Security Management of Laboratory Door Lock Application Based on Intelligence

Wendong Zhao

Huaiyin Institute of Technology, Huaian 223003, Jiangsu, China

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Abstract: This paper introduces the design and development of laboratory access control system based on radio frequency identification technology. The existing door locks are relatively old-fashioned door locks. The management of door locks and keys is cumbersome and unsafe. Not automated enough it may lead to the loss of keys and the failure to start the course normally, or the failure to close the door locks and lead to the unsafe classroom. To solve these problems, we design a relatively automated laboratory access control management system to solve these problems. It can realize the functions of swiping cards in and out of the laboratory, record the entry and exit of personnel, modify the access rights of personnel by administrators, and open the door lock by one key in the background. The realization of these functions can improve the security of laboratory door lock, enhance the manageability of laboratory door lock and multi-purpose card can simplify the key storage.

1. Introduction

Nowadays, with the rapid development of society, many things are being intelligent zed, and the access control of many schools' laboratories is still the traditional door lock, which is neither convenient nor safe. RFID technology can replace the traditional door lock. RFID technology is a non-contact automatic identification technology. Its identification work can be completed automatically without human intervention. If you want to obtain some relevant data, it can automatically detect the RF signal and identify the target object [1]. RFID technology is equivalent to the wireless version of barcode technology. Compared with barcode, RFID has many advantages, such as waterproof, antimagnetic, high temperature resistance, long service life, etc. in addition, RFID has a large reading distance, easy to change the storage information, and can be used by one card for multiple purposes, which are more convenient to use. As for security, the network lock can record the access of people in real time, and the lock card system is more secure than the lock key system. And the network door lock greatly facilitates the manager, and it is more convenient, safer and faster to manage all the door locks. The access control system studied in this paper is a system that can realize these functions.

Nowadays, with the rapid development of science and technology, people's demand for security is no longer satisfied with the traditional door lock. The appearance of the Internet of things fundamentally solves this problem. The appearance of the Internet of things makes the Internet door lock come into people's sight. RFID technology based on the Internet door lock can achieve the control of access personnel, real-time monitoring of personnel access and other functions Moreover, the network door lock has the advantages of high security, simple operation and convenient management.

Access control system, also known as access control system [2]. In the era of advanced science and technology, the management of keys and locks has been unable to meet the access control system's management of entrances and exits and channels. With the development of technology, the access control system has developed more modern and full-featured [3]. Today's access control system can

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help people manage the access and passageway more orderly after connecting the network. It is also safer and more convenient than the traditional access control management. It can record the access of people and can well refuse the access of illegal people. This access control system is used for laboratory access, which can be connected to the educational administration network to obtain the class schedule and the teacher's class situation. Generally, only the teacher who has a class can open the door during the class time, and the students can't open it, which can effectively prevent illegal personnel from entering the classroom. If the teacher forgets to bring a card, he can also contact the administrator to open the door behind the scenes, which is much more convenient than the traditional door lock. This access control system can strengthen the management of laboratory safety, manage the access of personnel, ensure the safety of laboratory property, record the access situation, facilitate future reference, and strictly limit the access of personnel.

2. Principle of RFID Technology

The simple working principle of RFID: RFID tag enters the magnetic field and obtains energy from the induced current, then receives the radio frequency signal sent by the reader, and transmits the information stored in the RFID chip through the radio frequency electromagnetic field, then the reader reads the received information and decodes it, and finally the central information system will process the data with the relevant number [7].

There are inductive coupling and backscatter coupling between reader and electronic tag. Inductive coupling is suitable for RFID in low frequency, while backscatter coupling is generally used in higher frequency [8].

Reader is the information control and processing center of RFID system, which can be divided into read-only or read / write devices, which is determined by their structure and technology.

The structure of RFID is very simple. It is a simple wireless system composed of two basic devices, interrogator and transponder. It can realize the functions of control, detection and tracking.

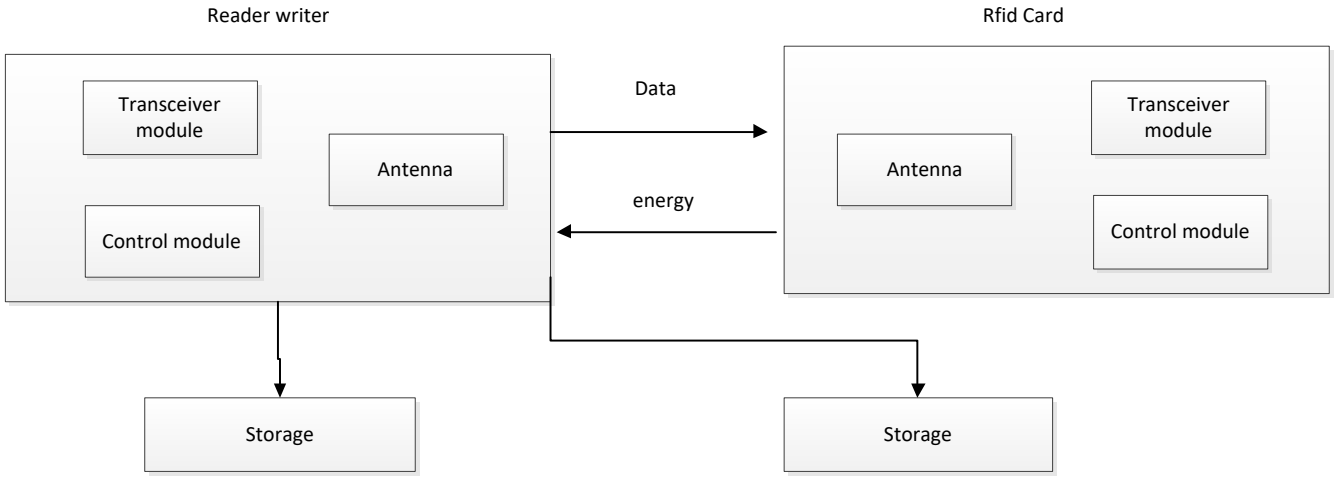

Figure 1 RFID schematic

3. Design of Access Control System Based on RFID Technology

Through the above requirement analysis and overall design, in order to better realize the proposed requirements, the designed system should adopt more advanced scientific and reasonable technology. For this reason, we designed the laboratory door system based on C / 's mode, and the system software structure flow is shown in Figure 2.The specific operation process of the laboratory access control management system is as follows:

1) The user swipes the IC card on the door lock of the laboratory;

2) After receiving the user's swiping card information, the door lock management end uploads the user's physical card to the access control management server;

3) According to the received physical card number, the access control server searches for the corresponding user information in the system, and then judges whether the user has the right to unlock the door.

4) If the user has the permission to open the door, the system will send the door opening command to the door lock, and the door lock controller will open the door lock and turn to step 6 for execution;

5) If the user does not have the right to unlock the door, the system will provide

6) End

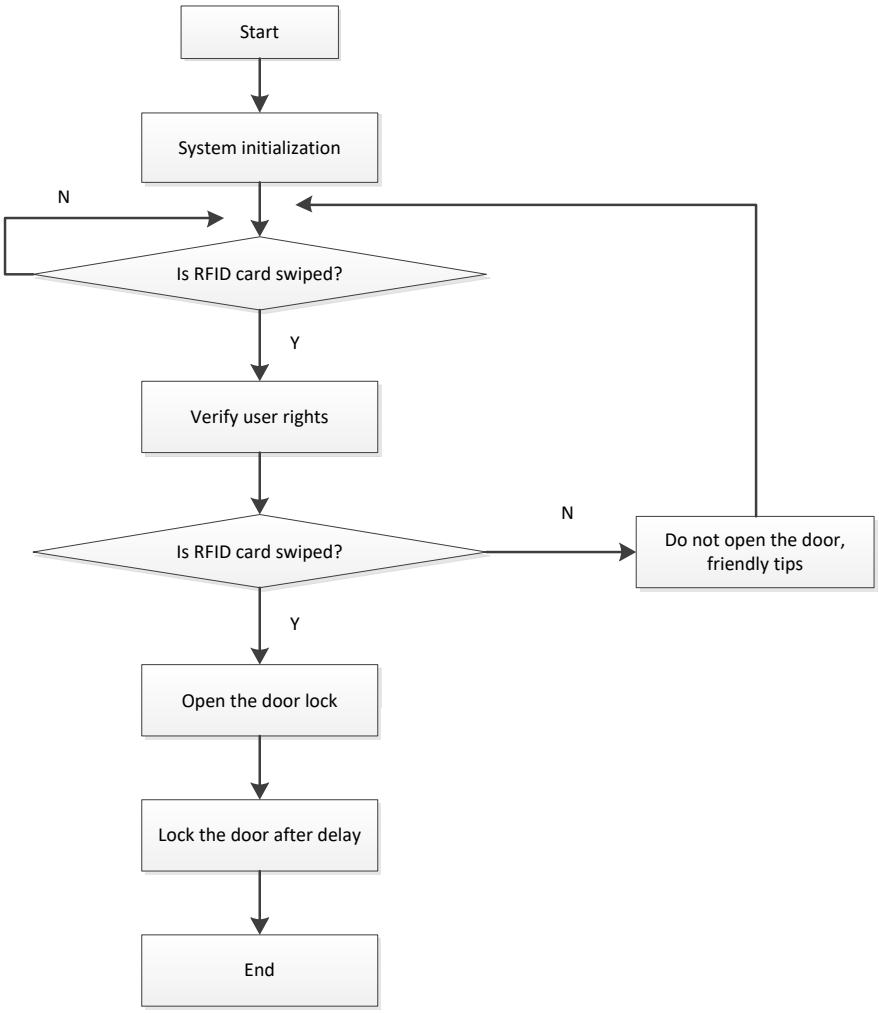

Figure 2 Access control operation process

4. The Realization of Access Control System Based on RFID Technology

When the system is implemented, RFID technology, UDP protocol and socket components are comprehensively used in strict accordance with MVC layered design mode. According to the operation logic, the system functions are encapsulated into classes. Based on the object-oriented programming method, the extracurricular physical exercise attendance system based on RFID and UDP protocol is realized. The main interface of the system is shown in Figure 5;

In the check-in system of extracurricular physical exercise shown in Figure 5, we can realize the check-in attendance of students' extracurricular physical exercise and the docking of basic data of students. The data management system based on B / S structure is shown in Figure 6. The system mainly analyzes and counts the check-in data, and provides all kinds of users with the data they need.

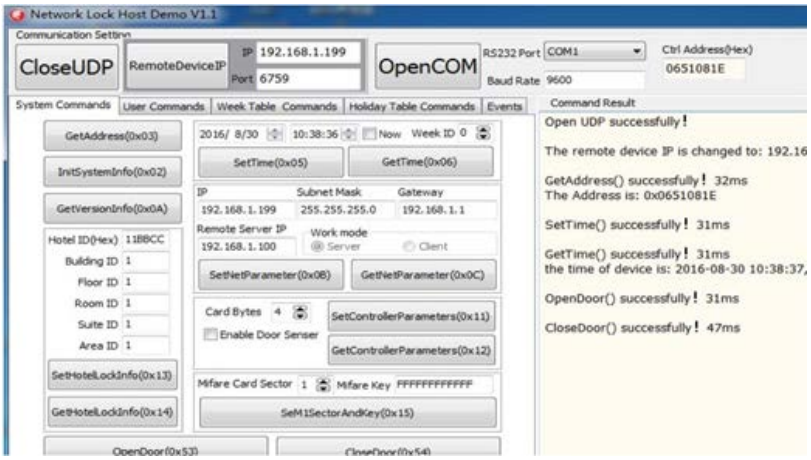

Figure 3 Main interface of access control system

5. Conclusion

The establishment of access control management system based on C / S architecture provides a more convenient door lock mode for laboratory teachers, laboratory classroom administrators, etc. In this paper, the design and implementation of the laboratory access control management system are introduced in detail. The developed laboratory access control management system has perfect functions, stable and reliable operation.

This paper analyzes the working principle and characteristics of RFID, and designs the laboratory management system. RFID radio frequency card is used in the system. Teachers or managers need to swipe the card when entering and leaving the laboratory for access control. The card reader reads the information, which will be transmitted to the management system. The management system will judge whether the user information has the authority to open the laboratory door lock and decide whether to open the door lock. At the same time, the user swipe card information will be stored in the personnel access record for the administrator to view. The administrator can manage these information, at the same time, add and delete user information to control user rights. However, as the RFID technology cannot recognize people, if the teacher does not bring the card, you can contact the administrator to confirm the identity, and then the administrator opens the door at the background.

At present, the laboratory access control management system is in trial operation. The test and application results show that the system is stable and reliable and meets the basic requirements of users.

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