Design and Implementation of Radio Frequency Identification: Security cum Attendance System

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Abstract- The objective behind the RFID based attendance and Security system is to make and analyze the data of attendance of employees, student as well as security of the organization or complex .RFID tags can be applied in many operations where the identification and tracking is required. For any organization, Security is a concern, so by the use of RFID any employee can be restricted to the certain private areas and in any case there is a security breach it directly reports to the data collection centre and the buzzer will make a sound. RFID can also be used in Identification and tracking. By the use of microcontroller accessibility of every person can be checked. It gives a unique identification to every individual and assures the security. This makes the system time efficient.

Keywords – RFID tags, Reader Microcontroller, LCD display

I. INTRODUCTION

The aim behind this paper is to develop a smart system for any organization where hundreds of employee works and every individual are bound for the limited access. Also, it is not easy to calculate the attendance of the employees on monthly basis manually it becomes very time consuming if we randomly enter every employees name and time of entry in the office and exit from the office. RFID fulfils this purpose. By creating Database in the RFID tags every individual gets a specific identity. When the employees enters into the office the RFID reader reads the information related to the identity and verify and grant him access into the office. Data collection point saves the information. If a new employee joins in the organization that his Identity code can be created and if any employee leaves the company his identity code may be erased and from the next time he cannot enter into the office. If any person whose entry is unauthorized the buzzer will make sound and will send information to the control center Measurement is a factor that is frequently used in ones daily life. Generally measurement is finding a number that shows size or amount of a particular entity. Measure of an entity can be judged by its magnitude and dimension (unit). Thedistance is measured using scale, ruler, measuring tape etc which needs physical contact with the target whose distance is to be measured. RFID tag is made of Tag and Reader Tag stores the identification number given to the particular user and the memory stores the additional information. When the tag comes in contact with the reader it reads the information and identification and verifies.

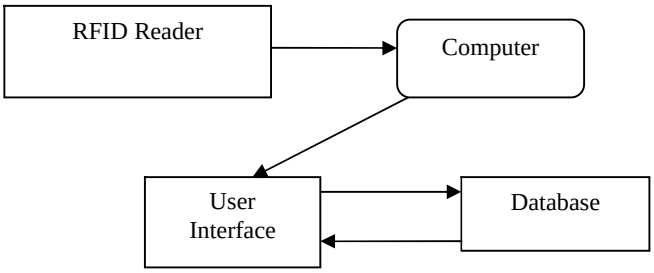

Figure 1: Block Diagram of Proposed Technique

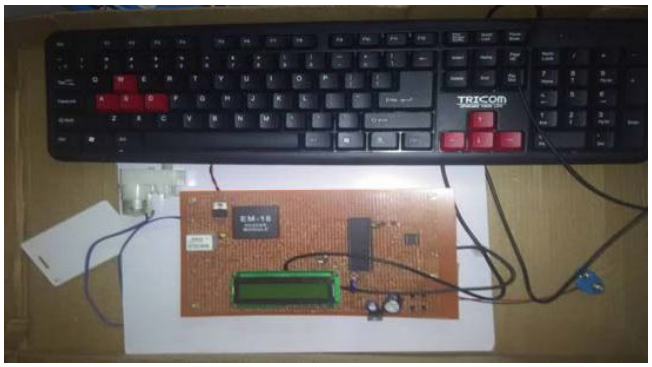

Figure 2: RFID Based attendance and security system

1.1 LITERATURE REVIEW

RFID Attendance system is based on the leading technology .The use of RFID is growing rapidly in electronic field for attendance [1]tracking goods [2], vehicles[3], animal tracking[4], items inventory in retail store[5] and automatic toll collection[6]. This technology uses radio waves from transmission of data from RFID tag; the reader receives data for the identification and tracking object [6]. This type of technology was also used in the World War II[7]. It was used to identify between friend and foe. A U.S. national Charles Walton was the first to get a patent for active RFID in 1973 .RFID has large role time and attendance management as well as security access. This provides a relief to the organization as attendance of all employees is ready in one click.

II. METHODOLOGY

RFID is based on the coupling effects. Components of RFID are Reader and Tag. The function of the reader is to transmit a signal called carrier signal and to receive the response from tag near to the reader. A tag receives the signal transferrd from tag and response from tag and responds to the reader by activation the entry signal.Reader can be mounted on the door frame to receive tag data from person passing through it. The reader emits radio waves from one inch to feet based upon power output. The reader detects the tag as it comes in contact with the electromagnetic zone and activation signal is given and data is passed to control room through server. All the data of the employee's information is stored in the database of the server used for the company entry access.

III. Configuration Blocks of RFID System

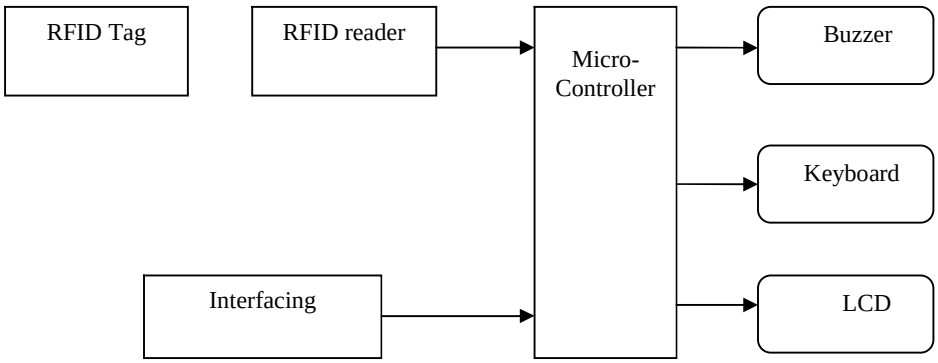

Figure 3: Configuration Overview of RFID System

3.1 Micro-Controller

Microcontroller AT89C205[8] is used in RFID attendance and security system it functions as a brain of the computer. Its main task is to make decision of input and gives the result output.it is a high performance CMOS 8 bit microcontroller having 8K bytes of memory and requires low power to operate. It has 32 I/O lines. LCD is interfaced with the microcontroller. It also devides how and when the output should be sent to the LCD display.

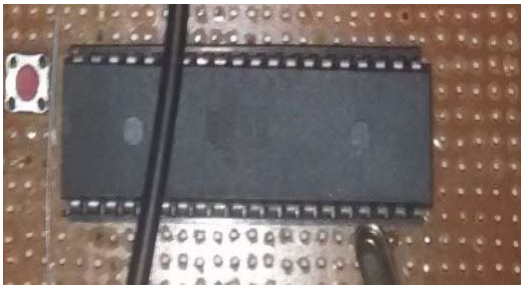

Figure 4: Microcontroller

Figure 5: RFID Card

Figure 6: RFID Reader

Figure 7: LCD

3.2 RFID CARD

RFID card consist information of that user which is needed to enter in the complex. Which could be a unique code or identification number and the memory stores the additional information needed.RFID card can be of two types Read only and Read/write. In Read only cards no additional information can be added. All the information is pre-written by the manufacturer. It uses serial communication to send the data. RFID card are made of plastic body which consists of internal circuitry, Different types of RFID are being used in now a days depending upon the application.

3.3 RFID READER

RFID reader reads the information stores on the RFID card. It consists of on-chip antenna and uses 5V power supply. It operates at 125 KHz frequency. After reading information from the RFID card and sends it to the microcontroller through the receives pin. Microcontroller matches it with the data stored in the memory and verifies it.

3.4 LCD DISPLAY

It is an electronic optical device used to display the information of the employee based the data base and direction sent from the microcontroller. It consists of 16 pins with inbuilt back light. In RFID access after reading the card with RFID reader. After verification from the database the information of the employee displays on the Liquid Crystal Display (LCD).

3.5 FREQUENCY RANGE OF RFID

RFID can be designed opearting at three frequencies

Low Frequency :- Frequency range is 125/134 KHz generally used for access control, vehicle tracking, animal counting and tracking.

High Frequency :- Frequency range is 13.56 MHz,data upto 1.5 meters can be read easily.

Ultra High Frequency:- Frequency range is 850 MHz to 950 MHz ,can read data upto 3 meters easily.

IV. PROPOSED SYSTEM FLOW DIAGRAM

In RFID System human error possibility is minimum. It is hard to do all the entries manually but with this system this task is easy. Once the tag enters in the electromagentic zone ,the reader gets activated and send the information to the microcontroller and verification is doen on the basis of the database. If entry is valid then the door gets unlocked ,and gate gets again locked after entry of that person. If entry is invalid then the gate will remain locked and buzzer will alarm. Figure 8 shows the flow chart of the proposed technique.

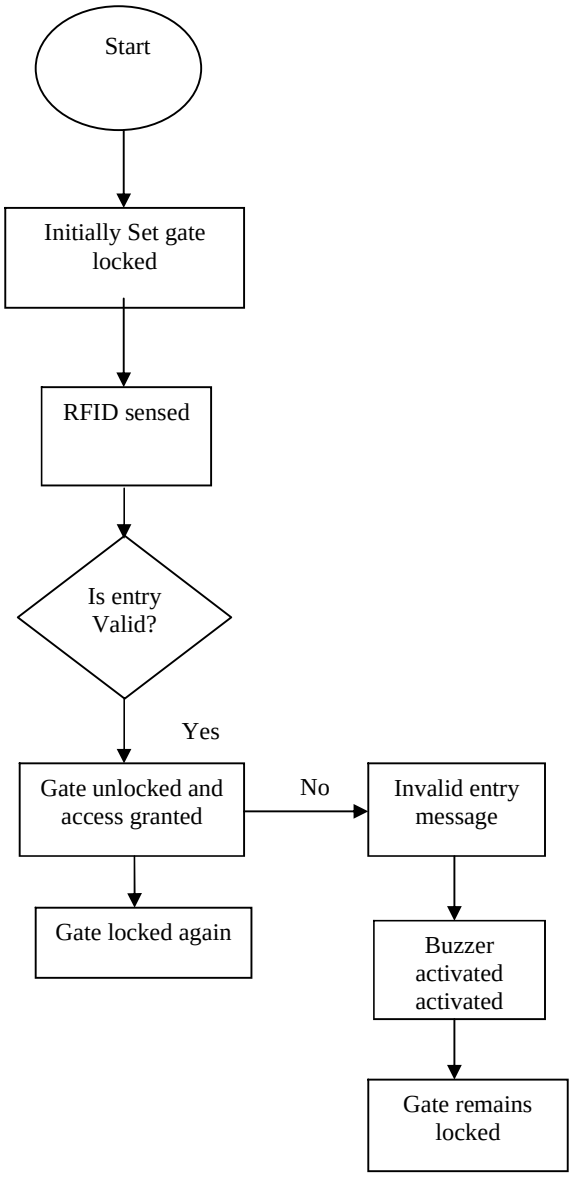

Figure 8: Flow diagram of RFID system

4.1FUTURE SCOPE OF THE PROJECT

RFID system can also be used with the wireless sensor networks which can sense environmental conditions. RFID can also be used in the Robotics with the help of wireless sensor network. It can be interfaced with the GSM system . RFID system can be used for the anti money laundring . Banks cam use the RFID technology to track the movement of money. This system can be used to generate through web based system. A camera may be installed into the system to check the person that he is not using other person's card. Late entrant can be selected by improving the system. Cloning of RFID tag can be prevented by encryption of data.

4.2 SOFTWARE

The programme is written in assembly language and microcontroller 8051 is used to assemble. The programme is written such a way thay it is easy to understand. By using this microcontroller, new entry can be created and deleted.

V. CONCLUSION

The objective of the project was to design and implement an RFID based attendance and security system. The RFID setup detected the tag when came in the contact of the RFID reader. It is a low cost, reliable technology which does not need any human intervention except creating database initially. This system produces exact report any human intervention. RFID system is a very cost effective system. Small power requirements and broad deployment enhance the value of the technology but Privacy may be a concern but still many organizations are trailing this technology.

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