

Improved Security to School Children Using GSM

Dandi Chaitanya¹, Y.Murali²

1. Post Graduate scholar, Malla Reddy Engineering College, Kompally, Ranga Reddy, Telangana.
2. Assistant Professor, Department of Electronics and Communication Engineering, Malla Reddy Engineering College, Hyderabad-500100, India

Abstract— Children’s missing is becoming a global concern, especially in India. School children these days face ‘n’ number of security challenges which is evident with the growing crime rate at a significant level. As it is impossible for school going children to think themselves and take decisions, taking good care of them is a difficult task. Technology should be imperative to safe guard the society. In this paper, we present a GSM based school children security system using RFID that monitors and updates the child status to parents and school principal from time to time. The developed working model considered RF ID Technology and an advanced ARM 7 processor and GSM Technology. The return status of the child is secured by providing the message to the parent in advance is encouraged to meet the challenges in the child security. The working model is developed and tested periodically for constant monitoring.

Keywords— Aurdino, Microcontrollers, PHP, Gateway Provider

I. INTRODUCTION

The project aims at the total security of the children. Counters are used at the entrance and exit locations of bus, at the entrance of the school, playground, washrooms and etc.. The school children are required to scan their tags and the corresponding messages will be sent to their parent’s mobiles. Thus child arrival and departure details will be regularly sent to parents using GSM technology. This paper focused to provide the security to the children from starting location to destination with applied RF technology [1]. School children safety is the most significant component encouraged to precede research with the support of advanced technology. Several bitter incidents forced to develop an innovative methodology to provide secure life for children. The safety mechanism to the children travelling from school to home and vice versa is very important. A GSM Module is basically a GSM Modem (like SIM 900) connected to a PCB with a different types of output taken from the board – say TTL Output (for Aurdino, 8051 and other microcontrollers) and RS232 output to interface directly with a PC. M.Navya et.al proposed GSM-GPS technology to track children, GSM sends information to parent [2]. G.Bharathi, L.Ramurthy proposed a mechanism to trace the missed student using GSM-GPS technology. Latitude and altitude are given by GPS [3][4][5].

EM-18 RFID reader is one of the commonly used RFID reader to read 125KHz tags. It features low cost, low power consumption, small form factor and easy to use. It provides both UART and Wiegand26 output formats. It is used as a system that transmits the identity of an object using radio waves by Kumar[6].V.Sivasankaran et.al proposed a RFID-GSM technology to provide security. RFID tags are attached to the children bags and GSM messages [7].

The rest of the paper is organized as follows. Section 2 presents the practical implementation. Section 3, presents the working of the model. In Section 4, we present aurdino code to connect the RFID. In Section 5, we present our verified results. Section 6 concludes the paper.

II. PRACTICAL IMPLEMENTATION

A. Connecting Aurdino with GSM module

We use SIM900 GSM module . You need to double check your GSM modules power requirements. Our GSM module requires a 12 volts input. So we feed it using a 12V,1A DC power supply. We have seen GSM modules which require 15 volts and some other types which needs only 5 volts input. They differ with manufacturers. You can feed the data from GSM module directly to Arduino only if the module is enabled with TTL output pins. Otherwise you have to convert the RS232 data to TTL using MAX232 IC and feed it to Arduino.

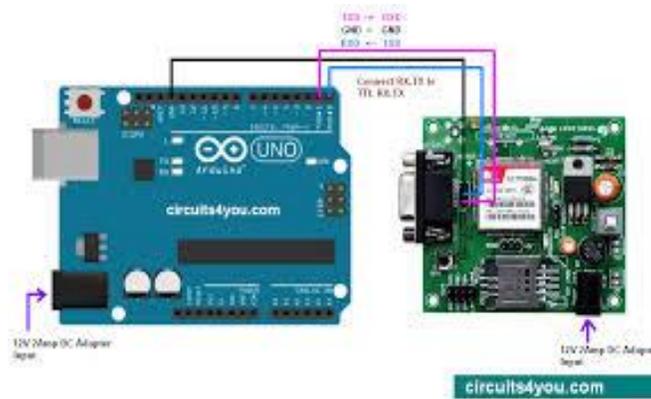


Fig.1Connecting Aurdino with GSM

B. Connecting Aurdino with EM 18 RFID

It can be directly interfaced with microcontrollers using UART and with PC using an RS232 converter. Connect the Arduino 5v supply to vcc of the EM 18 module and connect the ground pin of Arduino to EM 18. Transiver of the EM 18 is connected to the rx pin of the arduino to transfer the 12 digit code information from the EM 18 to Arduino.

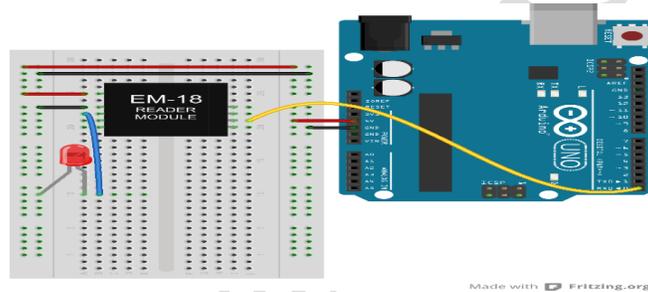


Fig. 2ConnectingAurdino with EM 18 RFID

C. Connecting LCD with Aurdino

It has 16 pins and the first one from left to right is the Ground pin. The second pin is the VCC which we connect the 5 volts pin on the Arduino Board. Next is the Vo pin on which we can attach a potentiometer for controlling the contrast of the display. Next, The RS pin or register select pin is used for selecting whether we will send commands or data to the LCD. For example if the RS pin is set on low state or zero volts, then we are sending commands to the LCD like: set the cursor to a specific location, clear the display, turn off the LCD and so on.

Next comes the R / W pin which selects the mode whether we will read or write to the LCD. Here the write mode is obvious and it is used for writing or sending commands and data to the LCD. Next is the E pin which enables the writing to the registers, or the next 8 data pins from D0 to D7. And the last two pins A and K, or anode and cathode are for the LED back light.

After all we don't have to worry much about how the LCD works, as the Liquid Crystal Library takes care for almost everything. From the Arduino's official website you can find and see the functions of the library which enable easy use of the LCD. We can use the Library in 4 or 8 bit mode. In this tutorial we will use it in 4 bit mode, or we will just use 4 of the 8 data pins.

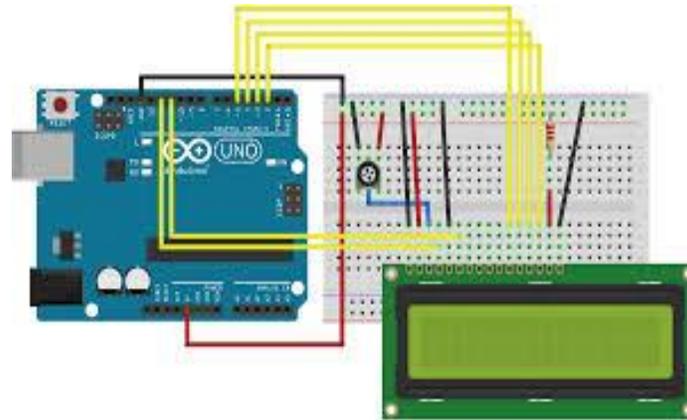


Fig. 3Connecting LCD with Aurdino

III. WORKING OF THE MODEL

RS232 serial port to signals suitable for use in TTL compatible digital logic circuits (power range: 0 V to + 5 V).If the microcontroller reads the data from the RFID reader, the LED will be turned on to indicate the successful read of the tagnumber. The flow chart is as follows: Testing is very crucial part to validate the functionality of the proposed system. It should be designed to increase the likelihood of finding an error and checking the functionality of the proposed system. The units were implemented individually at first and then they were integrated and configured as required for the system. The unit test was held for all the units in our system: RFID reader and tags, GSM modems and school server.

1. Bus Unit: The bus unit consists of an RFID reader, a GSM modem and a control unit. The RFID reader detects the children when they board/leave the bus. It is located inside the bus. The GSM modem is used to send this data to the school unit. A microcontroller is used to interface the RFID reader with the GSM modem. ATmega32 microcontroller is used to interface the reader and the GSM modem in the bus unit for data exchange.

The reader communicates with microcontroller using serial communication interface RS232. However, due to the difference in voltage levels, a max232 chip is used to convert signals from that are responsible for sending and receiving SMS and calling.

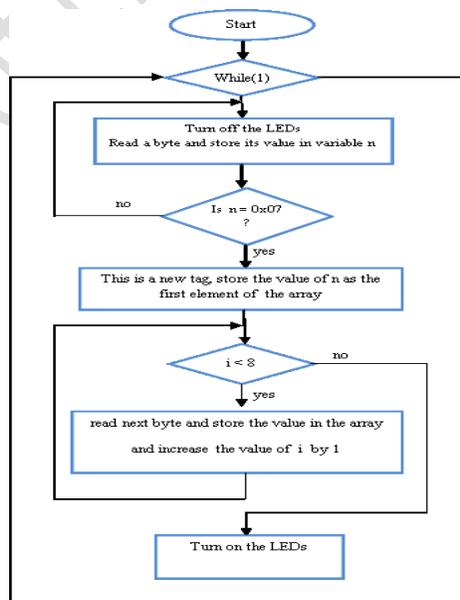


Fig. 3.2Flow chart

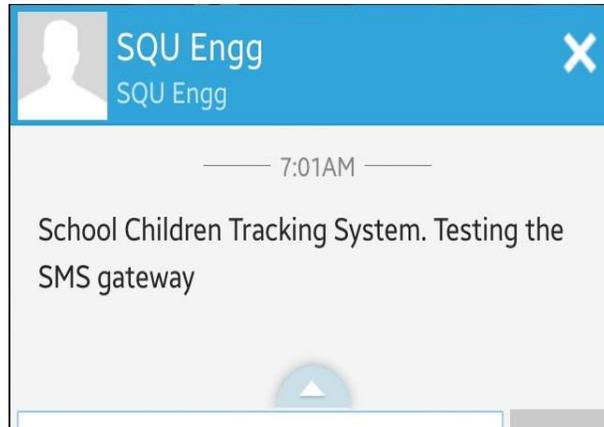


Fig. 4 SMS gateway test

GSMModem

GSM modems connectivity was tested using TMAS GSM-GPRS modem test program with the at commands

D. Communication between TwoModems

Two TMAS GSM/GPRS modems were used to send data from the bus unit to the school unit. One of modems is located in the bus unit to send SMS which contains the tag serial numbers to another GSM modem in the school.

E. Receivingthe Data from the BusUnit

A code written in PHP reads the received SMS, updatesdatabase, and notifies the parents if needed.

F. SMSNotifications

The PHP code written for the SMS gateway was tested. To use the SMS gateway, the following parameters are set: user ID, password, language, recipients, and the messages. The user ID and password are given by the gateway provider. The language has to be set before writing the text so that it can be sent properly. There are many integer values for different languages. The result of testing the code is shown in figure2.4.

G. Code to connect the RFID

<pre> if(Serial.available()) { delay(100); buf1 = String(Serial.readString()); Serial.println(buf1); for(i=0;i<12;i++) { if(buf1[i]==s1[i])j++;if(buf1[i]==s2[i])k++;if(buf1[i]==s3[i])l++; delay(5); } if((j<12))j=0;if((k<12))k=0;if((l<12))l=0; if(j>=11) { state=state+1; if(state%2==1) { lcd.clear(); lcd.setCursor(0,0); lcd.print("Alert! YOUR SON/Daughter"); lcd.setCursor(0,1); lcd.print("Present Today"); mySerial.print("AT+CMGF=1\r"); delay(1000); mySerial.print("AT+CMGS="+917013814892+"\r"); //Number to which you want to send the sms delay(1000); </pre>	<pre> #include <SoftwareSerial.h> SoftwareSerialmySerial(10, 11); #include<LiquidCrystal.h> LiquidCrystallcd(9,8,7,6,5,4); staticint state=0; constint sw1=2; constint sw2=3; constint sw3=12; char s1[12] = "0800A727BE36"; char s2[12] = "0800A6FFA9F8"; char s3[12] = "0800A6C8F096"; String buf1; //stringTwo; inti,j=0,k=0,l=0,total=0; void setup() { Serial.begin(9600); // Serial port for connection to host mySerial.begin(9600); lcd.begin(16, 2); lcd.print("GSM SCHOOL "); lcd.setCursor(0, 1); lcd.print("SECURITY SYS "); delay(2000); } void loop() { //Serial.println(digitalRead(sw3)); </pre>
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```
lcd.print("FEE DUE :10K");
lcd.setCursor(0,1);
lcd.print("PAYMENT DONE");
mySerial.print("AT+CMGF=1\r");
delay(1000);
mySerial.print("AT+CMGS=\"+919553012627\
\r"); //Number to which you want to send the
sms
delay(1000);
mySerial.print("FEE DUE :10K");
mySerial.print(" PAYMENT DONE");
delay(1000);
mySerial.write(0x1A);
delay(1000);
k=0;
}
if(l>=11 &&digitalRead(sw1)==1)
{
lcd.clear();
lcd.setCursor(0,0);
lcd.print("YOUR SON/DAUGHTER");
lcd.setCursor(0,1);
lcd.print("PRESENT TODAY");
mySerial.print("AT+CMGF=1\r");
delay(1000);
mySerial.print("AT+CMGS=\"+919553012627\
\r"); //Number to which you want to send the
sms
delay(1000);
mySerial.print("YOUR SON/DAUGHTER ");
mySerial.print("PRESENT TODAY");
delay(1000);
mySerial.print("YOUR SON/DAUGHTER ");
```

```
mySerial.print("Alert! YOUR SON/Daughter ");
mySerial.print(" Present Today");
delay(1000);
mySerial.write(0x1A);
delay(1000);
}
j=0;
if(state%2==0)
{
lcd.clear();
lcd.setCursor(0,0);
lcd.print("Alert! YOUR SON/Daughter");
lcd.setCursor(0,1);

lcd.print("LEFT From Clg");
mySerial.print("AT+CMGF=1\r");
delay(1000);
mySerial.print("AT+CMGS=\"+919553012627\
\r"); //Number to which you want to send the
sms
delay(1000);
mySerial.print("Alert! YOUR SON/Daughter ");
mySerial.print(" Left FromClg");
delay(1000);
mySerial.write(0x1A);
delay(1000);
}
}
if(k>=11)
{
lcd.clear();
lcd.setCursor(0,0);
```

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<pre> delay(1000); l=0; } if(l>=11 &&digitalRead(sw3)==1) { lcd.clear(); lcd.setCursor(0,0); lcd.print("PLEASE ALERT"); lcd.setCursor(0,1); lcd.print("EMERGENCY CONDTN"); mySerial.print("AT+CMGF=1\r"); delay(1000); mySerial.print("AT+CMGS=\"+919553012627 \r"); //Number to which you want to send the sms delay(1000); mySerial.print("PLEASE ALERT"); mySerial.print("EMERGENCYCONDTN"); delay(1000); mySerial.write(0x1A); delay(1000); l=0; }} </pre>	<pre> mySerial.print("PRESENT TODAY"); delay(1000); mySerial.write(0x1A); delay(1000); l=0; } if(l>=11 &&digitalRead(sw2)==1) { lcd.clear(); lcd.setCursor(0,0); lcd.print("ATTENDANCE IN %"); lcd.setCursor(0,1); lcd.print("72"); mySerial.print("AT+CMGF=1\r"); delay(1000); mySerial.print("AT+CMGS=\"+919553012627\r "); //Number to which you want to send the sms delay(1000); delay(1000); mySerial.print("ATTENDANCE IN % "); mySerial.print(" 72"); delay(1000); mySerial.write(0x1A); </pre>
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IV. RESULT

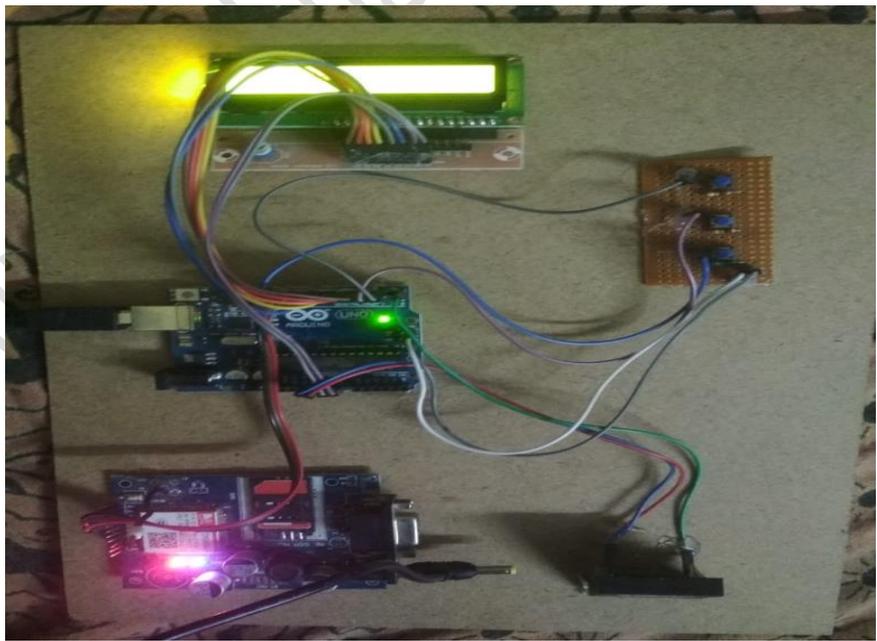


Fig. 5 Hardware diagram of the proposed approach

V. CONCLUSIONS

The developed working model is implemented on 30 feet length road constructed in the laboratory. The bus driving mechanism is able to move the bus with no deviations and the children security imparted to promote for real time applications. While returning to their home with this mechanism no student is permitted to move away from security without knowing the authorities. The return information message is sending to the parent in an advance will be an added advantage of the children from kidnapping. In future this proposed methodology is enhanced with anti-collision mechanism and biometric system is to be proposed to replace with the existing RFID technology.

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