Smart Parking App Using Slot Allocation & Reservations

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Abstract- *Among the challenges that we face in our day to day life one of most unavoidable challenge is parking the car where we tend to go. As our would like will increase our traveling will increase but as a result of forceful increase in usage of vehicles and increase in population we tend to face the powerful task of parking our car particularly throughout busiest hours of the day. Throughout peak hours most of the reserved parking lot gets full and this leaves the user to go looking for his or her parking among alternative parking area that creates a lot of traffic and leaves them with no indication on availability of automobile parking space. to beat this problem there's positively a need for designed parking in business environment. to style such parking slot we'd like to require into the account of reservation of parking slot with best automobile parking space that depends on price and time. price perform ought to also mix with the parking value and proximity to the destination. but here we have designed the time driven sequence technique that solves the problem of parking using slot allocation technique. This paper proposes an android application, that is employed to implement a example of smart Parking System supported Reservation (SPSR) that enables drivers to effectively find and reserve the vacant parking areas with the help of IoT (Internet of Things) with slot allocation technique and performs automatic charge method.*

KEYWORDS- smart parking, slot allocation, parking area control unit (PACU), smart parking allocation centre (SPAC), Android Application,QR Code.

1. INTRODUCTION

As the population increased within the metropolitan cities, the usage of vehicles got increased. It causes drawback for parking that results in traffic congestion, driver frustration, and air pollution. When we visit the varied public places like looking malls, multiplex cinema hall & hotels throughout the festival time or weekends it creates more parking problem. Within the recent analysis found that a driver takes nearly eight minutes to park his vehicle as a result of he pay longer in looking the car parking zone. This looking results in 30 to 400th of traffic congestion. Here we have a tendency to aiming to see a way to scale back the parking drawback and to do secured parking using the good parking below Slot Allocation technique with the assistance of Android application. RFID application is employed for

debit the number for parking charges through the RFID tag. The main contribution of our planned systems is to search out out standing of the car park and supply secured parking.

a) Motivation of the paper

The main motivation of this project is to reduce the traffic congestion that happens in and round the urban areas that is caused by vehicles finding out parking. within the newspapers, we can able to see several articles relating to the parking drawback everywhere india like Delhi, Mumbai, Chennai, bangalore and lots of metropolitan cities. Growing population has created several drawbacks; parking problem is one in all the large issues in our day to day life. in a recent survey, researchers have found that for one year, car cruising for parking created the equivalent of thirty eight times visits round the world, burning 177914.8 litres of fuel and manufacturing 730 a lot of carbonic acid gas. to cut back of these factors we have a tendency to opt for the good parking system.

Seeking a vacant parking zone during peak hours in areas like Hospitals, Hotels & shopping Centers, Airports, Universities, and Exhibitions & Convention Center has always been frustrating for many drivers. Surveys say that traffic generated by cars finding out vacancies in Parking areas is up to 400th of the overall traffic. currently that's a heavy issue to seem when, and good Parking System is one among the best available solutions to a minimum of cut back the traffic jam caused due to the on top of problem. This application provides data about the occupancy status of the areas within the parking zone equipped with sensors that find the presence of vehicles.

Smart Parking is an internet of Things (IoT) primarily based application, used to find the available parking slots. This app uses ultrasonic sensing element to find the presence of a vehicle (whether the parking slot is occupied or not). supported the parking slot occupancy, the standing (occupied/unoccupied) is displayed on the net application dashboard. In real time, the atmosphere have sensors and devices embedded into parking areas, transmittal information on the occupancy status; and therefore the vehicle drivers will explore for parking convenience exploitation their mobile phones or any picture show system that's attached to the vehicle. hence the driving force would know wherever there is associate available spot to park his vehicle in less time, reducing the energy consumption and pollution.

The second half during this application is doing analysis on parking trends in a parking zone. The analysis provides data regarding that parking zone is most occupied and least occupied and at what times of the day. This data is useful in selecting one parking zone once there square measure multiple available, keeping in mind the history of that area. for example, once there square measure quite one vacant slots the driving force can wish to choose the one that has less percentage as a result of the high occupancy rated slot can be needed by several alternative drivers and you do not wish to waste it slow reaching that slot.

2. MOTIVATION

A Smart Parking System like this helps drivers build smart selections which is able to reduce congestion and build the most of accessible areas. Finding a parking lot has become a daily concern of late, which is wherever the motivation for this project came up from. With the evolution of technology, we've smartphones, sensors that detect the presence of any object and my plan has a system wherever parking areas ar equipped with these ultrasonic sensors that tells about the occupancy status of the parking areas and a central management system that posts this occupancy standing to an internet application to guide the drivers to find a vacant slot.

The second half in this application is doing analysis on parking trends in a parking zone. The analysis offers info regarding that automobile parking space is most occupied and least occupied and at what times of the day. This info is useful in selecting one automobile parking space once there ar multiple on the market, keeping in mind the history of that house.

3. SMART PARKING

The planned system is that the mix of sensible parking and additionally the Slot allocation with the humanoid application. among the present system, a dynamic rule is distributed, which will be a random allocation methodology. It willy-nilly allocates automobile automobile parking space to the users.

The options of the planned system are;

• Guides drivers realize on the market parking areas close to them
• Less range of drivers looking to park, therefore reduces the holdup
• Avoids pollution & warming.
• Scalable, sturdy and reliable.
• Reduces the motive force stress and improves the geographic area.

• Provides tools to optimize the automobile parking space management
• Accurately establish the vehicle occupancy in real time.

This system expressly reserves and allocates optimum automobile parking space to drivers, as against merely guiding them to an area which will not be on the market by the time it's reached. The reservation in our "smart parking" system is completely different from that within the e-parking platform et al. mentioned earlier. within the "smart parking" system parking slots are going to be reserved for the user and by the user that ar elect to be optimum supported a well-defined objective perform structure.

a) Overview of smart parking

This planned system, uses the "Smart Parking" that takes the essential structure of PGI systems united part. It includes Driver request process centre (DRPC), sensible parking allocation centre (SPAC) and Parking resource management centre (PRMC)

b) Driver request processing center (DRPC)

It is the primary stage within the allocation process; drivers World Health Organization ar longing for parking spots can send requests to the DRPC. The request consists of 2 constraints: parking value and also the walking distance between a parking spot and also the driver's actual destination. It additionally contains the user's info, like current location, registration number, car size, etc.

c) Smart parking allocation center (SPAC)

The SPAC collects all the driver's requests from the DRPC over a definite time associate degreed makes an overall allocation at call points in time. associate degree assigned automobile parking space is distributed back to every driver via the DRPC. If a driver is happy with the assignment, he/she has the selection to order that spot. The allotted automobile parking space is updated within the PRMC
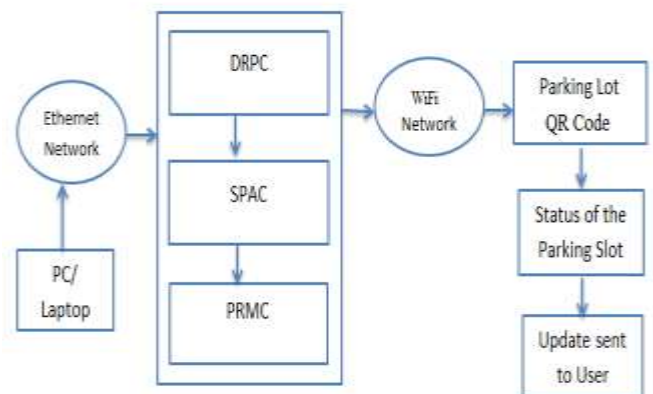
Fig 1: Smart parking frame work.

d) Parking resource management center (PRMC)

The PRMC updates the corresponding parking spot from vacant to reserve state and makes sure that other drivers have no permission to take that spot. If a driver is not satisfied with the assignment or fails to accept the slot, he has to wait till the next allocation decisions are made by the SPAC. Drivers with no parking assignment have the opportunity to change their cost or walking-distance. The status of the parking space is updated in the VMS (variable message sign) such as the number of parking spot occupied, reserved and also that are open to reserve.

4. PROPOSED SYSTEM

The proposed system is that the combination of smart parking and also the Slot allocation with the android application. Within the existing system, a dynamic algorithm is carried out, that may be a random allocation methodology. It randomly allocates automobile parking space to the users.

4.1 SLOT allocation

- Algorithmic rule The slot allocation methodology follows a sequence as mentioned higher than. it's the car park management Unit and also the good car park management Unit (SPAC)
- 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.
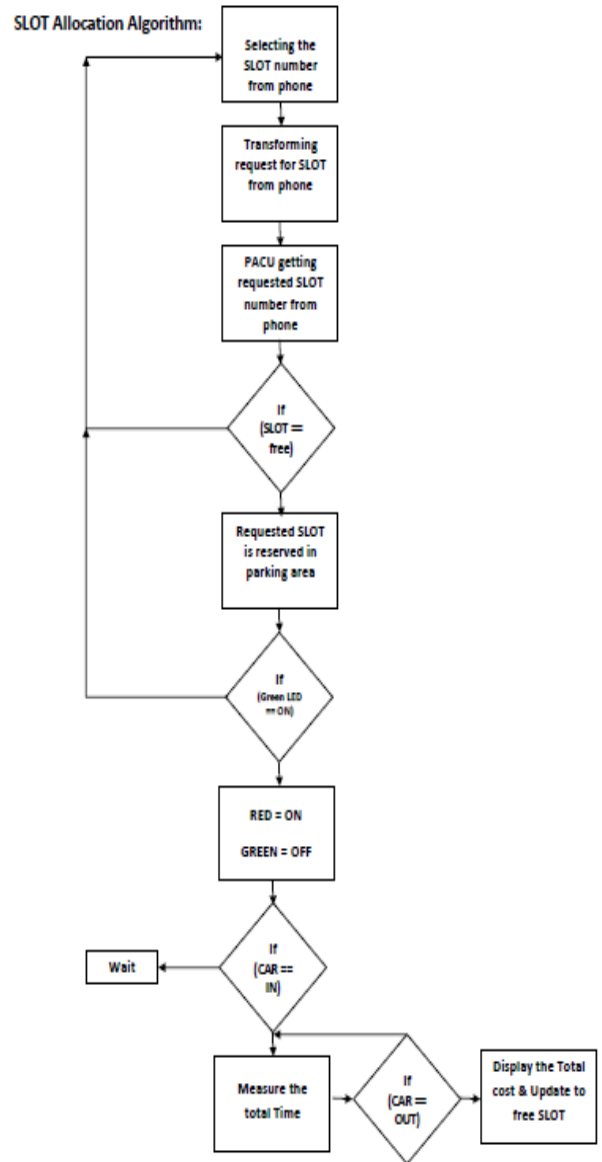

Fig 2: SLOT allocation algorithm

The above steps conclude the slot allocation algorithm. at first the driver sends request via mobile phone using android application and do reservation as mentioned within the good parking summary. they need the info of all drivers request and per the requests with the slot allocation method; the parking slot is allotted to the drivers within the car park. And finally updates the information to the mobile phone users. Here we can reserve our own parking slot. it's user friendly. Driver will select the parking slot that is comfy for them. It overcomes the methodology of your time saving compared to the dynamic resource allocation method and conjointly cheaper than that. using the FCFS scheduling methodology the priority will be scheduled.
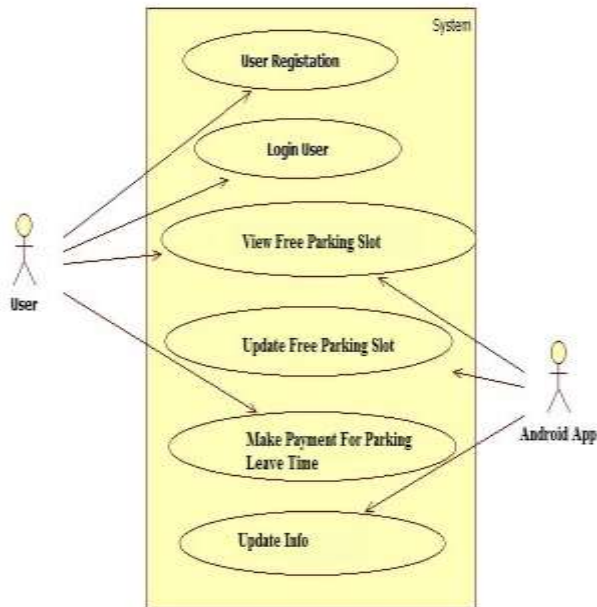
Fig 3: Use Case Diagram

5. CONCLISION

Smart Parking System is a solution to the existing traffic congestion, to reduce drivers' frustration by providing information about the occupancy status of the parking spaces. The project development went smoothly while teaching me many best practices in programming using the current trending technologies like Spring Framework, Hibernate ORM and REST APIs. I could see that all the initial requirements of the project are achieved and also I tried doing minor data analysis on the parking spaces occupancy statuses.

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