

# PROJECT OVERVIEW AND DESIGN

## SMART PARKING



## TEAM DETAILS

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<b>Problem Description</b>	It involves integrating IOT sensors into public transportation vehicles to monitor ridership,track locations and predict arrival times
<b>Goal</b>	The goal is to provide real time transit information to the public through a public platform,enhancing the efficieny and quality of public transportation

## OBJECTIVES

- To develop the user friendly automated parking system which reduces the man power and time saving.
- To offer safe and secure parking slots with in limited area.
- To reduce traffic mess caused by an unplanned parking system.
- To eliminate the unnecessary traveling of vehicles across the filled parking slots in a city.

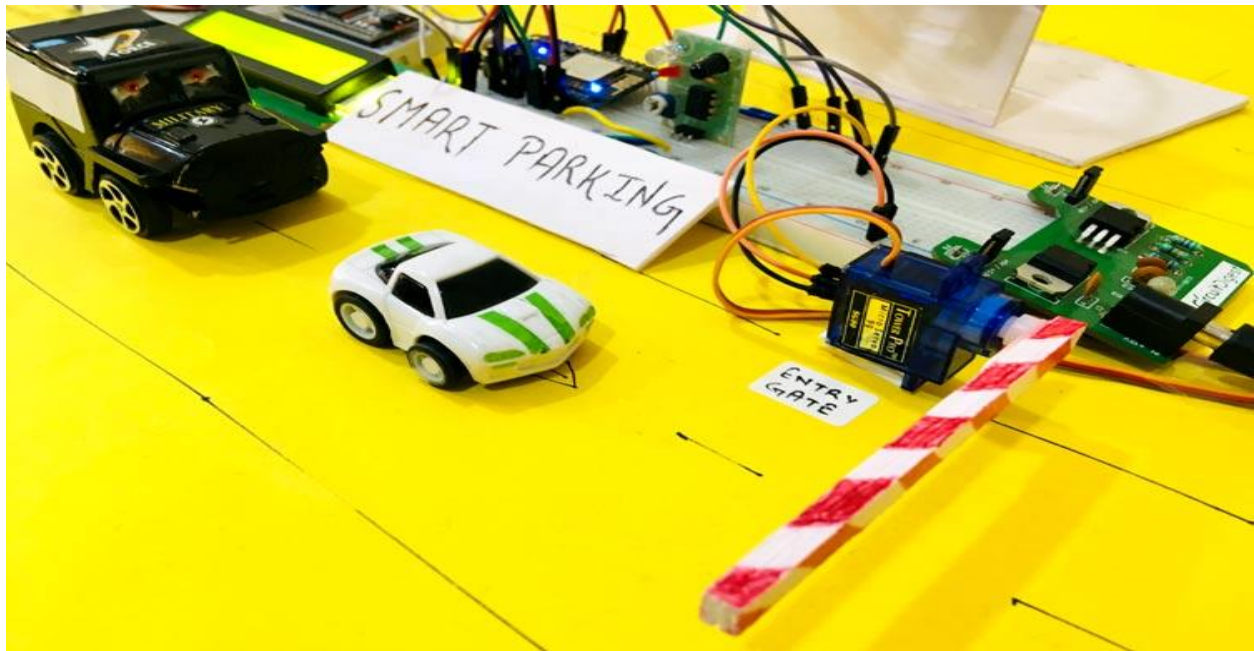


# INTRODUCTION

A smart car parking system helps in solving a common challenge of finding parking space in areas with a lot of traffic like residential areas, office buildings, schools and other facilities. With growing popularity of Smart Cities, there is always a demand for smart solutions for every domain. The IoT has enabled the possibility of Smart Cities with its over the internet control feature. A person can control the devices installed in his home or office from anywhere in the world by just using a smartphone or any internet connected devices. There are multiple domains in a smart city and Smart Parking is one of the popular domain in the Smart City. The Smart Parking industry has seen a number of innovations such Smart Parking Management System, Smart Gate Control, Smart Cameras which can detect types of vehicle, ANPR (Automatic Number Plate Recognition), Smart Payment System, Smart Entry System and many more. The parking system is controlled by the cloud. Nowadays car parking is congested cities. So we go to an easy method using the IoT parking system. In this project we are using the IR sensor to detect the slot is occupied or available and the data are sending to the microcontroller. The microcontroller is sending the data's to the cloud server (web page). Before this project, we want to park the car in any parking issue for cities. Now this project is very helpful to park the car in any parking using this system. This allows users to check for available parking spaces online from anywhere and available hassle-free parking. Thus the system solves the parking issue for cities and gets users an efficient IOT based parking management system.

# ABSTRACT

The proposed smart parking IOT circuit will be equipped with several sensors, inexpensive microcontrollers and Wi-Fi module using which a car / any vehicle owner can check if there is a vacant space in a parking lot using his / her phone or tablet or even on computer. The number of vacant spaces in the smart parking lot can be viewed from anywhere in the world using a URL link or the user can scan a QR code. The scanned / shared URL can be browsed on any web browser to know how many empty parking spot exist in real time. In this IoT Smart Parking System, we will send data to webserver for looking up the availability of space for vehicle parking. Here we are using firebase as IOT database to get the parking availability data. For this we need to find the Firebase host address and the secret key for authorization. If you already know using firebase with NodeMCU then you can move ahead else you should first learn to use Google Firebase Console with ESP8266 NodeMCU to get the host address and secret key.



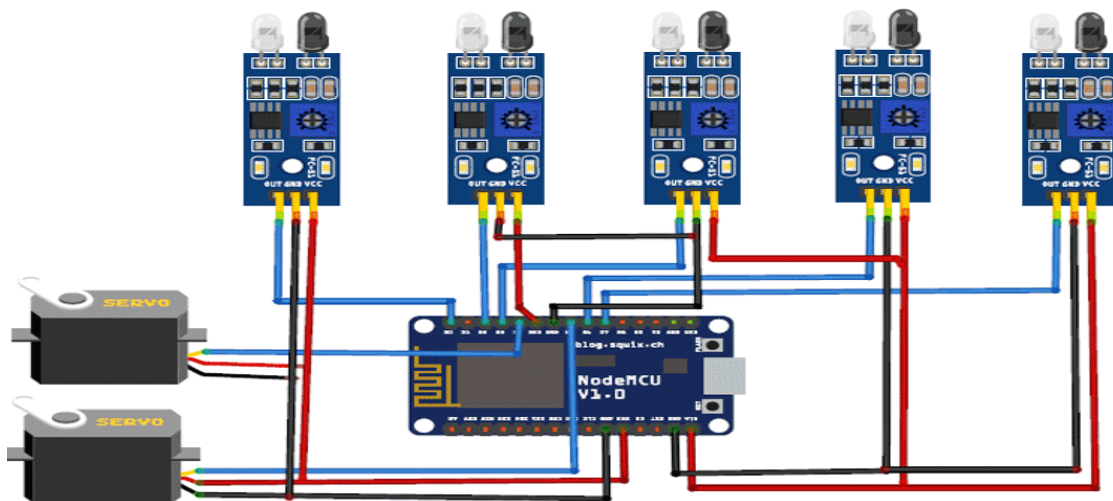
# REQUIREMENTS

## HARDWARE COMPONENTS:

- Servo Motors
- IR Sensors
- Arduino board
- ESP8266 NodeMCU

## SOFTWARE COMPONENTS:

- Arduino IDE



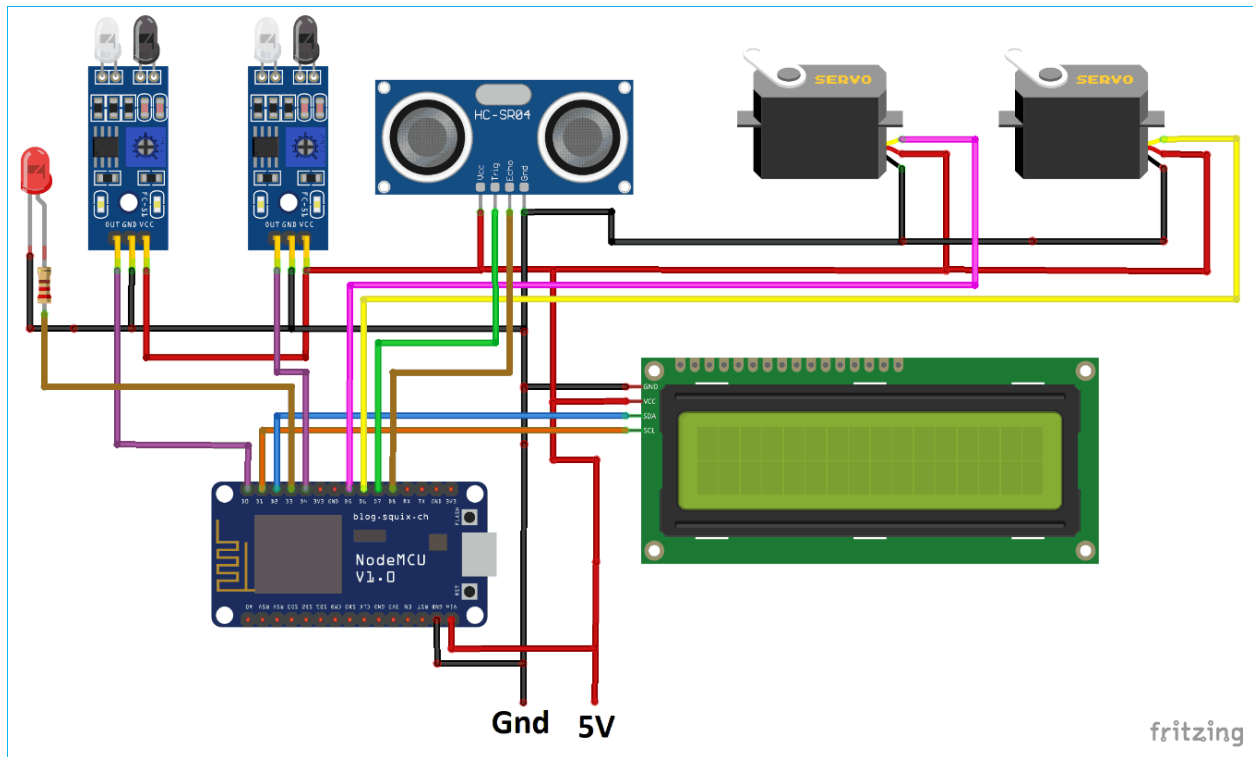


# CIRCUIT DIAGRAM

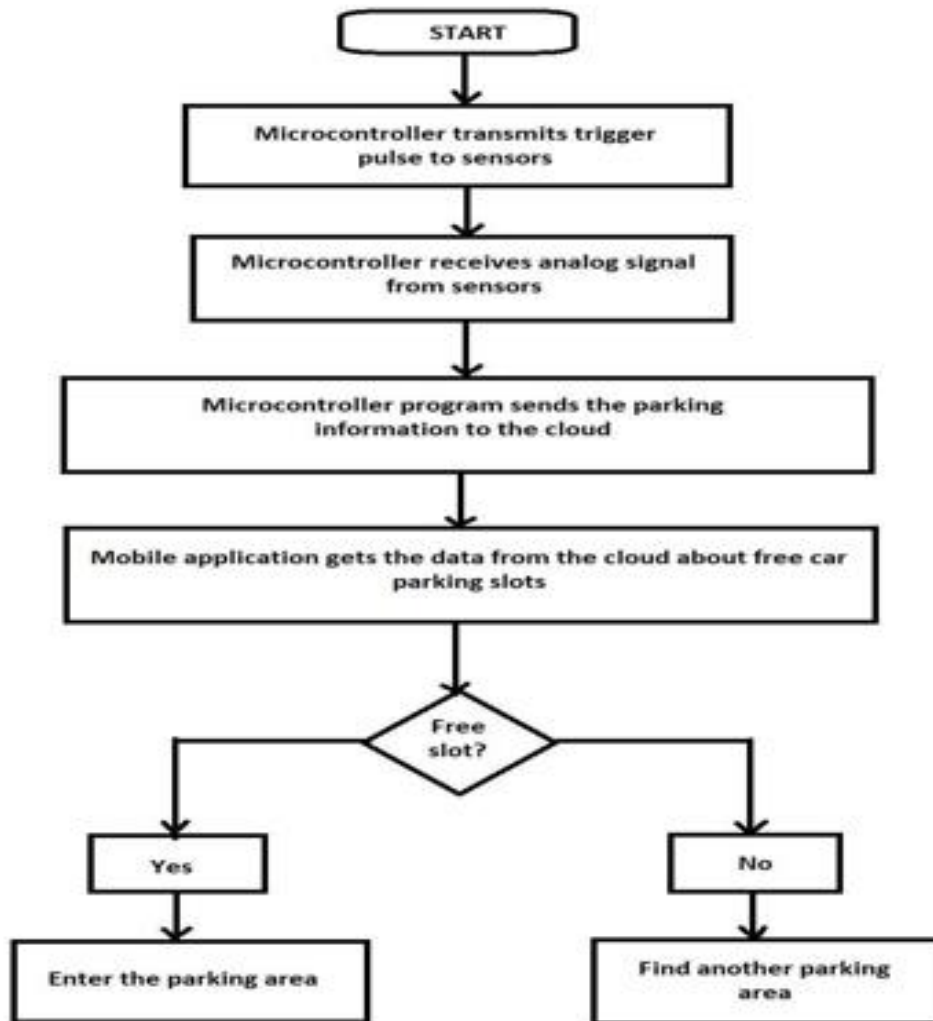
Circuit diagram for this IoT based vehicle parking system is given below. It involves two IR sensor, two servo motors, one ultrasonic sensor and one 16x2 LCD.

Here the ESP8266 will control the complete process and also send the parking availability information to Google Firebase so that it can be monitored from anywhere in the world over the internet. Two IR sensors are used at entry and exit gate to detect the presence of car and automatically open or close the gate. IR Sensor is used to detect any object by sending and receiving the IR rays

Two servos will act as entry and exit gate and they rotate to open or close the gate. Finally an Ultrasonic sensor is used to detect if the parking slot is available or occupied and send the data to ESP8266 accordingly.



# WORKING FLOW





# ARCHITECTURE



# CONCLUSION

- Our project detects the empty slots and helps the drivers to find parking space in unfamiliar city. The average waiting time of users for parking their vehicles is effectively reduced in this system.
- The optimal solution is provided by the proposed system, where most of the vehicles find a free parking space successfully.
- Our preliminary test results show that the performance of Arduino UNO based system can effectively satisfy the needs and requirements of existing car parking hassles thereby minimizing the time consumed to find vacant parking lot and real time information rendering.
- This smart parking system provides better performance, low cost and efficient large scale parking system.
- When car enters the parking area, the driver will park the car in the nearest empty slot when slot is occupied the LED light glows and when slot is empty LED lights are turned off automatically indicating that the parking slot is empty to be occupied.
- It also eliminates unnecessary travelling of vehicles across the filled parking slots in a city.