JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

STUDY OF SMART APPROACH OF PARKING SERVICE

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Abstract*— The valet parking system is made up of carefully built yet simple-to-use software apps that allow even the most technologically challenged persons to access ride-on-demand services. As a result of our findings, we now realise the necessity for an on-demand valet service system in India's metropolitan centres, where the population is growing and car traffic is expanding. This project creates an architecture based on the Firebase Cloud Messaging(FCM) technology and introduces a novel algorithm that provides a valet parking system. This study developed a system that assists users in finding the cheapest parking alternatives by using new performance measures to calculate the user parking cost based on distance and duration. This cost will be used to provide a solution for identifying an available valet service provider in response to a user's request, as well as a solution for proposing a new valet service provider if the present valet service provider refuses the request or no one is available to serve at the time. The simulation findings suggest that the algorithm assists users in receiving on-demand valet service and reduces the time spent looking for parking in real time. We will also be successful in putting the planned system into practise.

Keywords: ***car parking, valet, machine learning, k nearest neighbor, android, java, etc***

I. INTRODUCTION

As the number of automobiles increases, the demand for parking has become a component of society. We are all familiar with the challenges that exist in today's parking system, such as auto theft and driver discomfort. To address these issues, various parking management system solutions have been created. As a result of observing the current parking system in today's society, a new system is being developed to improve and alleviate problems with the current parking system. This research proposes a solution in the form of a new automated parking system. PARKAGENT, an agent-based, spatially explicit model for parking in the city, is presented in this study. We mimic the behaviour of each driver in a spatially explicit environment, and are able to capture the complicated self-organizing dynamics of a huge collective of parking agents within a non-homogeneous (road) region, unlike standard parking models. Over distinct driver groups, the model gives distributions of key values such as search time, walking distance, and parking prices. It was created as an Android application and can handle an almost infinite number of agents. The model's benefits include the reduction of time spent booking, searching for, and travelling from a parking spot to a destination. The model is designed to examine the impact of extra parking supply in a residential neighbourhood with a parking deficit, using precise data from field surveys. This model demonstrates that increased parking supply has a linear effect on the occurrence of extreme values, but has only a minor effect on the average time spent looking for a parking spot or the average walking distance between the parking spot and the destination.

Motivation: As a growing number of cities suffer with traffic congestion and insufficient parking supply, the smart parking business continues to evolve. While sensor deployment is central to the development of smart parking, a wide range of additional technological advancements, including as cameras, wireless communications, data analytics, induction loops, and smart parking metres, are enabling more adaptive systems.

II. LITERATURE SURVEY

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 suggested system is a connected car-based on-street parking location service system that includes a parking space detection device (DD), a cloud server, and a mobile application. Each of the automobiles in the system has a DD that serves as a mobile sensor unit (MSU). The suggested system is built on the crowdsourcing concept; as a result, each MSU is responsible for detecting free parking locations and providing parking-related information (MSU id, MSU position, and the width of identified free parking location) to the server via a wireless network. A user (i.e., motorist) can then utilise a mobile application to find a free parking spot and go to it.

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

The goal is to create a self-driving car utilising RTOS (Real Time Operating System) and a smartphone. It is motivated to configure a flexible (Automated Guided Vehicle) AGV's guidance system. The driver finds it difficult to park their vehicle in a narrow garage, thus it is possible to park the vehicle using a smartphone via Bluetooth with a range of 100 metres between the car and the smartphone, and GPS (Global Positioning System) is also used to determine the location. This GPS device will assist the user in quickly locating the vehicle. The "Automobile Assist" technology is utilised to monitor the car's driving path, and the things that happen around the car can be observed in real time on the smartphone via GPS.

Car parking information system

Gytis Dalangauskas ; Vilius Dziaugys ; Danielius Adomaitis ; Igor Šajev

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

DOI: 10.1109/eStream39242.2016.7485927

The main issues are traffic bottlenecks, unexpected car accidents, and exhaust gas concentrations. Analysis of parking manoeuvres and the development of traffic management algorithms for closed spaces allow for effective process management and the assurance of safety regardless of the human element. This paper introduces a modernised multi-storey car park stand model, as well as algorithms for modelled circumstances and management programmes.

Recommended architecture for car parking management system based on cyber-physical system

Shafiq ur Rehman ; Volker Gruhn

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

DOI: 10.1109/ICEMIS.2017.8272987

The proposed approach, which is based on CPS, addresses the issue of car parking. The proposed approach is effective and efficient since the user will utilise the smartphone app to enter location information and send it to the server. The server will look for available parking spaces, gathering data from sensors, and sending it back to the user along with travel recommendations. The user will drive that route and park their vehicle in the server-designated area. The proposed method is a novel approach to utilise a cyber-physical system to tackle the car parking problem.

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 study presents an intelligent indoor car parking system that is both time and cost effective. The term "assistance" denotes that the parking will be handled by line-following robots that will transport the car from the parking area's entrance. In this work, we discussed a real-world application of a traditional line-following robot, which was used to improve an indoor auto parking system by adding some additional features beyond just following a line. Because the essential technology is readily available, our suggested system will have a very cheap implementation cost. The solutions that are currently available on the market to assist with indoor car parking usually necessitate some additional structural features.

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 study presents a simple approach for monitoring autos and incorrect parking in a smart parking system. We're honing our talents to work with small components like Arduino, Ultrasonic sensor, PIR motion sensor, and Nexion display to show the results. The primary purpose of this study is to address one of the most common problems that many people face: incorrect parking, by making parking smart and using it to achieve optimal efficiency without incurring excessive costs or requiring several sensors in a single parking lot. The smart parking system receives a signal from three ultrasonic sensors in a Moving Arduino, analyses the signal, converts it to code, and then transmits the code through wireless radio frequency.

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 obtaining a car parking spot has become a major factor in the development of this article and our proposed smart parking system. Aside from that, the use of internet of things (IoT) technology has become a fantastic technology that is suitable for complicated systems with minimum hardware usage. The concept of smart parking system is intended to be able to provide services for vehicle parking space seeking and car parking spot allocation through the mobile application with the deployment of IoT based on cloud computing, various smart devices, and also smart automatic machine.

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 suggested work is an example of how IoT and cloud computing technology might be used together. The goal of this project is to design, analyse, and implement a "IoT based sensor enabled car parking system," which allows users to pre-reserve parking slots from a remote location via a mobile application. To benefit the valid user, authentication of the valid booking is included. This system is made up of low-cost infrared sensors, a Raspberry-Pi model 3b for real-time data collection, and the E-Parking mobile app. E-Parking is a mobile application that was created with Android Studio and runs on Android 4.3.

III. PROPOSED SYSTEM

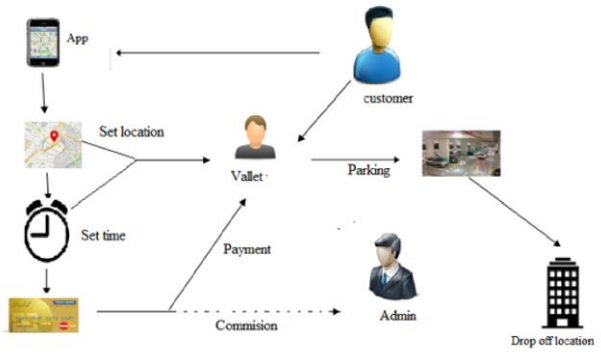

Fig: Proposed System

Our project is an on-demand valet parking service with the goal of streamlining the parking process. A user can hire a valet using the app to come to a chosen point (within their service location), take their vehicle, and park it in an enclosed space until they need it again. We can see the flow of events in the diagram below, such as a customer using its app to book a valet and specifying the time and location for which they would be charged. At this stage, they may also choose value-added services. They will then be sent to the payment page, where the payment will be processed by the administrator and forwarded to the valet service provider. Meanwhile, the valet service provider will get the request along with the time and location and will assist the user in finding a parking spot. Once the vehicle is handed over to the valet, it will be parked at the closest available safe parking area until the user requests it be returned or it will be delivered to the user's specified location. As a result, this service is quick, handy, and economical.

1. 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.

2. Experimental Results:

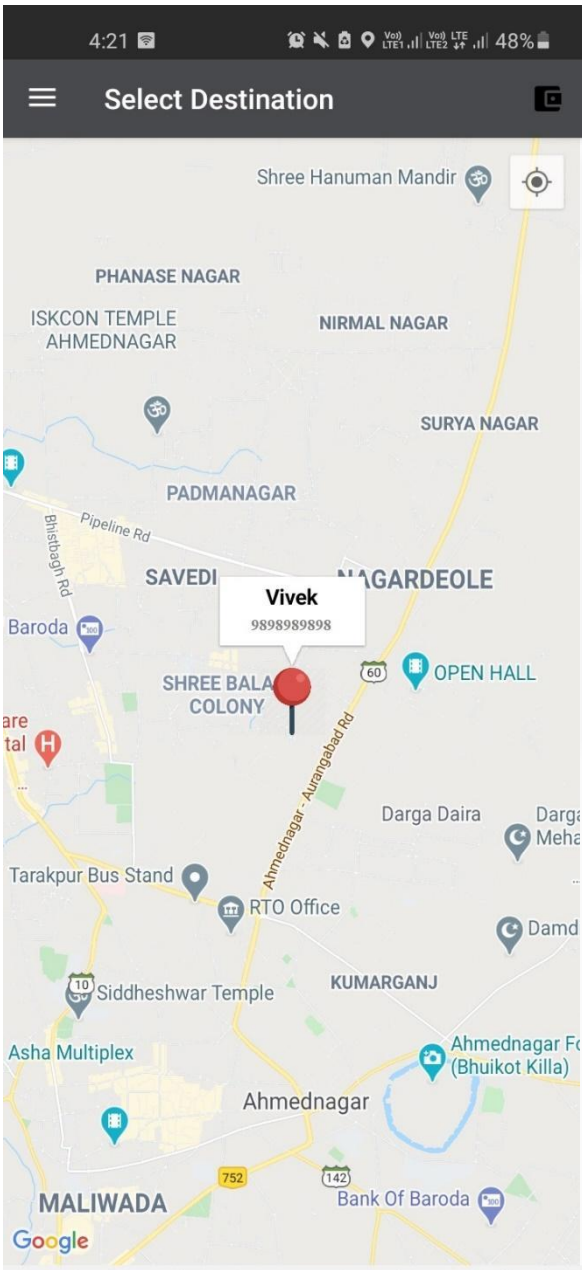

Fig: View Service Providers

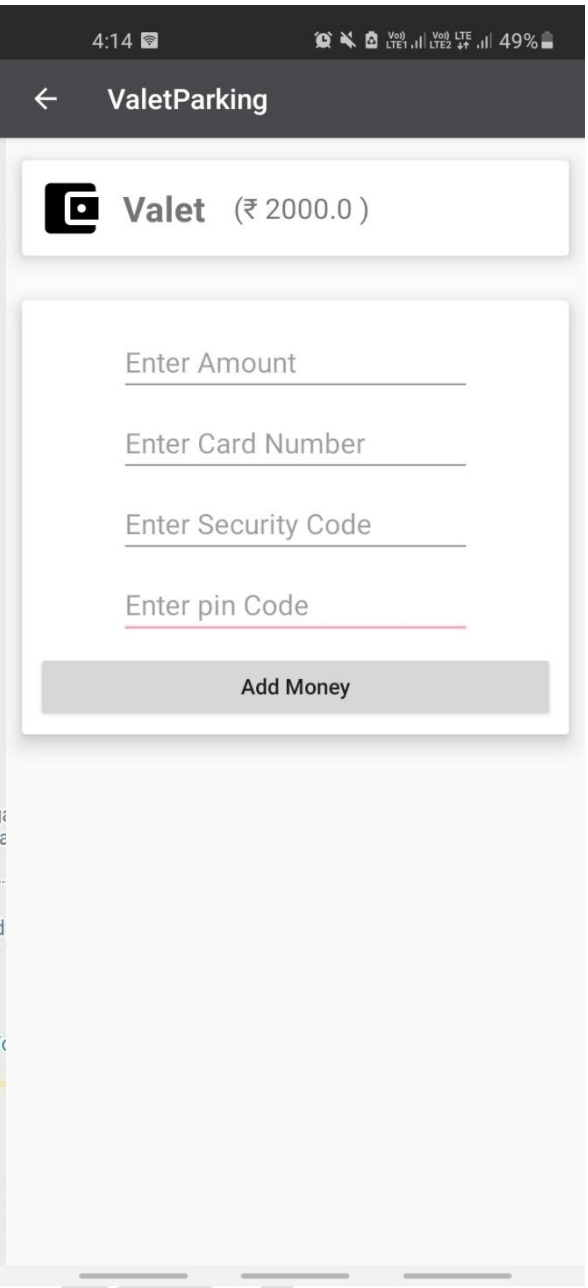

Fig: Add Valet Ammount

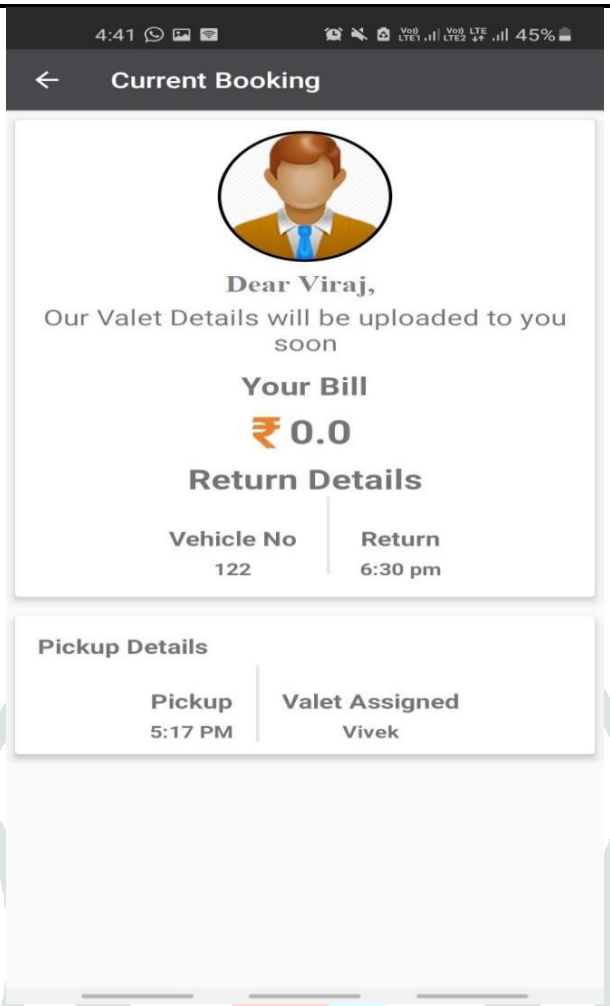

Fig: Booking Details

IV. CONCLUSION

Thus have developed 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.

V. REFERENCES

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