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Smart Id card system

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ABSTRACT

The Smart ID Card System, a system wherein an individual can use the ID card for Door Access and Attendance Management. RFID technology has been employed in this system. When the ID card (containing the RFID tag) is found to be valid by the RFID reader, door access is provided. The door access time (In-time and Out-time) is noted in order to provide the attendance. The attendance of the student is updated in the university portal and also a message is generated to parents through GSM technology. This entire system is divided into two main parts – The Hardware and the Software. The Hardware part includes a motor unit (connected to the door); the RFID Tag (ID card); RFID Reader, which is connected to the host computer device using a serial to USB converter cable and a GSM Module. The Software part includes the Interface created using Microsoft Visual Studio, which is connected to the student database present in Microsoft Access.

Keywords: *Smart Id card, Door access, Attendance management, RFID, GSM*

1. INTRODUCTION

RFID - Radio-frequency identification (RFID) is a technology that uses radio waves to transfer data from an electronic tag, called RFID tag or label, attached to an object, through a reader for the purpose of identifying and tracking the object. RFID technology which is a matured technology that incorporates the use of electromagnetic or electrostatic coupling in the radio frequency portion of the electromagnetic spectrum to uniquely identify an object, animal, or person. RFID chips contain a radio transmitter that emits a coded identification number when queried by a reader device.

The tag's information is stored electronically. The RFID tag includes a small RF transmitter which transmits an encoded radio signal to interrogate the tag and receiver which receives the message and responds with its identification information. Some RFID tags do not use a battery. Instead, the tag uses the radio energy transmitted by the reader as its energy source. The RFID system design includes a method of discriminating several tags that might be within the range of the RFID reader.

Door access system - RFID Based Door Access System will help in identifying authorized persons and provide access only to those. The major work is for the Microcontroller to communicate with the RFID devices and store authorized person's data. This system should be able to minimize the technical human error. Apart from this, the system should help the user to transform into a paperless environment and save time.

Attendance management system - The primary aim of the project is to uniquely identify individual students based on their unique tag identifiers. The key characteristics of the application include:

- Perform automated attendance
- Generate a report of attendees for a particular course
- Error-free tag identifier detection
- Integrity and security in data storage

This paper concentrates on the principal purpose to overcome the human errors while recording student attendance. The attendance is obtained with the ID cards which use RFID technology. It is then updated in the university portal. The message regarding the attendance is sent to the parents using GSM Technology.

2. SMART ID CARD SYSTEM

Implementation

Working – The Smart ID Card System depends on RFID technology and GSM Technology. The system is a combination of the door access system, attendance management system and the GSM system to generate messages to parents regarding the attendance of the student. Apart from all this, the attendance of the student is also uploaded to the university portal for further use.

The working of the system begins with the RFID Reader identifying the RFID tag present in the student's ID card. If the tag is found to be valid, further processes are carried out. If the tag is invalid, the access is denied.

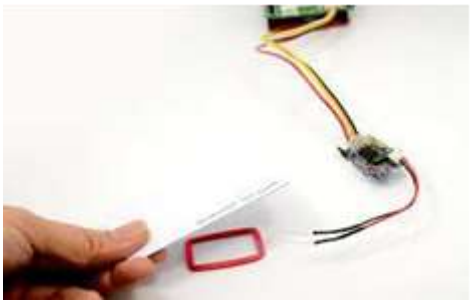

Figure 1: RFID Tag and RFID Reader

Once the RFID reader provides access to the user or student, the door access is provided. The door access time that is in-time or out-time is noted. This time provides the attendance. Every RFID tag is unique and the RFID reader is connected to the database (student database in this case). This database and RFID reader is in turn connected to the university portal and a GSM Module. The university portal will store the attendance report of the student. The GSM module is used in order to generate messages to parents regarding the attendance of the student. A message format is set and as the door access time is noted, the attendance message is generated to the parent. In case the student is absent, the message of absence is generated. This is done when any of the students in the database haven't turned up within the specified in-time and out-time. The Reader is also connected to a display in order to showcase the details

Figure 2: Hardware Elements

Software Implementation: The proposed system has been explained as follows:

Step 1: RFID Reader Recognizes the RFID tag.

Step 2: RFID Reader encrypts code sent through the tag.

Step 3: The encrypted data is matched with the database.

Step 4: If the data matches, access is provided, else denied.

Step 5: For the Attendance Management System, the RFID Reader is connected to the computer through serial communication.

Step 6: The Computer notes the door access timing and sends the data to the database via a Graphical User Interface (GUI).

Step 7: The database uploads the data in the university portal.

Step 8: The GSM Module generates a message to parents.

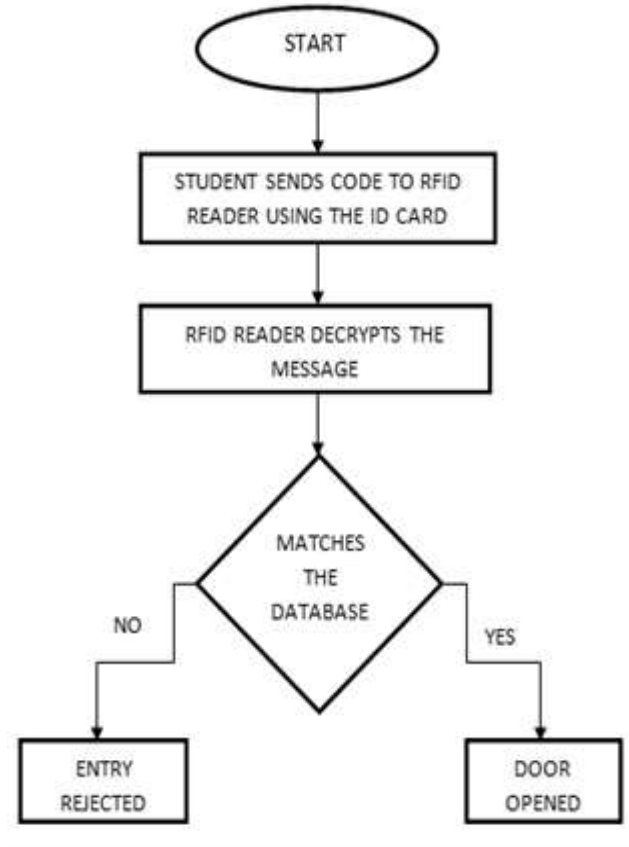

Figure 3: Flowchart for Door Access System

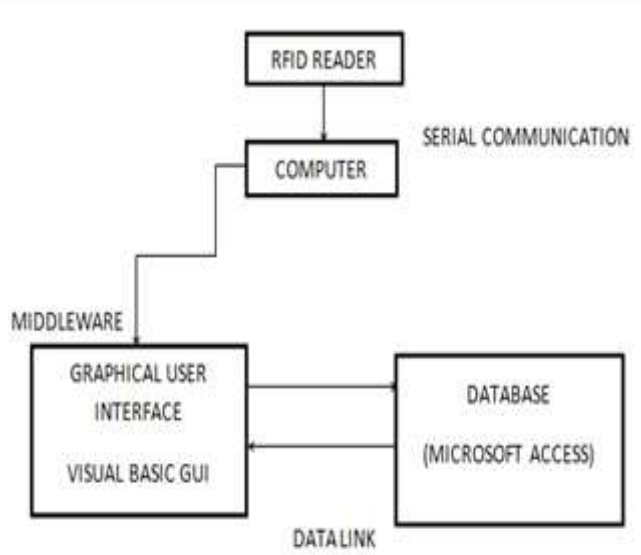

Figure 4: Flowchart for Attendance Management System

3. RESULTS AND DISCUSSION

The proposed system was tested using a database of few students and the unique RFID tags for each student. The door access provided only for the authorized students. The attendance was posted immediately in the university portal and messages were received by parents.

Door Access System: The door access system is mainly a circuit based system in which the door is connected to a circuit. As a model, we have used the disc drive to show the opening and closing of the door. The circuit components are the PIC motherboard and the other is the circuit made of relays, capacitors, and inductors. These two parts are

connected to the drive which acts as the door. These are also connected to the transformer which transforms the signals and then it is connected to the RFID detector and reader. A small part lies in the software part where the microcontroller is programmed only to provide access to particular people. That software part is on the laptop. Both are connected by using serial communication. The door opens only if the ID card has access to open the door.

Attendance Management System: The Attendance is obtained by a part of the door access system. The door access time is noted with the help of a timer. This time is noted and saved in the database of every particular student and uploaded in the university portal. When complete attendance is recorded, through SMS the entire attendance record is sent to the parents. The details and the numbers of parents are already fed in the database.

Figure 5: Tested System

4. FUTURE SCOPE OF WORK

RFID was used since every student would possess an ID card. But, in order to provide better security, to avoid illegal access and fake attendance, cameras can be fixed in the project. Biometric methodologies like fingerprint can be used or with the camera, face recognition can be done.

5. CONCLUSION

The study has identified and explained the key benefits of RFID technology and made use of the RFID Technology in a suitable application.

The project has combined advantages of three different systems which include the door access system, attendance management system and the GSM technology.

RFID will open doors to a pool of applications. Although the focal challenge to thwart the adoption is its investment cost, RFID technology provides an ocean of business opportunities that could convince several firms adopt it.

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