



VALET BASED CAR PARKING SYSTEM USING MACHINE LEARNING

Shraddha Thorve ,Swapnali Satpute, Pranjali Salunke , Sayali Kedar

Computer Engineering,
Bharati Vidyapeeth s College Of Engineering For Women, Pune, India

Abstract: Valet parking system consists of thoughtfully crafted yet easily mastered software applications which are easy to use for technologically less oriented people to use ride on demand service. Our findings have made us understand the need of on demand valet service system in the metropolitan cities of India due to the increasing population and the subsequent increase in the vehicle traffic. This project introduces a novel algorithm that provides a valet parking system and develops a architecture based on the Fire base Cloud Messaging (FCM) technology. This paper proposed a system that helps users find parking solutions at the least cost based on new performance metrics to calculate the user parking cost by considering the distance and time. This cost will be used to offer a solution of finding an available valet service provide upon a request by the user and a solution of suggesting a new valet service provider if the current valet service provider does not accept the request or nobody is available to serve at the moment. The simulation results show that the algorithm helps in providing on demand valet service to the users and minimizes the users hassle is finding parking in the real time. We will also successfully implement the proposed system in the real world.

Index Terms - car parking, valet, machine learning, k nearest neighbor, android, java, etc.

I. INTRODUCTION

The demand for parking has been part of society as the number of vehicles increases as time goes by. The problems in today's parking system such as car theft and inconvenience for drivers are common to all of us. Different strategies in parking management system have been developed

to solve these kinds of problems. As observe the existing parking system in today's society to make a new system to improve and solve problems in the current parking system. This study presents a solution by making new automated parking system. In this paper, we present PARKAGENT, an agent-based, spatially explicit model for parking in the city. Unlike traditional parking models, we simulates the behavior of each driver in a spatially explicit environment and is able to capture the complex self-organizing dynamics of a large collective of parking agents within a non-homogeneous (road) space. The model generates distributions of key values like search time, walking distance, and parking costs over different driver groups. It is developed as an android application, and can work with a practically unlimited number of agents. The advantages of the model are it will save time required for booking, searching or travelling from parking slot to the destination place. Taking detailed data from field surveys, the model is used to study the impact of additional parking supply in a residential area with a shortage of parking places. This model shows that additional parking supply linearly affects the occurrence of extreme values, but has only a weak impact on the average search time for a parking place or the average walking distance between the parking place and the destination.

MOTIVATION:

The smart parking industry continues to evolve as an increasing number of cities struggle with traffic congestion and inadequate parking availability. While the deployment of sensor technologies continues to be core to the development of smart parking, a wide variety of other technology innovations is also enabling more adaptable systems including cameras, wireless communications, data analytics, induction loops, and smart parking meters.

RELATED WORK:

A Connected Car-based Parking Location Service System

Yugesh KC ; Chang-Soon Kang

Published in: 2019 IEEE International Conference on Internet of Things and Intelligence System (IoTaIS)

DOI: 10.1109/IoTaIS47347.2019.8980443

The proposed system consists of a connected car-based on-street parking location service system, in which the system consists of the parking space detection device (DD), the cloud server, and mobile application. Each of the cars in the system is equipped with a DD that acts as a mobile sensing unit (MSU). The proposed system is based on the concept of crowdsourcing; thus, each MSU is responsible for detecting the free parking location and transmitting the parking-related information (MSU id, MSU location, the width of detected free parking location) to the server through a wireless network. Later, a user (i.e., driver) can select a free parking location and navigate to its feasible parking location via a mobile application. However, when the system is unable to detect any free on-street parking location, it suggests users about off-street parking facilities near the user's intended destination.

SMART CAR PARKING WITH MONITORING SYSTEM

M. Swatha ; K. Pooja

Published in: 2018 IEEE International Conference on System, Computation, Automation and Networking (ICSCA)

DOI: 10.1109/ICSCAN.2018.8541196

It's to design a drive less car by using RTOS (Real Time Operating System) and a smartphone. It is motivated to configure the guidance system of a flexible (Automated Guided Vehicle) AGV. The driver finds very difficult to park their vehicle in a narrow garage, so it helps to park the vehicle using smartphone via Bluetooth with the range of 100 m, ranges between the car and the smartphone and GPS (Global Positioning System) is also used to know the location. This GPS system will help the user to easily identify the car location. "Car Assist" technology is used to monitor the car driving path and the things happening around the car can be viewed in the smartphone via GPS. It supports live time preview to monitor the car parking garage. The users need not to be present inside the car like some previous generation systems. The proposed work is compared with bench work results and yield very less time to monitor and park the vehicles against the existing system.

CAR PARKING INFORMATION SYSTEM

Gytis Dalangauskas ; Vilius Džiaugys ; Danielius Adomaitis ; Igor Šajev

Published in: 2016 Open Conference of Electrical, Electronic and Information Sciences (eStream)

DOI: 10.1109/eStream39242.2016.7485927

The main problems include traffic jams, unexpected car accidents, and concentration of exhaust gases. Analysis of parking manoeuvres and creation of traffic management algorithms for closed spaces lead to effective planning of management of such processes and allow securing safety regardless of human element. This article presents a modernised stand model of a multi-storey car park, algorithms for modelled situations and their management programs.

Shafiq ur Rehman ; Volker Gruhn

Published in: 2017 International Conference on Engineering & MIS (ICEMIS)

DOI: 10.1109/ICEMIS.2017.8272987

The proposed solution based on CPS, solve the problem of car parking system. The proposed solution is effective and efficient as the user will enter location details using the smartphone app and send it to the server. The server will search for the available parking slots, getting information from sensors and send it back to the user with the route directions. The user will follow that particular route and park vehicle at the area designated by the server. The proposed solution is a novel approach to solve the car parking problem using cyber-physical system.

SMART CAR PARKING WITH THE ASSISTANCE OF LINE FOLLOWING ROBOT

Meherin Hossain Nushra ; Quazi Ashikur Rahman ; S.M.Faiaz Mursalin ; Nashita Binte Asad ; Miah Mohammad Asi

Published in: 2019 International Conference on Sustainable Technologies for Industry 4.0 (STI)

DOI: 10.1109/STI47673.2019.9068046

This paper proposes a smart indoor car parking system that can be time and cost effective at the same time. The term “assistance” stands to signify that the parking will be conducted by line following robots carrying the car from the entrance of the parking area. In this paper we have discussed a real-life implementation of a conventional line following robot, using it for the indoor car parking system enhancement through some additional features; other than only following a line. Our proposed system will have its implementation cost really low due to the ease of availability of the required technology. The technologies available in the market at present in order to help with indoor car parking; mostly require some extra structural designs which can only be installed during the construction of new buildings. However, existing traditional parking systems are huge in numbers and cannot be reconstructed in a convenient manner to match those systems; even sometimes the renovation is impossible in some cases. Therefore, our newly featured line following robot can be a proposed solution to those existing problems in the available indoor car parking systems giving an efficient alternative for the users.

SMART PARKING SYSTEM FOR MONITORING CARS AND WRONG PARKING

Faris Alshehri ; A. H. M. Almawgani ; Ayed Alqahtani ; Abdurahman Alqahtani

Published in: 2019 2nd International Conference on Computer Applications & Information Security (ICCAIS)

DOI: 10.1109/CAIS.2019.8769463

This paper proposes a simple method of smart parking system that monitoring cars and wrong parking. We are using skills to deal with some small pieces such as Arduino, Ultrasonic sensor, PIR motion sensor and Nexion display to display the results. The primary goal of this paper to solve one of the problems that a lot of people suffered the wrong parking, by making the parking smart and with it we will reach the ideal efficiency without the high cost or many sensors in one park. The smart parking system takes a signal from three Ultrasonic sensors in a Moving Arduino, the Moving Arduino analysis the signal and Convert the signal to code, then send the code by using a wireless radio frequency to the Fixed Arduino. The Fixed Arduino will display it using Nexion display touch screen telling us the results. If any problem on the parking car like wrong park the display will show us a green car and red line, a vacant park will be a black car and correctly park will be a green car. After making the prototype and testing the model we find that the result is 95% correctly with 5% mistake because the model and the objectives was small in our point of view.

SMART PARKING SYSTEM WITH AUTOMATIC CASHIER MACHINE UTILIZE THE IoT TECHNOLOGY

Agustina Ampuni ; Sopater Fonataba ; Adi Fitrianto ; Gunawan Wang

Published in: 2019 International Conference on ICT for Smart Society (ICISS)

DOI: 10.1109/ICISS48059.2019.8969793

The difficulty of finding car parking spot has become one of main consideration to create this paper and focusing on develop our proposed smart parking system. Other than that, the utilization of internet of things (IoT) technology has become one of great technology that match for complex system with a minimal use of hardware. With the implementation of IoT based on cloud

computing, several smart devices, and also smart automatic machine, the concept of smart parking system are expected to be able to provide services for car parking spot searching and car parking spot allocation through the mobile application.

IoT BASED SENSOR ENABLED SMART CAR PARKING FOR ADVANCED DRIVER ASSISTANCE SYSTEM

B M Mahendra ; Savita Sonoli ; Nagaraj Bhat ; Raju ; T Raghu

Published in: 2017 2nd IEEE International Conference on Recent Trends in Electronics, Information & Communication Technology (RTEICT)

DOI: 10.1109/RTEICT.2017.8256988

The proposed work is one of the applications of combination of IoT and cloud computing technology. The objective of this work is to design, analyze and implement “IoT based sensor enabled car parking system”, this enables the user to pre reserve parking slot from remote place with the help of mobile application. Authentication of the valid booking is incorporated to benefit valid user. This system is implemented using low-cost IR sensors, Raspberry-Pi model 3b for real-time data collection, E-Parking mobile application. E-Parking mobile application is developed using android studio having baseband version of android 4.3.

DEVELOPMENT OF A QR-CODE BASED SMART CAR PARKING SYSTEM

Enamul Hoq ; Sajib Paul ; Md. Tarek Ur Rahman Erin

Published in: 2019 5th International Conference on Advances in Electrical Engineering (ICAEE)

DOI: 10.1109/ICAEE48663.2019.8975536

This study presents a solution by making new automated parking system. With the integration of QR code technologies to make a new design of parking system that is capable of providing security and convenience for everyone who will be using it. The system based on findings proves that the concept of study is reliable on its aim in providing security in today's parking system.

AUTOMATIC CAR PARKING SYSTEM USING RASPBERRY-PI WITH CLOUD STORAGE ENVIRONMENT

R Aswini. ; T Archana.

Published in: 2019 IEEE International Conference on System, Computation, Automation and Networking (ICSCAN)

DOI: 10.1109/ICSCAN.2019.8878771

In automatic parking system enables driver to locate the available parking slot even in traffic congestion area using Raspberry-pi and stores the data of the driver in cloud to enable scalability and accessibility. Each authenticated user uses their own allocated slot and the others are provided with different available slot. The available slots are provided to the user in any range of accessing the parking slot.

PROPOSED SYSTEM:

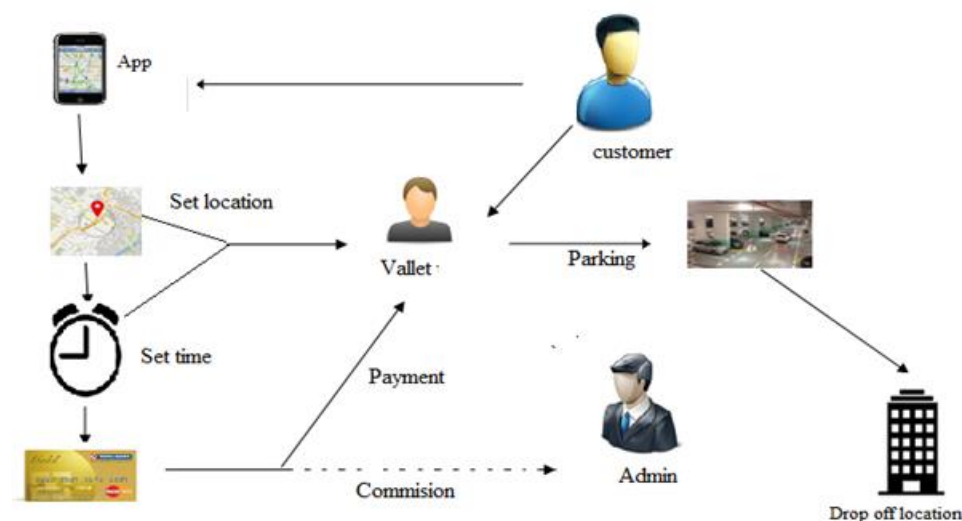


Fig: Proposed System

Our project is an on-demand valet parking service that aims to optimize the process of parking cars. Through the app, a user can request a valet to come to a designated spot (within their service location), take their vehicle, and park it in an enclosed space till the patron needs it again. In the following figure we can understand the flow of events, such as customer using its application for booking the valet, setting the time and location based on which they will be charged. They may also opt for value added services at this time. After this they will be sent to the payment page from where the payment will be processed through the admin and sent to the valet service provider. Meanwhile the valet service provider will receive the request with time and location and act accordingly to assist the user to park their vehicle. Once the vehicle is handed over to the valet they will park the car in the nearest safe parking spot available and once the user demands its car back or as requested it will be dropped off to the user's desired location. Thus making this service fast convenient and affordable.

ALGORITHM:

- KNN: K nearest neighbors is a simple algorithm that stores all available cases and classifies new cases based on a similarity measure (e.g., distance functions). KNN has been used in statistical estimation and pattern recognition already in the beginning of 1970's as a non-parametric technique.
- Determine parameter K = number of nearest neighbor.
- Calculate the distance between the query-instance and all training sample.
- Sort the distance and determine nearest neighbor based on the k -th minimum distance.
- Gather the category of the nearest neighbor.
- Use simple majority of the category of nearest neighbors as prediction value of the query instance.

KNN Pseudo code

kNN (dataset, sample)

1. Go through each item in my dataset, and calculate the "distance" from that data item to my specific sample.
2. Classify the sample as the majority class between K samples in the dataset having minimum distance to the sample.

CONCLUSION:

Thus we are going to develop a prototype model for agent based valet parking system using android and web. The web application will run as a local host and communication between android and web will be using WLAN. The system will be helpful to solve the parking problems of cities to great extent.

References:

- [1] Pranali Patil, Akash Arawade, Prajakta Jadhav, Seema Gawade, Prof. Jyoti Deshmukh, "ON DEMAND VALET PARKING SYSTEM", February 2019.
- [2] Pranali Patil, Akash Arawade, Prajakta Jadhav, Seema Gawade, Prof. Jyoti Deshmukh, "Survey On-Demand Valet Service System using Mobile Application", November 2018.
- [3] G. Motta et al. Personal mobility service system in urban areas: The IRMA project. In IEEE Service-Oriented System Engineering, pages 88- 97, 2015.
- [4] L. Rayle, S. Shaheen, N. Chan, D. Dai, and R. Cervero, App-based, on-demand ride services: Comparing taxi and ridesourcing trips and user characteristics in San Francisco, Tech. Rep., 2014.
- [5] Y. Huang et al. Large scale real-time ridesharing with service guarantee on road networks. VLDB Endowment, 7(14):2017-2028, 2014.

