



## SMART CAR PARKING SLOT RESERVATION USING ARDUINO UNO

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**ABSTRACT:** *This paper aims to provide a user friendly, reliable and automated car parking system. A major problem in day to day life is parking of vehicles especially the car parking at an appropriate place. And the issue indirectly leads to traffic congestion. This paper presents the basic concept of using server or cloud based smart parking services in smart cities as an important application of the Internet Of Things (IOT) paradigm. This system will be accessible through a mobile app or through the webpage provided and can be used to monitor or find the empty slot. The Ultrasonic Range Detection Sensor is utilized with Arduino to indicate the empty slot. By measuring the distance using ultrasonic sensor drivers are able to find the empty slot in parking to park the car and help the driver to find the slot easily and reduce the searching time. As the parking place is found to be empty it is detected using ultrasonic sensors which report it further.*

### I.INTRODUCTION

In the current era, we are facing a new problem of parking of vehicles in urban cities. By using our automated parking system, a user can save much time for searching free parking space. The user can book in advance the parking slot and update the information to the server. Every user has a unique id and password. Too many cars, too much traffic and there is no enough

parking area. This is the situation which is seen in most of the metropolitan cities today. People keep on roaming on roads searching for a parking space to park their vehicles especially at peak hours of time. Our proposed system presents a smart parking system that regulates a number of vehicles to the nearest parking space at any given time based on the parking space availability. "Intelligent Parking System (IPS)" is implemented using the Operating System Android. The user requests the Parking Control Unit to check the status of available parking slots. As soon as the user request, all the available free slots are displayed to the user. If the availability of parking space is confirmed, the user can book the parking slot and proceed to pay. The vehicle follows its path towards the starting of the parking area. The user fixes his slots by showing his confirmation details to the concerned person at Parking area. After communicating, the vehicle will further follow its path to the allocated parking slot. After successful parking the slot details are updated simultaneously in the Administrators database. Finally the time to find for an empty parking slot is minimized. The main responsibility of the Intelligent Parking System (IPS) is to help the user to find an area where parking is available and total number of slots free in that area. Thus our proposed methodology reduces the user's effort and time of searching a parking slot.



## II. RELATED WORK

1.D.J.Bonde “Automated car parking system commanded by android application” in Proc. IEEE Conf.,03-05, Jan 2012\ The aim of this project is to automate the car and car parking as well. A miniature model of an automated car parking system that can regulate and manage number of cars that can be parked in given space at any given time based on the availability of parking slot. Automated parking is a method of parking and existing cars using sensing device. The entering and leaving to the lot is commanded by an android application.

2.M.M.Rashid, A. Musa, M. AtaurRahman, and N.Farahana, A. Farhana “Automatic Parking Management System and Parking Fee Collection Based on Number Plate Recognition International Journal of Machine Learning and Computing , 93-98, 2012.

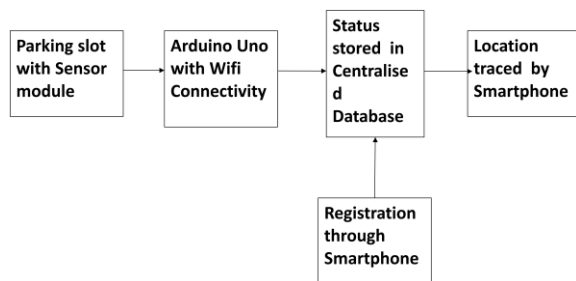
This paper discussed on automatic parking system and electronic parking fee collection based on vehicle number plate recognition. The aim of this research is to develop and implement an automatic parking system that will increase convenience and security of the public parking lot as well as collecting parking fee without hassles of using magnetic card. The auto parking system will able to have less interaction of humans and use no magnetic card and its devices. In additions to that, it has parking guidance system that can show and guide user towards a parking space. The system used image processing of recognizing number plates for operation of parking and billing system. Overall, the systems run with pre-programmed controller to make minimum human involvement in parking system and ensure access control in restricted places.

3.R. Yusnita, FarizaNorbaya, and Norazwinawati Basharuddin “ Intelligent Parking Space Detection System Based on Image Processing”, Internation Journal of Innovation, Management and Technology, 232-253, 2012.

This paper aims to present an intelligent system for parking space detection based on image processing technique that capture and process the brown rounded image drawn at parking lot and produce the information of the empty car parking spaces. It will be display at the display unit that consists of seven segments in real time. The seven segments display shows the number of current available parking lots in the parking area. This proposed system, has been developed in software and hardware platform.

## III.SYSTEM DESIGN

Our system utilizes Arduino Uno, the open source and user friendly hardware, with Wifi connectivity. Uses Ultra Sound sensor for identification of the parking slot status. The status of the parking slot is uploaded into the centralized database Which can be monitored through the smart phones. The users can be registered for their slot in advance through Mobile App. Initially the slot selection is made by the user from his mobile phone. He checks for the availability of a parking slot that is nearest to his location. If it is available, he moves to the next stage or else go to the initial state.Transfers request for parking slot from the mobile using Android application. The Parking Control Unit (PCU) gets the slot number requested by the user. If the payment is done successfully, then the requested slot is reserved in the parking area.



**Fig:1 Block Diagram for Proposed Methodology**

After reserving a particular slot by the user then the status of that respective slot will be marked as RED=RESERVED and the remaining will be GREEN=EMPTY. As soon as the vehicle gets entered into the parking slot, the timer gets ON and measures the total time. As soon as the vehicle moves out of the parking slot, the timer gets OFF and the total cost will be displayed.

#### IV. PROPOSED SYSTEM

Vehicle Parking System Using Arduino UNO Designing, creating and delivering a main edge stopping innovation is called as Smart stopping. It is a vehicle stopping framework that helps drivers locate an empty spot. Utilizing the Ultrasonic sensors in each stopping space, it identifies the nearness or nonattendance of a vehicle. Brilliant Parking framework is demonstrated as a correct, strong and cost effective approach to guarantee that street clients know precisely where empty car parking spots are. As the populace expanded in the metropolitan urban areas, the utilization of the vehicles has also expanded. It causes issue for stopping which prompts movement clog, driver disappointment, and air contamination. When we visit the different open spots like shopping centres, multiplex film lobby and lodgings amid the celebration time or ends of the week it makes all the more stopping issue.

In the current research found that a driver takes almost 8 minutes to stop his vehicle since he invest more energy in looking the parking area. This seeking prompts 30 to 40% of activity blockage. This project perceives how to diminish the stopping issue and to do secured stopping utilizing the shrewd stopping under Slot Allocation strategy with the assistance of Arduino UNO. The primary commitment of our proposed frameworks is to discover status of the stopping territory and give secured stopping. In the course of recent years, movement experts in numerous urban areas have built up a model called Parking Guidance and Information (PGI) framework for good stopping administration. PGI frameworks, tells about the dynamic data of stopping in the controlled region and aides the clients to the empty stopping spaces.

#### V. IMPLEMENTATION

Ultrasonic Sensor HC-SR04 is a simple sensor which emits Ultrasonic Radiations from its transmitter and is used for measuring the distance between sensor itself and any obstacle in front of it. The sensor has a transmitter and a receiver on it. Sensor provides 2cm to 400cm of non-contact measurement.

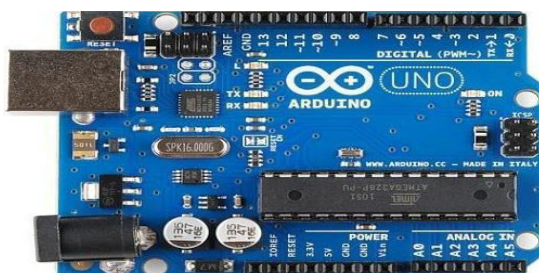


## Fig:2 Ultrasound sensor module

This sensor consists of four pins, which are:

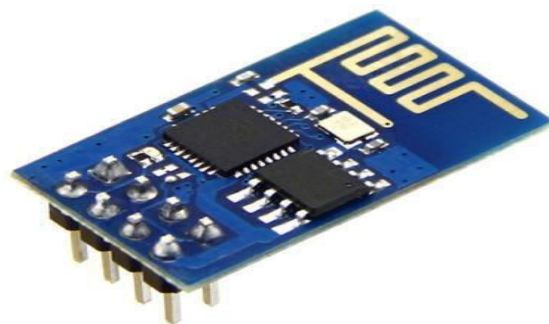
- Vcc (+5V): You need to provide +5V at this Ultrasonic Sensor HC-SR04 Pin.
- Trig (Trigger): It's a trigger Pin where we need to provide a trigger after which this sensor emits ultrasonic waves.
- Echo: When Ultrasonic waves emitted by the transmitter, hit some object then they are bounced back and are received by the receiver and at that moment this echo Pin goes HIGH.
- GND: We need to provide ground to this PIN of HC-SR04 Ultrasonic Sensor.

Trigger pin is an output pin while the Echo pin is an input pin, we will discuss them in Working section in detail. Moreover, it requires +5V to start operating. It is normally used to detect objects in front of it or to measure the distance between different objects. Arduino uno kit Arduino is an open-source platform used for building electronics projects. Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board. Arduino is an open-source electronics prototyping platform based on flexible, easy-to-use hardware and software.



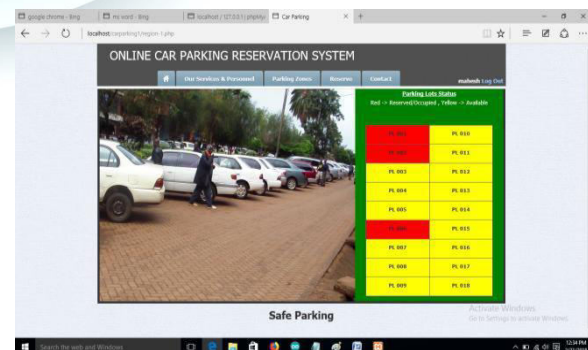
## Fig:3 Arduino Uno

Arduino Uno is integrated with WiFi ESP 8266 module in order to access the internet and to provide continuous monitoring.



## Fig:4 WIFI Module

A user will view the text message and their status of the parking slots and will decide to choose the slot accordingly. The text will contain the slot numbers and also whether the slots are free or parked. The slots will be updated with necessary changes and received by the user for every few seconds. Data Stored in database



## Fig:5 Slot Availability Display



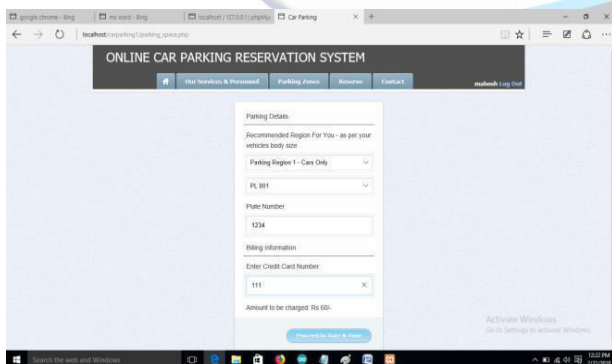
All the data has to be stored in a standardized manner. This is why tables have been created. Tables are the simplest objects (structures) for data storage that exist in a database.

User login the application where he can view various parking slots in his destination location. User selects his desired parking slot that is nearest to his destination. After selecting a slot the user needs to check for the availability of that respective slot. The user can check the status of the slots with the help of green and red colour indications. Where green colour indicates that the respective slot is empty and the red colour indicates that the respective slot is already allocated to some other user.

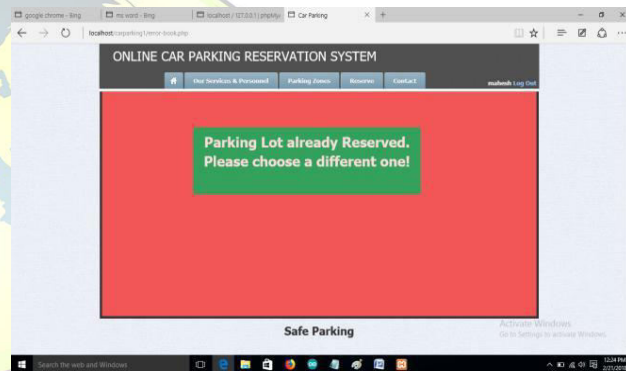


**Fig:6 Details Stored in Database**

To register your Mobile Phone simply go to the home page and create an account



**Fig:7 Registration through Smartphone**



**Fig:8 Status Monitor Smartphones**

## **VI.CONCLUSION**

This paper summarizes an efficient way to park a vehicle using recent technology. This app allows the user to take control of the parking decision unlike traditional method of trying several parking spaces physically. Usage of this app at large scale would benefit user even if a user is in new place. The app is user friendly and handy so people of all age groups can use it easily.

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