

RFID BASED CAR PARKING SYSTEM

¹Purak Sethi, ²Prof. Ruchika Doda

¹Student, ²Assistant Professor

Department of Electronics and Communication Engineering
Mahavir Swami Institute of Technology, Sonipat, Haryana

Abstract: - The main objective of the project “RFID BASED CAR PARKING SYSTEM” is to develop simple project that offers an efficient car parking management system with the help of RFID Technology. Car parking management in organizations and malls often consists of many tasks like issuing tokens, noting the check-in and check-out time, calculating fare and finally collecting the amount.

1. INTRODUCTION

RFID based Car Parking System is a simple project that offers an efficient car parking management system with the help of RFID Technology. Car parking management in organizations and malls often consists of many tasks like issuing tokens, noting the check-in and check-out time, calculating fare and finally collecting the amount. As the number of vehicles are increasing, the problems faced by manual parking management system are also increasing. Such problems can be eliminated to some extent by implementing an intelligent parking system where the entry and exit of cars is monitored and payment is made easy with sensor technology. This project deals with an interesting manner of security access based car parking system using AT89C51 microcontroller and RFID Technology.

INTRODUCTION TO RFID

RFID stands for Radio Freq Ident. RFID is one member in the family of Automatic Ident and Data Capture (AIDC) technologies and is a fast and reliable means of identifying objects. There are two main components: The Interrogator (RFID Reader) which transmits and receives the signal and the Transponder (tag) that is attached to the object. An RFID tag is composed of a miniscule microchip and ant. RFID tags can be passive or active and come in a wide variety of sizes, shapes, and forms. Communication between the RFID Reader and tags occurs wirelessly and generally does not require a line of sight between the devices. An RFID Reader can read through most anything with the exception of conductive materials like water and metal, but with modifications and positioning, even these can be overcome.

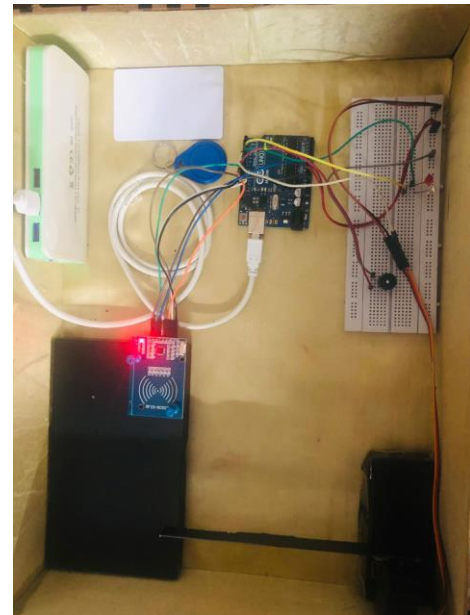


Fig 1.1: Diagram

2. LITERATURE SURVEY

1. Radio Freq Ident (RFID) Based Car Parking System
Muhammad Mazlan - University Tun Hussein Onn
Malaysia, Johor, Malaysia (IJIV) Publisher : IEEE

Radio Freq Ident (RFID) technology is widely used in various applications such as attendance system, tracking system, monitoring system or parking system. Currently, the existing parking system used manual entrance through security guard to access the premise. Therefore, the company need to hire security guard to monitor the premise. In addition, the security guards need to monitor all movement of vehicle or person that enter or leave the premise. As a result, unauthorized vehicle or person can easily access the building. To address this problem, we proposed a parking system using RFID technology that can monitor vehicle's movement that enter or leave the specific area or place by scanning the RFID tag. The potential benefit is it can improve security for both security guards and users. Besides that, this parking system can facilitate access control for users and improve traffic flow during peaks period. There are five modules in the proposed parking systems which are user reg, vehicle reg, RFID tag, staff and report generation.

2. RFID Based Smart Car Parking System Anusooya G, Christy Jackson J, Sathyarajasekaran K, Assistant Professor, School of Computing Science and Engineering, VIT University, Chennai Campus,

Vandalur – Kelambakkam Road, Chennai, Tamil Nadu, India

The main objective is to avoid the cramming in the car parking area by implementing an efficient car parking system along with a user-friendly application for an ease of use. Normally at public places such as multiplex theatres, market areas, hospitals, function-halls, offices and shopping malls, one experiences the discomfort in looking out for a vacant parking slot, though it's a paid facility with an attendant/ security guard. The parking management system is proposed to demonstrate hazard free parking. The proposed system uses infrared transmitter-receiver pairs that remotely communicate the status of parking occupancy to the raspberry pi and displays the vacant slots on the display at the entrance of the parking so that the user gets to know the availability /unavailability of parking space prior to his/her entry into the parking place. Implementation involves minimal human interaction and provides a seamless parking experience thereby reducing a lot of time wasted by the user in parking his/her vehicle

3. RFID BASED AUTOMATIC CAR PARKING SYSTEM Publisher Issue 4, April 2014): IEEE

There has been a considerable amount of reduction in transaction costs and decrease in stock shortage with the use of Radio Freq Ident (RFID) technology in automation. Most of the RFID networks include a wide range of automation technologies. These technologies are RFID readers, RFID writers, RFID barcode scanners, and RFID controllers. In this study, a solution has been provided for the problems encountered in parking-lot management systems via RFID technology. RFID readers, RFID labels, 7 computers, barriers and software are used as for the main components of the RFID technology. The software has been handled for the management, controlling, and operation tasks for parking lots. Checkins and check-outs of the parking-lots will be under control with RFID readers, labels and barriers .

4. A RFID Based Vehicle Identification and Paid Parking System Journal of Student Research (2017) MEC, Muscat, OMAN

In the current scenario, parking has become a major issue as there is space, money and manual work related issues associated with it. Though the advancements in technology have brought parking facilities the way we see today, these limitations are yet to be overcome. We find it difficult to find a parking slot during peak traffic times. Payment is also difficult as it is manually done; payment is not fully automatic as it involves direct payment of cash or coin. Also, it involves payment for a fixed amount of time which might not ensure full utilization of money spent in case of leaving before the estimated time. In this project, an attempt has been made to overcome the problems encountered in the present paid parking system through RFID technology.

ANALYSIS

- The problem is solved by various system they manage vehicles particularly in a dedicated area. Accurately identify and authorize vehicle movement.
- Collect and record vehicle movement data.
- Increase security within the parking facility.

The advantages are:-

1. RFID based Car Parking System is implemented in this project and can be used to eliminate the hassle of manual operation of parking system .
2. There is a greater sense of security due to the fact that patrons do not actually walk to and from their own space.
3. This system can help in reducing cost, increase in productivity and saves time
4. There is easier facade integration since there are no ramping floors or openings in exterior walls

The disadvantages are:-

1. There may be fear of breakdown.
2. Use of redundant system will result in great cost

3. RESEARCH METHODOLOGY

The main connections for basic functioning of the microcontroller include a reset circuit, oscillator circuit and EA Pin. Reset circuit consists of a push button, 10KΩ resistor and a 10μF capacitor. External oscillator circuit consists of an 11.0592 MHz quartz crystal and two 33pF capacitors. Finally, a 10KΩ resistor is used with EA pin to pull it high. The next hardware we need to connect is the 20 x 4 LCD. The pin configuration of a 20 x 4 LCD is similar to that of a 16 x 2 LCD. The only difference is that a 20 x 4 LCD has few extra segments. In order to access those extra segments, we need to program the microcontroller accordingly.P3.6, GND and P3.7 pins are connected to the three control pins of the 20 x 4 LCD i.e. RS, RW and E. The data pins of the 20 x 4 LCD are connected to Port 1 of the microcontroller. The next component we are going to connect is the RTC. First we have to connect a 32.768 MHz crystal oscillator between the oscillator pins of the RTC IC. Then connect a 3V coin type Lithium battery to the VBAT terminal of the RTC IC. Finally the I2C terminals i.e. SCL and SDA of the RTC IC are connected to PORT0 pins. Hence, they must be pulled high with 1K resistors. Now you can connect SCL and SDA to P0.0 and P0.1 of the microcontroller. After connecting the RTC, now we are going to connect the EEPROM. First connect the SCL and SDA pins of the EEPROM IC to the P0.0 and P0.1 pins of the microcontroller. Then, connect the address input pins of the EEPROM to Ground. Finally, connect the RFID reader to the controller. Connect the TX pin of the RFID Reader to RXD pin (P3.0) of the Controller and RX of RFID is connected to TXD (P3.1) of microcontroller.

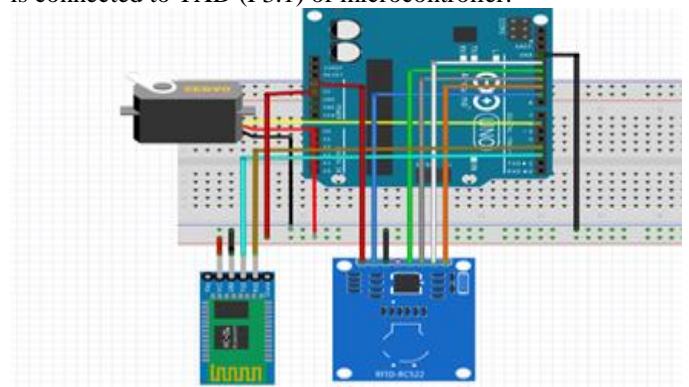


Fig 3.1: Circuit Diagram

4. CODING

```
#include <SPI.h>
#include <MFRC522.h>
#include <Servo.h>

#define SS_PIN 10
#define RST_PIN 9

#define SERVO_PIN 3
Servo myservo;

#define ACCESS_DELAY 2000
#define DENIED_DELAY 1000
MFRC522 mfrc522(SS_PIN, RST_PIN); // Create MFRC522 instance.

void setup()
{
  Serial.begin(9600); // Initiate a serial communication
  SPI.begin(); // Initiate SPI bus
  mfrc522.PCD_Init(); // Initiate MFRC522

  myservo.attach(SERVO_PIN);
  myservo.write( 70 );
  delay(7500);
  myservo.write( 0 );
  Serial.println("Put your card to the reader...");
  Serial.println();
}
void loop()
{
  // Look for new cards
  if ( ! mfrc522.PICC_IsNewCardPresent() )
  {
    return;
  }
  // Select one of the cards
  if ( ! mfrc522.PICC_ReadCardSerial() )
  {
    return;
  }
  //Show UID on serial monitor
  Serial.print("UID tag :");
  String content= "";
  byte letter;
  for (byte i = 0; i < mfrc522.uid.size; i++)
  {
    Serial.print(mfrc522.uid.uidByte[i] < 0x10 ? " 0" : " ");
    Serial.print(mfrc522.uid.uidByte[i], HEX);
    content.concat(String(mfrc522.uid.uidByte[i] < 0x10 ? " 0" : " "));
    content.concat(String(mfrc522.uid.uidByte[i], HEX));
  }
  Serial.println();
  Serial.print("Message : ");
  content.toUpperCase();
  if (content.substring(1) == "69 C8 E2 2A") //change here the UID of the card
  {
```

```
Serial.println("Authorized access");
Serial.println();
myservo.write( 70 );
delay(7500);
myservo.write( 0 );

}

else {
  Serial.println(" Access denied");

  delay(DENIED_DELAY);
}
}
```

5. RESULT AND CONCLUSION

RESULT

The system provides details of the vacant parking slots in the vicinity and reduces the traffic issues due to illegal parking in the vicinity. It is designed with an objective to meet the requirements of controlled parking that offers effortless parking tactics to the authorities.

CONCLUSION

Automatic multi-stored car parking system is very good substitute for car parking area. The design is obviously an efficient one because compared to other existing design it can handle more cars in a limited space. The lifting mechanism is also simpler and cost effective. LCD panel is provided to display the parking space availability information about the total number of cars that can be parked and the place vacant for parking. Two IR sensors TX RX pairs are used in this project to identify the vacant spaces. It is a versatile project with application in almost every field, be it residential or industrial. We would like to conclude this project as a very great and upgradable.

6. FUTURE SCOPE

Automated multistoried car parking system has a vast scope in the future because of the following reasons given for demo we have used DC motor in future it can be implemented with hydraulic motor using which the car can be lifted quickly when compared to the DC motor. It can also be implemented with the rtc (Real time clock) which can be used for billing purpose. It keeps the record of the entry and exit time of the car. In order to increase the number of the number of slots higher version of microcontroller can be used. And infrared sensors can be used for each and every slot in order is to slot is free to park or it is full. Here to provide security we are using verification code scheme, in future it can be improved further .

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