



JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)

An International Scholarly Open Access, Peer-reviewed, Refereed Journal

Internet of Things Based Vehicle Parking Smart Slot Availability Detection (VPSSAD)

¹Sachin Tupsoundre, ²V. V. Yerigeri

¹² Department of Post-Graduation, MBES COE Ambajogai (MS), India

¹ Dr. B. A. T. U. Lonere, India,

Abstract: In this latest virtual generation, we guarantee that almost everyone has a smartphone and no additional hardware is required for the consumer interface. As a rule, big cities have at least one car that you can easily pay for. Therefore, the city parking problem is over. This causes parking problems, heavy traffic and high pollution. This is a problem faced in many cities today. Vehicle drivers waste most of their time finding available parking spaces. We will look at a demonstration of how to mitigate these parking problems and perform efficient IoT-based valley services. Traffic management systems have been introduced in many urban areas, and new parking guidance systems have been introduced, which are parking guidance information technologies (PGIs) for good parking. With the IoT, you can build the world's largest city groups at incredible speeds and build integrated parking systems. This scheme aims to increase the number of in-vehicle devices that detect the number of automatic slots by extending the parking app for free parking using a reputation detection approach. This document uses an Android application. Due to the rapid population growth in urban areas, almost all citizens use cars. The manual parking guidance system has several drawbacks and very expensive maintenance of parking system, time required to generate results, double data entry. In this paper we proposed and implemented such system to overcome all these problems using IoT and cloud-based technology.

IndexTerms - IoT, VPSSAD, ESP8266, ThingSpeak.

INTRODUCTION

Parking allocation gadget in buying complexes, multistore buildings, flats commonly have parking slots, garages regulated through human interferences [1]. Once upon a time, on our go to LULU mall in Kerala, there arises a state of affairs to park our vehicle. Since it's a top hour many motors had been there ended in time loss and heavy visitors is visible withinside the gateway. There had been no regulating structures in allocating areas [4]. Some protection guards had been hired to modify visitors and allocate area which did not paintings as humans do not allow them to paintings properly. This effects in chaotic congestion whilst extra motors are to be parked at a time in a distinct area. Hustling withinside the gateways could be very not unusual place at some stage in top hours due to the fact many motors get collected at the doorway [5] and it'll be very tough to modify the visitors there. Apart from this, it's far a time-eating manner to discover a ideal location to park the auto of any individual. There aren't any right indicators given withinside the gateway approximately the provision of areas withinside the garage. The driving force has to move all of the manner internal with his/her car to discover a right empty area to [11] park their car and incase of now no longer availability of areas the driving force has to pop out to via the doorway and look for area in some other floor. Hence excessive visitors' congestion exists withinside the gateway of the parking slots particularly at some stage in top hours and the time loss in that manner may be averted through decreasing human interference in allocating parking slots together with offering facts approximately the empty parking slots to be had [13]. These are a number of the inferences we've skilled in my opinion in our go to buying complexes, department stores etc. The parking costs series out of doors provides extra problem to it. In order to cast off this problem, a right indication approximately the areas to be had for parking have to receive withinside the front gateway itself approximately the provision of area for parking motors. Thus, a gadget needs to be designed with sensors, gates, indicators and presentations to modify parking allocation to assist People Park their motors without difficulty have to be designed. It will lessen the visitor's congestion together with saving a number of times in locating an empty slot for parking the motors of individuals [15]. This paper will provide an explanation for an easy vehicle parking allocation gadget so that it will modify the parking manner and allocate areas for motors to be parked. Excess motors coming can be redirected due to the fact the gateway can be closed if all of the areas are occupied internal. The facts concerning most of these can be displayed assisting the customer.

A. PROJECT OBJECTIVE

- Our project aims to accurately adjust the parking allocation system without human intervention to avoid traffic jams in front of parking lots equipped with basic electronic components.
- Designed to be implemented in shopping complexes, malls, skyscrapers and apartments, especially to regulate parking allocation during peak hours.
- Shows the number of free parking spaces at the entrance itself, reducing the time lost when looking for free parking spaces. It also shows certain available spaces that can be parked on the driveway itself of the Android phone.
- Restrict the entry of vehicles when the parking lot is full, and systematically regulate the entry of vehicles into the parking lot. If all seats are already occupied, the gate will be closed. No other access to the interior is allowed. Therefore, the driver looks for a location on another floor of the parking lot.

B. PROBLEMS IN PARKING

- Parking lot traffic at certain times, especially due to vehicle congestion during rush hours. Parking lots are not regulated and are used by workers instead of automation.
- Loss of time looking for free parking space. The driver needs to find a place in his car.
- More human intervention in room allocation.

LITERATURE SURVEY

There are many ways to develop parking automation, but research on many articles shows that more human participation [1] is in parking. This needs to be significantly reduced and is a major goal when developing an automatic parking space allocation system. In reality, there is no automation in Japan regarding the allocation of parking spaces. Countries like Europe, the United States, and Japan have implemented advanced mechanisms for creating automatic parking allocation systems [1]. So this project was done with a simple sensor and microcontroller [2]. Human intervention in seat allocation leads to unnecessary congestion of vehicles, especially during rush hours [3]. In this way, simple sensors are used instead of traditional methods such as those used in shopping centers to provide optimal results at low cost [4]. The system installed IR sensors on both sides of the gate entrance located in each available parking space. Two sensors are installed in the basement of the parking space, and the distance between the two sensors is sufficient to detect all hatchback vehicles in India. This helps to effectively place the sensor in the parking system [5]. Therefore, the car will not be undetected by the IR sensor. Here, Arduino is used as a microcontroller [6], and the information received from the sensor is transmitted to the servo motor, LCD, LED, etc. LEDs, LCDs and servomotors are connected to the Arduino as output devices. Therefore, it reacts based on the input received from the sensor. That is, vehicle detection and seat allocation [8]. This is the optimal parking space allocation mechanism and employs a cost-effective design approach. Servo motors are used to open and close the gates, and an LCD is used to display details of available parking spaces as a supplement to the reference material. In some cases, RFID is used. RFID mechanisms are used to provide more accurate results with high efficiency. However, this mechanism cannot be applied everywhere because it is not possible to predict the visitors of the spot in advance. The input information we receive is very anonymous. There is no room for anonymity when using RFID. It is practically impossible to equip all parked vehicles with RFID receiver tags [8]. When a car passes through the gate, the IR sensor at the gate first detects the car and sends a signal to the microcontroller [9]. The microcontroller checks the number of spaces available for parking and then retransmits the signal to the servomotor. When parking space becomes available, raise the actuator 90 degrees to open the gate [9]. The IR sensor on the other side of the gate is used to count the number of cars entering the parking lot, reducing the count and displaying it on the LCD. The display shows the number of empty parking spaces remaining and the total number of parking spaces already occupied. LED display.

SYSTEM DESIGN

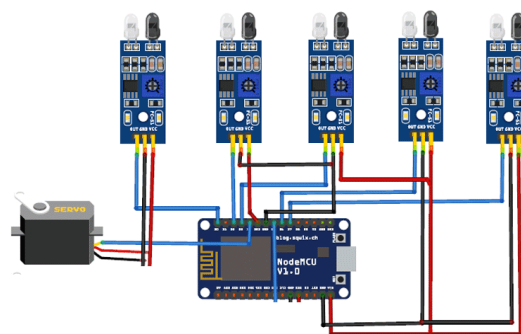


Figure 1 Block Diagram

The IR sensor place in such a way to detect the space is occupied. The four IR is used to detect slot free or occupied, one sensor is used to pen close barricades attached to servo motor.

PROPOSED SYSTEM

The main problem is to find a parking niche, whether in the shopping boardwalk or companies or at the field or in hospitals. An average, people spent much time to find a suitable parking. Most of the people situate their vehicles in places not designated for parking, and parking in places not reserved for parking places. Generally, there are reasons to situate people in places not reserved for parking similar as the area designated for parking isn't enough to feed the requirements. This is due to the weak planning and not allowing of results to keep pace with the large increase in the number of vehicles, and utmost people situate the vehicles for long times without allowing. Drives looking for parking space is a major cause of business traffic and accounts for 30. Traditional parking System In recent times, number of vehicles possessors are adding day by day, when someone tries to find a position to stop his auto after a long day of work surprised by the lack of parking to stop his vehicles and see the motorist passes positions further than formerly to find him a position. Traditional parking consists of only two passages to enter and exit harborage. In some parking only one entrance to enter and out of space, while parking spaces are small for a small vehicle, while the big vehicle takes further than one position, which makes effects worse, occasionally the vehicles stands but when it isn't possible to open the. The vehicles is scratched with the coming auto because the parking is too small and cannot take up enough space between vehicles for the parking, but when you exit take a lot of time to get out of the vehicles for fear of hitting any vehicles near- in. Smart parking system the traditional parking has been developed to a parking system that helps the motorist to know the enthralled and available positions through a display that contains the number of available parking spaces and where they are. This system is used in numerous places and break the problem of arbitrary parking and not to stand in places not available to stand up. Smart parking consists of two networks, an external network and an internal network, the external network is that the stoner connects to the Internet and enter the operation of smart parking to reserve a position and be reserving anywhere available in a data network, and the stoner enters the garçon of smart parking to be suitable to reserve the asked position without the need to pierce parking Through the operation the stoner can know any vacant positions and available and places parking. The internal network of parking is the process of connecting all bias smart parking When the garçon is transferring a signal to the pall and the part of the pall shoot this signal to the display screen and from the display screen to the detector and the detector to the top of the position and vice versa and this communication is done internally without the intervention of any hand or stoner.

- * Our paper aims at regulating parking allocation system with delicacy without any mortal hindrance to avoid the business traffic before parking places with introductory electronic factors.
- * It's designed in such a way to be enforced in shopping complexes, promenades, multi-store structures, apartments to regulate parking allocation especially during peak hours.
- * It displays the number of empty parking places available at the entrance itself thereby reducing the time loss that happens in searching for empty parking places. It also displays the specific space available for parking in the entrance.
- * It restricts the entry of vehicles when the parking area is full and regulate the entry of vehicles entering inside the parking garage systematically. However, the gateway will be closed, If all the places were enthralled formerly. No farther entries will be allowed outside. Therefore, the motorist will search for a space in another bottom of the parking garage.

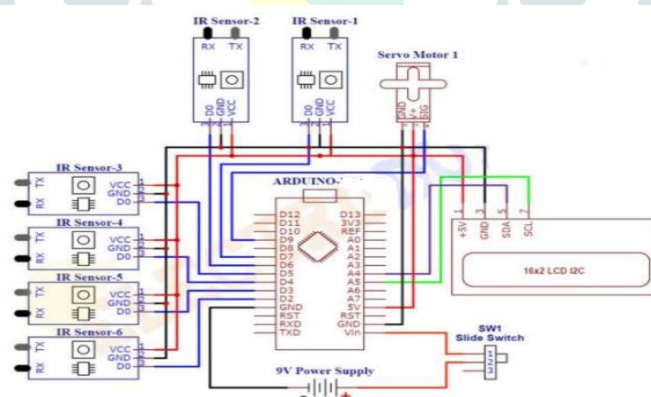


Figure 2 Proposed Diagram



Figure 3 Expected Working of Car Parking System

In this project, we are going to implement smart car parking system, we are using IR sensors which will detect the car is parked in the slot or not. If car parked then it will show space is occupied or empty. By using ESP8266 NodeMCU kit we can achieve the concept of IoT. Which will display on Android mobile phone.

Table 1 Actual Results for seven Test Cases

Test Case No.	I	II	III	IV	V	VI	VII
Scenario	If parking is not occupied	If parking is fully occupied	If parked car wants to out	If user open application without Wifi	If user get in or get out from parking space	If Wifi not connected to IoT kit	If anyone space vacant
Expected Result	Main gate will open	Main gate will not open	Main gate will open	The application will not run give error to connect internet	The main gate will hold for some time and down it automatically	The model IR sensors shows lights on it.	The gate will open else not
Actual Result	SUCCESS	SUCCESS	SUCCESS	SUCCESS	SUCCESS	SUCCESS	SUCCESS

Implementation and Result

For making the model used the light weight ply, so we can easily cut and make expected prototype as shown in figure.



Figure 4 Material used for Model



Figure 5 First Prototype

After completing the prototype, we placed the IR sensor over it. We are used 4 IR sensor to detect 3 cars parked or not. As shown in figure.



Figure 6 Placed IR sensors

Following figure represent the upper view of prototype.

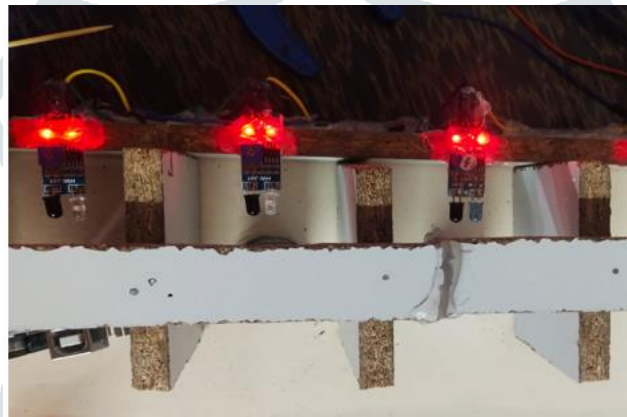


Figure 7 Upper view

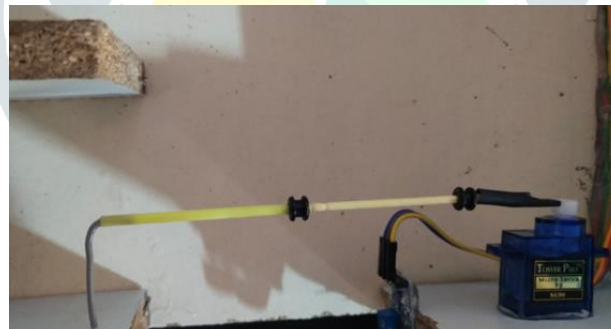


Figure 8 Barricade using Servo

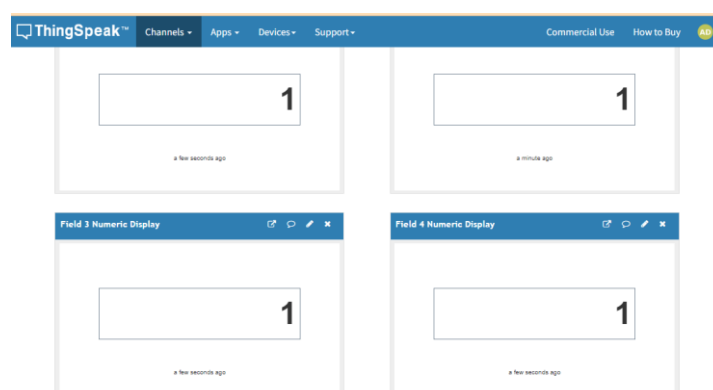


Figure 9 All slots Empty

The symbol “1” represents the Empty. The whole slot is empty now.

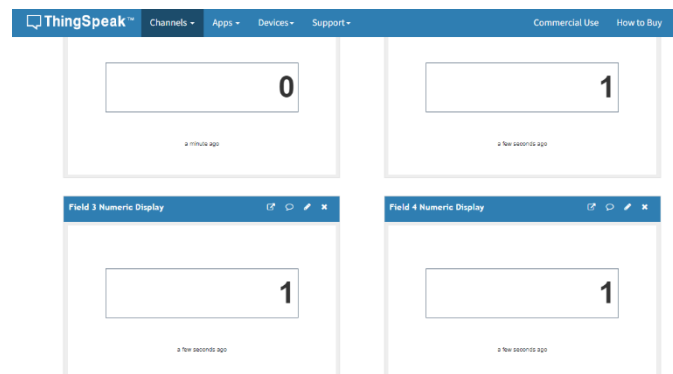


Figure 10 Display on App Slot 1: F (Full)

Likewise, if slot is full or empty, it will display on Android application.

If all slots full then the barricades will not open if any new car enters into parking area. The barricades remain closed. If any one vehicle left from slot the barricades will open if new car enters.

ISSUES, CHALLENGES AND FUTURE WORKS

As the parking system is designed and implemented, though in a prototype mode, we find several issues and challenges that can help for the improvement in future work. This section briefly discussed the issues, challenges and the future works or directions. Firstly, this VPSSAD app only available in Android based since android is an open-source software. To develop in various platform, developer need to consider another software that can suit with the ESP8266-sensors installation. People also need to install this app when they come to the mall. An awareness to learn the technology, thus, follow and catch up with the advancement of industrial revolution should be conducted. Next, we found that there are some difficulties to configure the IP address and the coordinates of the sensor that installed on the parking. Sometimes the IR Sensor and Wi-fi shield will read wrong data when looped periodically. Several experiments need to be conducted to specify the loop parameter, then, reduce the wrong data information. We plan to further enhanced the system by implementing level-based parking's mall for both, indoor and outdoor, and also provide accurate directions to the users to find their closest vacant parking space.

CONCLUSION

VPSSAD is being developed with three major implementations: multiple hardware connections, a database as a ThingSpeak cloud, and a mobile application. The hardware selected is an ESP8266 node MCU, IR sensor, 180-degree servomotor and breadboard, male-to-male jumper wire, and male-to-female jumper wire. The database uses an Excel spreadsheet that acts as an intermediary for hardware and mobile applications built in the ThingSpeak cloud. With the development of VPSSAD, these users can easily find parking spaces on their mobile phones, as many people spend their time outdoors, especially on weekends and holidays. Both the VPSSAD mobile application and the VPSSAD prototype kit have been run to successfully complete this task. Users can check the information every second on their mobile phones. Mobile phones will be updated from time to time. This implementation has been tested in situations where the error handling of the proposed system is smoothly controlled. In summary, the implementation of VPSSAD solves the problem and improves the current problem associated with this system. The proposed work is an example of how mobile applications and IoT technologies can be applied to the concept of smart cities and have a positive impact on society and quality of life, especially in urban areas.

REFERENCES

- [1]Noor N.M, Z Razak and Mohd Yamani, —Car Parking System: A Review of Smart Parking System and its Technology, Information Technology Journal, 2009.
- [2]Mohammed ahamed, wangguangwei “STUDY ON AUTOMATED CAR PARKING SYSTEM BASED ON MICROCONTROLLER”. International journal of engineering research and technology ISSN: 2278-0181, volume-3, issue-1, January-2014
- [3]Wuhongwang “METROPOLIS PARKING PROBLEMS AND MANAGEMENT PLANNING SOLUTIONS FOR TRAFFIC OPERATION EFFECTIVENESS” hindawi research paper, volume 2012, article ID-678952
- [4]Ma. Janice J. Gumasing and Charles Aaron V. Atienza “Parking System for Shopping Centers in Metro Manila” IEEE journals
- [5]DharminiKanteti,D V S Srikar,T K Ramesh, “Intelligent Parking System” in IEEE journals
- [6]Suntheetha, Akey, and Rajesh Sharma. "Cost Effective EnergySaving System in Parking Spots." Journal of Electronics 2, no. 01 (2020): 18-29.
- [7]Anand, J. V. "Automatic Traffic Control Technologies for Remote Monitoring Of Unmanned Railway Gates." Journal of Electronics 2, no. 01 (2020): 30-37.
- [8]Masiha Sabnam, Mousumi Das, Parimita A Kashyap -Automatic Car Parking System AJET, ISSN: 2348-7305, Volume 4(1), 2016
- [9]Janhvi nimble, Priyanka bhegade, snehalsurve, priyachaugule “AUTOMATIC SMART CAR PARKING SYSTEM”. International journal of advances in electronics and computer science ISSN-2939-2835 volume-3, issue -3, march2016
- [10]A.A Kamble and A Dehankar —Review on Automatic Car Parking Indicator System, International Journal on recent and innovation trends in computing and communication, Vol 3 no.4 pp 2158-2161.
- [11]Walter Balzano And Fabio Vitale —DiG-Park: a smart parking availability sea

BIOGRAPHIES

Sachin Tupsoundre, has completed his B Tech Degree from E&TC Department & pursuing Masters in Digital Communication Department in MBES college of Engineering, Ambajogai, India.



Prof. V. V. Yerigeri, has completed B.E in Electronics & Communication Engineering & M.E. in Power Electronics & Perusing Ph.D. in Signal Processing. He has teaching experience of more than 24 Years. He has presented many papers in National & International Conferences & Published more than 50 papers in National & International Journals.

