

RFID Based Attendance System Using GSM

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ABSTRACT

Students are less motivated to attend the classes due to easy availability of all the information on the internet, 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. Therefore, the system functionality is not only records the student attendance, but also sends alert SMS to their parents when the student is present or absent.

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. In this particular project we show that how we provide an advance attendance system with time management system. In this project we use one hardware circuit with RF reader interface and RF Passive card for attendance system. Whenever we show any card to the hardware system then reader gets the data of RF card. The system can be connected to the computer using ARDUINO IDE Software, it process the data whatever we code and compare it with database in access.

II. RFID SYSTEM

Radio frequency identification (RFID) is a standard term that is used to describe a system that transmits the identity and track tags attached to object or person. RFID refers to a wireless system comprised of two components tags and readers. The reader is device that has one or more antennas that emit radio waves and receive signals back from the RFID tag.

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 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.

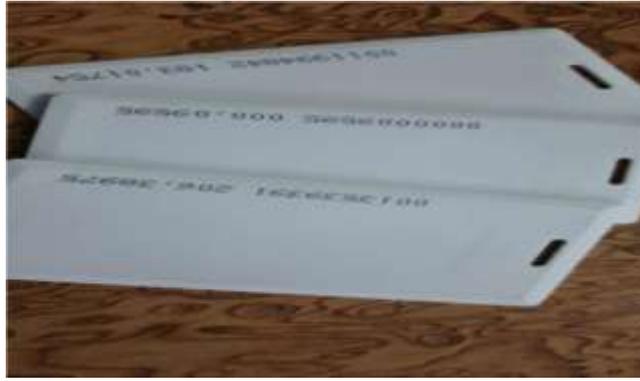


Fig 1: RFID Tags

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.



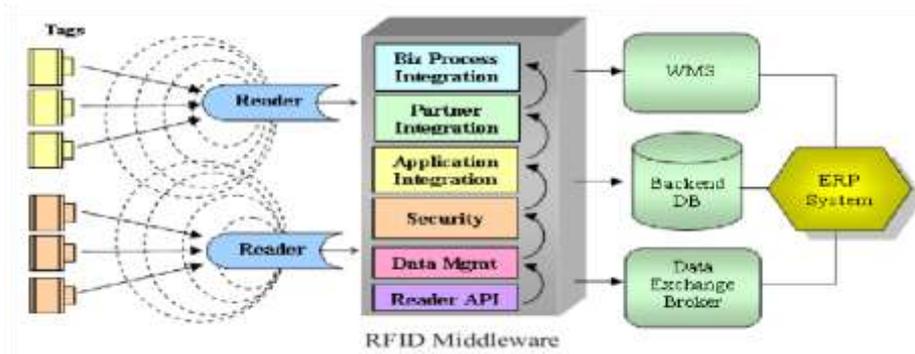
Fig 2: RFID Reader

III. ANTENNA

The antenna emits radio signals to activate the tag and read and write data to it. Antennas are the conduits between the tag and the transceiver, which controls the system's data acquisition and communication. Antennas are available in a variety of shapes and sizes; they can be built into a door frame to receive tag data from persons or things passing through the door, or mounted on an interstate tollbooth to monitor traffic passing by on a freeway. The electromagnetic field produced by an antenna can be constantly present when multiple tags are expected continually. If constant interrogation is not required, a sensor device can activate the field.

IV. MIDDLEWARE

A RFID middleware is the interface that sits between the RFID hardware and RFID applications. ... It handles and processes the raw RFID data before passing it as aggregated events to the applications; it provides an application level interface for managing RFID readers and querying the RFID data.



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. A short read range is preferred so as to maintain the authenticity and security of the attendance being recorded.

VI. GSM MODEM

A GSM modem is a specialized 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.



Fig 3: GSM Modem

VII. APPLICATION DESCRIPTION

Followings are the application description:

- ✦ It performs the attendance automatically
- ✦ There is error free tag identifier recognition
- ✦ Message of being present or absent is sent to the registered mobile number
- ✦ It is an embedded model

Human errors can be arise while recording the attendance, hence this paper focus on the principle purpose to overcome the human errors while recording student attendance with the overall efficiency.

We have used RFID tag. Whenever the RFID tag is swapped near the RFID reader, data is moved to the reader. The data is transferred to the ARDUINO UNO, from the reader. Then the attendance is taken by the attendance system if the tag is found to be authenticated.



Fig 4: LCD Display

The circuit contains a 16x2 LCD display (shown in Fig 4), which is the output device of the system. It displays the user's information when the RFID tag is read by the RFID reader. The input to the attendance system is the unique tag identifier stored in the RF tag, which is sensed by the reader. The components are mounted on the PCB for the inter dependability between the component.

VIII. WORKING PROCEDURE

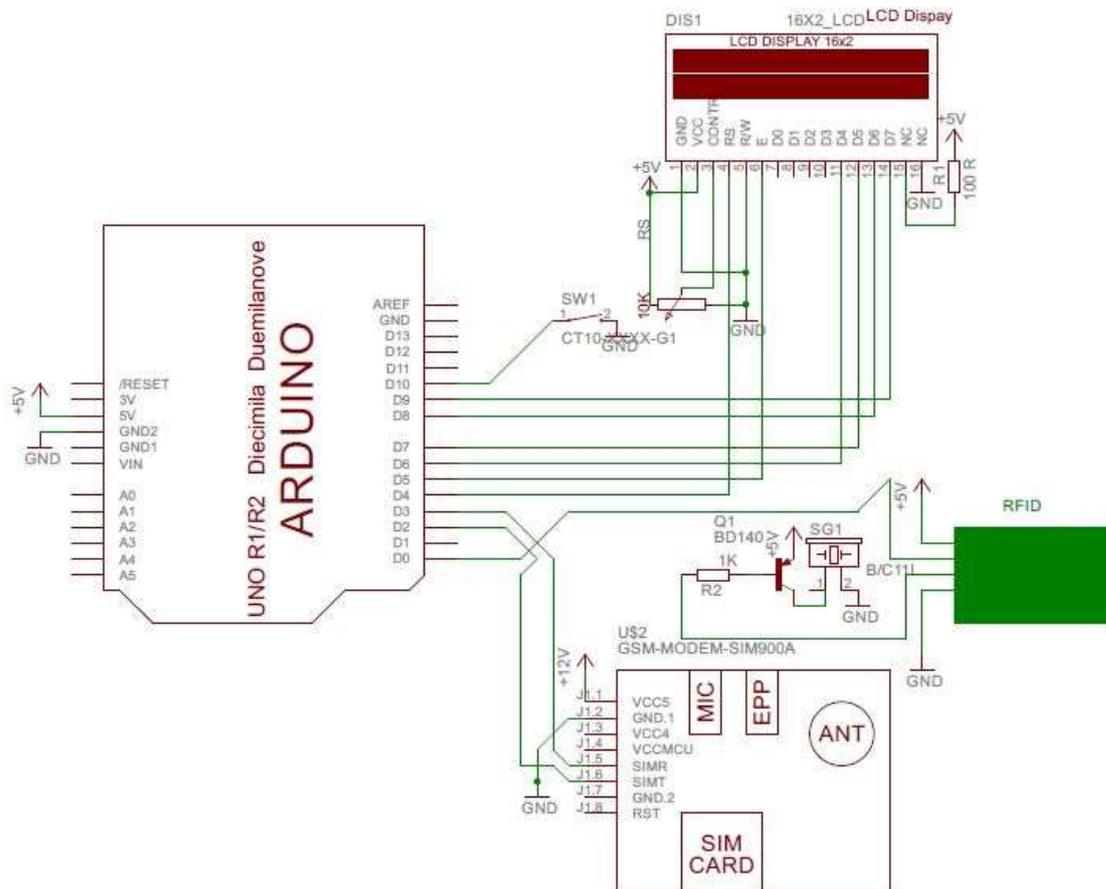
Hardware implementation of the work can be seen in fig.5. The RFID tag will be taken in contact to the reader. RFID reader reads the RFID tag. The RFID reader stores the data of the tag. The stored data passes from reader to microcontroller and students information to the LCD display. The attendance of the students is taken and the message of being present or absent is sent to the parents via GSM. GSM system is used to send SMS to their parents.

When the student press the switch, the student is asked to place the RFID Tag to the RFID Reader. When the student punch the RFID Tag within the specified time he/she marked as Present but when he/she doesn't punch the RFID Tag with in specified time, the student get marked as Absent and an SMS alert is sent to his/her parent, saying that "Your child (xyz) is absent" (in case of absence) and "Your child (xyz) is present"(in case of presence).



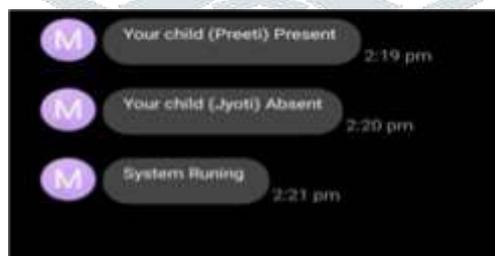
Fig 5: Prototype of the work

IX. CIRCUIT DIAGRAM



X. RESULT

The status of every student is displayed. 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 communication ports. 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.



XI. 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 supply. Therefore, it is very portable and can be carried to the class for taking the attendance.

XII. FUTURE WORK

- ✦ Study of other RFID techniques for better service and security.
- ✦ Interfacing the system with an Ethernet Shield so that data can be transmitted wirelessly too many other PC's.
- ✦ Range of RFID reader can be further increased so it can detect RFID tag easily by a distance.

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