



RFID Based Attendance System with an SMS Alert

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ABSTRACT: Now a days due to easy availability of all the information on the internet, students are less motivated to attend the classes, due to which most of the students are unable to maintain minimum attendance. This work is to simplify attendance recording system by using Radio Frequency Identification (RFID) technology. RFID based Attendance recorder with SMS alert System is a web based application that will be developed to overcome the above stated problem. The system will be developed by using GSM (Global System for Mobile communication) technology and database support. The information from RFID Database handling System will be used for taking attendance and for sending SMS alert also. This System interacts with parents by sending message. Therefore, the system functionality is not only records the student attendance, but also sends alert SMS to their parents when the student is absent.

KEYWORDS: RFID Attendance Systems, Attendance with SMS alert, Student attendance with RFID, Attendance system, RFID system

I.INTRODUCTION

Most of the educational institutions' administrators are worried about student irregular attendance. Absenteeism can affect student whole academic performance. The ordinary method of taking attendance by calling names or signing on paper is very time-taking and insecure, and also this method is inefficient. Radio Frequency Identification (RFID) based attendance system is one of the solutions to label this problem. This system can be used to take attendance for student in school, university and college. It also can be used to take attendance of no. of workers present in working places. Its ability to uniquely identify each person based on the code present for every RFID tag type of ID card make the process of taking the attendance easier, faster and secure as compared to ordinary or traditional method. Students or workers only need to place their ID card on the reader and their attendance will be taken immediately. With actual time capability of the system, no. of attendees taken will be more precise since the time for the attendance taken will be recorded. The system can be connected to the computer using RS232 or Universal Serial Bus (USB) port. It stores the data of attendance taken, inside the database. Another way of viewing the recorded attendance is by using HyperTerminal software. A frame-work of the system has been successfully fabricated.

II.RFID SYSTEM

Radio frequency identification (RFID) is a standard term that is used to describe a system that transmits the identity (in the form of a unique 12-digit series number) of an object or person wirelessly^[1]. The identity is transmitted using radio waves. This comes under the wide category of automatic identification technologies. RFID technology does not require contact or line of vision for communication, unlike universal UPC bar-code technology^[2]. RFID data can be read through the human body, clothing, utensils, toys, non-metallic materials, etc.

RFID tag: RFID Tag is an integrated circuit chip that has unique electronic unique code (EUC) contained in it. In a basic RFID system, tags are attached to all items that are to be stalked. RFID tags that are used for this work are shown in fig.1. The microchip is present inside RFID tags. The microchip includes minute circuitry and an integrated silicon chip. These tags are connected to an antenna that can be built into many variety kinds of tags including apparel hang

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tags, labels, and security tags, as well as a wide variety of industrial asset tags. The tag chip contains memory which stores details of students and other information so that it can be scanned and tracked by RFID readers anywhere. Here “UNIQUE” refers to each and every code word of the tag and is independent of other code word^[5]. The tag acts as a Key that is capable of opening a particular locks .So, it is also named as RFID key. The sequence is a numeric serial, which is stored in the RFID memory.

Each tag can store 2Kbyte of information about every student. The tag memory can be permanent or recordable, which can be again programmed electronically by the reader any number of times. There are three types of RFID tags which are active, semi-passive and passive. Passive tags are passive in nature i.e. they don't have any battery source built in them. They take electric power from the electromagnetic field generated by the reader. They do not have any active transmitter. They rely on altering the RF field from the transceiver in a way that the reader can detect. The word itself refers that active tags are active in nature i.e. they do not require any extra source externally, they have their own inbuilt battery. The high frequencies that are transmitted by it are detected at a longer range.



Fig:1 RFID Tags

RFID reader: An RFID reader is a network connected device which may be fixed or mobile, with an antenna that sends power as well as data and sends commands to the tags. EM-18 RFID reader is shown in fig.2. RFID Reader is a scanning device that uses the antenna to identify the tags that are in its zone^[4]. It transmits signals at specific frequencies. RFID readers are usually ON all the time. It continuously transmits radio energy in the form of waves and awaiting any tags that enter their field of operation. EM 18 RFID Reader is shown below in fig2. EM 18 RFID reader is the device capable of reading. It redeems the information or data is stored inside the RFID tags. Similar to RFID tag, RFID reader is also of 2types: (a)Active reader and (b)The passive RFID reader.

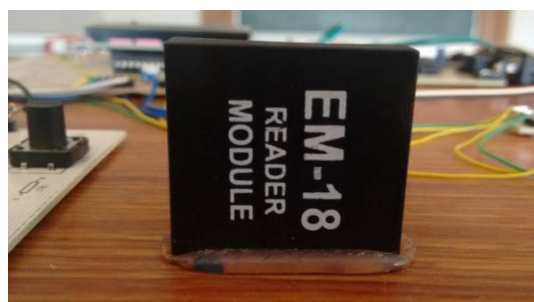


Fig:2 RFID Reader

III. ANTENNA

The tag and reader communicate with each other through a medium called antenna. It has the property of electromagnet. The antenna can energise a passive tag and transfer data by emitting wireless impulses. The antenna



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comes in different models. The different types of antennas are mentioned as follows: (1) Stick antennas, (2) Adaptive antennas, (3) Omni directional antennas (4) Di-pole or multi-pole antennas, (5) Beam-forming or phased-array element antennas, (6) Circular polarized, (7) Gate antennas, (8) Patch antennas and (9) Linear polarized.

IV.MIDDLEWARE

The middleware is an interface required to manage the flow of data. It directs the flow of data from reader and to transmit it efficiently to the backend database management systems. The middleware supervise the number of tags present in the system. It extracts pertinent information from the readers.

The software module of the middleware processes the raw data given in by the hardware circuit. The raw data fed into the middleware are:

1. Unique tag sequence number
2. Timestamp of data entry

The middleware receives the unique identifier from the reader and compares it with the list of stored tags. The details are fetched and displayed on the LCD display, if the identifier sequence is present. A new record is created with the corresponding timestamp, if the identifier is not present. And the information is stored in the database. The student will be assisted to fill in the following details:

1. Name
2. Course details
3. Stream
4. Timester

V. DATABASE STORAGE

The backend database primarily deals with the storage of relevant information recorded by the reader and communicated by the middleware. For example, the middleware in an automated security control system will store all tag readings taken by the reader in the database. This helps create log entries for the system.

The new student registration is done by making modifications in the arduino program. The new student's details are added in program sequence. Data once stored in the database can only be modified by the system administrator. The RFID reader used in this work operates at a frequency of 125 KHz with an effective read range of 10cm only. A short read range is preferred so as to maintain the authenticity and security of the attendance being recorded.

VI.GSM MODULE

A GSM modem is a specialised type of modem which accepts a SIM card. It operates over a signature to a mobile operator, just like a mobile phone. This can be a true modem device with a serial, USB or Bluetooth connection, or it can be a mobile phone that provides GSM modem capabilities. GSM modem is connected to personal computer. SMS, commonly referred to texting message. It is a service for sending short messages to mobile devices with maximum characters up to 160. Mobile devices include Cellular Phones and Smart phones. "Arduino SMS" app is installed in mobile. It is connected to arduino through Bluetooth interface (shown in fig.3). When student get absent, this modem sends SMS to the parent's mobile indicating that the student is absent to attend classes in college.

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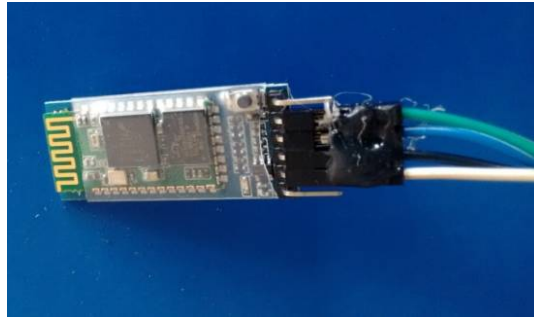


Fig:3 GSM Module

VII.APPLICATION DESCRIPTION

The primary aim of the research is to uniquely identify individual students based on their unique tag identifiers. A systematic and serialised approach is required to solve this difficulty. The important characteristics of the application include:

- Perform attendance automatically
- Generate report of students who are present for a particular course
- Error free tag identifier recognition
- Easy measurability to incorporate more records
- Togetherness and reliability in data storage

This paper focus on the principal purpose to overcome the human errors while recording student attendance and the formation of a data basic student attendance database system with an enhanced overall efficiency. The application graphical user interface (GUI) is sketched using Visual Basic 6.03 and Microsoft Access is used as the database supplier. The Atmel4 AT89S52 is the heart of the system, which is a less-powered high performance CMOS 8bit microcomputer with 8K bytes of downloadable flash programmable and erasable read only memory.

A 12 digit number is incorporated on the RFID tag. We have used passive tag. Whenever the tag is swapped near the reader, because of the induced mutual inductance energy, data is moved to reader. The data is transferred to the microcontroller, from reader. Then attendance is taken by the microcontroller if the tag is found to be authenticated.

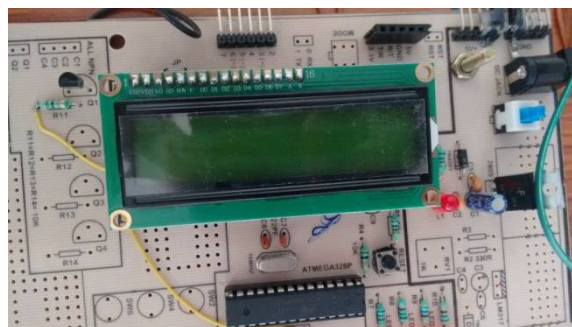


Fig:4 LCD Display

The circuit contains a 16x2 LCD7 display panel (shown in fig.4), which is the output device of the system. It displays the user's information when the stored tag is read by the reader. The serial interface allows connectivity to a local database for data storage and retrieval. The input to the system is the unique tag identifier stored in the RF tag, which is sensed by the reader. The components are mounted on the printed circuit board for inter dependability between them.

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

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Vol. 6, Issue 4, April 2017

VIII. WORKING PROCEDURE

Fig.5 shows hardware implementation of the work. The RFID tag will be taken in the range of the reader. The RFID reader senses the signals of the RFID tag within 10cm of range. The reader sends out a power pulse to the antenna. The system has two antennas, which of these, one situated on the tag and other on the reader. The RFID reader stores the data which is stored sent by the tag. The stored data passes from reader to microcontroller and students information get displayed on LCD display. The attendance of the students is maintained and their status is updated to the parents via GSM. GSM system is used to send SMS to their parents.

As soon as the student swipes the card, the student is asked to enter 4-digit password, by which the door will be opened for that student. At the same time LCD shows the text as “enter the student”. When student don’t swipe the card with in specified time, the student get marked as absent. The detailed information of each student with real time recording is listed on PC by using processing-2.2.1. And an SMS alert is sent to respective parent, saying that the “xxxx student is absent”.

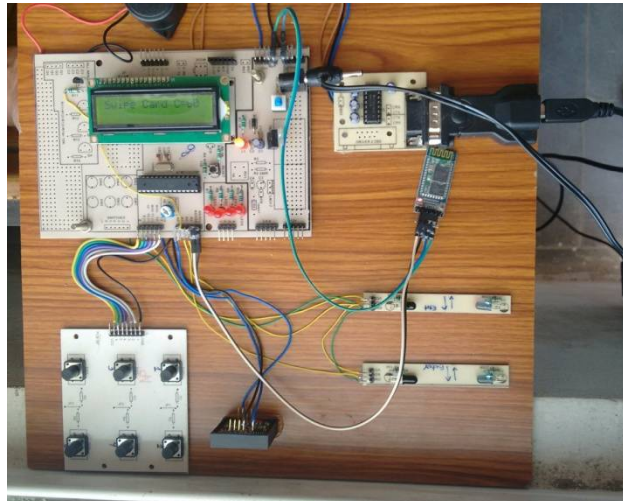


Fig:5 Prototype of the work

IX. CONCLUSION

A low cost RFID Based Attendance System framework has been successfully developed. The prototype of the system provides several advantages upon standard method of taking attendance in class. The system has automated attendance. The prototype developed in this work is closely packed and light weight. It consumes low power. It can run using power adapter or battery power. Therefore, it is very portable and can be carried to the class for taking the attendance.

S.NO.	STUDENT NAME	BRANCH	ID	TIME	DATE	STATUS
1.	Surya Prathap	EEE	1	16:06:31	23/02/2017	Present
2.	Sai Lalitha	EEE	2	16:06:48	23/02/2017	Present
3.	Gopal	EEE	3	16:07:07	23/02/2017	Present

Fig:6 Status of students in Excel Sheet

The status of every student is displayed in excel sheet(as shown in Fig.6). The attendance taken is protected and precise since the tag ID has a unique 12-digit code. The prototype is user-friendly with easy available switches and



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communication ports^[3]. The main advantage that is provided by RFID gadget over other attendance system is that, not necessary to place the card exactly near to the RFID Reader. Attendance can be stored and recovered easily. Another advantage of the system is it has high identification and verification speed. This system can be applied not just in the classes but also in working places with the feature total working hours can be recorded.

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