

## Phase 5

### SMART PARKING SYSTEM USING IOT

#### INTRODUCTION:

In the growing countries like India, China, Russia etc. The volume of Vehicle is increasing in exponentially. The Automobile markets are growing gigantically which increases in parking issues which may leads to high traffic in major cities. And directly or indirectly which consumes the fuel like Petrol and Diesel in large amount. Keeping this issue in our mind we came across the idea of implementing smart parking system using Lot. With the help of early parking slot booking process and save time, money, and fuel for the vehicle owner. Which indirectly support owner's economics.

Reducing the amount of time and bother required to find an open parking place is one objective of smart parking systems. In addition to reducing CO2 emissions, noise, and other pollutants, being able to precisely direct a car to an open place has several positive environmental effects. There are regulations regarding parking in every city and on every street. Cities place a lot of value on parking spots. A city must have adequate parking spots to give its citizens and tourists a place to leave their vehicles. A city needs to cater to the demands of the drivers because vehicles are a major component of transportation. utilising a website or app to assist drivers in finding parking quickly and easily. providing details to parking inspectors so they can find offences. encouraging individuals to utilise alternative forms of transportation when parking is a problem.

#### METHODOLOGY:

The functional block diagram-based smart parking system using Lot consist of ESP WROOM 32 Microcontroller, RFID reader module with tags, IR sensors, 12V DC Motors, 16\*2 Liquid Crystal Display, H Bridge, Transistor – Transistor Logic USB and 12V Power Supply is given to the system. RFID reader module is used to authentic the user. When the user scans the RFID tag over RFID reader module. It read the RFID tag details and Data send to Backend through ESP WROOM 32 via TTL USB (serial communication). Where data of user is stored in database while user booking the slot in website. If the data is correct, then Microcontroller allows 12V DC motor open's the gate to user to enter parking slot. 16\*2 LCD is used to guide or instruct the user in each step. IR Sensors detects the presence and Absence of the vehicle in the respective parking slot.

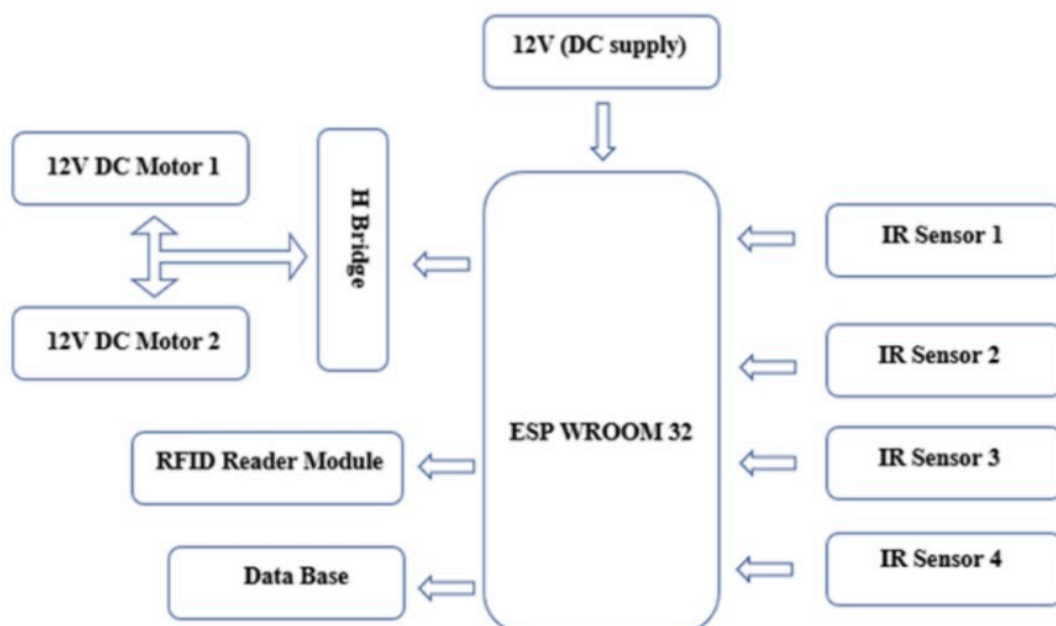


Figure 1. Block Diagram

## Functional Block diagram:

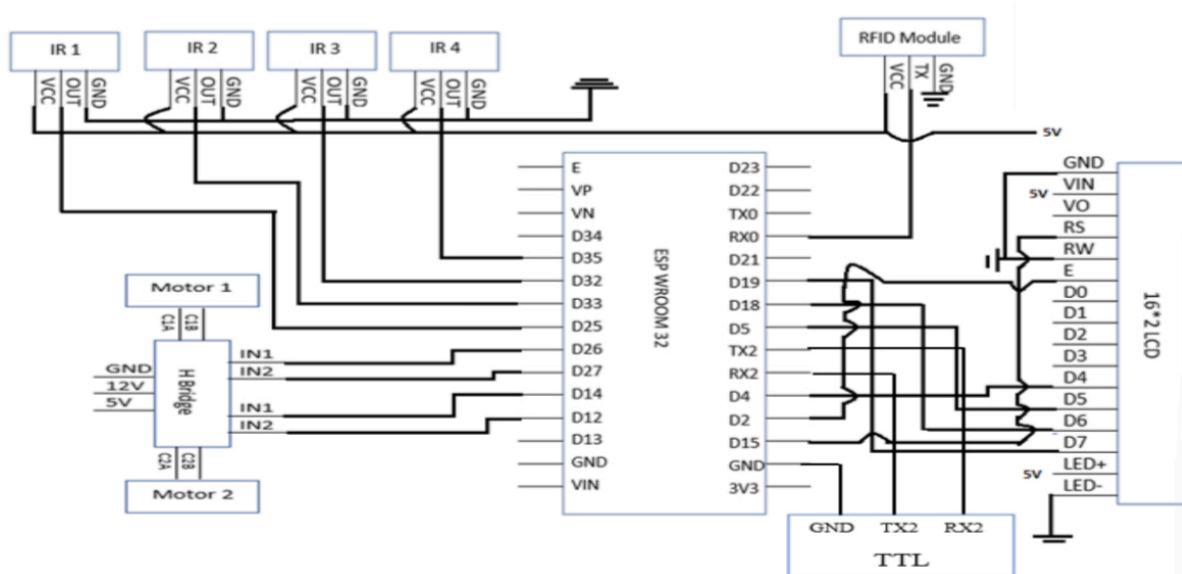


Figure 2. Circuit Diagram

### Circuit diagram:

This figure 2 shows the circuit diagram of smart parking system using Lot. LCD display takes the output from the ESP 32 board digital input/output pin number 4, 5, 18, 19, 2 and 15 where enable pin is connected to Pin no.32 in ESP 32, reset pin is connected to Pin.no 15, Pin.no 4, 5, 18 and 19 are connected to the digital pins of LCD D4, D5, D6, and D7 respectively, The four IR Sensors pins are connected to the digital input/output pins 25,33, 32 and 35 and pins of ESP 32. The RFID Reader module Transmitter pin (TX) pin is connected to Receiver pin (RX0) pin of ESP 32. The Transmitter pin (TX) and Receiver pin (RX) serial pins of TTL USB is connected to Receiver pin (RX2) and Transmitter pin (TX2) pins of ESP-32 respectively. IN1 and IN2 pins of 12V DC Motor-1 pins are connected to 26 and 27 pin of ESP-32. IN1 and IN2 pins of 12V DC Motor-2 pins are connected to 12 and 14 pin of ESP-32.

### IMPLEMENTATION OF SMART PARKIG SYSTEM USING IOT:

The Smart parking system using IOT, consist of two major parts.

- Smart parking Website
- Smart parking Hardware implementation

### Working Model:

#### PERFORMANCE ANALYSIS:

When the user scans the RFID tag over RFID reader module. It read the RFID tag details and Data send to Backend through ESP WROOM 32 via TTL USB (serial communication). After that some following cases are discussed below.

Case I: When User details matched.

- Then checks for the arrival time and time entered in website to fine (if applicable)
- Then checks for sufficient balance amount. Present in the wallet.

Case II: When User details is not matched.

- Then user may use wrong RFID tags or no slot's is registered for that RFID tag.
- The booked slot might be cancelled. Due to over time.

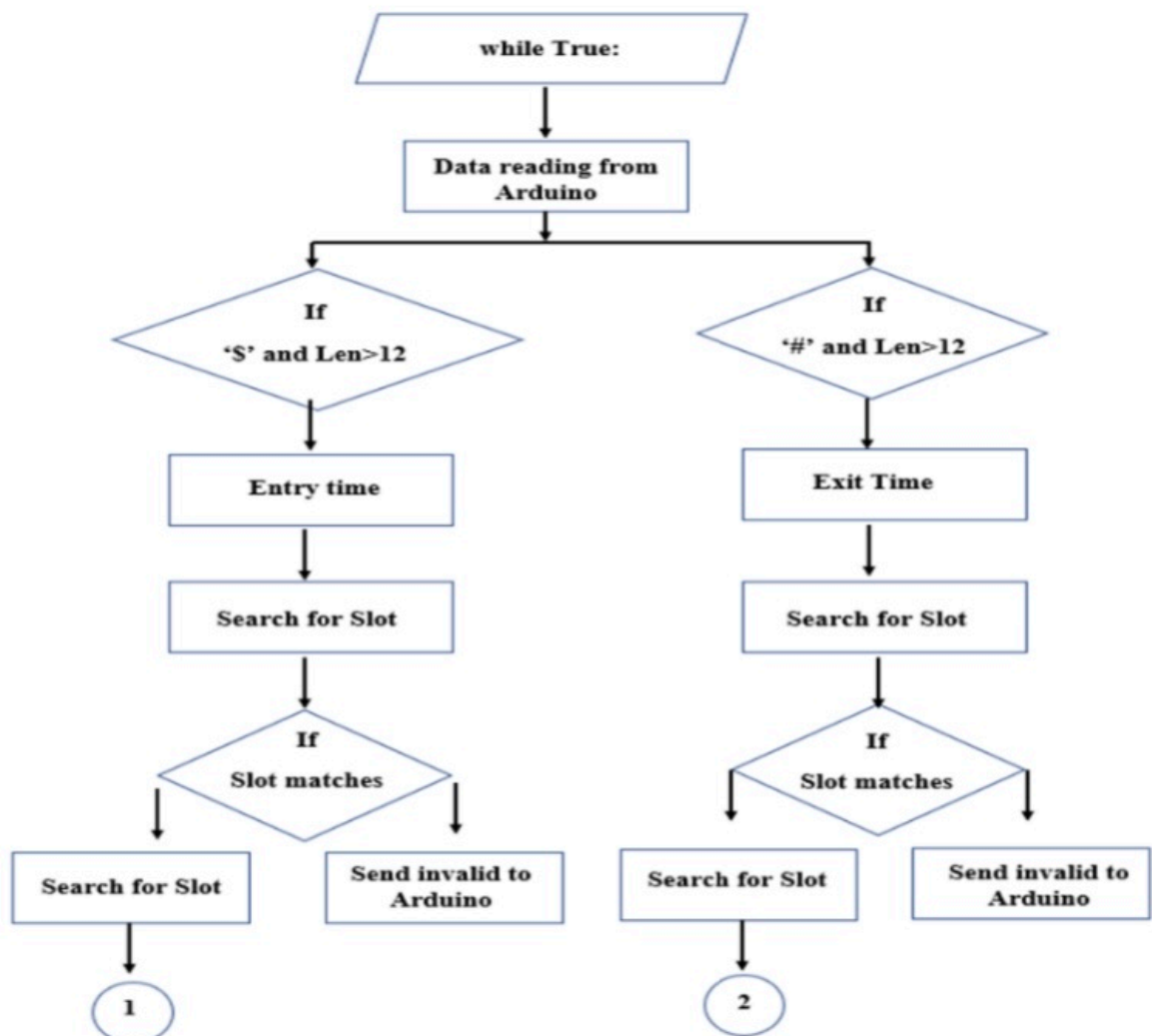
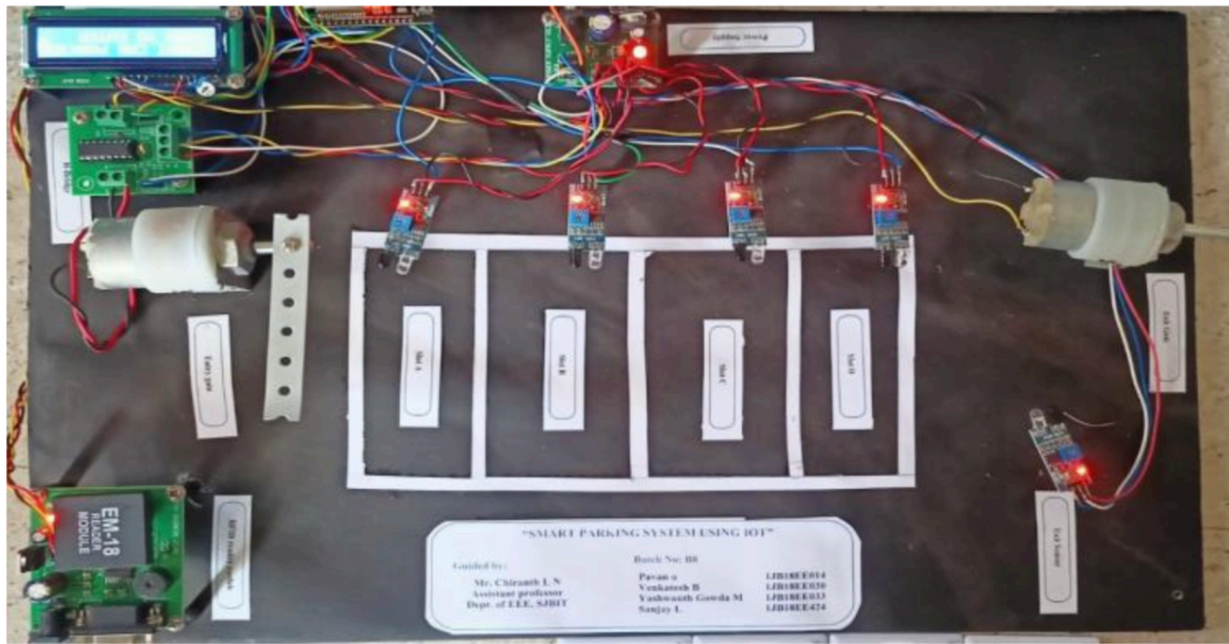


Figure 10. Backend Flow Chart

**Flowchart:****PERFORMANCE ANALYSIS:**

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**RESULTS:****Amount Calculation**

In figure 8. The user 1, who booked the slot A reached the parking slot on time, so zero fine amount is charged. The user 2, who booked the slot B reached the parking slot with 10 minutes delay, so 10 rupees fine amount is charged. When, the user decides to vacate the slot and approaches exit gate. The Exit IR sensors sense the car and ask to scan the RFID again. To calculate the total duration of parking time in the slot. And checks the available balance and deduct the total bill amount then the exit will open. User will message alert.

**CONCLUSION:**

Humanity has long aspired to the idea of smart cities. Since a few years ago, significant progress has been achieved in realising smart cities. New opportunities for smart cities have emerged thanks to the development of IoT and cloud technology. The foundation of creating smart cities has always been the development of intelligent parking structures and traffic control systems.

In this project, we address the parking problem and provide a Smart parking system built on the Internet of Things. The method that we suggest offers real-time data on the number of parking spaces that are available in a parking location. Our web application allowed users in remote areas to reserve a parking space for themselves. The project's efforts are aimed at enhancing a city's parking infrastructure and, as a result, the quality of life for its residents.

**GitHub user :**

<https://github.com/Rithikcv/Smart-Parking->