International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 07 Issue: 05 | May 2020 www.irjet.net p-ISSN: 2395-0072

Smart Car Parking System

Smita Awagan[1], Supriya Borkar[2], Payal Mandavkar[3], Seerat Choudhary[4], Prof. Deepa Bhattacharya[5]

[1]Smita Awagan, Ballarpur Institute of Technology, Department of Computer Science and Engineering
[2]Supriya Borkar, Ballarpur Institute of Technology, Department of Computer Science and Engineering
[3]Payal Mandavkar, Ballarpur Institute of Technology, Department of Computer Science and Engineering
[4]Seerat Choudhary, Ballarpur Institute of Technology, Department of Computer Science and Engineering
[5]Prof. Deepa Bhattacharya, Ballarpur Institute of Technology, Department of Computer Science and Engineering

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Abstract – *As World's population is increasing each and every day, also the problem of increasing number of vehicles are increasing either. The places for parking of vehicles are growing scarce. Earlier in old days, traditional parking spots use to suffice the needs of people, but as the parking places are growing small and number of vehicles are increasing, newer ways has to be implemented to deal with the parking problems. Many of the systems implemented now works fine, but in the coming near future, those old ways will not be sufficient in solving and dealing with the parking problems. In the proposed system in this paper, we are introducing a algorithm that will increase the efficiency of current smart parking systems and develop a network based parking system. The Smart Parking System will let the user find a parking spot automatically at the least cost by considering the time of vehicle will be parking and the distance coupling it with free places in the car park. This system will minimize the user waiting time substantially.*

Key Words: **Smart Parking, Parking System, Parking Algorithm, Dynamic resource allocation, Smart car parking.**

1. INTRODUCTION

In the wake of recent and intelligent traffic management system, there is also a need of Smart Parking System which will enable the people with a smart and optimized solution of parking their vehicles without much of waiting time. This Smart Parking System aims at dealing the same problem of parking, waiting queues, and not finding the appropriate parking spaces. This system will also impact the cost cutting measures by reducing the staff of parking spaces. The current common methods of parking systems is tedious and time consuming, people have to search for the parking space and park their vehicles without having any prior information about the number of empty spots in parking places. This traditional system sometimes results in failure of providing the parking spot, also resulting in long queues causing dreadful situations. The alternative is to find a car parking with empty parking space to allot to the person wishing to park the car. However this does not solve the common problem of parking which is the distance between the parking space and the person's destination. In the recent lights and technology, vehicle-to-vehicle and vehicle –to-infrastructure interaction with support of various wireless technologies such as RFID, Zigbee, wireless mess network, and internet are used to implement a stronger solution for bigger parking problems. However, solution offered by the current level of smart parking system are not optimized and often fail to cope with the high rising demand of spaces for parking of the vehicle. This study aims to solve the problem by providing beforehand information about the parking spaces for the driver and to make reservation minutes before heading to parking area with supported devices like Smartphones, Tablets, or PCs.

To solve the problem stumbled upon in the traditional and smart parking system; we propose a system which will bring significant change and development in technology. The Internet of Thing (IoT) has created revolutions in many fields, and will be used in proposed system. In this proposed system, we will construct each car parking lots as an IoT network, and the data that includes the vehicle GPS location, distance between car parking lots, and number of free spots to the data centre. The data centre will act as a cloud server to calculate the cost of parking requests, and these costs will be frequently updated and will be accessible by the vehicle in the network. This system will also include the interaction by Smartphone with the data centre network.

2. System Overview

Proposed System

The system proposed in the paper combines real time reservation with share time reservation, thus a driver can reserve a parking spot before heading to parking lot. The parking space can be reserved minutes before or even days before the actual parking time of the vehicle. Real Time Reservation will be achieved with the dynamic resource allocation similar to skill based routing in call centre. Drivers will be notified and allocated with the best parking spots until they reach the destination. In case of Share Time Reservation, static resource allocation will be used so that parking spot can be reserved by scheduling where driver can explicitly choose preferred resource and time frame which will be occupied in the future.

This system proposes the concept of advance booking of parking spaces and advance payment methods in order to ensure no-time delay in the process of reserving a parking

spot. Also with this system, the parking lot staff can be reduced to huge numbers which will aide in saving money thus reducing the cost of managing parking lots easier.

3. MATHEMATICAL MODELS

System S is represented as S= {F, J, R, T, W, C}

A. Set F = {f1, f2, f3 … fn} Where, F is shows as a set of

locations and f1, f2, f3 ….. fn are the number of location of corresponding entity.

B. User Ratings U= {u1, u2, u3 ...un} Where, U is represented as a set of user user location.

C. Location Mining Whiten same city by existing system

Where,

J = {j1,j2,j3 ... jn } where , J is represented as a set of confidence after visiting of right location from input and j1, j2 , j3 ….. jn are the number of real ratings for the entity.

E. Dimensions neighbor T= {t1, t2, t3,..tn} Where, T is stands for as a set of nearest nebular and t1, t2, t3 ....tn is number of neighbor.

F. Dimensions Weight: W= w1, w2, w3, wn Where, W is

representing as a set of Dimensions Weights and w1, w2, w3 … wn are number of weights of a entity.

G. User Location Dimension Weight X= {x1, x2, x3 ...xn}

Where, X represents the set of Parking location Dimension Weight and x1, x2, x3 ...xn are the number of weight of overall user location.

F. Overall Trust Evaluation by confidence for find nearest neighbor.

$C=\sum m$

$d=1\ td * wd$

Where, C - Overall Trust Score td-trust scope for dimension

d=(1m)

wd-weight for dimension d=(1m).

I. Overall Location distance Score Os=C+X/2

where, Os=Overall parking location C= Overall user location

X= parking location Dimension Weight as compare to other parkings.

3. CONCLUSION

In this proposed Smart Parking System it incomes the best smart parking solutions which will solve the problems faced with the traditional parking systems also overcoming the problems in other proposed smart parking systems. This system guarantees pricing policies for static and reservations that will increase the allotment of parking spaces. Also the system will be a network based parking system will be solve the long queues outside parking areas providing drivers with a efficient system of parking right from the Smartphone. Also the system aims at reducing the cost of maintaining and managing the parking spaces.

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