



# QUICK PARK: AN EFFECTIVE PARKING SYSTEM

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**Abstract:** One of the unresolved issues in today's smart world is the inefficient parking system. It becomes difficult for a driver to find an empty spot, resulting in a waste of time, money, and fuel, as well as the worst-case scenario of failing to seek out any car parking zone. Many problems, such as being stuck in traffic and having a limited number of parking spaces, can be solved by IoT. To address this issue, we propose a system that would save drivers time by allowing them to see where there are parking spots with available free spots in the surrounding area. Our project will make use of low-cost sensors and wi-fi modules to provide real-time data. This data will be updated in the database and retrieved by our Android application, allowing people to accurately locate where the available places are. This project, once implemented, will reduce pollution in metropolitan centres while still saving time and money.

**Keywords:** IoT (Internet of Things), Android Application

## I. INTRODUCTION

Vehicle traffic now has potential to be a major downside in cities, and it is developing exponentially. With increasing vehicles and congested parking spaces throughout urban areas, the parking problem remains a disadvantage. Finding a suitable spot for a vehicle may be a regular practice for many people in cities around the world. This search consumes millions of barrels of the world's oil each day.

Almost every time, drivers must look for a parking space, which takes more time. As a result of this project, drivers will be able to easily determine whether or not there is available parking and where it is located. To successfully build the quick car parking system, an ESP8266 equipped with ultrasonic sensors will be used.

## II. RELATED WORK

In this proposed idea [1] of "A smart parking system on reservations and optimal resource allocation". Drivers access the framework by means of application or web. Another idea for a "smart parking" system. This framework unequivocally designates and saves ideal parking spots to drivers. It utilizes the idea of blended whole number straight issue. An algorithm is used [2] to increase the efficiency of the cloud-based parking system and network architecture technology is used. This method is used to find the lowest price of parking space. It shows the number of parking spaces available and also the distance of the parking space from the user. The user can also install an application on their mobile phones to access this information. With this method, the time of the user to find a parking space can be decreased. In this project [8], the system utilizes the Arduino comprising of RFID innovation to visualize cars. An RFID is used to measure the number of free parking spaces. This project gives a system to reduce congestion in the car park and limits down the searching for a parking spot. After signing into the application, a driver can book a desirable parking spot. The client receives the data of that particular parking spot through notification. At that point, the framework refreshes the situation with the parking spot to "awaiting spot" during which time the framework won't permit different clients to hold it. If the framework confirms that the spot is free it changes its status to available. Then the framework will refresh the status from the web (the situation with vehicle spaces) when another vehicle participates in the framework. In this way, the situation with the general system is constantly refreshed continuously. QR codes are used to locate parking spaces in a smart car searching method proposed in [5]. A mobile phone application is used to decode the QR code and determine the parking space details such as parking floor number, and parking location ID. To track and alert the availability of parking spaces, a smart parking system [6] with WiFi module, cloud server, Raspberry Pi, and display device with intelligent sensors deployed on-site is used.



### **III. AIM AND OBJECTIVE**

The goal of this project is to develop an efficient Smart Car Parking System. This is most often done to improve traffic flow within the parking lot. This program's primary aim is to create a software solution that allows users to check the availability of parking in their area. Furthermore, a parking prototype will be built to demonstrate the use of the parking, and a Smart phone application will be developed to share details about the status of parking spots. The application will be used to gain complete control of the parking as well as to make people more aware among parking users. The objectives are addressed as follows:

- To build an android application known as Quick Parking System.
- To implement a parking prototype to demonstrate the use of the parking.
- To allow users to be aware of their parking status.

### **IV. EXISTING SYSTEM**

People used to struggle to find a parking space because smart cities have increased the number of vehicles and reduced the available parking space. Efforts are being made to locate a parking space in cities. People who find a parking spot usually do so through a reserved parking space for themselves, while those who cannot afford a parking space are forced to find a free parking spot. They also face issues such as increased traffic and fewer parking spaces.

### **V. PROBLEM STATEMENT AND SCOPE**

In the current scenario in countries like India, every driver is struggling to find an open parking space due to valuable time wasted from inefficient parking systems, more fuel is consumed while searching for parking spots, and more pollution is being produced.

Parking spaces are hard to find in the city. Most of the time, drivers will have to roam around for some time before they can be able to find an available space. Therefore, with this project, drivers can easily know if there is available parking and also where space is. An ESP8266 with low-cost ultrasonic sensors will be used as the base of our project to successfully build the quick car parking system

### **VI. PROPOSED SYSTEM**

This system will help the drivers locate an empty spot through an application. By using ultrasonic sensors, we will be able to keep a record of the number of cars parked inside a parking garage. Thus, when a vehicle enters a parking spot, an ultrasonic sensor can then state whether a vehicle is there in the space or not. Then the data from the sensors data will be sent to the cloud and then the user will be able to check if any parking space is empty or not through an application. It involves ESP8266 (Wi-Fi module), HCSR04 (ultrasonic sensor).

The flow of the system:

- The user will log in to the application.
- The user will search the destination and then look for nearby parking area.
- If they find a parking area then they will be notified about the remaining parking spots.
- Then they can navigate to that parking areas.

### **VII. METHODOLOGY**

The process in this proposed model begins as soon as the user begins looking for a parking spot..

- I.The user then logs into to the application and begins searching for a parking space nearby.
- II.The application displays the nearest parking space available to the user. If the user wishes to park at that location, he or she can use the application's book option.
- III.After making a reservation, the user will be directed to their parking space using the application's navigation feature.
- IV.When the user arrives at the parking area, he or she can park in the designated spot.



VIII. IMPLEMENTATION

The implementation of the system includes two different stages.

I. SOFTWARE IMPLEMENTATION.

Two technologies are used for the making of the project -

**Flutter:** It is a Google open-source SDK which allows developers to build apps for Android, iOS, and even the web using a single codebase. We used flutter to create an android application that enables users to check parking availability from their smartphones. Firebase has been used to read real-time server data, which will then be displayed in the app.

**Firebase:** It is a Google platform that provides a cloud database, backend server, and functions to web and mobile applications. We used Firebase for the real-time database, as well as Cloud Fire Store to update the available parking spots in real-time. The Navigation and Booking Features are shown in Fig.1 and Fig.2.

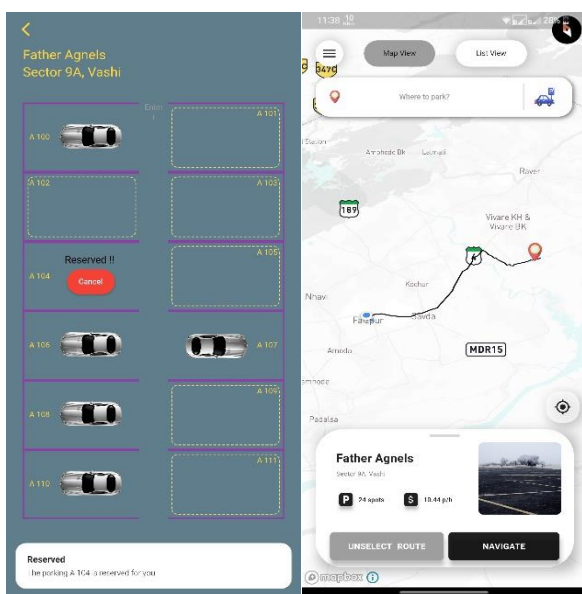


Fig.1. Navigation Feature

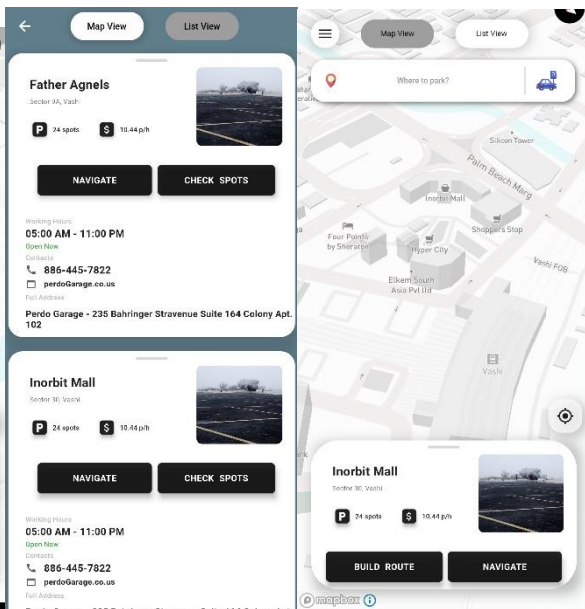


Fig.2. Booking Feature

HARDWARE IMPLEMENTATION

In Every Parking spot, an IoT hardware Kit will be Installed. It will be consisting of Wi-fi Modules, Power Regulating Circuit, and an Ultra-sonic sensor. This IoT kit will keep on updating the values of that particular parking spot. After that, it will collect the value from the sensor and will send it to the firebase which acts as a Real-time database in our case. At last, the values from the database will be fetched by our android application. Whenever any user search for the parking places the android application used that data to display the real result of the parking place. Here Fig.3 represent the connection between the component that are used in the system.

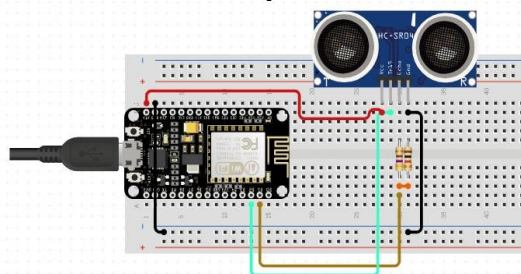


Fig.3. Circuit Diagram



## COMPONENTS REQUIRED

- **ESP8266** - The ESP8266 is an exceptionally easy to understand and easy device to upload our data and update it frequently to the web network. It can likewise get information from the web utilizing APIs to get any data that is accessible on the web, hence making it more intelligent.
- **ULTRASONIC SENSOR HC SR04** - This is an ultrasonic distance sensor. The cost of the sensor is very low and it is very accurate. It uses sonar to determine distance. Its range to detect an object is around 20mm
- **MB102** - This is a Breadboard Power Supply Module that is easy to use. It allows connecting any DC power supply. It can be turn OFF and ON button for power supply.

## IX. FUTURE SCOPE

We will continue to expand the capacity of parking spots in the future, and we will enhance the application by adding an online payment gateway, which will allow users to book parking spots more effectively. Implementing this system in malls, shopping centres, and domestic airports will help it advance. We will try to improve the power supply approach that we are using in this project in the future because it is not as effective as it can be, and a suitable machine learning algorithm can be added that will suggest users nearby empty parking spaces depending on some conditions.

## X. CONCLUSION

One of humanity's dreams has always been smart cities. As the Internet of Things (IoT) and Cloud Technologies advance, new smart city opportunities emerge. One of the most important aspects of developing smart cities is a smart parking system. We implemented an IoT-based Smart Car parking system in this project. This proposed system would be able to display the current status of the parking spot where the user wishes to park their vehicle. Users from various locations can use this application to confirm the availability of parking spots in their destination parking area. This project's concept would increase a city's parking functionality by reducing the time spent looking for parking spots as well as reducing pollution while using less fuel.

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