A Micro Project report on

SMART CAR PARKING SYSTEM USING IOT

Submitted to the **CMR Institute of Technology** in partial fulfillment of the requirement for the award of the Language Laboratory of

IOT WITH CLOUD COMPUTING LAB

of

III B. Tech II Semester

in

Computer Science and Engineering (AI & ML) Department

Submitted by

G. SREESHANTH	**(21R01A6688)**
K. ASHWINI	**(21R01A6689)**
KB. AAKASH	**(21R01A6690)**

Under the Guidance Of

Dr. L. Arokia Jesu Prabhu
(Associate Professor of CSE(AI&ML))

CMR INSTITUTE OF TECHNOLOGY

(UGC AUTONOMOUS)

(Approved by AICTE,Affiliated to JNTU,Kukatpally,Hyderabad)

Kandlakoya,Medchal Road,Hyderabad

2023-2024

CMR Institute of Technology

(UGC AUTONOMOUS)

(Approved by AICTE, Affiliated to JNTU, Kukatpally, Hyderabad) Kandlakoya, Medchal Road, Hyderabad.

CERTIFICATE

This is to certify that a Micro Project entitled with: "**SMART CAR PARKING SYSTEM USING IOT**" is being submitted by

G. SREESHANTH	**(21R01A6688)**
K. ASHWINI	**(21R01A6689)**
KB. AAKASH	**(21R01A6690)**

In partial fulfillment of the requirement for award of the **IOT WITH CLOUD COMPUTING** laboratory of III B.Tech II Semester in CSE (AI & ML) to the CMRIT, Hyderabad.

Signature of Faculty	Signature of Course Co-ordinator	Signature of HOD
Dr. L. Arokia Jesu Prabhu	**Dr. L. Arokia Jesu Prabhu**	**Mr. P. Pavan Kumar**

ACKNOWLEDGEMENT

We are extremely grateful to **Dr. M. Janga Reddy**, **Director, Dr. B. Satyanarayana**, **Principal** and **Mr. P. Pavan Kumar**, **Head of Department**, Dept of Computer Science and Engineering (AI & ML), CMR Institute of Technology for their inspiration and valuable guidance during entire duration.

We are extremely thankful to our **IoT with Cloud Computing Laboratory** faculty in-charge **Dr. L. Arokia Jesu Prabhu**, Associate Professor of CSE(AI&ML), **CMR Institute of Technology** for her constant guidance, encouragement and moral support throughout the project.

We express our thanks to all staff members and friends for all the help and coordinationextended in bringing out this Project successfully in time.

Finally, we are very much thankful to our parents and relatives who guided directly or indirectlyfor successful completion of the project.

G. SREESHANTH (21R01A6688)

K. ASHWINI (21R01A6689)

KB. AAKASH (21R01A6690)

INDEX

Introduction:

What is IOT

The internet of things, or IoT, is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers (UIDs) and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction. A thing in the internet of things can be a person with a heart monitor implant, a farm animal with a biochip transponder, an automobile that has built-in sensors to alert the driver when tire pressure is low or any other natural or man-made object that can be assigned an Internet Protocol (IP) address and is able to transfer data over a network. Increasingly, organizations in a variety of industries are using IoT to operate more efficiently, better understand customers to deliver enhanced customer service, improve decision-making and increase the value of the business.

Importance of IOT

The internet of things helps people live and work smarter, as well as gain complete control over their lives. In addition to offering smart devices to automate homes, IoT is essential to business. IoT provides businesses with a real-time look into how their systems really work, delivering insights into everything from the performance of machines to supply chain and logistics operations. IoT enables companies to automate processes and reduce labour costs. It also cuts down on waste and improves service delivery, making it less expensive to manufacture and deliver goods, as well as offering transparency into customer transactions.

Advantages of IOT

- It can assist in the smarter control of homes and cities via mobile phones. It enhances security and offers personal protection.
- By automating activities, it saves us a lot of time. 2
- Information is easily accessible, even if we are far away from our actual location, and it is updated frequently in real time.
- Electric Devices are directly connected and communicate with a controller computer, such as a cell phone, resulting in efficient electricity use. As a result, there will be no unnecessary use of electricity equipment.
- Personal assistance can be provided by IoT apps, which can alert you to your regular plans.
- It is useful for safety because it senses any potential danger and warns users. For example, GM OnStar, is a integrated device that system which identifies a car crash or accident on road. It immediately makes a call if an accident or crash is found.
- It minimizes human effort because IoT devices connect and communicate with one another and perform a variety of tasks without the need for human intervention

Smart Car Parking System:

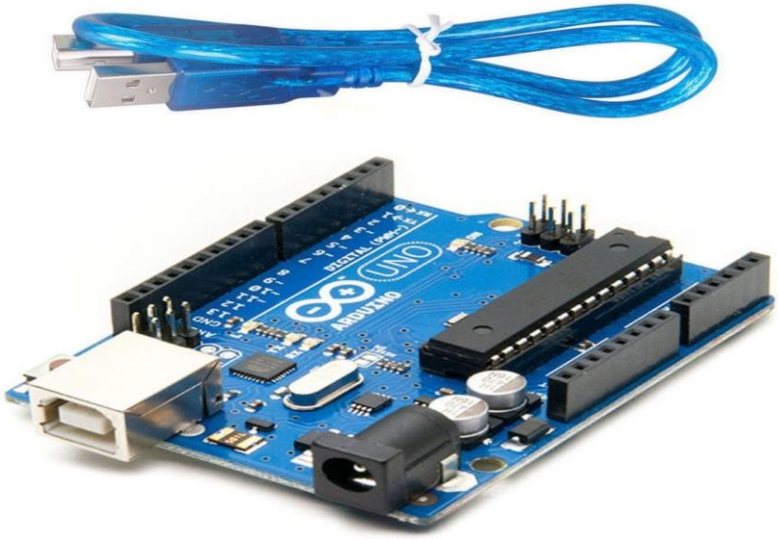
The car parking system using IoT takes a user authorization mechanism through a mobile app or license plate scanning. At the same time, the controller on the barrier or gate may allow or refuse drivers to park their cars according to the set parameters.

An IoT-based smart parking system also solves the problem of overcrowded parking lots. It allows drivers to reserve parking spaces in advance through a mobile application or web interface.

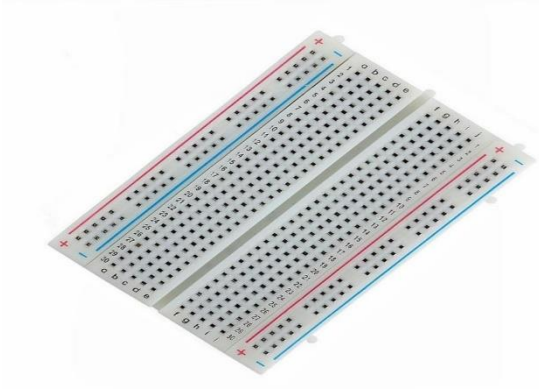
It's also possible to use individual solutions like parking locks for reservations. These are devices installed directly on parking slots. When a parking space owner leaves the territory, a parking lock will block entry for other cars.

Materials Required:

- Arduino UNO



- Bread board

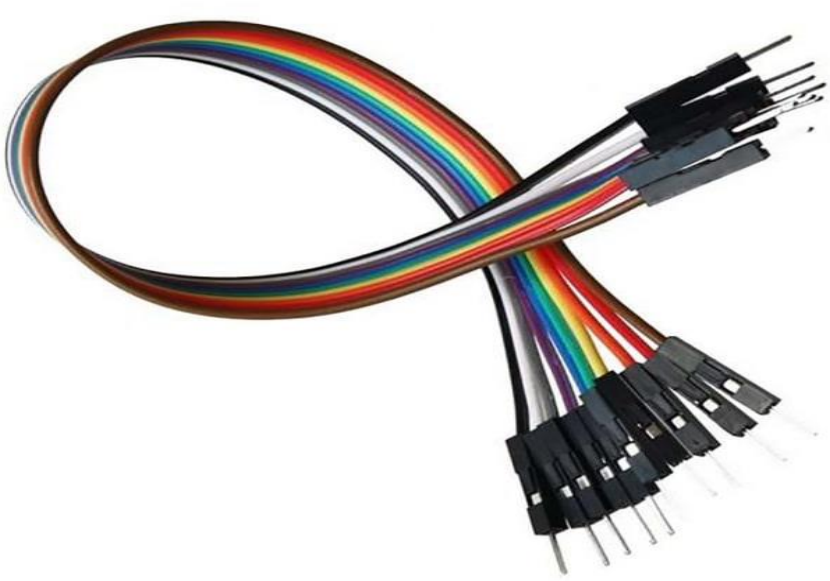


- LCD Display With I2C Module

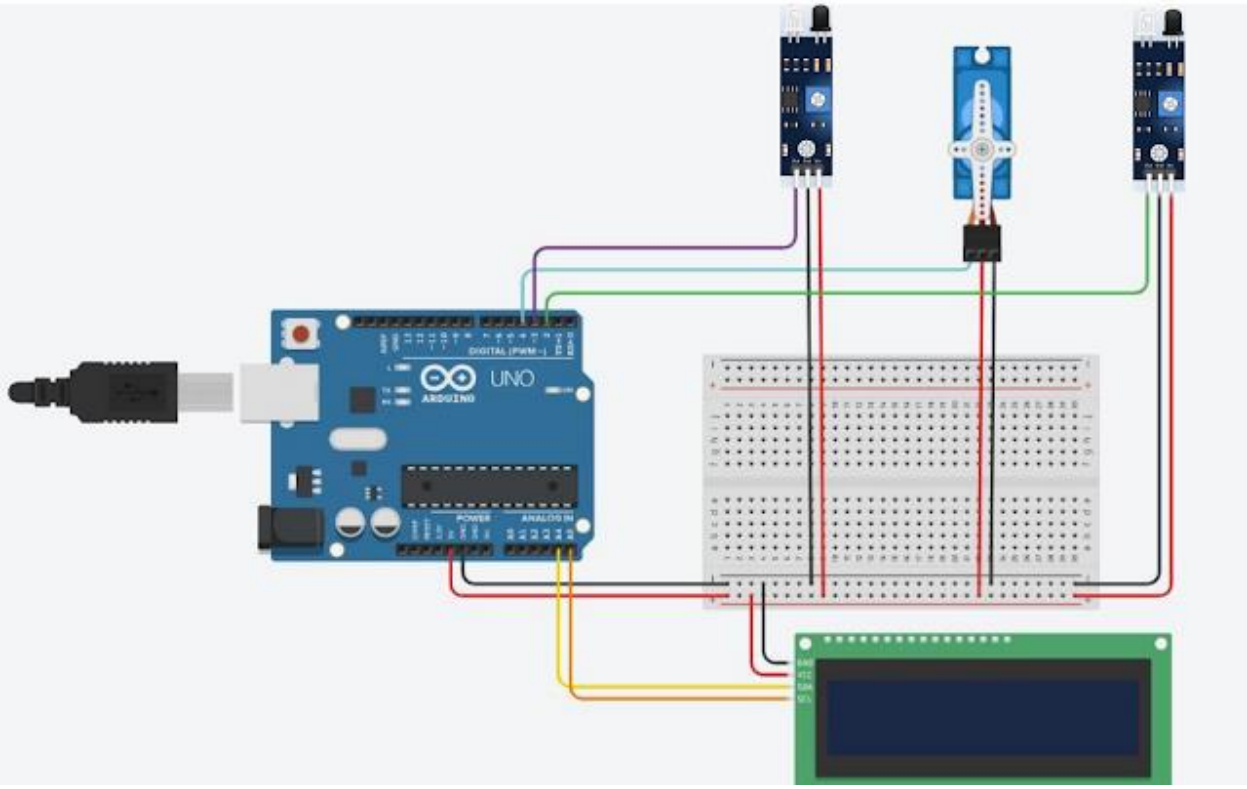
- Servo meter

- IR Sensor

- Jumper wires



Circuit Diagram



Procedure:

1.Gather Components:

- Arduino Uno board
- Servo motor
- Jumper wires (male-to-male, male-to-female)
- Breadboard
- IR sensor module

2.Connect Arduino to Breadboard:

- Place the Arduino Uno on the breadboard vertically, ensuring that it spans the center gap without touching any of the breadboard's metal contacts.

3.Connect Servo Motor:

• Connect the power (usually red wire) and ground (usually brown or black wire) of the servo motor to the breadboard's power rails (one wire to the positive rail and the other to the negative rail).

• Connect the signal wire (usually orange or yellow) of the servo motor to a digital pin on the Arduino (e.g., pin 9).

4.Connect IR Sensor:

• Connect the VCC (power), GND (ground), and OUT (signal) pins of the IR sensor module to the breadboard.

• Connect the VCC pin of the IR sensor to the positive rail of the breadboard.

• Connect the GND pin of the IR sensor to the ground rail of the breadboard.

• Connect the OUT pin of the IR sensor to a digital pin on the Arduino (e.g., pin 7).

5.Wire Jumper Connections:

• Use male-to-male jumper wires to make the connections between components on the breadboard and the Arduino.

• Connect the VCC and GND rails of the breadboard to the 5V and GND pins on the Arduino, respectively.

• Connect the signal pins of the servo motor and IR sensor to the digital pins on the Arduino as per the connections made in steps 3 and 4.

6.Upload Arduino Sketch:

• Use the Arduino IDE to write a sketch (code) that controls the servo motor based on input from the IR sensor.

• Include the necessary libraries for the servo motor and IR sensor in your sketch.

• Write code to read the output of the IR sensor and move the servo motor accordingly (e.g., rotate the motor when an object is detected).

7.Test the Setup:

• Upload the code to the Arduino Uno.

• Power up the system and test the functionality by placing objects in front of the IR sensor and observing the servo motor's response.

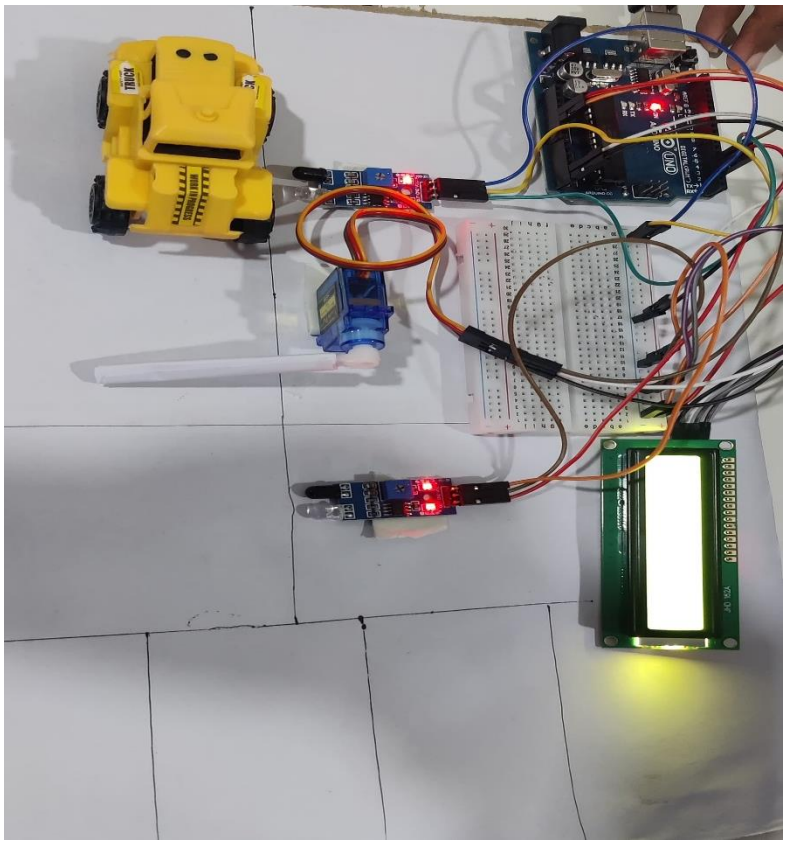
Source Code:

```
#include <Wire.h>

#include <LiquidCrystal_I2C.h>

LiquidCrystal_I2C lcd(0x27,16,2);

#include <Servo.h>

Servo myservo;

int IR1 = 2;

int IR2 = 3;

int Slot = 4;          //Total number of parking Slots

int flag1 = 0;

int flag2 = 0;

void setup() {

 Serial.begin(9600);

 lcd.init(); //initialize the lcd

 lcd.backlight(); //open the backlight

 pinMode(IR1, INPUT);

pinMode(IR2, INPUT);

myservo.attach(4);

myservo.write(100);

lcd.setCursor (0,0);

lcd.print("     ARDUINO    ");

Serial.println("ARDUINO");
```

```
lcd.setCursor (0,1);
lcd.print(" PARKING SYSTEM ");
Serial.println("PARKING SYSTEM");
delay (2000);
lcd.clear();
}
void loop(){
if(digitalRead (IR1) == LOW && flag1==0){
if(Slot>0){flag1=1;
if(flag2==0){myservo.write(0); Slot = Slot-1;}
}else{
lcd.setCursor (0,0);
lcd.print("    SORRY :(    ");
Serial.println("Sorry");
lcd.setCursor (0,1);
lcd.print("  Parking Full  ");
Serial.println("Parking Full");
delay (3000);
lcd.clear();
}
}
if(digitalRead (IR2) == LOW && flag2==0){flag2=1;
if(flag1==0){myservo.write(0); Slot = Slot+1;}
```

```
}
if(flag1==1 && flag2==1){
delay (1000);
myservo.write(100);
flag1=0, flag2=0;
}
lcd.setCursor (0,0);
lcd.print("    WELCOME!    ");
Serial.println("WELCOME!");
lcd.setCursor (0,1);
lcd.print("Slot Left: ");
Serial.print("Slot Left:");
lcd.print(Slot);
Serial.print(Slot);
}
```

Output:



Arduino Uno

sketch_may31a.ino

```
1   #include <Wire.h>
```

Output Serial Monitor ×

Not connected. Select a board and a port to connect automatically.

```
Arduino
Parking system
Welcome!
Slot left:
5
Welcome!
Slot left:
5
Welcome!
Slot left:
5
Welcome!
Slot left:
5
Welcome!
Slot left:
5
Welcome!
Slot left:
5
```

Conclusion

- The implementation of a smart car parking system using IoT technologies offers a transformative solution to the perennial problem of parking in urban environments.
- By leveraging IoT, this system enhances efficiency, convenience, and sustainability.
- Real-Time Monitoring and Availability: IoT sensors and devices provide real-time data on parking space availability, significantly reducing the time drivers spend searching for parking.
- This leads to decreased traffic congestion and a smoother driving experience.
- Automated Parking Management: Automated entry, exit, and payment processes streamline parking operations, reducing human error and labor costs.
- Predictive Analytics: Analyzing historical parking data helps predict peak times and optimize space utilization.
- This can inform city planning and the allocation of parking resources.
- User Behavior Analysis: Understanding user patterns and preferences enables personalized services, enhancing user satisfaction.

References:

- https://simplecircuitslol.blogspot.com/2024/03/arduino-code-car-parking-system.html
- https://simplecircuitslol.blogspot.com/2024/03/material-required-car-parking-system.html
- https://simplecircuitslol.blogspot.com/2024/03/circuit-diagram-car-parking-system.html
- https://webbylab.com/blog/