ANDROID APPLICATION FOR VEHICLE PARKING SYSTEM

Mr K.Devendran ME
Assistant Professor
Department of CSE
Kongu Engineering College
Perundurai
Erode-638052
skdeva@gmail.com

Su.Nivethaa
Department of CSE
Kongu Engineering College
Perundurai
Erode-638052
sunivethaa@gmail.com
Ph:8760048030

Abstract— **Among the challenges that we face in our day to day life one of most unavoidable challenge is parking the car wherever we go. As our need increases our travelling increases but due to drastic increase in usage of vehicles and increase in population we face the tough task of parking our car particularly during busiest hours of the day. During peak hours most of the reserved parking area gets full and this leaves the user to search for their parking among other parking area which creates more traffic and leaves them with no indication on availability of parking space. To overcome this problem there is definitely a need for designed parking in commercial environment. To design such parking slot we need to take into the account of reservation of parking slot with optimal parking space which depends on cost and time. Additionally, four hours prior to his expected arrival, the user can pre-book a slot in the area he desires if it is available. This will help reduce the load on the administrator as his physical work reduces drastically and user can search the parking slot through Android Application. Payment services are made available using Google Wallet, so the user is required to own a credit card or debit card. Application relieves the user from the hassle of manually searching and waiting for empty slots to park the vehicle.**

Keywords: smart parking, slot allocation, parking area control unit (PACU), smart parking allocation centre (SPAC), Android Application.

1.INTRODUCTION

Android is a **mobile operating system** developed by **Google**,based on the **Linux kernel** and designed primarily for **touchscreen** mobile devices such as **smartphones** and **tablets**. Android's **user interface** is mainly based on **direct manipulation**, using touch gestures that loosely correspond to real-world actions, such as swiping, tapping and pinching, to manipulate on-screen objects, along with a **virtual keyboard** for text input. In addition to touchscreen devices, Google has further developed **Android TV** for televisions, **Android Auto** for cars, and **Android Wear** for wrist watches, each with a specialized user interface. Variants of Android are also used on **notebooks**, **game consoles**, **digital cameras**, and other electronics. This paper proposes a Smart Parking System based on android technology for avoiding the parking problems which provides process of pre-booking the slots through the use of a simple and interactive Android application. This application is expected to provide an efficient and cost-effective solution to the effluent vehicle parking problems. The paper describes the overall system architecture of our application. The user needs to have an Android enabled device to reap the benefits of this application. After installing the app, user needs to mandatorily register with the application. Booking of the slot at user's desired location should be done four hours prior to the arrival. Payment services are made available using Google Wallet in the future, so the user is required to own a credit card or debit card. Penalty will be levied on late arrival as well as on over use of the slot after user specified

entry and exit time. The places where security surveillance (CCTVs) is made available will be used by the administrator to keep a track of the vacant or occupied slots. Else, physical presence of the administrator at the slot site will be required. During reservation process the client needs to provide with details that includes booking person's name, vehicle number, expected entry and exit time.

2. EXISTING SCENARIO

2.1.Wireless Sensor Network Parking (WSN)

In these system Infrared (IR) sensor nodes senses the status of the car space and transfers the information to a controller. It thereby displays the information on a LED screen with which the user can check for empty vehicle slots, in turn reducing his time. As infrared cannot penetrate walls, therefore it cannot be used in closed parking areas due to low wavelength. (E.g. shopping malls or residential area where parking is done in enclosed area).

2.2.Smart Parking

Designing, developing and producing a leading edge parking technology is called as Smart parking. It is a vehicle parking system that helps drivers find a vacant spot. Using the IR sensors in each parking slot, it detects the presence or absence of a vehicle, and sends messages to user. Smart Parking system is proven as an exact, robust and cost efficient way to ensure that road users know exactly where unoccupied car parking spaces are.
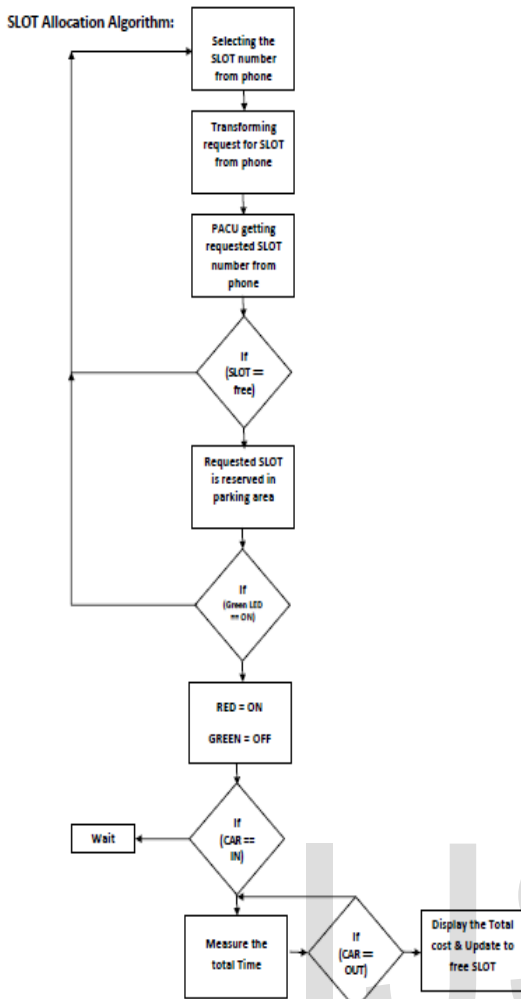
2.3.SLOT Allocation Algorithm

The slot allocation method follows a sequence as discussed above. It has the Parking Area Control Unit and the Smart Parking Area control Unit (SPAC). The functions are as follows:
□ Initially the slot selection is made from the mobile phone
□ Transforming request for parking slot from the mobile using Android application

□ The Parking Allocation Control Unit (PACU) gets the request slot number from the mobile
□ Checks for the parking slot for availability. If it is free go to the next stage. If the slot is not free goes to the initial state.
□ If the parking slot is free, the requested slot is reserved in the parking area
□ After reserving the parking slot in the parking area, it checks for a condition if it is available. (i.e. Whether GREEN led is on)
□ If the parking slot is not free then it will go to the initial stage.
□ After reserving the parking slot in the parking area then the status of the led will be RED=ON && GREEN=OFF.
□ If car gets entered into the parking slot, the timer gets ON and measures the total time. If not, the timer waits till car to get in.
□ Once the car is to move out of the parking slot, the timer gets OFF and displays the total cost.
□ Displays the total cost finally and updates the free slot information.

The above steps conclude the slot allocation algorithm. Initially the driver sends request via mobile phone using Android application and do reservation as mentioned in the smart parking overview. They have the database of all drivers request and according to the requests with the slot allocation method; the parking slot is allocated to the drivers in the parking area. And finally updates the information to the mobile phone users. Here we can reserve our own parking slot. It is user friendly. Driver can choose the parking slot which is comfortable for them. It overcomes the process of time saving compared to the dynamic resource allocation method and also cheaper than that. Using the FCFS scheduling method the priority will be scheduled.

SLOT Allocation Algorithm:

detected and Red LED will be glow if object is detected.

2.5.RFID

A Radio Frequency Identification Tag (RFID) tag is an electronic tag that exchanges data with a RFID reader. Here we are going to use Active tag of RFID. While RFID's original uses were primarily for inventory tracking in retail environment, this technology has quickly created a presence in an extremely diverse number of fields including easy gas payment, credit card replacement. RFID tag has chip, memory and an antenna.

2.6.Android

An android application is created using Android studio. The android applications are developed using the JAVA code. Using the JAVA compiler the source files are converted to JAVA class files. The Android SDK contains a tool, which converts JAVA class files into a .dex (Dalvik Executable) file. The .dex file and the resources of an android application are packed into an .apk (Android Package) file. The resulting .apk file contains all data to run the Android application and can be deployed to an Android device using adb tool. The Android system is more secured. The Android system installs each and every Android application with the unique user and group ID.Android contains a permission system, declares required permission in the AndroidManifest.xml configuration file.Using the slot allocation method the Android application is developed for the Smart parking. Slot reservation can be done using the slot allocation method. The request is updated in the server and forwards it to parking area.

3.PROPOSED SYSTEM

3.1 Starting The Application

The user needs to install the application on his android based device. after installation, the icon of the app will feature on the home screen of the

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2.4.IR sensor

An infrared sensor is an electronic device which is used to sense light wavelength of its surroundings by either emitting or detecting infrared spectrum. It will also capable of measuring the heat being emitted by an object and detecting motion. LED will be glow with respect to the IR sensor detection. Green LED will be glow if no object is

user's device.welcome screen will be flashed to the user on opening the application. The proposed system is the combination of smart parking and the Slot allocation with the Android application. In the existing system, a dynamic algorithm is carried out, which is a random allocation method. It randomly allocates parking lot to the users.

3.2 Registration

Initially, the user has to register his details with the application for the first time. This is a one-time registration. The user has to enter details like username, gender, phone number and email-id. All this data will be stored on server. Booking for slots mandatorily has to be done four hours prior to arrival.

3.3 Selection of location for parking

The client is provided with multiple parking locations. Client has to select one of the locations provided where he desires to park the vehicle.

3.4 Select vehicle type

After selecting the location, options for the vehicle type is provided i.e. 2-wheeler or 4-wheeler alongside the rate chart for parking charges is prompted.

3.5 Availability status of the slots

Based on the type of vehicle selected availability of the empty slots will be displayed along with the total slots reserved for that vehicle type. Colour coding is used to indicate empty v/s reserved slots. Green indicates empty slots and Red indicates that currently there are no empty slots for reservation.

3.6 Enter user's details for slot reservation

In case the slot is available, the client can proceed further with the reservation process or else he can go back to change the location/vehicle type or else can terminate the entire process.
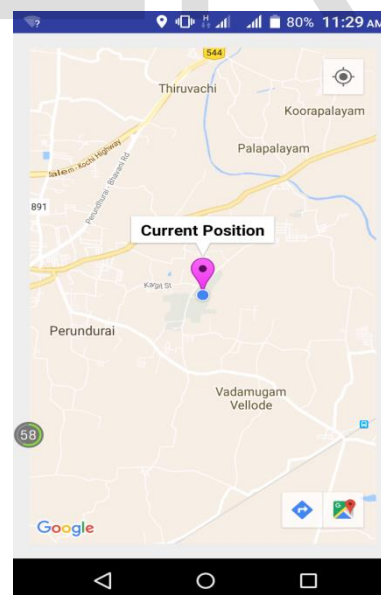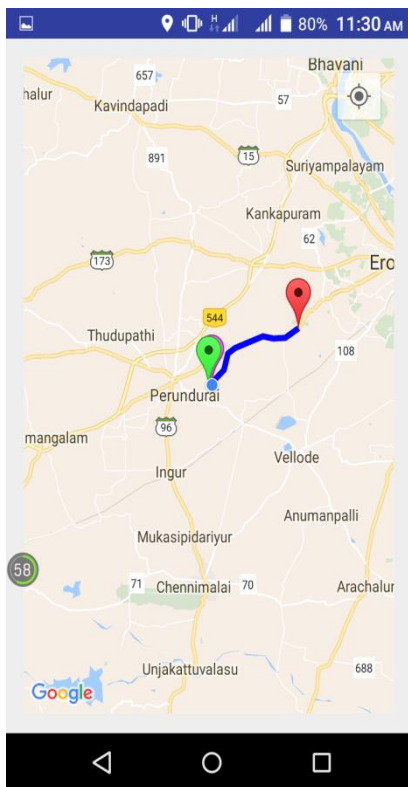
3.7 Confirmation

On successful reservation, a confirmation page with user details is shown which is editable.

EXPERIMENTAL RESULTS:

Marker representation:
The Application initially shows the current location of the user. Then the user should notifies the destinated location in the application. Then the applications shows the route of the user,it will helpful to the user to find the location of the parking lot.The above figure shows the current position of the user. Then the following figure shows the route of the destinated position by the marker representation.The marker is indicated in red colour.Then the route is indicated in blue colour.This shows the route from perundurai to nearest parking lot from perundurai.

4. FUTURE SCOPE

The Application can be developed for other popular mobile operating systems. In future, our application can be implemented on the existing operating systems like iOS, Windows and BlackBerry also on the upcoming and promising operating systems like Firefox OS, Jolla and Tizen. Our application can be used as an alternative to the present parking systems in malls, at railway stations, near airports, theatres, etc. as an efficient means to park.Google Wallet can used to make secure payments fast and convenient.

5. CONCLUSION

If it is a dwelling, entertainment centre or a market place, the first and foremost question in the minds of everyone is about the parking slot. Compared to other developed countries, the problem of parking is disheartening in India as there is no well devised plan in place. There is a wide gap and total mismatch between the production of vehicles and the parking slots. Government authorities have been raking their brains day in and day out to tackle this problem. The parking problem is quite acute in places of entertainment such as theatres and shopping malls. We touched a small scenario of parking problem in India in this paper. We brought out in this paper how the parking problem in such places can be tackled with a well-thought plan. The plan helps both the visitors and administrators. It helps the visitors in finding out the availability of a parking slot, get the availability confirmed, and reach the place within the time slot allotted. It helps the administration to allocate the vacant slot to the next person in queue. A well thought parking plan saves the time of visitors in booking a parking slot in advance and the administration to allocate the vacant slot in a methodical and organized manner.

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