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# Ultra Smart Space Saving Parking System

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***Abstract:*** ***When visiting unfamiliar locations, finding a parking spot can be a time-consuming chore. This "Ultra Smart Space Saving Parking System" contributes to the effective development of the smart city while also reducing the amount of time spent looking for a parking spot. With the growing number of vehicles on the road and the global population, more parking spaces and services are needed. The project's goal is to lower the danger of not being able to find requested parking spaces without wasting space. It prevents vehicles from making unnecessary trips across crowded parking spaces. This technology employs a digitalized QR code approach to create an enhanced car parking system. The parking system in a car that uses an actuator or sensor in each vehicle to assist drivers in finding a vacant space.The QR retrieve information are used to identify the slot. The user (Vehicle owner) must show their OR scanner, the QR code is validated using SSIM (Structured Similarity Index) technique (checks image quality), and then the scanner collects all information from sensor and server node. That IR sensor have the parking slot information whether the slot is vacant or not.***

***Keywords-structured similarity index(SSIM).***

## 1. INTRODUCTION

The project entitled smart parking system is to manage all the parking facilities for the vehicle user. The consequences of heavy traffic jams and spot the free space to park the motor car. One of the important concerns is the problem of parking those vehicles in free slot area. Though, if there is space for parking the vehicle but so much time is squandered in finding that exact parking slot resulting in more fuel intake and not also environment friendly.It is a difficult to find out the parking,itself can provide the precise vacant position of a parking slot.Initially when the user is about to enter the location the LCD displays the number of empty and filled spots .The user would be thrown with a notification on their mobile of the parking slot number ,where they should park there vehicle.

## LITERATURE REVIEW

An efficient car parking system using raspberry-pi in the year 2021 the realistic logistics not only involves vehicle capacity and working hours, but also factors such as the second trip of vehicles and heterogeneous vehicles[1]. Aiming at the constraints of these VRP variants, an algorithm is proposed to solve the heterogeneous vehicle routing problem with a second trip. In the process of calculating the initial solution, the concept of k-ring shaped Voronour neighbors reduces the computational complexity and avoids the problems caused by outliers[2]. When allocating customers, the idea of “Borrow-In and Borrow-Out” proposed in this article is adopted to rationalize the route planning results[3]. In the calculation process of considering the second trip, the customers closer to the depot are regarded as the final order[4]. For heterogeneous vehicles, this article adopts a greedy strategy[5]. The experimental results of multiple instances show that if the depot provides a heterogeneous fixed vehicles fleet, compared to when only a single vehicle type is provided, the result is a reduced number of vehicles used by 4.46% on average, and the loading utilization rate of vehicles is increased by 4.02% on average[6]. A limitation of this solution lies in that the system is complex and its implementation is expensive when a detection device is installed on each parking lot[7]. Furthermore, when only RFID transceiver is used for vehicle detection and identification, the system can be bedeviled by electromagnetic interference, which affects the accuracy[8].And after the calculation of considering the second trip, the number of vehicles used is reduced by 5.09% on average, and the loading utilization rate of vehicles is increased by 4.41% on average[9].The proposed integrated smart parking system brings multiple parking service providers together under a unified platform aiming to provide one- stop parking information services to the commuters in a smart city[10]. However, the adaptation of such a system is prone to tempering while a massive amount of data is shared among different parties which raise concerns related to trust and performance[11]. To address this challenge, we propose a blockchain-based architecture specific to the integrated smart parking systems[12]. Finally, we present a set of design principles which shows the applicability of our proposed blockchain-based integrated parking system[13].A variety type of vehicle detectors has been used in parking information acquisition[14]. These vehicle detectors mainly include the inductive loop,acoustic sensor, infrared sensor, or ultrasonic sensor system using video camera sensor technologies have been proposed to collect the information in vehicle parking field[15].

However, a video camerasensor is vulnerable to bad weather and night time operation[16]. Furthermore, it is expensive, and can generate a large amount of data that which affects the accuracy, the reading from sensor needs to be collectedconstantly which will result in wearing out the battery[17]. To extend the battery lifetime and increase the vehicle detection accuracy, a parking sensor system has been proposed[18]. While power management technique has been implemented to optimize energy consumption, high occupancy monitoring accuracy is achieved using two- fold sensing approach[19].As consequence, smart-parking technology using wireless sensors for outdoor parking is costly due to the large number of sensors units required to cover the entire parking lot[20]. Although, parking occupancy monitoring systems have made a significant progress, smart parking payment is rarely studied in smart parking research[21]. Yet, there are companies working on the patents of parking systems for payments[22]. A first approach consists in using a camera or an RFID transceiver for vehicle detection and identification[23].Over the last few years, finding vacant parking spaces has become a hassle for drivers especially in crowded cities[24]. This problem leads to wasting drivers' time, traffic congestion, and air pollution. Recently, smart parking systems aim to address this problem by enabling drivers to have real-time parking information about vacant parking spaces[25]. However, the existing parking systems rely on a central third party to organize the service, which makes them subject to a single point of failure and privacy breach concerns by both internal and external attackers[26]. In this paper, we propose a secure smart parking system using blockchain technology[27]. Specifically,transparency, and availability of the parking system[28]. Then, to protect the drivers' location privacy, we use cloaking technique to hide the drivers' locations. The blockchain validators return available parking offers with in the cloaked area[29]. Finally, the driver selects the best offer and makes reservation directly with the parking lot[30]. Evaluations are conducted to evaluate the proposed scheme, and results indicate practicality of our scheme[31].

## PROPOSED METHODOLOGY

The proposed system needs a camera, infrared sensor, and Arduino. Infrared sensor is used for detecting the object. The camera opens only when the infrared sensor detects an object.The captured QR code will sent to Arduino.The Arduino receives the QR image from the camera which is placed in the parking space.As per the Image detection process,read the QR image from the QR code.After image processing is done ,validate and check whether it is correct QR code or not.Using a structural similarity index(SSIM) is an method used for measuring the similarity between two images. The printed QR code information with contact number,vehicle model type will be shown in the screen.After ensuring the successful information from the QR code it will checks the slot availability and shows the slot section ,when the desired slot is free or not.The output will be shown from the select the required slot from the available slot.Finally get the user mobile number from the scanned QR code and after connect to the twilio account.Twilio helps to send and manage messages programmatically,and sending the notification to the user(drivers).The system supports which minimizes the traffic congestion by displaying free vacant spaces to users as much as possible.The Structural similarity index (SSIM) is a method for predicting the perceived quality of digital television and cinematic pictures, as well as other kinds of digital images and videos. SSIM is used for measuring the similarity between two images

A. Advantages of proposed system

It is a time saving process,to guide the drivers by providing map to park the vehicle in a desired area using app.
It avoids collision for one vehicle to another and also waiting time of vehicle for parking.
It reduces the space wastage of Parking area and also allocate the required parking slot.

B.SSIM TECHNIQUE

The Structural similarity index (SSIM) is a method for predicting the perceived quality of digital television and cinematic pictures, as well as other kinds of digital images and videos. SSIM is used for measuring the similarity between two images

B. ThingSpeak is an IoT analytics platform service that allows you to aggregate, visualize, and analyze live data streams in the cloud. You can send data to ThingSpeak from your devices, create instant visualization of live data, and send alerts.It facilitates data access, retrieval and logging of data by providing an API to both the devices and social network websites. ThingSpeak was originally launched by ioBridge in 2010 as a service in support of IoT applications.Multinomial NB (MNB)

C. Testing

System testing is based on the logical assumption that, if all components of the system are correct, system testing will be useful as a user-oriented vehicle prior to deployment. System testing finds faults, provides a recommendation to the administrator and alters the alteration, as well as checks the output's reliability. Before going live, the system is checked to see if the necessary software and hardware are in place to complete the project. To guarantee that this project is correct, it has passed the following testing methods.

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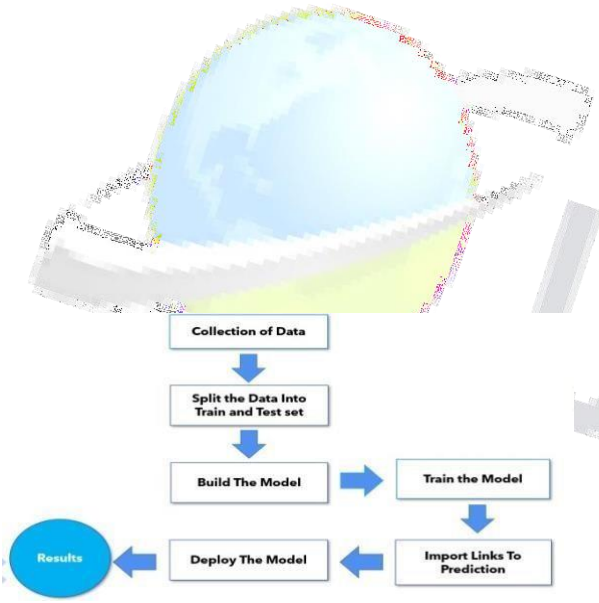


Figure 1. Graphical workflow of proposed models for detection phishing of websites

## II. RESULTS AND DISCUSSION

The concept of Smart Cities has always been a dream for humanity. Since the past couple of years ago large advancements have been made in making smart cities a reality.The system that we propose provides real time information regarding availability of parking slots in a parking area. Users from remote locations could book a parking slot for them by the use of our mobile application.The efforts made in this project are intended to improve the parking facilities of a city and thereby aiming to enhance the quality of life of its people.

## III. CONCLUSION

The concept of Smart Cities has always been a dream for humanity. Since the past couple of years ago large advancements have been made in making smart cities a reality.The system that we propose provides real time information regarding availability of parking slots in a parking area. Users from remote locations could book a parking slot for them by the use of our mobile application. The efforts made in this project are intended to improve the parking facilities of a cityand thereby aiming to enhance the quality of life of its people.

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