

Solar Based Panel Access Controlling System Using Relay Network

Panchal Nilesh¹, Patel Priyansh¹, Rathava Umesh¹, Rathva Virendrakumar¹, Jagdish Bichve¹

¹Student, Electrical, Sigma Institute of Engg, Vadodara, Gujarat, India

²Assistant professor, Electrical, Sigma Institute of Engg, vadodara, Gujarat, India

ABSTRACT

This paper describes the design of solar based panel access controlling system using relay network is used for security purpose. Only person who is having smart card can only access the industrial panel to control total panel. For this we are going to use solar panel to give power and battery will be charged. We will use regulator to feed power to microcontroller. To drive motor L293D IC will be used. Now when person with smart card comes and put his card information to RFID reader. Then reader will give command to controller. Unique card number will authenticate person and if it match to data motor will open the door.

Keywords: ATmega 16 Microcontroller, RFID Reader, Solar Panel, 6V Electromagnetic Relay

I. INTRODUCTION

Radio frequency identification (RFID) is a wireless technology that can be used to develop the access control system. Automatic identification and access control system has become necessary to overcome the security threats faced by many organizations. By installing the system at the entrance will only allow the authorized persons to enter the organization. The system can also be installed at various points inside the organization to track the person's movement and to restrict their access to sensitive areas in the organization. In such a way, suspicious persons can be caught which will surely improve the security level in the organization.

In the figure the system block diagram is given. By studying the system practically it is divided into three parts.

- 1) ATmega 16 Microcontroller
- 2) RFID Reader
- 3) 6V Electromagnetic Relay

The aim of this project is to design of Solar Based Panel Access Control System Using Relay Network security system using Radio Frequency Identification Device (RFID), in which only authorized personnel are allowed access to a secure area. The working of the project is explained here.

II. METHODS AND MATERIAL

1. Block Diagram:

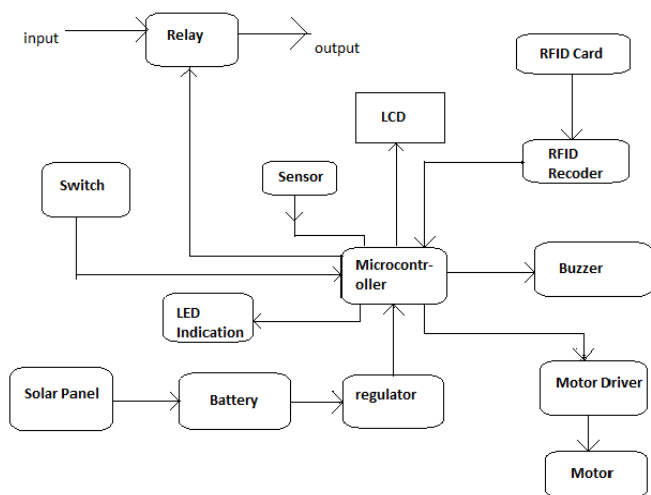


Figure 1. Block diagram

When the circuit is powered ON, the microcontroller will initially display a message as “Swipe the Card” on the LCD display.

When the RFID Card or Tag is swiped against the RFID reader, it will detect the ID card and sends the unique card no. to the microcontroller via serial terminal.

With the help of suitable programming, we need to compare the received card no. with the numbers that are already stored in the microcontroller or any database like external memory unit.

If the received number is matched with the already stored number, then the microcontroller will display the name of the card holder on the LCD and activates the motor driver IC. As a result, the door is opened for a predefined duration after which the door is automatically closed.

If there is no match for the received numbers with the stored numbers, then the microcontroller will not open the door and displays a message as “Access Denied” on the LCD display.

2. Material:

A. RFID Reader.



Figure 2. RFID Reader

RFID tags, or simply “tags”, are small transponders that respond to queries from a reader by wirelessly transmitting a serial number or similar identifier. They are heavily used to track items in production environments and to label items in supermarkets. They are usually thought of as an advanced barcode. However, their possible area of use is much larger. This paper presents a few new applications that are possible using RFID technology such as locating lost items, tracking moving objects, and others. RFID tags are expected to proliferate into the billions over the next few years and yet, they are simply treated the same way as barcodes without considering the impact that this advanced technology has on privacy.

B. Microcontroller ATMEGA16.



Figure 3. ATmega 16 Microcontroller

The Atmega-16 microcontroller is an 8-bit high performance microcontroller of Atmel’s Mega AVR family with low power consumption and high speed.

ATmega-16 microcontroller comes with 16KB programmable flash memory, EEPROM of 512 bytes and static RAM of the 1KB.

It has 40 pins. The 32 pins are for input/output lines which are divided into four categories designed as PORT A, PORT B, PORT C and PORT D.

C. Electromagnetic Relay:

Relay is an electromagnetic device which is used to isolate two circuits electrically and connect them magnetically.

They are very useful devices and allow one circuit to another one while they are completely separated. They are often used to interface and electronic circuit to an electrical circuit which is works at very high voltage.

For example, relay can make 5V DC Battery circuit to switch 230V AC circuit. Small sensor circuit can drive to electrical bulb.



Figure 4. Electromagnetic Relay

A relay switch can be divided into two part: input and output. the input section as coil which is generate magnetic field when small voltage from electronic circuit is applied to it.

These voltage is called operating voltage commonly used to relay are available in different configuration of operating voltage Output section of operating voltage like 6volt, 9 volt, 12volt, 24 volt etc.

III.RESULTS AND DISCUSSION

Flow Chart:

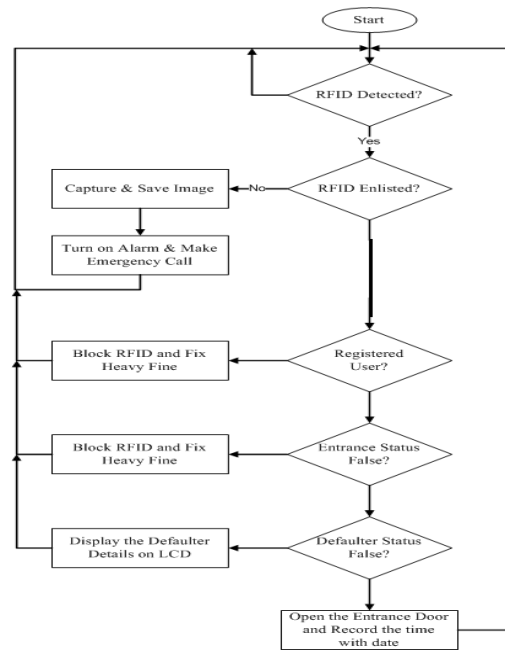


Figure 5. Flow Chart

While entrance and exit monitoring controllers help in tracking the users, mess monitoring controller automates the mess attendance system.

RFID tag number, the controller searches it in a list of registered numbers stored in NV-RAM. If a match is found, controller asks the user to enter the password. The password list of registered users is also maintained in NV-RAM corresponding to RFID tag numbers. If the entered password is correct, controller grants access to the user for entering the mess hall. At the same time, controller sends the user information along with mess attendance to the computer system through main controller. The computer system updates the database and sends “attendance recorded” message to the mess controller. In this way, the exact mess charges are maintained in on-line database. The flow chart describing the operation of mess monitoring controller is shown in Figure 5.

RFID based Security Access System is designed in this project. As the system uses RFID Technology based identification, it can be used to access secured areas like research centers, defense sites etc.RFID tag and reader should not be in LOS (low operating system) to make the system work. Unlike barcodes, tag can store

more information. More over it follows instruction /command of reader.

Tag can be read only as well as read or write unlike barcode. This technology is use for security and attendance purpose in colleges. Even though RFID Technology is secure, the security can be increased by integrating other security measures like facial detection, finger print scanner etc.

As the card details are stored in the microcontroller, only a limited number of card details can be stored. This can be increased by implementing a memory unit like EEPROM.

IV.CONCLUSION

In this paper, design of a security and access control system for use in Punjab University hostels is presented. The system uses radio frequency identification with biometrics technology to differentiate between valid and invalid users. The system accomplishes the security and access control task by processing information from sub-controllers. These controllers include entrance monitoring controller, exit monitoring controller and mess monitoring controller installed at entrance gate, exit gate and mess gate respectively. Industrial, mess, colleges, commercial building etc. are used our projects.

V.REFERENCES

1. D L. Wu, Wing W. Y. NG, D. S. Yeung, and H. L. Ding, "A brief survey on current RFID applications," in Proc. International Conference on Machine Learning and Cybernatics, Baoding, July 12-15, 2009, pp. 2330-2334.
2. B Yan and D. Y. Lee, "Design of spot ticket management system based on RFID," in Proc. International Conference on Networks Security, Wireless Communications and Trusted Computing, 2009, pp. 496-499.
3. G Ostojic, S. Stankovski, and M. Lazarevic, "Implementation of RFID technology in parking lot access control system," in Proc.

Annual RFID Eurasia Conference, 2007, pp. 1-5.

4. N Ahmad, S. Butler, and U. Ramachandran, "GuardianAngel: An RFID based indoor guidance and monitoring system," 2010, pp. 546-551.