



Smart Parking System Based on Dynamic Resource Sharing

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Abstract:

The main objective is to avoid the cramming in the car parking area by implementing an efficient car parking system along with a user-friendly application for an ease of use. Normally at public places such as multiplex theatres, market areas, hospitals, function-halls, offices and shopping malls, one experiences the discomfort in looking out for a vacant parking slot, though it's a paid facility with an attendant/security guard. Our project makes an attempt to reduce manual labor. We plan to achieve this by providing a digital system in the parking area. In this we make use of RFID technology. Which is attached to an object, through a reader for the purpose of identifying and tracking the object. When the customer comes at the parking gate the RFID reader reads the tag allotted to the user. By this details of the vehicle taken from that tag updated in the database. The system will then check if there is space available in the parking area and accordingly grant access to the customer. When the parking is full no vehicle will be allowed. The space available in the parking lot will be continuously updated in the system so that the entry of the vehicle can be controlled.

Keywords: RFID, Global Positioning System (GPS), Slot Reservation.

I. INTRODUCTION

Nowadays in many public places such as malls, multiplex systems, hospitals, offices, market areas there is a crucial problem of car parking. The car-parking area has many lanes/slots for car parking. So to park a car one has to look for all the lanes. Moreover, this involves a lot of manual labor and investment. So, there is a need to develop an automated parking system that indicates directly the availability of vacant parking slots in any lane right at the entrance. Finding a parking space is a common challenge faced by millions of citizens every day. Let's imagine a driver who arrives to a shopping center looking for the place to park his car. Let's also imagine that the shopping center is on sale and therefore it is bursting with people. If the user needs to buy something quickly, something that he forgot the previous day when he did his weekly shopping, and he is also in a hurry because he just quit from his job for a few minutes, he would need extra help to find the best parking-position. The driver is not concerned with the shopping center entrances that are far away from his current location, rather he wants to choose one from several entrances near his current location and, if possible, closer to the requested shop. A location-based application could help to this user with this problem as it would guide him depending on his current location. A crucial part of this location-based application is locating users' current location. Global Positioning System (GPS) is a widely used technology for this purpose and it is constantly being improved. With the advances in GPS and wireless communications technology and the growing popularity of mobile devices, such as PDA, the need for location-based applications has gained significant attentions. In the last few years some similar projects have been developed in many different places with many different purposes. One of these projects is the one developed as a part of the digital campus project at the University of California, NAPA (Nearest Available Parking lot Application). This application, which finds an empty space from multiple parking lots scattered around a campus or some area like a city or an

airport, is intended to reduce the bottleneck at the campus entrance, which is often a time consuming process in itself. The proposed system consists of an android app, desktop application and RFID kit. With the android app user can search for vacant parking slot based on his/her current location. Once the parking slot is selected the app directs the user towards parking slot. With this app user also has various other options like cancel booking, view his/her personal details like booked parking slot, booking time, booking ID and cost he/she has to pay. Desktop application is for admin to keep the track of parking slot i.e. which parking slot are available and which are not. The RFID kit is basically used for allocation and deallocation of parking slot. Once the user reaches to the respective parking space user is assigned with a RFID tag which will contain details of the user and admin mark that parking slot as booked.

II. LITERATURE REVIEW

One of the methods for parking system is done by using **image processing** [1]. In this system, a brown rounded image on the parking lot is captured using camera and processed to detect the free parking slot. The details about vacant parking spaces are displayed on the 7-segment display. Firstly, the image of parking slots is taken. The image is segmented to create binary images. The noise is removed from this image and the object boundaries are identified. The image detection module identifies which objects are round. And accordingly free parking slot is allocated.

A vision based car parking system [2] uses two types of images i.e. positive and negative. for detection. In this method, the required object is detected by the object classifier within the given input. Positive images hold the car images from various angles. Whereas negative images do not hold any car images in them. The co-ordinates of parking space specified are used as input to detect the presence of cars in the region. However, limitations may occur with this system with respect

to the type of camera used. Also, the co-ordinate system used selects specific parking locations and for that camera has to be placed at a fixed position. Limited set of positive and negative images may put limitations on the system.

Number Plate Recognition technique [3] uses image processing method for processing number plates of the vehicles. In this system, the image of the license number plate of the vehicle is obtained. It is further divided to obtain individual characters in the number plate. Ultrasonic sensors are used to detect vacant-parking slots. Then the images of number plate are taken and analyzed. Simultaneously, the current timing is noted so as to calculate the parking fees. If there is no parking space available then "FULL" sign is displayed on LCD screen. One of the limitations of this system is that background color must be compulsorily black and character color white. Also, analysis is limited to number plates with just one row.

III. SYSTEM ARCHITECTURE

The front end system provides graphical user interface (GUI). The clients interact with the system via android app. With the android app user can search for vacant parking slot based on his/her current location. Once the parking slot is selected the app directs the user towards parking slot. With this app user also have various other option like cancel booking, view his/her personal details like booked parking slot, booking time, booking ID and cost he/she has to pay. Desktop application is for admin to keep the track of parking slot i.e. which parking slot are available and which are not. The RFID kit is basically used for allocation and deallocation of parking slot. Once the user reaches to the respective parking space user is assigned with a RFID tag which will contain details of the user and admin mark that parking slot as booked.

IV. PROPOSED SYSTEM

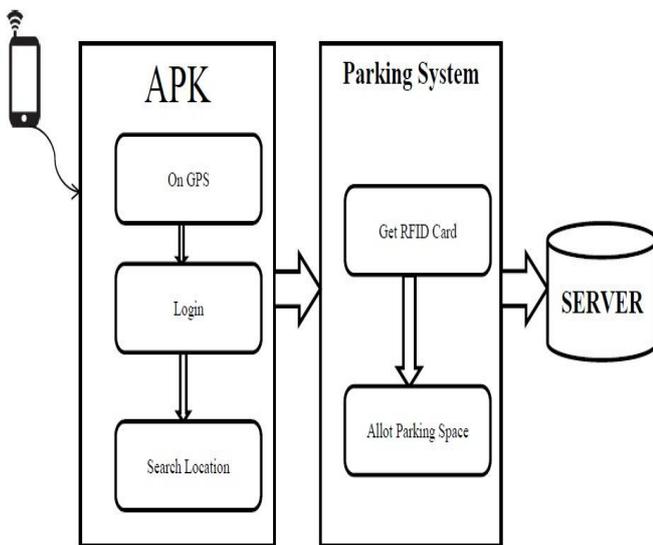


Figure.1. Architecture Diagram

a) Android

This system has been designed as a set of independent modules that communicate with each other through the use of Android

1. **M1 - Communication** module keeps track of the state of the parking spaces.
2. **M2 - GPS** keeps track of the car's current position, minimizing the GPS position error.
3. **M3 - GUI** to manage user interaction.

4. **M4 - Outside Parking Manager** module controls the global parking state.

5. **M5 - Configuration** manages the GPS device configuration

b) Car Parking

The system we are proposing here is a digital parking management system that removes the use of manual labour, thus eliminating any kind of manual error which used to occur in the earlier parking systems implemented. The proposed system uses RFID technology to identify the vehicles. In this system we have RFID tags fixed on the vehicles which are read by the devices called the RFID readers which are installed at the parking area entrance. The RFID tags will contain the unique user password which is read by the RFID reader and is used for validation purposes. The proposed system can be used in various applications. It can be used in shopping malls and in an office parking area. In such places, time factor plays a major role. The digital parking management ensures minimal time usage thus eliminating the time consumption problem. Also the proposed system eliminates manual labor. Thus it eventually minimizes the risk of errors in data entry. Thus, the proposed system has wide applications and aims for the implementation of a systematic system..

c) Mysql Database

The system relies heavily on a Mysql database that stores all the user data, request data, and data about the parking spots. The user table will store the details about each user. No information like age, sex, etc will be stored. Only the user name will be stored to make sure that the parking spots being marked are marked only by humans. The request data table will store all the request from users of the system. This storing of requests will help us mine the data and find areas for which the requests are the most. We can then publish these results to show the areas where there is a need for parking infrastructure. The requests will be time-stamped so that we can create visualizations of request data with recognizable patterns at different times of the day, month, year etc. The parking spot data will be stored in a separate table and will store the latitude and longitude of the parking spots along with the username of the user who submitted that spot. Each parking spot will have a rating. The people who use the system will rate the parking spot based on their experience. As a result, the parking spot with the highest rating is the most genuine one. Similarly, the parking spots with a low rating can be inferred to be "risky".

V. CONCLUSION

Smart parking System provides the better parking management by increasing the parking utilizations and fair pricing. The time and fuel waste in searching vacant parking space is reduced. The security feature of the system is enhanced with the OTP requirements upon entrance to the parking lot.

VI. REFERENCES

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