Survey on Book My Vehicle Place Cloud Based (Smart Parking System Application)

Rupali Khairnar, Pooja Chinchore, Pratima Pathare, Prof. Pankaj Badgujar

Student, Dept. of Computer, JES'ITMR, Pune University, Nashik (Maharashtra), India

Student, Dept. of Computer, JES'ITMR, Pune University, Nashik (Maharashtra), India

Student, Dept. of Computer, JES'ITMR, Pune University, Nashik (Maharashtra), India

Assistant Professor, Dept. of Computer, JES'ITMR, Pune University, Nashik (Maharashtra), India

ABSTRACT: This paper provides an optimized solution for Smart Parking System with respect to the affected problems in cities. According to the increase of population and vehicle density and specially during the hectic hours of days, it is quite a difficult job for the drivers to park the vehicle after sorting out a parking space. The main aim of the paper is to get a conclusion to the issue mentioned before which plots the Smart Parking System. This system module uses Internet of Things (IOT) technology and cloud computing. An appropriate algorithm of shortest path used to find the shortest distance between the user and each car park in the system. Hence, the waiting time of the user is reduced. The paper also indulges usage of smartphones and android application for the prerequisite communication between the user and SPS. IR Fencing Sensors are used in this system to detect the car in parking slot and also as it minimizes the cost.

KEYWORDS: Smart Parking System (SPS) Android Application, IR Fencing Sensor, Internet of Things (IOT) Parking Guidance Information (PGI) Smart Parking System based on Reservation (SPSR).

I. INTRODUCTION

Internet of Things (IOT) is playing a vital role through giving a connection between network and the environmental things so that it will be quite easy for remote location based access over the Internet things. As the rapid growth of population involving the growth of high living giving a rapid rise to problems for parking areas to get a safe parking lot in hectic hours and in required time constraints. Rise of modern era is giving growth to high level life constraint which include vehicles in it due to that density of vehicles is causing direct impact on the traffic in metropolitan cities all this impact shoots the levels of human community as leading pollution of air and noise, traffic congestions, frustration led to drivers. Finding an availability of parking with waiting for a long time and effort during giving a visit to various populated places example: luxury hotels, super markets, shopping areas, etc. It a worst case in some places related to availability of parking slots quite a difficult job to get a parking slot that too you can't guarantee is your vehicle safe parking there.

Now-a-days we are featuring the Parking Guidance and Information (PGI) systems for managing the parking systems by proving a direction to the driver who is in need of parking slots entering any place it is a dynamic view as the parking areas have someone present there to direct tell us about the parking slots which are vacant. To take a hold on this hectic evolution and the dynamic PGI systems and even to sort out this system in a better way there is a cloud based Smart Parking System linking with Internet of Things (IOT) which will combinable featured an android application. Considering various parking areas users booking for a parking, their updated data would be addressed to the server and even to lessen the load on the server we are using public cloud. The user willing to book the parking would have to get registration done with filling some required information as name, mobile no and email-id.

Active Infrared Beam Detectors (IR Beams) is a IR Sensor which adopts infrared invisible detection technology, it resides of a transmitter and a receiver. The receiver consists of receiving the infrared beams and the transmitter emits 2-4 beams of infrared. Infrared Fence Beams sensors are quite unobtrusive and effective methods for exceeding the levels

of protection to your business and in your home. Based on the technology of infrared they can be configured to monitor perimeter, parking's, unauthorized places. These are the spectacular systems which detect both vehicles, human beings and objects. Beam Detectors and Hardwired Infrared Fence can work Uniform be able to provide mono-crystalline silicon solar panel of IR beam motion detectors for power supply. Uniform security beam detectors are quite easy and simple to install; it also highlights an advanced performance.

Our system is to find the status of parking of vehicles number of vacant parking slots for parking places and the parking place locater in this vehicle would be in IOT network and the GPS locater for the required parking area to get the minimum distance between the parking lots will be transferred to the cloud and for any changes are updated later. At the user end for booking it require android application on smart phones. In this SPS system we have kept cost minimalistic usage in the parking area. A security feature is to prevent the database at the server end and at the cloud basis. No misuse can be done through the application. We developing a parking system as costing is the major factor and aim to customize the application with minimalistic hardware.

II. PROBLEM STATEMENT & RELATED WORK

A. *PROBLEM DEFINITION AND ANALYSIS*

To design and develop an application for smart parking system which will help to get the solution for the time-consuming constraint of difficulties in finding vacant spaces for parking, improper parking and parking fee payment. Time consuming pattern related to parking which is not feasible to reach the place and get the parking in the reachable time. Analysis states the project will scrutiny the parking system problems in India and would be focusing only on the Parking Guidance Information (PGI) without having any discussion over payment system and ticketing. The further sections would have the current flows of business in most awaited places who provide parking services to their users and customers

B. *SMART PARKING SYSTEM USING PARKING SLOT ALLOCATION AND RESERVATIONS*

Increase in using 4-wheelers and 2-wheelers got a rapid excess in population, this is very difficult to search out place for parking a vehicle in the crowded areas specially during the toughest hours being populated which causes traffic and strain to people to get a vacant slot for parking. Quality of now-a-days parking system is just getting the direction according to the information which even led luck of users of availability of vacant space for parking. In the paper study, we are having a reservation for parking slot which would be cost efficient too. Parking cost and juxtaposition to the destination should combine with cost function. For solving the problem of parking the vehicle using slot allocation technique the time driven sequence method is used. This study paper features an android application which is required to implement a virtual meta-data of SPSR that allows a vehicle driver to impact reserved vacant spaces with the Internet of Things with respect to allocation of slots. Some highlights of the proposed system are:

1) Guidance in providing vacant parking space availability nearby them.
2) It decreases the traffic congestion due to the less drivers searching around for vehicle parking.
3) It avoids global warming, air pollution & noise pollution.
4) It is reliable, scalable and robust.
5) In real time vehicle occupancy is accurately searched out.

The Smart Parking System (SPS) is canvased hardware's such as object sensor (IR fencing sensor), Arduino boards etc. by making use of some IOT supportable. Here we are using IR fencing sensors by keeping the cost usage in mind and less hard work required to troubleshoot the system in absence of working and failure condition. Modern and upcoming vehicles are very much advanced with actuators, sensors and devices to communicate which include handheld devices, embedded computers and GPS locator devices. The system consists of hardware supportable operating system Windows, Linux and Android whereas server side we will require Linux os then to operate the software for prerequisite auridino boards we will need windows os and to the user side android platform to use the android application.

III. PROPOSED FRAMEWORK

The system targets to provide and service of smart parking with extra security and per-eminence, it is quite a very useful and easeful comprehension used as an eventual procedure to cope with parking and finding the availability of vacant spaces easily in metropolitan cities with lots of traffic congestion equally with high noise and air population. Eventually secured and smart parking is making use of IOT technology, IR Beam Detectors, Wireless Sensor Network, Cloud Computing, Database Analysis, Internet of Things, etc. Therefore, by the concern of getting familiar to the latest upcoming technologies involving it in a compact also to solve the problems with respect to the vehicle parking and the management of parking areas which is a troublesome issue concern to the future phase constraint, in the featured working module users would be able to register via the mobile number and their respective email-id and the prerequisite location finder according to the parking area maps provided to the database.

The user would be able to login by a unique code (otp code). He can add as many desired vehicles in his single account by choosing options to fill the details like first, second, third vehicle. Convenience of the SPS would listing the minimum distance location for you to park the vehicle under your convenience such as hospitals, railway stations, malls, hotels, etc. The user featuring the app too book the parking according to his/her convenience can get the exact detail of cost, time and discounts on the parking booked. System database would be featured with maps rendered of parking areas so that exact location details and direction would be done for you by the app. Shortest path algorithm is used to check out the minimum distance for the parking availability. Payment would be decided according to the required parking areas authorities grant so there can be slight change is amount.
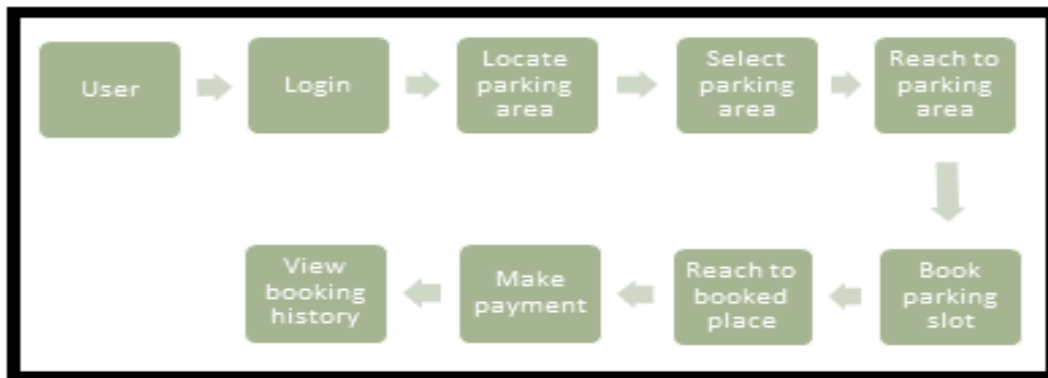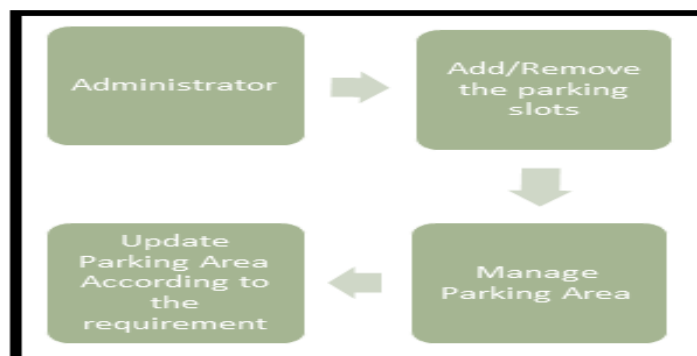

Fig. User Point of View

Fig. Administrator Point of View

But as you park your vehicle at the booked place your time would be calculated according to it, and the payment would be with two phases firstly manually as when you leave the parking area you need to pay the person responsible of taking the booked place payments otherwise second option would be select the time and make the payment online at the time of booking the parking. The prerequisite work including changes would be updated to the cloud.

The sensor would sense the vehicle which would deal to calculate the time, and further for the cost evaluation at the time of booking. IOT and cloud computing would build a network for the communication between the user and the network to fulfill their requirements with respect to the particular initiates.

IV. MODULE DESCRIPTION

A. *SIGNING IN*
The application of smart parking system authorizes the user to first login/register using email id, mobile number. The user must fill all the profile details including the vehicle details he/she have. There will be signing options for end user and parking facility manager. Purpose of enabling the user login/register with their account so that saved data will be used for further operations. For registration process email id and mobile number will be taken as an input. First time user has to login using email id and mobile number then fill up the profile form. Then login using registered email address to book a parking slot. After filling the profile form or normal registration successfully, the user will able to use application efficiently. Initially end user need to Sign up using any email id or mobile number.

B. *BOOKING*
For booking desired parking slot. The input will be the name of parking slot and time at the booking would be according to the present state of using the application. If book now option is selected by user, it should get booked at the mentioned and the prerequisite time of booking the parking slot. The user gets notification of availability of parking slot and its respected cost as an output. The end user books a parking slot, whereas parking manager books slot for a guest user.

C. *PAYMENT*
Payment would be decided according to the required parking areas authorities grant so there can be slight change is amount. But as you park your vehicle at the booked place your time would be calculated according to it, and the payment would be with two phases firstly manually as when you leave the parking area you need to pay the person responsible of taking the booked place payments otherwise second option would be select the time and make the payment online at the time of booking the parking.

V. RELEVANT MATHEMATICS ASSOCIATED WITH THE SYSTEM

A. *SYSTEM DESCRIPTION WITH RESPECT TO MATHEMATICS*
- **Input:** The input to the system is according to the user who initiates the communication. If the user is initiating the web application to see the parking status for availability. If the user initiates the web application to check the distance for parking slots and cost initiated by the particular parking slot.
- **Output:** The output of the system will be dependent on the terms of user. The user initiating the web application to see the parking status availability will get output as the visually/graphically display of the vacant spaces for parking. If the user initiates the web application to check the distance for parking slots and cost initiated by the particular parking slot will get output as calculated distance and cost from the source to destination respectively.

$S = IR, TR, F, E$

IR- set of IR LED's

TR- set of Transistors

F- set of IR LED's with digital 1 output.

E- set of IR LED's with digital 0 output.

whereas,

IR rays be the optical led status observed indicating slot is empty when high pulse pinkish color and where it does not observe any pinkish radiation indicating obstacle within the transmitter or receiver.

Let, C= Lo, nRS, RS, Rr, Rsid, Osp

where,

Login (Lo) is User Login Function.

NOT RESERVED (nRS) is Reservation not done.

RESERVED (RS) is Reservation done.

On Spot Park (Osp) is successful occupied lot.

Reservation Request (Rr) is Function to reserve specific lot. Reservation id (Rsid) is Generated after successful Reservation.

- **Success Condition**: When object is, sensed system will get 1 as output and when the object is not sensed system will get output as 0 and where 1 is non-vacant space in parking slot, and 0 is vacant space.

- **Failure Condition:** When the sensors won't work properly system will get fluctuating pulses as input and output with respect to 0 and 1s which will show the inconsistency.

B. *Relevant Mathematical Model*

$Pij = \{P11, P12,...,Pij\}$

- o set of available parking

$$= \sum_{i=0}^{n} Paij - \sum_{i=0}^{n} Pbij$$

Paij – set of total available parking

Pbij – set of bookedparking slots

$Cost = [Pij * \sum_{i=0}^{n} hr] * Ptype$

hr = set of total available parking slots not used

Ptype = type of parking

VI. CONCLUSION AND FUTURE WORK

The relevant study features an optimized solution with respect to a parking system which is a cost effective plus easy and relevant to use even it improves the performance by decreasing the queue and irrelevant traffic congestion by finding the vacant availability for parking the vehicle in peak hours at populated places. Our main target is to fix a parking slot at the present phase of requirement rather by just giving an irrelevant search for getting the area to park the vehicle. In future study, we can feature security benefits at both the ends one at the user and the other at the server side to indulge the system to setup on a large scale, as the system involves upcoming latest technologies like Internet of Things, Cloud Computing and GPS to communicate over a network to find the available spaces in described parking area. Thus, we make a decision to conclude that the Smart Parking System can be used in real time in any populated metropolitan cities, country.

REFERENCES

1. L. Atzori, A. Iera, and G. Morabito, "The Internet of things: a survey," Computer Networks, vol. 54, no. 15, pp. 2787-2805, 2010.
2. http://www.mdpi.com/journal/sensors Sensors 2014, 14, 22372-22393; doi:10.3390/s141222372
3. Faheem1, S.A. Mahmud, G.M. Khan, M. Rahman and H. Zafar,‖A Survey of Intelligent Car Parking System‖, October 2013
4. http://ijarcet.org/wp-content/uploads/IJ
5. Thanh Nam Pham1, Ming-Fong Tsai1, DucBinh Nguyen1, Chyi-Ren Dow1 and Der-Jiunn Deng2. "A Cloud-Based Smart-Parking System Based on Internet-of-Things Technologies" 2015
6. Renuka R. and S. Dhanalakshmi.Department of Electronics and Communication Engineering, Easwari Engineering College, Chennai, India. "Android Based Smart Parking System using Slot Allocation & Reservations" 2015.
7. Li, T.S.; Ying-Chieh, Y.; Jyun-Da, W.; Ming-Ying, H.; Chih-Yang, C. Multifunctional intelligent autonomous parking controllers for carlike mobile robots. IEEE Trans. Ind. Electron. 2010, 57, 1687–1700.
8. Callum Rhodes, William Blewitt, Craig Sharp, Gary Ushawand Graham Morgan. "Smart Routing: A Novel Application of Collaborative Path-finding to Smart Parking Systems"2014.
9. Cui Shiyao, Wu Ming, Liu Chen, Rong Na. "The Research and implement of the intelligent parking reservation management system based on zigbee technology" 2014.
10. R. E. Barone, T. Giuffrè, S. M. Siniscalchi, M. A. Morgano, and G. Tesoriere, ``Architecture for parking management in smart cities,'' *IET*.