Sensors and Actuators Project Presentation

VIP Car Parking System

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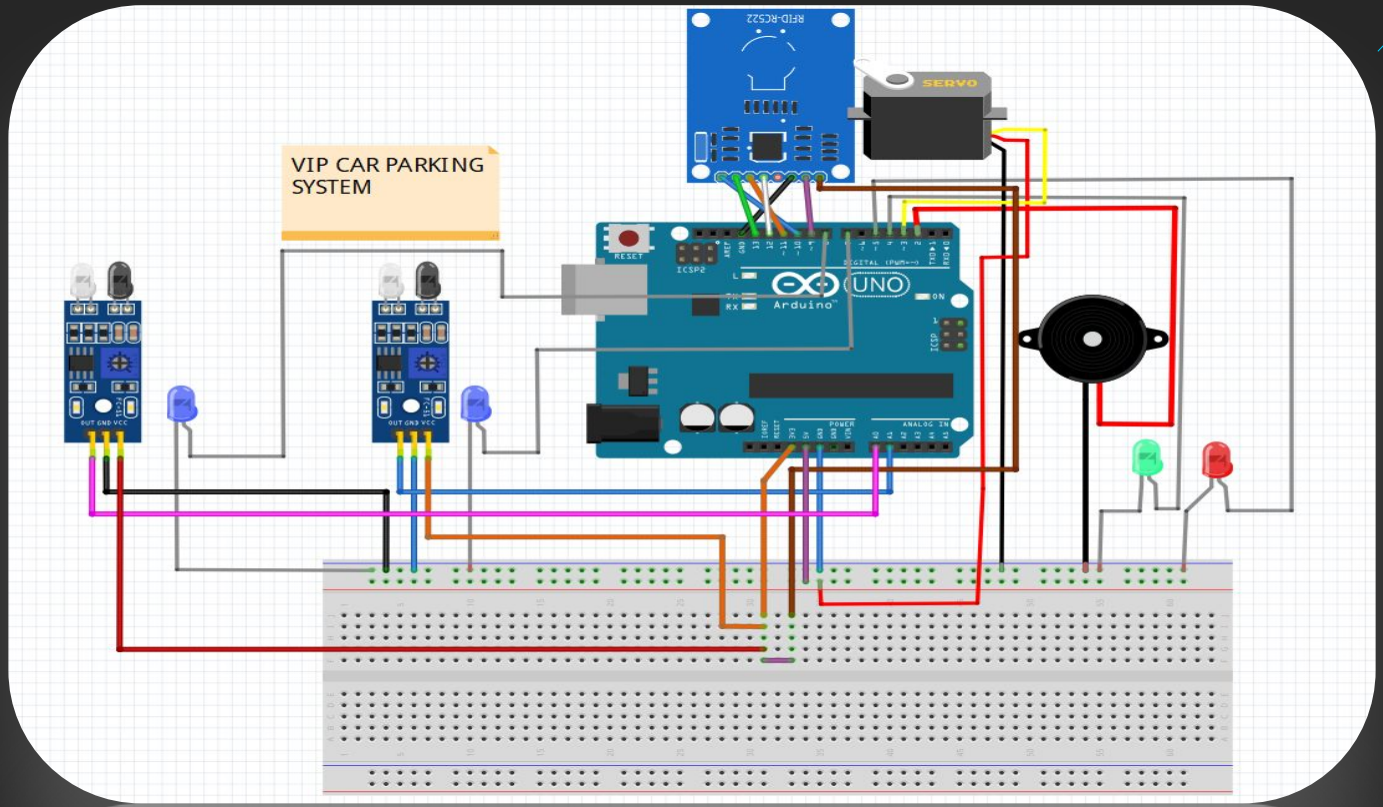
CONTENTS

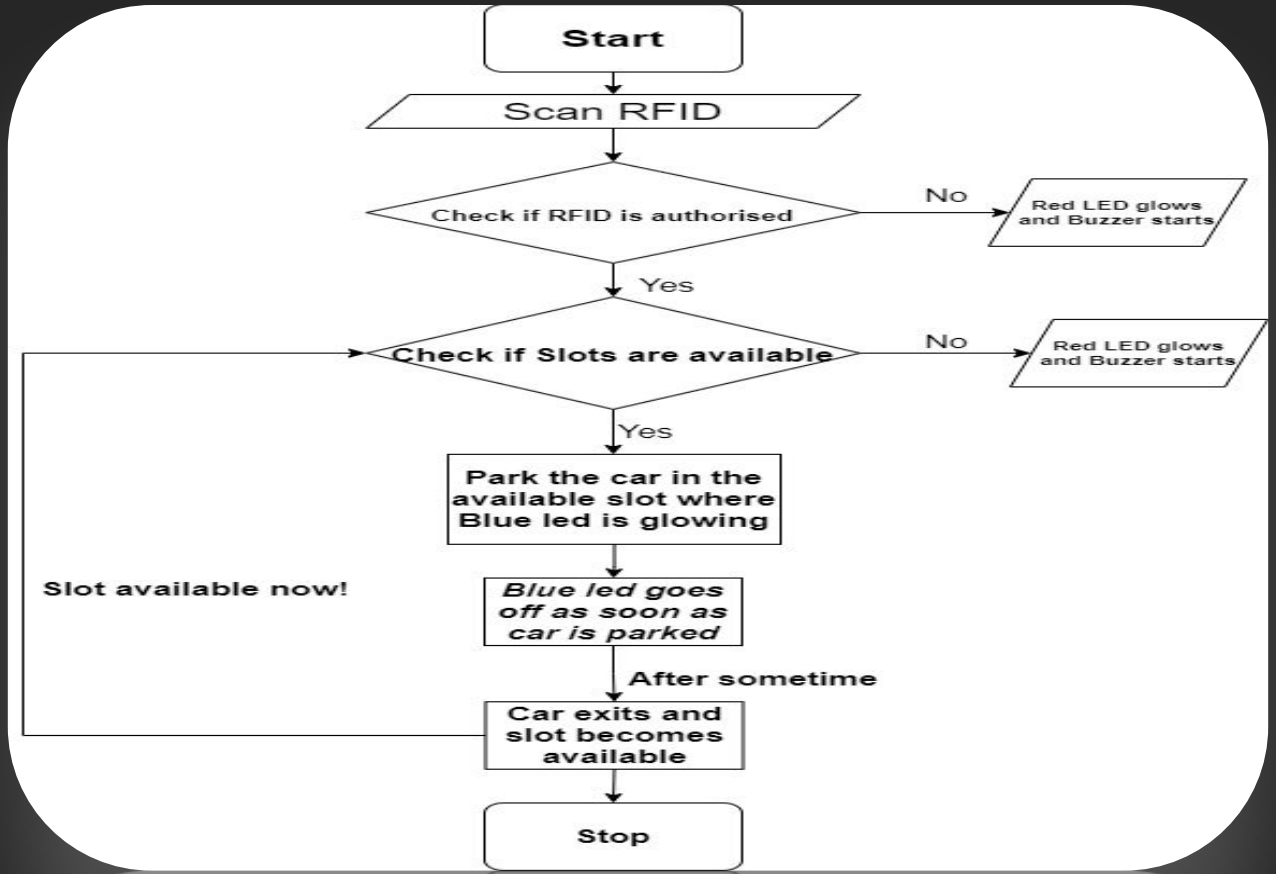
INTRODUCTION

- In this project, we've implemented a "VIP Car parking system" using Infrared sensors and RFID authentication.
- This project focuses on automating the parking system at malls, hotels, and at wedding entry too.
- It restricts the entry of unauthorized person
- If the parking is full, it can restrict the entry of incoming guests.

Schematic Diagram

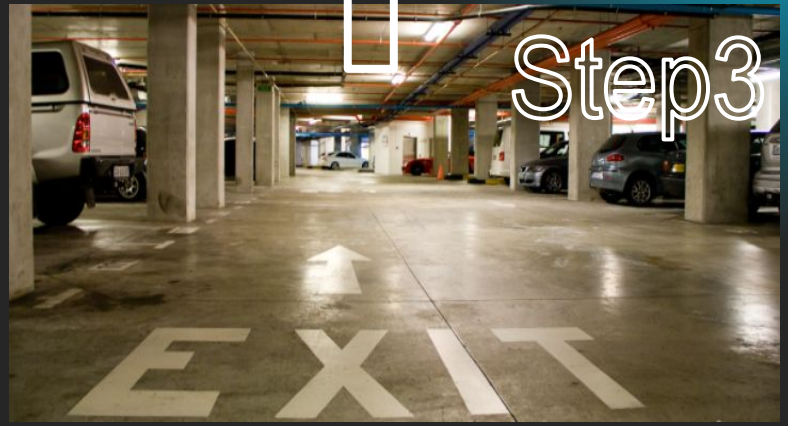


Working


Start
Scan RFID
Check if RFID is authorised
No
Red LED glows and Buzzer starts
Yes
Check if Slots are available
No
Red LED glows and Buzzer starts
Yes
Park the car in the available slot where Blue led is glowing
Slot available now!
Blue led goes off as soon as car is parked
After sometime
Car exits and slot becomes available
Stop


Step1


Step2


Step3
EXIT

CODE

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

#define SS_PIN 10
#define RST_PIN 9
#define LED_G 4 //define green LED pin
#define LED_R 5 //define red LED
#define BUZZER 2 //buzzer pin
#define IR A1 //IR proximity sensor
#define LED_IR 7

MFRC522 mfrc522(SS_PIN, RST_PIN);   // Create MFRC522 instance.
Servo myServo; //define servo name

void setup()
{
  Serial.begin(9600);   // Initiate a serial communication
  SPI.begin();      // Initiate  SPI bus
  mfrc522.PCD_Init();   // Initiate MFRC522
  myServo.attach(3); //servo pin
  myServo.write(0); //servo start position
  pinMode(LED_G, OUTPUT);
  pinMode(LED_R, OUTPUT);
  pinMode(BUZZER, OUTPUT);
  noTone(BUZZER);
  pinMode(A1, INPUT);
  Serial.println("Put your card to the reader...");
  Serial.println();

}
void loop()
{
```

```
  delay(10);
  int slots=1;
  int ir_reading = analogRead(A1);
  Serial.println(ir_reading);
   if (ir_reading < 300)
    {
        digitalWrite(LED_IR, LOW);
        delay(10);
        slots--;
    }
    else
    {
        digitalWrite(LED_IR, HIGH);
        delay(10);
        slots++;
    }
  // 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);
```

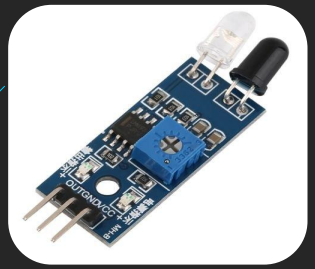
```
    content.concat(String(mfrc522.uid.uidByte[i] < 0x10 ? " 0" : " "));
    content.concat(String(mfrc522.uid.uidByte[i], HEX));
  }
  Serial.println();
  Serial.print("Message : ");
  content.toUpperCase();
  if(slots>0){
    if (content.substring(1) == "83 23 38 BB") //change here the UID of the card/cards that you want to give access
    {
      Serial.println("Authorized access");
      Serial.println();
      delay(500);
      digitalWrite(LED_G, HIGH);
      tone(BUZZER, 500);
      delay(300);
      noTone(BUZZER);
      myServo.write(180);
      delay(5000);
      myServo.write(0);
      digitalWrite(LED_G, LOW);
    }

    else   {
    Serial.println(" Access denied");
    digitalWrite(LED_R, HIGH);
    tone(BUZZER, 300);
    delay(1000);
    digitalWrite(LED_R, LOW);
    noTone(BUZZER);
    }
   }

  else{
      if (content.substring(1) == "83 23 38 BB"){
```

```
            Serial.println(" Access denied, parking full!");
                tone(BUZZER, 100);
                digitalWrite(LED_R, HIGH);
                delay(200);
                digitalWrite(LED_R, LOW);
                delay(200);
                digitalWrite(LED_R, HIGH);
                delay(200);
                digitalWrite(LED_R, LOW);
                delay(200);
                digitalWrite(LED_R, HIGH);
                delay(200);
                digitalWrite(LED_R, LOW);
                noTone(BUZZER);
                delay(200);
        }
      }
}
```

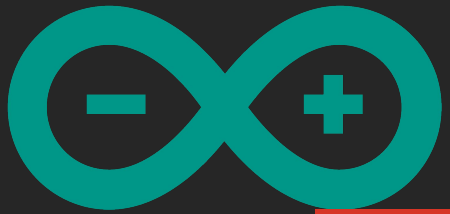
HARDWARE SPECIFICATIONS



Name of component	Price(As on Robu.in)
1. RFID Module	₹132
2. Arduino Uno	₹830
3. Servo Motor	₹105
4. IR proximity sensor	₹35*2
5. Buzzer 3v	₹18
6. LED bulb	₹21*4
7. Breadboard	₹150
	Total: ₹1390

SOFTWARES USED

- Arduino IDE
- Fritzing
- Google Docs
- VS code



CONCLUSION

- Hence we implemented the VIP car parking system using RFID and IR sensor via Arduino.
- When all the slots are empty and the RFID card is scanned via RFID scanner and if it recognizes it then it will allow the car to be parked.
- If it’s an invalid card or the parking is full, then it will sound the buzzer and will not allow the car to go inside and red led will blink.

Bibliography

- Official Arduino documentation
- www.youtube.com/carparkingusingArduino
- www.Google.com

Thanks

End of presentation