Smart Car Parking Monitoring System with Android Application

Lavanya Anantakumar Balol and K. Mallamma Byahatti

Abstract--- Parking is a problem for almost everyone today so there has to be a solution, which helps getting rid of problems arising due to the lack of a proper parking management system. Although various static serving parking systems are exist, they can serve only a few users. So the aim of this study is to provide a dynamic solution by introducing the concept of Smart parking monitoring system over the internet with Android Application. The purpose of this system is to computerize the parking space reservation. Its aim to provide model of car parking that can direct and manage the number of cars that can be parked in given space at any given time based on availability of parking space after doing the registration by user using android application on his smart phone. Smart Parking System has the strategy of counting and maintaining details of cars entering and leaving using Sensors like Ultrasonic. This provides Reservation facility online in advance for given location and then park the vehicle with minimal fees. The difference between our system and existing systems is that we are going to provide smart system with automation with less human interference.

Keywords--- Parking space detection, Automated parking, Image processing, Android Application, Raspberry pi, Arduino, Ultrasonic sensors.

I. INTRODUCTION

VARIETY of occasions like when we are at shopping malls, hotels or multiplex cinema halls we are busy in searching free parking slot to park our car. It becomes difficult for us to find proper parking space.

To solve these problems there is big need of Smart automated parking system that regulates parking. The system which we are going to provide, will facilitate user to reserve parking slots in advance from any place by connecting to internet. And will provide Slots information and Cancellation facility to customer. Fee collection subsystem will be there which is achieved by Number plate character recognition. On using Android application on user’s device he can make reservation for parking space by providing the information like name, password, Email Id and car number. When car arrives at entrance parking area, image of number plate is captured by camera. By using image processing and character recognition technology, the car number is matched with registered number to check corresponding information given by user. If the information is confirmed then user can park the car at designated slot. Ultrasonic sensors are used to get show the information about free slot thus after successful parking, the data will be updated automatically. The system is based on modules (1) Android Application (2) Interfacing of Arduino with Ultrasonic sensor (3) Interfacing of Raspberry pi with Camera. Thus this system proves to be useful for the purpose of the car parking automation and thereby helps to reduce car driver’s time as the user can book his parking spot beforehand.

II. LITERATURE SURVEY

Many people through their works, tried to solve traditional parking problems by making parking slots information available to user. The existing works can be broadly categorized in two areas, Wireless sensor network-based systems and Camera-based systems.

A. Automated Car Parking System Commanded by Android Application


Automating the car and parking. The research presents a model of an car parking system that can regulate and manage the number of cars which can be parked in a given parking area by taking availability of parking spaces in consideration. Both entering and exiting the car parking is handled by an Android based application. This is the main thing of consideration from D.J. Bonde System. Where other existing systems are little depending to the human, they never mind about automation. Here D.J Bonde system also has drawbacks, such as the driver has to wait at the parking gate for identification of vacant lot and no reservation of parking lot which can facilitate car owners to save time

B. Android based Smart car Parking System

Prof.Yashomati R. Dhumal, Harshala A. Waghmare, Aishwarya S. Tole, Swati R. Shilimkar,

"Android based smart car parking system."[2]

Introduces a model of an Automated Car Parking system that provides the parking slot at any time to user. Also the system proposes parking fee collection facility. For this they are using car number plate character recognition techniques. On using Android application on user’s device he can make reservation for parking space by providing the information like name, date, time and number of car. When car arrives at entrance parking area, image of number plate is captured by camera. By using image processing and character recognition technology, the car number is matched with registered number to check corresponding information given by user.

III. PROPOSED SCHEMA

In the Proposed scheme Automated Smart Parking System

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which is used to detect the available car parking space. Ultrasonic sensors are used for the object (cars) detection by which available car parking empty space is notify. Here creating slots with different places within same location. Android application is developed to view the notified car parking empty space. Using Android App we can book the particular slot for park the vehicles.

IV. ARCHITECTURAL DESIGN

![System Architecture](image)

Figure 1: System Architecture

A. Android Application

Android application which is going to provide facility for reservation of parking lot in advance. and through this app customer come to know about the free slots available in advance. Application gets data from cloud.

B. Arduino Microcontroller

Arduino is an open-source project that created microcontroller-based kits for building digital devices and interactive objects that can sense and control physical devices. Arduino can be used to develop interactive objects, taking inputs from a variety of switches or sensors, and controlling a variety of lights, motors, and other physical outputs.

C. Ultrasonic Sensor

1) Used for non-contact distance measurements within a 2 cm to 3 m range
2) Ultrasonic sensors can be used to solve even the most complex tasks involving object detection or level measurement with millimetre precision, because their measuring method works reliably under almost all conditions.
3) Ultrasonic sensor can work within all lighting condition, making this a good choice to supplement infrared object detectors.
4) Simple pulse in/pulse out communication requires just one I/O pin

V. METHODOLOGY

![System Flow](image)

Figure 2: System Flow

Figure shows how the system is assembled. Initially parking space selected for project has been registered on the web map server to make the system more dynamic by using internet. Camera and Ultrasonic System has been arranged such that it will provide facility for identifying authorized person by using car Number plate character recognize technique.

The user willing to use the reservation facility must be logged-in into our parking system through his phone. For this user has to a registered customer of our parking system, this is achieved by giving his information like Name, Email-Id, Password and mainly his Car Plate Number. He can then log in to the system whenever he needs to reserve a parking space or use the available space.

The system provides displays available parking spaces in a particular parking area. So that user can select the desired parking space by just clicking on the space.

When reaching on the space camera captures picture of car number plate and recognizes characters and compare it with the already registered car number. If he is authorized personnel he will be allowed into parking area and parks his vehicle on the space. These activities are then reflected into the database that maintains the status of every parking space i.e. whether it is available or allocated.

VI. DISCUSSION

Ultrasonic System based approach is used to detect the available car parking space. Here creating six slots within same location. White color indicated as vacancy and red color indicated as occupancy and Blue color indicated as Reserved slot. Slot information continuously updated into server from the decision making process. Server updates that information to the android gateway server.

Server slot information’s are updated to gateway server,
which provides this information to the android application. The gateway server also sends confirmation message or mail to customers as alerts for residing (car) more than their limited time inside the parking area. Android application is developed to provide all information related to parking slots whether is allocated to a customer or not, it means parking slot vacant or engaged. So that system calculates total number of free slots and allocated one. Using android phone we can reserve the particular slot for park the vehicles.

VII. CONCLUSION

It is shown that Empty parking slot information can be gathered effectively while travelling or before reaching the parking lot using smart phone application. Empty parking slots can be booked while travelling or before reaching the parking lot itself so that car energy and time is saved. For future enhancement it is also possible to show the directions to park the vehicle easily.

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REFERENCES


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