Passive Entry And Exit Using Rfid System

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Abstract- *The existing parking management systems require man power to supervise the operations and it also requires manual recording of data in excel sheets and on paper. For universityparking's, scenario is very hectic to keep track of and the human error also comes into the picture. Because of all these issues, automation of the parking management system is required. Nowadays, the modern world requires smart cities and the smart cities require automation techniques in its various aspects such as universities, malls and parking areas. The use of Radio Frequency Identification known as RFID technology reduces human efforts as well as errors. That's why the RFID based system has been proposed to solve the issues related to parking management. The proposed system in this paper consists of different technologies as well as some new enhancements which are namely, Arduino uno, ethernet shield and ZigBee and RFIDs. This makes the existing systems more trenchant, user-friendly and at the same time, the proposed system also manages to be pretty thrifty. The approach in this paper realizes intelligent yet cost-effective management of vehicles entering and exiting inside the campus and the paper also tries to realize the Smart cities mission of the Government of the republic of India.*

Keywords- Arduino, Ethernet shield, google spreadsheet, RFID systems, smart parking and cost-effective.

I. INTRODUCTION

This article guides a stepwise walkthrough by Experts for writing a successful journal or a research paper starting from inception of ideas till their publications. Research papers are highly recognized in scholar fraternityand form a core part of PhD curriculum. Research scholars publish their research work in leading journals to complete their grades. In addition, the published research work also provides abigweight-agetogetadmissionsinreputedvarsity.Now,here we enlist the proven steps to publish the research paper in a journal.

II. AIM OF THE PROJECT

The main aim of our project is to allow vehicles such as university bus, cars and bikes inside the university. This project helps in reducing human work efforts such as noting down the entry and exit time and number of times the vehicle has entered and exited the university.

The concept of access control using Arduino &RFID technology is that to easy access of vehicle entering inside the university without any delay and no human error. In this method the RFID tag is placed in each vehicle's license plate and RFID reader is placed at the entry and exit gate. The reader and tag must be aligned so that the tag is being read efficiently. The data from RFID reader is send to the Arduino board, which is basically Microcontroller based board. Arduino board receives that number and compares with valid numbers. If that number is valid send some command('1') to the arduino and send another command('0') if that received number is invalid. The Arduino transmit corresponding data to the ethernet shield .

On the receiving side depending on the received data, the arduino will send data to google via ethernet shield, if RFID reader '0' is received , the arduino will send Logic HIGH signal to the POWER transistor, then power is ON ,the gate will open by hep of motor and the timings and RFID number will noted to the google spreadsheet. if arduino '1' is received , the arduino will send Logic LOW signal to the POWER transistor, then power transistor is off, so the gate will close and wait for the next vehicle.

III. METHODOLOGY

In our project we are giving an authorized ID to the arduino board, when the vehicle having RFID tag comes near to the RFID reader at the gate, then the ID number on the tag is given to the arduino board through the reader, arduino board compares the valid ID with received ID, if the ID is valid then the gate will open and the timing of the vehicle will be noted to the google spreadsheets.

The ethernet shield helps in transmitting details from Arduino to the spread sheet. The pushing box helps in notifying the spreadsheet with global GMT timings.

The spreadsheet is saved and can be accessed by authorized person and with help cloud service (google drive), the datum can be saved for the future references.

IV. SIGNIFICANCE OF THE WORK

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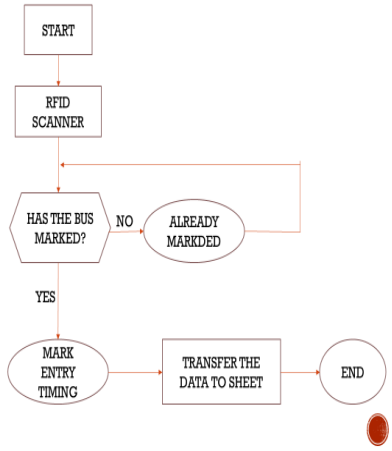
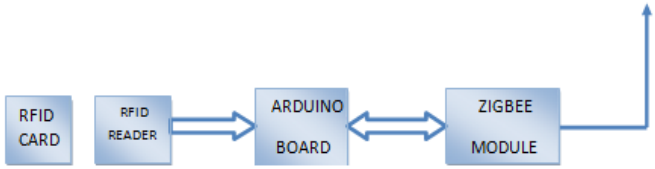
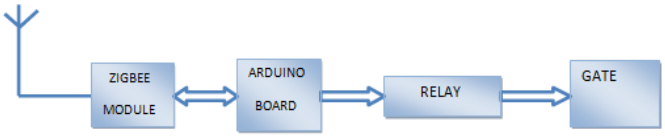
V. BLOCK DIAGRAM



A. Flow chart of transmitter



B. Flow chart of receiver



VI. IMPLEMENTATION OF ACCESS CONTROL USING RFID AND ARDUINO

The concept of access control using Arduino &RFID technology is that to control the Door automatically. In this method RFID reader& Arduino board is placed far away to the door.This project employs RFID Short for radio frequency identification, RFID is a dedicated short range communication technology. The term RFID is used to describe various technologies that use radio waves to automatically identify people or objects. RFID technology is similar to the bar code identification systems we see in retail stores everyday; however one big difference between RFID and bar code technology is that RFID does not rely on the line-of-sight reading that bar code scanning requires to work.

With RFID, the electromagnetic or electrostatic coupling in the RF (radio frequency) portion of the electromagnetic spectrum is used to transmit signals. An RFID system consists of an antenna and a transceiver, which read the radio frequency and transfer the information to a processing device (reader) and a transponder, or RF tag, which contains the RF circuitry and information to be transmitted. The antenna provides the means for the integrated circuit to transmit its information to the reader that converts the radio waves reflected back from the RFID tag into digital information that can then be passed on to computers that can analyze the data.

In RFID systems, the tags that hold the data are broken down into two different types. Passive tags use the radio frequency from the reader to transmit their signal. Passive tags will generally have their data permanently burned into the tag when it is made, although some can be rewritten.

Active tags are much more sophisticated and have on-board battery for power to transmit their data signal over a greater distance and power random access memory (RAM) giving them the ability to store up to 32,000 bytes of data.

Radio Frequency Identification (RFID) is a generic term for non-contacting technologies that use radio waves to automatically identify people or objects. There are several methods of identification, but the most common is to store a unique serial number that identifies a person or object on a microchip that is attached to an antenna. The combined antenna and microchip are called an "RFID transponder" or "RFID tag" and work in combination with an "RFID reader" (sometimes called an"RFID interrogator").

VII. CODING

VII(a) TRANSMITTER CODE

```
#include<SoftwareSerial.h> SoftwareSerial mySerial(10,11);
char
*a[]={"1234567890","5656567890","9876543210","2100971
93B","20004BDC10"};
```

```
char d[10]; int j,I;
void setup()
{
Serial.begin(9600); mySerial.begin(9600);
}
void loop()
{
int p=0; while(mySerial.available()==0);
if(mySerial.read()==0x0a)
{
for(int i=0;i<10;i++)
{
while(mySerial.available()==0); d[i]=mySerial.read();
}
}
for( i=0;i<5;i++)
{
char *b=a[i];
// Serial.write(b); for(j=0;j<10;j++)
{
if(b[j]!=d[j]) break;
}
if(j==10)
{p=1;
//for(int k=0;k<10;k++)
//while(1)
Serial.write('1');
}
}
if(p!=1)
{
Serial.write('0');
}
}
```

VII(b) RECEIVER CODE

```
void setup()
{
pinMode(8,OUTPUT); Serial.begin(9600);
digitalWrite(8,HIGH); Serial.println("door closed");
}
void loop()
{
int a;
// digitalWrite(8,HIGH); while(Serial.available()==0);
a=Serial.read(); Serial.println(a);
}
if(a=='0')
{
digitalWrite(8,LOW); Serial.println("door open");
delay(5000); digitalWrite(8,HIGH); Serial.println("door
closed");
}else
{
digitalWrite(8,HIGH); Serial.println("door closed");
}
}
```

VIII. COMPONENTS

Hardware used:

Arduino UNO
Ethernet Shield
RFID RC522 reader with Tag
Jumper wires
Bread board
ZIGBEE

Software used:

Arduino IDE
Google drive
Pushing box
Google App script
Internet (for real time access)

VIII(a) ARDUINO

The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter.

"Uno" means one in Italian and is named to mark the upcoming release of Arduino 1.0. The Uno and version 1.0 will be the reference versions of Arduino, moving forward. The Uno is the latest in a series of USB Arduino boards, and the reference model for the Arduino platform; for a comparison with previous versions...

FIG VIII(1) ARDUINO BOARD

The board can operate on an external supply of 6 to 20 volts. If supplied with less than 7V, however, the 5V pin may supply less than five volts and the board may be unstable. If using more than 12V, the voltage regulator may overheat and damage the board. The recommended range is 7 to 12 volts

VIII(b) FEATURES OF ARDUINO

Microcontroller	ATmega328
Operating Voltage	5V
Input Voltage (recommended)	7-12V
Input Voltage (limits)	6-20V
Digital I/O Pins	14 (of which 6 provide PWM output)
Analog Input Pins	6
DC Current per I/O Pin	40 mA
DC Current for 3.3V Pin	50 mA
Flash Memory	32 KB (ATmega328) of which 0.5 KB used by bootloader
SRAM	2 KB (ATmega328)
EEPROM	1 KB (ATmega328)
Clock Speed	16 MHz

IX. RFID TECHNOLOGY

A. *DEFINITION*

RFID stands for Radio Frequency Identification. it uses radio waves to automatically identify people or objects. RFID is an automated data-capture technology that can be used to electronically identify, track, and store information contained on a tag. A radio frequency reader scans the tag for data and sends the information to a database, which stores the data contained on the tag**.**

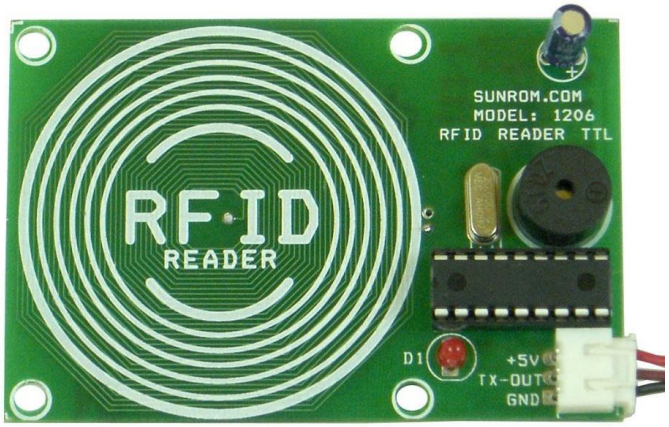


FIG IX(1) RFID READER

The ability of RFID technology to communicate without optical line of sight and over greater distances than other AIDC technology further reduces the need for human involvement in the identification process. For example, several retail firms have pilot RFID programs to determine the contents of a shopping cart without removing each item and placing it near a scanner, as is typical at most stores today. In this case, the ability to scan a cart without removing its contents could speed up the checkout process, thereby decreasing transaction costs for the retailers. This application of RFID also has the potential to significantly decrease checkout time for consumers.

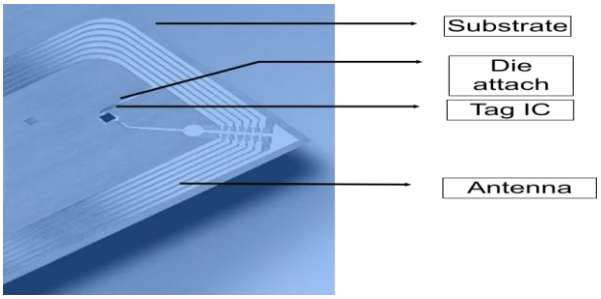


FIG IX(2) RFID TAG

B. Classifications of Tags

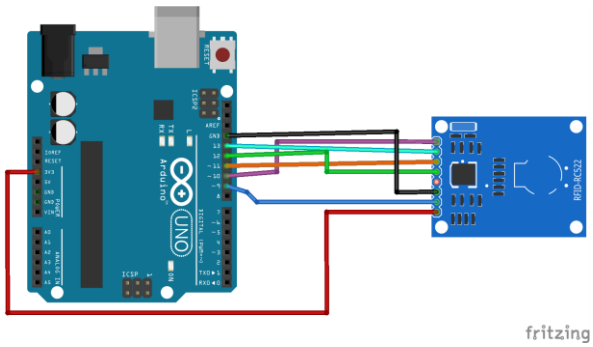
Tags are classified into different types based on battery and memory. They are

- Passive tags
- Active tags
- Semi passive tags
- Read only tags
- Read write tags
- Write once read many times tags

X. CONCLUSION

- Firstly the basic concept of this project is to monitor the entry of the vehicle before entering into the campus/building/office.
- The entry of the vehicle can monitored automatically with the help of RFID system
- Thus reducing human effort and human errors.
- The entry and exit time is accurate while being monitored.
- The RFID tags are placed onto to the vehicle in appropriate/accordingly to the place where the reader is kept. (for e.g. if the reader is placed Infront of the gate, thereby the tags must be kept respect to the vehicle.)
- When the vehicle nears the entry point, the vehicle's RFID tag is scanned by the reader which is placed to near to it.
- When the reader reads the tag, it sends signal to google sheet via Arduino and ethernet with accurate timings.
- Each tag represents a unique number which can be updated according to user's need.
- The user can access the entry and time list using google spreadsheet at anytime.
- The time is connected directly to internet's GMT time thus reducing the incorrect time entry.
- In this project, the vehicle used here is the college bus and the entry time can be updated automatically.
- In future projects, it can be implemented to student's cars and bikes.

XI. CIRCUIT DIAGRAM



Connections Between Arduino And Rfid

RST 9 9
SDA(SS)- 4/10 -4/53
MOSI 11- 51
MISO 12 -50
SCK 13 -52
VCC 3.3 v -3.3v
GND to GND to GND
IRQ is not connected

REFERENCES

[1] http://ieeexplore.ieee.org/document/7917989/
[2] T. Kwak and S. Moon, "A Digital Doorlock with Voice Recognition" in Proceedings of KIIT Spring Conference, vol. 2012, no. 5, (2012), pp. 345-348.
[3] Ilkyu Ha, "Security and Usability Improvement on a Digital Door Lock System based on Internet of Things" , in International Journal of Security and Its Applications,Vol.9, No.8 (2015), pp.45-54
[4] Yong Tae Park, Pranesh Sthapit, Jae-Young Pyun, "Smart digital door lock for the home automation" TENCON 2009 - 2009 IEEE Region 10 Conference, 23-26 Jan, 2009
[5] Md. Nasimuzzaman Chowdhury, Md. Shiblee Nooman, Srijon Sarker. , "Access Control of Door and Home Security by Raspberry Pi Through Internet", International Journal of Scientific and Engineering Research 4(11) · November 2013
[6] R. E. Barone, T. Giuffrè, S. M. Siniscalchi, M. A. Morgano, and G. Tesoriere, ``Architecture for parking management in smart cities," IET
Intell. Transp. Syst., vol. 8, no. 5, pp. 445452, 2014.
[7] C. Shiyao, W. Ming, L. Chen, and R. Na, ``The research and implement of the intelligent parking reservation management system based on ZigBee technology," in Proc. 6th Int. Conf. Meas. Technol. Mechatronics Autom. (ICMTMA), 2014, pp. 741744.
[8] D. J. Bonde, R. S. Shende, K. S. Gaikwad, A. S. Kedari, and A. U. Bhokre, ``Automated car parking system commanded by Android application," in Proc. Int. Conf. Comput. Commun. Inform. (ICCCI), 2014, pp. 14.
[9] J. E. Hammann and N. A. Markovitch, ``Introduction to Arena [simulation software]," in Proc. Winter Simulation Conf., 1995, pp. 519523.
[10] W. D. Kelton, R. Sadowski, and N. Zupick, Simulation With Arena, 6th ed. New York, NY, USA: McGraw-Hill, 2014.
[11] T. Altiok and B. Melamed, Simulation Modeling and Analysis With ARENA. Amsterdam, The Netherlands: Elsevier, 2007.
[12] M. D. Rossetti, Simulation Modeling With Arena. New York, NY, USA