysis and BIM and GIS services and is divided into big data platforms, Internet of Things access platforms and GIS&BIM platforms according to functional boundaries. Industry applications are based on general platform capabilities, collect field data and control field equipment and provide application systems for various industries and professional directions[1]. Various products interact through common interfaces, protocols and data models. The sensor is connected to the IoT gateway through the hardware interface and then connected to the IoT access platform through the communication interface. The smart phone APP and smart watch are directly connected to the IoT access

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platform through the communication interface to realize the upload of perception data and control instructions Received. The Internet of Things access platform provides external device data and perception data and provides device management services and reverse control services for industry applications. The big data platform provides data services and analysis capabilities for industry applications. The GIS&BIM platform provides presentation services for industry applications. The big data platform is the core component of the smart business support platform. It is responsible for data storage, cleaning, analysis and artificial intelligence services in various industries. It is the heart of the smart business support platform. It is a general big data platform + a data analysis service engine for vertical industries. , With distributed file system, distributed database, data mining, real-time computing, offline analysis and machine learning, provide professional, automated, visualized data analysis services and artificial intelligence services for smart water, smart personnel management and other applications. The IoT control system is in the figure below.

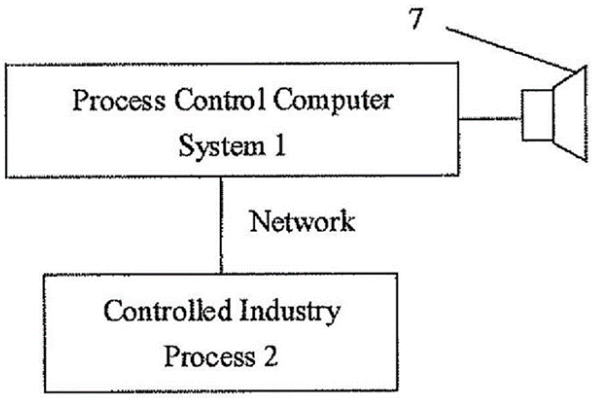

Figure1. IoT system.

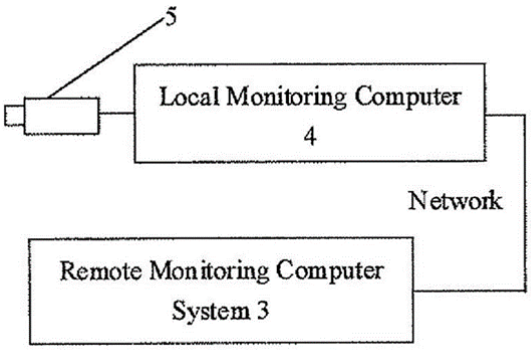

Figure2. IoT system.

3. Remote control function

3.1. Wireless communication

(1) The user applies for a license on the cloud platform website and provides the information required by the platform, uses the microcontroller recommended by the platform as an IoT terminal, connects to the ESP8266 wireless communication module, writes the corresponding AT command and sets the working mode to serial port transparent transmission , Connect to the wireless router to access the Internet and establish a TCP connection with the platform through the IP address of the cloud platform server and the open port. (2) The cloud platform provides the soeket server to support the TCP connection of the terminal for data transmission. When the server receives a TCP connection request, it opens up a thread to process the connection to ensure the design requirements for simultaneous access of multiple terminals in practical applications[2]. (3) Since the terminal connected to the cloud may be running in some complicated environments, abnormal power failure, equipment damage, improper operation of the user, etc. may occur, causing the connection to be abnormally interrupted, but the server still assigns the connection running Threads cause a waste of server resources. Therefore, the server has a disconnection monitoring mechanism and the client must periodically send a heartbeat packet to the server so that the server can sense the survival status of the terminal and the validity of the device connection, monitor abnormally connected terminals in time and close invalid connections. (4) After the

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terminal is connected to the cloud, the server will parse the terminal's unique identification number and the corresponding secret key for identity verification according to the data message it sends and close illegal connections to ensure the security of legal devices and servers. The IoT wireless system is in the figure below.

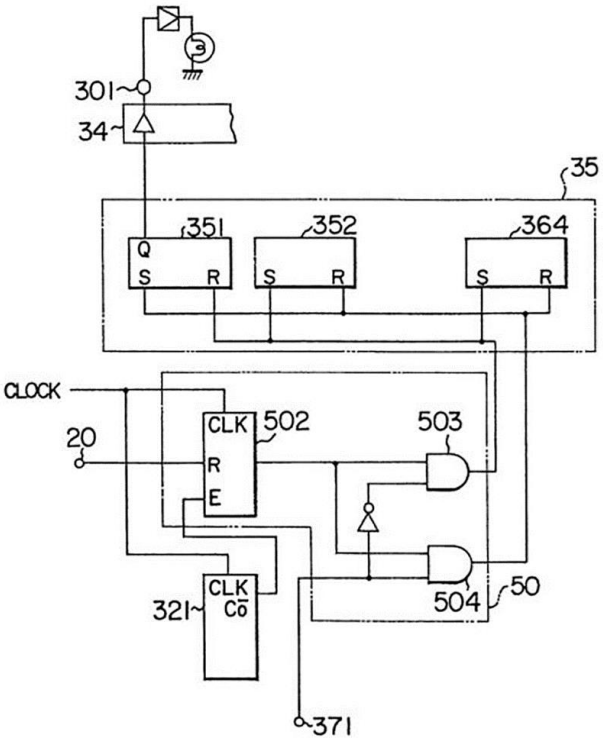

Figure3. IoT wireless system.

3.2. Data packaging and processing

(1) The cloud platform provides a data protocol. After the terminal establishes a connection with the server, the data generated by the perception layer (such as the sensor module of the Internet of Things application device) is added to the data generated by the perception layer (such as the sensor module of the Internet of Things) according to the protocol and the message is encapsulated into a message and sent to the server. The server parses the obtained datagram to obtain the specific valid data of the terminal's identity, microcontroller type, sensor type and perception layer[3]. (2) After the server obtains the message encapsulated by the terminal according to the data protocol, it parses the user identity, obtains the data type, analyzes the valid data and finally performs the database operation and stores it in the corresponding database according to the user identity, data time and acquisition time. The IoT processing system is in the figure below.

Figure4. IoT process system.

3.3. *Control interface*

(1) The cloud platform provides users with two remote control solutions, online instruction set and Android programming interface. Users can use the website of the cloud platform to remotely control IoT terminals connected to the cloud, or they can write remote monitoring and control apps based on the Android programming interface. (2) The cloud platform regards the Android device as a special terminal for connection, treats the acquired data as a special data for analysis and forwards it according to the corresponding device terminal. (3) The control instruction to get the website is similar to the processing method of Android device in (2). The back end forwards the data obtained from the front end to the soeket server and the server forwards it according to the corresponding device terminal. The IoT monitor system is in the figure below.

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Figure5. IoT monitor system.

4. Campus safety protection system

4.1. Smart campus management

The Internet of Things makes campus information management more "smart". Through the Internet of Things, human-like perception capabilities, communication capabilities, communication capabilities, processing and storage capabilities and decision-making capabilities can be obtained[4]. Taking the construction of a school's smart campus related asset exchange part as an example, it is possible to establish a portfolio of related equipment for life cycle management (including inquiry, purchase, use, maintenance, scrap, etc.), equipment configuration information management (including coding, purchase date, Manufacturer brand specifications, detailed configuration of main parts and accessories, etc.), equipment maintenance information management (including location changes, configuration changes, operation and maintenance records, fault records, responsible persons, automatic configuration of operating equipment, etc.) and other equipment information management (prices , Integrators, warranty information, purchase contracts, etc.). By incorporating this information into the Internet of Things, a lot of real-time data from the switch can be transmitted back to the data center through smart sensors, so that the current manual-based data collection process can be automated. When hundreds or thousands of switches are operating at the same time, a huge database will be obtained. By comparing and digging into these data, you can monitor the operation of many switches, adjust the configuration and even find faults in time. Repair in advance. It may have taken a long time to perform various diagnosis and troubleshooting before, but now it can be completed in a short time and the application of the Internet of Things has achieved an order of magnitude improvement in efficiency. The IoT lock system is in the figure below.

Figure6. IoT lock system.

4.2. Intelligent teaching environment

The application of the Internet of Things can also realize the intelligentization of the teaching environment and it can also be widely used in many fields such as classroom teaching environment management and book borrowing management in the campus. For example, the Internet of Things technology is applied to the adaptive classroom teaching environment. It can collect all kinds of information related to the classroom environment in real time, such as the teacher's lecture sound, classroom light[5], classroom temperature, etc. and automatically analyze and follow the classroom equipment Collecting information is automatically

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adjusted to an appropriate state; teachers can remotely operate various teaching equipment as required through the multimedia system; classroom and multimedia administrators can monitor and manage the classroom and its equipment in real time. In terms of book borrowing management, schools can establish an intelligent book management system to set up RFID tags for each book, so that RFID tags can be used on the book self-checking machine to read multiple books at once, complete self-service borrowing and returning books.*4.3. Smart classroom teaching* Regardless of the traditional classroom teaching mode, or MOOC, micro-class, mobile classroom or other Internet teaching methods, information is still more one-way transmission from teacher to student and a large number of students are still passively receiving knowledge. Classroom teaching can make every item digitized, networked and intelligent. At the same time, students' behavior, study habits, learning process, knowledge mastery, etc. are also digitized as "things" so that they can be used All kinds of smart terminals track these abstract contents and convert them into digital form for storage, so as to complete the interaction between people and people, things and things and people and things and achieve real-time capture and analysis of teaching and learning demand information and Related resources are adjusted accordingly[6].

5. Conclusion

The intelligent campus security protection industry is an inevitable trend in the development of future campus security protection models. As a product of new technology, it can not only affect people's lives, but also promote the development of the national economy. However, the current development of the smart campus security protection industry is not very sound and there are many problems that need to be solved in the development process: such as incomplete systems and immature technologies. To solve these problems, the industry as a whole needs to be able to develop continuously. On the basis of the Internet of Things technology, actively introduce advanced concepts and technologies and vigorously promote the concept of smart campus security protection, thereby enhancing the development of the smart campus security protection industry.

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