# SMART PARKING BOOKING SYSTEM

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*Abstract :* - Escalation in the amount of vehicles is raising the issue of vehicle parking at an appropriate area especially, the car parking. This directly or indirectly leads to traffic congestion and crowding. This is because the current transportation infrastructure and car parking facility are incapable to cope up with the arrival of considerable amount of vehicles on the road. To ease the mentioned problem, some authors proposed a Smart Parking Management System which would benefit users to automatically find a parking zone with a lower amount. Smart Parking booking system involves use of IR sensor, Arduino Uno, ESP8266-01 Wi-Fi module and web server. The modern parking platform enables us to connect, evaluate and automate data gathered from devices and execute the possible smart parking system. The system would facilitate vehicle occupancy, checking and managing vacant parking space in real-time and scale-down the environmental pollution. The proposed system caters optimum usage of parking area and obtains substantial revenue generation.

*IndexTerms* **- Parking system, Arduino Uno, Android Studio, .net, IR sensors.**

## I. INTRODUCTION

Traffic overcrowding in metropolitan cities is an alarming issue worldwide and it has been rising exponentially. Car parking has been a primary contributor and cramped parking spaces in urban areas play a major role. Hunting for a convenient parking space is a routine (often irritating) activity for many drivers across the globe. This searching activity burns around a million barrels of oils every day. These problems will worsen up as the world's population continues to urbanize without a tactical, convenience-driven retract from the car. According to records, Smart Parking System could be accountable in saving approx 2, 00,000 gallons of fuel till 2030 and approximately 3, 00,000 gallons of fuel by 2050 if it is implemented well. The Smart Parking systems gather information about all the available parking slots in a specific geographical area. The process is real-time and places vehicles at the particular positions. It contains real-time data collection using low-cost sensors and mobile-enabled parking reservation system which allows them to book their precise slot in advance. The importance of Smart Parking is: 1.Systematically sense and predict spot/vehicle occupancy in real-time. 2. Guides residents and visitors to available parking slots. 3. Optimum usage of available parking space. 4. Simplifies the parking experience and adds value for parking stakeholders, such as merchants and drivers. 5. Helps the free flow of traffic in the city. 6. Enables intelligent decisions using data, including real– time status applications and historical analytics reports. 7. Smart Parking plays an important role in creating better urban environment by reducing the emission of CO2 and other pollutants. 8. Provides tools to optimize workforce management.

## II. AIMS and OBJECTIVES

The purpose of this project is to reduce the search time for a suitable parking space in crowded cities. It also helps to driver to easily find vacant places and to reduce energy consumption at some extent which in return helps to lessen the air pollution. This project is an attempt to deliver an optimal system which gives a choice to the people to book their parking space and time as per their convenience and requirement of their vehicle. The aim of the Smart Parking Booking System is to make the parking experience convenient and time saving. The question to be addressed here in this module is, how to give parking slots to the drivers? The project is to mainly answer this particular question addressed by providing an Android application to reserve parking slot as per drivers need.

Objectives of Proposed Design Proposed parking system would save time and provide comfortable hazel free parking experience to the users. Features of the parking management system are as listed below:

1. Monitoring of parking space and updated indication of vacant parking slots.
2. Assistance to the parking place via displays.
3. Safe parking assistance using ultrasonic sensors.
4. Automatic record of check-in and check-outs of the cars/vehicles
5. Payment of parking charges from the users account.

## III. LITERATURE SURVEY
### 2.1 Futuristic Parking Management

Several parking guidance techniques have been made since past few decades. This section elaborates the advantages and disadvantages of various parking approaches. Also, we simulate and analyze the existing parking systems under practical conditions, test their performance and compare their outcomes.

## 2.2   Blind Search

When the user is unaware of parking locations, he randomly searches for vacant parking spots. The driver blindly searches for the suitable parking space within a certain distance from his destination. The driver will stop his search when he finds an appropriate parking area. Otherwise the driver will continue his search until he gets the desired parking lot.

## 2.3   Parking Information Sharing (PIS)

The current parking state has adopted parking information sharing system in which the smart parking system updates the information regarding the availability of available parking spaces. The driver selects the parking slot in the vicinity of his current location and can park his/her vehicle on that parking slot. But the major disadvantage of this system is that over the past few years the number of vehicles has increased exponentially, but the available parking spaces are limited. This causes increase in demand for a single parking space, among several drivers. Hence, PIS makes searching for parking space easier but by sharing information of parking slot, it also increases its demand.

## 2.4   Buffered PIS (BPIS)

To address the complicated "collective-vehicles-chase-single-slot" phenomenon, developers of smart parking systems reform the PIS mechanism. Hence, there might be a number of drivers, pursuing the particular available spaces, the system has a few extra slots to avoid the collision. But it is not easy to figure out the number of buffer spaces. If the buffer is less, the problem of "collective-vehicles-chase-single-slot" will not be eradicated. The implementation of parking spaces will be low, if it is too large. Hence it can be calculated that the blind search system is an open loop system, where drives make conclusions without considering the state of the system. The PIS and BPIS strategies allow users to make verdict without investigating the entire system. However, this phenomenon cannot be completely eradicated. To lessen the traffic searching for parking, we came up with a reservation based system, wherein the users book their respective parking slot through the parking management system. If the driver makes a successful reservation, it guarantees him an available parking space and he can park his vehicle in that slot. This reservation based system allows drivers to accomplish the most advantageous parking space under their budget restraints.

## IV. PROBLEM STATEMENT

Parking systems have concerns regarding available parking spaces, wastage of time, wastage of fuel, and pollution due to fuel combustion. Also due to lack of parking spaces available, people tend to park their vehicles on the side of a busy road, hence causing chaos and less space for driving the vehicle. In order to solve these problems regarding parking, this project provides a convenient way of booking a parking space in advance. This system provides user to easily park their vehicles without any chaos and pay for the booked slot accordingly. The main hardware component used in this system is Sensors which detects the slot for any parked vehicle and shows the availability to the user accordingly.

## V. PROPOSED METHODOLOGY

Our proposed system will be having a hardware which will continuously detect the parking area for parking the car. There will a hardware which will contain a microcontroller, an I.R sensor and a WIFI module. The hardware will continuously sense the parking lot and send report to the server continually. The user will be having an android app. The user can register into the app and book the parking area for their car. The admin can view the parking logs and view location and slots for parking area.
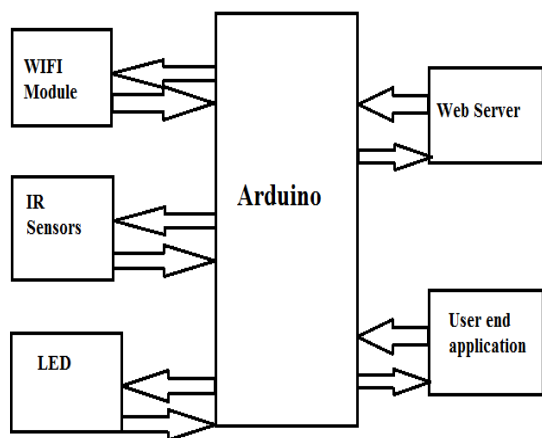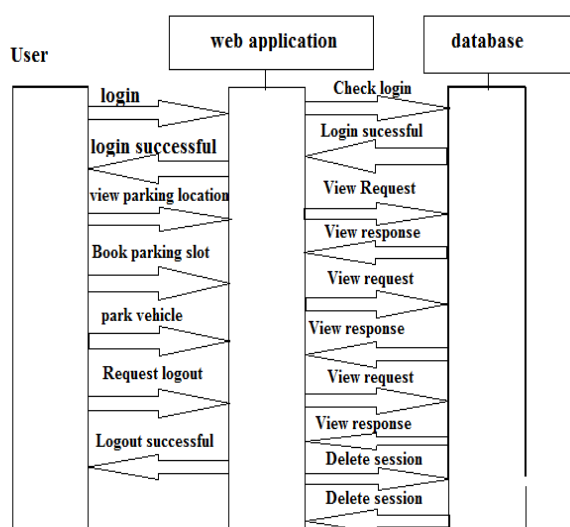
Fig.1. Block diagram of proposed system
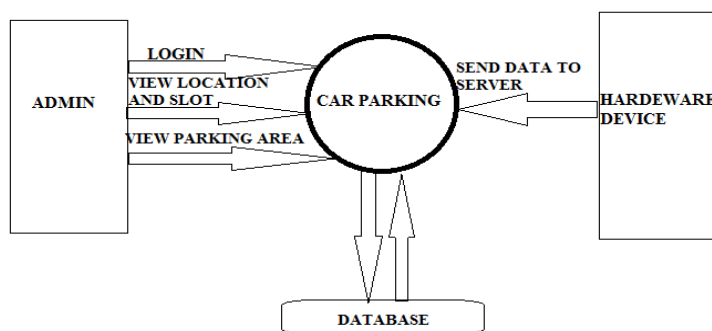


Fig.2. Sequence Diagram



Fig.3. Dataflow diagram

As shown in Fig.2, the user logs in to the web application. The web application checks the login details, if they are valid, the application shows successful login. The web application then searches for the parking location in the vicinity of the user. The user, according to the requirement, will book the parking slot for a specific time period. The hardware device ssends information to server on the available parking space, which is stored in the database, as shown in the fig.3.The admin collects the information from the database and provides the parking spaces accordingly.

## VI. ACKNOWLEGEMENT

## VII. CONCLUSION

In this project, we have built an application for booking parking spaces in advance. The purpose of this project is to reduce the traffic and fuel combustion due to searching for a suitable parking area. The application will store the information of the parking spaces in the database and use sensors to the presence of the vehicles and show availability accordingly.

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