

Implementation of Student Safety System Using RFID

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Abstract -Recently, crime against children is increasing at higher rate and it is high time to offer safety system for the children going to school. This paper presents a system to inform parents about the status of their children such as absence. The system checks and detects which child enter the wrong bus and issues an alert to this effect. RFID-based detection unit located inside the bus detects the RFID tags worn by the children. In addition, the system checks the children absence and updates the database. The parents can log into the system website and monitor the details of their children.

Keywords _ RFID (Radio Frequency Identification) , Bus Alert System , Web Server , Database , Students Absence

I. INTRODUCTION

Nowadays, parents are worried about their children because of the high rate of kidnapping. Moreover, parents are having long working hours, so they simply do not have as much time to spend for their children. Moreover, they will be persuaded by kidnapper before they enter the school. So, it is the responsibility for the school to take care of their students and they also know in-time and able to send an alert message to their parents if the students are not at the school at school start time. However, it is not easy to do this manually. The school authorities cannot check their students individually and cannot send an alert message to their students. So, The suitable solution for this problem is by designing a system that will alert the student such as by ringing buzzer or by LED if the student enter the wrong buses. Moreover, an automatic SMS sending system will be needed to send SMS if their children will not arrive school at school starting time.

II. SYSTEM BLOCK DIAGRAM AND COMPONENTS

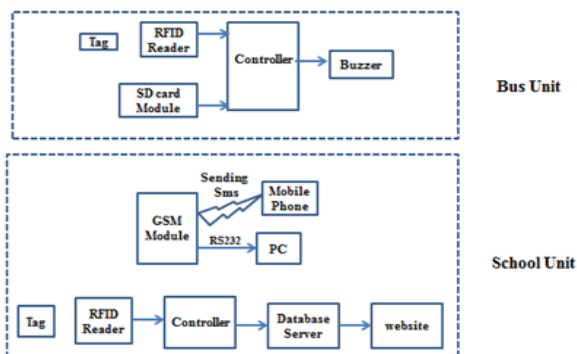


Figure1. Block Diagram of the system

The block diagram of the system is shown in Figure.1. This Block Diagram consists of RFID (radio frequency identification) , Controller (Arduino Mega 2560) , SD card module , Buzzer and GSM Module (SIM900A) and webpage .

A. Bus Unit Description

The bus unit will detect the children when they enter/leave the bus. RFID technology is used to achieve this process. Controller will check if this read ID is matched with the student list stored on SD card. The buzzer will alarm if the ID do not match .

B. School Unit Description

The School Unit consists of a server and GSM module. The server acts as database server and web server. In addition , the server communicates with an SMS gateway to send notification in case a child is detected missing.

Table I. Components used in the system

Components	Specifications
RFID reader	MFRC522 13.56 MHz (high frequency) Reading Range (10cm – 1m)
RFID tag	Passive tag S50IC Card 1kbyte EEPROM
Controller	Arduino Mega 2560 Clock Speed (16MHz) EEPROM (4KB) SRAM (8KB) Flash Memory (256KB)
GSM Module	SIM900A

III. FLOW CHART FOR THE SYSTEM

A. Flow chart of the school Unit

The flow chart of the school unit is shown in Figure.2. In this flow chart we also initialize the I/O ports. Firstly, attendance is stored to the temporary table. To determine the absence list by matching student list with attendance list. This absence list will be uploaded to the website. SMS will be sent to parents whose children are absent without taking leave.

B. Flow Chart of the bus unit

The Flow Diagram of the controller is shown in Figure.3. Firstly we initialize the I/O ports. Next, the controller will read the student list stored on SD card. Then , the reader read the tag ID .Data is sent to SP controlled device in byte form . The controller with checkif read tag ID match with stored ID .

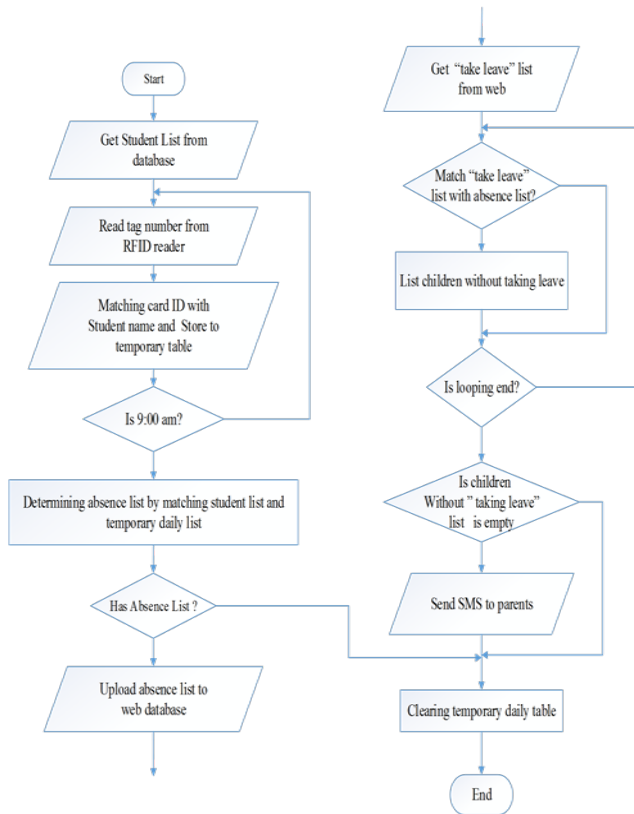


Figure.2. Flow chart of School unit

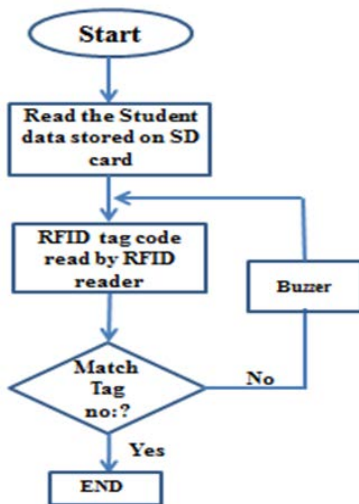


Figure.3. Flow chart of Bus unit

Testing is vital part to confirm the functionality of the system. Firstly, the units were tested individually and they were implemented to check if they were working correctly. Then, they were configured and integrated as required for the system. The unit test was held for all the units in system: RFID reader and tags, GSM modems and school server.

A. Bus Unit

The bus unit consists of RFID reader , Controller , SD card module and Buzzer as shown in figure4. Microcontroller is used to interface the reader and SD card module to check if the RFID tag code read by RFID reader is matched with the tag code stored in the SD card module.RFID based security system is able to identify whether the student enters the right bus or not .

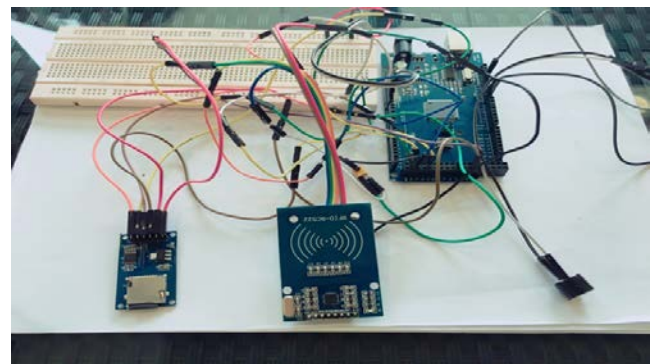


Figure.4. Working Circuit Diagram of Bus Unit

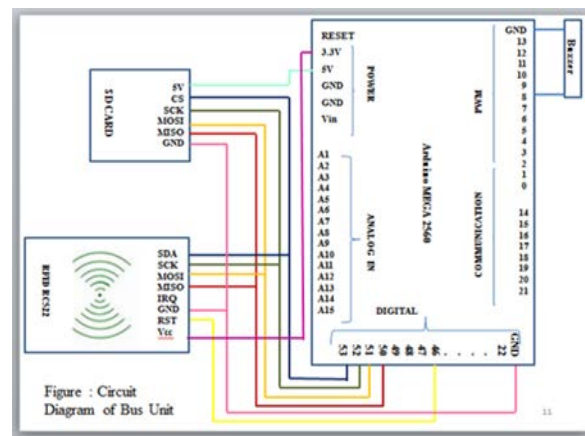
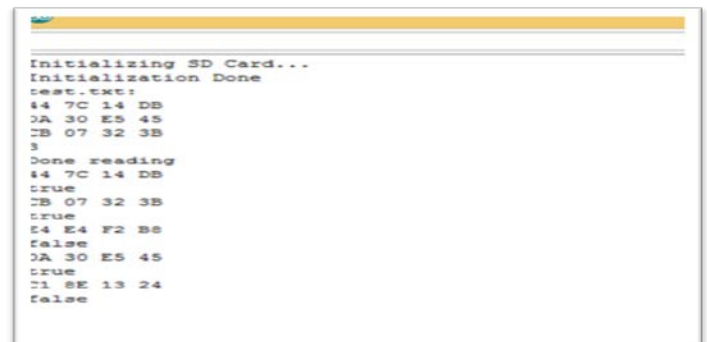


Figure.5. Circuit Diagram of Bus Unit



IV. IMPLEMENTATION AND TESTING

Figure.6. Serial Monitoring of bus unit

Figure 6 shows the accepted card information that read by the reader matches with stored base coded or not. If they are matched it returns true. If not, it return false.

B. School Unit

The school unit consists of RFID reader, Controller and GSM module as shown in Figure.7.

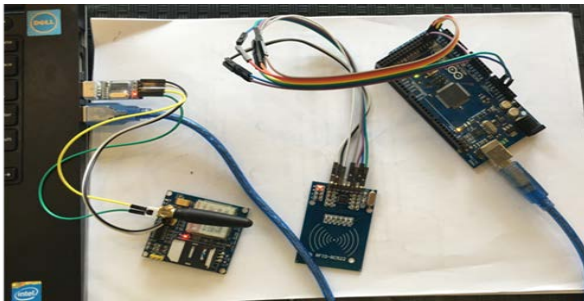


Figure.7. Working Circuit Diagram of SchoolUnit

1) Testing GSM Modem

The GSM module is connected to the PC by using RS232. This modem is a type of modem that accepts SIM card, and operates through a subscription to a mobile operator. It works like a mobile phone for sending and receiving SMS through radio waves. The microcontroller contain the AT commands, written in C, for sending SMS. The code was verified using a terminal program to ensure that microcontroller sent the correct AT commands to GSM modem. It is also responsible for notifying the parents in case of emergencies by sending SMS. The sms notification can be seen on Figure.9.

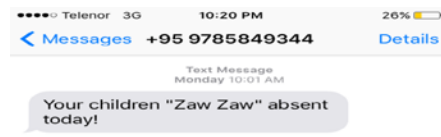


Figure.9. SMS that can be notified to parents

2) Web-based Application

This section presents some tests that had carried out to verify the functionalities of web-based application. The server is implemented in PC. The web pages are categorized different modules, namely the absence list, roll call, services. The pages are developed using Java scripting language and compatible with all major web browsers.



Figure.10. webpage that can be seen on parents phone

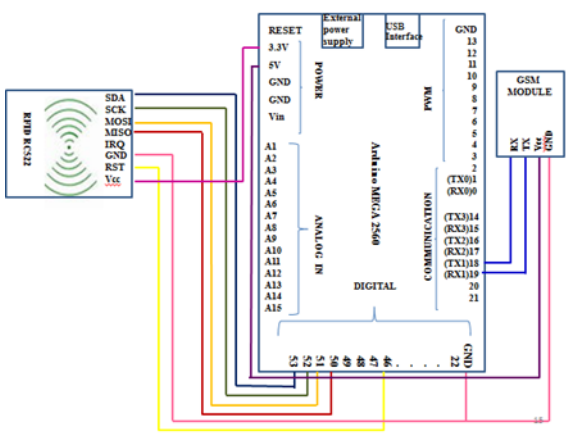


Figure.8. Working Circuit Diagram of SchoolUnit

The website functionality is provided by accepting request from the user's browser and responds back HTML documents (web pages) and files. Parents can have only access if they log in to website.

Parents can get access to web site via mobile phone. It is shown in Figure11. Only the authorized person can get access to absence list, roll call list and service.

Figure.11 shows that parents can take a leave on website.

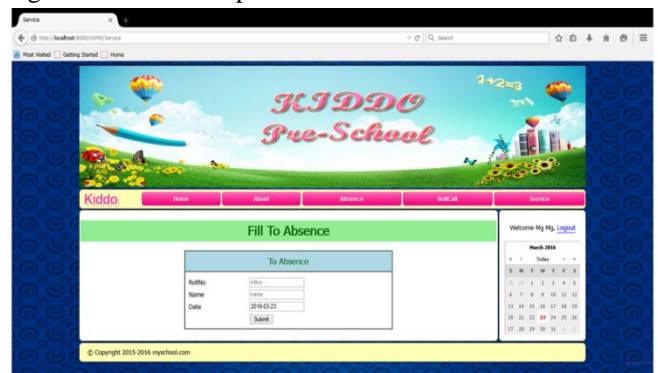


Figure.11. Parents fill absence form to take leave for their parents

V. CONCLUSION

This project implementation primarily focuses on alert if the children enter the wrong bus. RFID-based detection unit located inside the bus detects the RFID tags worn by children. The system checks and detects which child did not arrive the school and issues an alert message to this effect. In addition, the system checks the children absence list and updates the database. The parents can log into system website and monitor the details of their children.

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