

# IOT based Car Parking Mechanism and Control System

S.R. Rajeswari, Rohit Kumar Guha, Shubham Gautam, Adwitiya Rahman, T.V.R. Pavani

**Abstract**---Internet of Things (IOT) stages a important role in linking the environmental elements neighboring the network and has been created in a simple way to access these elements without an Internet connection from any inaccessible location. It is inevitable that the elderly are up to date with budding technology. Generally, there is lot of trouble in parking the vehicles in the parking slots. In this proposed system, we designed an intelligent parking system; which allows the handler to find the nearest empty parking slot (area) and provides the accessibility of parking spaces in the respective parking area. And, in general, he specializes in reducing the time to find tons of parking spaces and, in addition, avoids the free trip through tons of dried parking during a parking lot. In this way, it lessens fuel consumption which subsequently lessens the carbon footmark in the environment.

**Key terms**--- Internet of Things (IOT), Intelligent Parking System (IPS), Raspberry pi, Raspbian OS, Camera pi.

## I. INTRODUCTION

The introduction of Internet of Things was first done in 1999 in the personal identification center and this was initially used by Kevin Ashton. With the evolution of this newest combustion technology, it guarantees to unite all our things close to a network and to anthropoid action with less human participation. Even so, the network of things is in its early stages and there is no common design to date. There are many investigations and territorial units of implementations that currently occur together in single areas. Therefore, there are no suggestions or limits to outline the description of the network of things. Based on the context the applications of Internet of things has different definitions. In summary, it describes the reason why things are present in the physical world or in the unity of the configuration area AN connected with sensors or with any integrated system and are created connected to the network via wired or wireless connections. These connected devices are called smart devices or intelligent objects. And it consists of good machines that human action interacts with machines, environments, objects, etc. alternative. This incorporates to join any machine, machine to person and vice versa, etc. This communication is called M-M communication. M-M communication is developed by many standardized bodies. The microcontrollers, sensors, actuators present in M-M communication makes our life equipped for

communication. Some necessary aspects of the network of things include 1) the following behavior; 2) greater awareness; 3) analysis of the calls guided by the detectors; 4) There should be management response which responds instantly, etc. IOT is a technology which is growing unanimously in all fields and no restrictions and limits were found till now for the growth using this technology. Some good apps that you are currently implementing as good networks, good lighting, smart energy, smart city, smart health, etc. In general terms, this is classified into 3 classes such as detection, processing and connectivity. While the detection includes the detection of the speed of vehicles and humans (accelerometer), detection of temperature, pressure, etc. The network processor, the hybrid processor are used very often for victimization of these classes. There are many devices are connected using some technologies. More than half of the world's population lives in the city. Thus, cities have choked on their occupation. The transport vehicles which people in considerable number for the handler's convenience. Many a times people looking at the traffic congestion at parking slots tell their precise time to reach the destination. Therefore, overcrowding occurs within the traffic which results in a busy job looking for parking cars to park the vehicle. Most probably traffic arises only because of vehicle congestion within the urban area unit, so that people cannot see the empty spaces in the parking lot unusually parking their vehicles. Our proposed system could be a parking detector as well based mainly on the Raspberry pi which contains a pi camera to discover empty parking areas and send this information to the server; users access this stored data. This improves the user in the display of the parking areas status / availability before setting the trip. Here the main task is to use present existing resources at an ideal level to lessen waiting times, traffic overcrowding in the city area. Few embedded systems like Arduino, Raspberry Pi, etc. are used to develop the applications in the internet of things. The main aim is to develop a system at a lower price with additional performance.

## II. RELATED WORK

This efficient Parking slot System is intended using IOT compatible hardware, such as raspberry pi, Arduino boards, etc. Here we are oriented towards lower energy consumption and an additional performance device. The microcontroller storage device is completely loaded with NOOBS installer. This installer consists of supported hardware operating systems varied as Macintosh operating system, small

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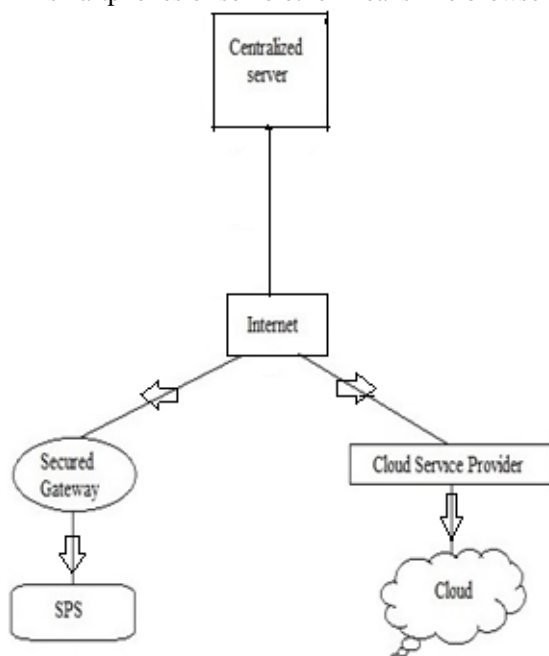
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operating system, open operating system, Raspbian operating system, etc., where less energy is consumed by the operating system.

### III. IMPLEMENTATION

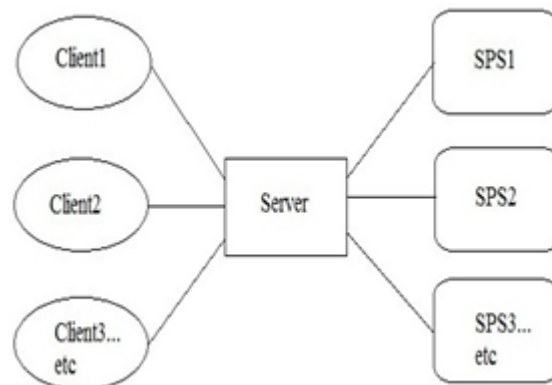
The proposed parking system is designed for parks which are open, parking spaces in streets and also for covered areas of parking. Most importantly Fig 1 is shown the IOT design (cloud based) for a decent parking system that contains a provider of cloud service which provides cloud storage for information storage on locations for empty parking slots in a parking area and so on., such as the availability information as in slot range, availability of vehicles, etc. And over a network this information is accessible through some safe and secure gateways. This upright parking slot system is made up of countable elements. And its functionalities are also included below:

- **Central server:** The central server manages databases which contains information on free parking spaces in and around the area of concern.
- **Raspberry pi:** The raspberry pi is a microcontroller which is used to contrivance our parking system and a raspberry pi camera is connected to it.
- **Capture of images:** The raspberry Pi camera is used to capture the batch image in incessant way of validating slots and to express its status as full or empty.
- **Navigation system:** The navigation system indicates the provision of empty parking spaces for handlers and shows them the way to the precise location of the nearest empty parking lot from the handler's current location.
- **Device demonstration:** this is a monitor or a card that is used to exhibit the administrator's interface facet and is able to change the parking spaces by detecting the device.
- **User(handler) device:** the handler can connect to the intelligent parking slot system with their smartphones or some other means like browsers.



**Fig.1: Architecture of proposed System**

The SPS which contains the raspberry plus two options and which is connected to the pi chamber. Here the pi camera is mounted on the top of the buildings or any roof tops or high poles where the lights in the street are arranged. Therefore, the device which is used to capture images i.e., camera is able to continuously perform inspections in respective parking spaces or slots in the parking masses to check if the specific space in that area is full or empty. The structure of parking system presents and contains some administrative points in each of the parking areas that can be used as reference points for the camera. The information is presented by certain protocols such as HTTP in a parking system for single or multiple spaces for parking. The central server has an update in the information of empty parking slots as there will be change in the parking spaces. Thus, the handler will be able to access this storage information from any location. The parking operators use this information for various purposes such as displaying the free parking spaces and all the statistics of the parking areas noted at different point of time each and every day. Fig.2 shows clients and SPS with the server communications between them. In this way a single consumer will have access to the data of the numerous parking spaces in the city. Therefore, spotting the provision of parking spaces, the user will opt for his convenient lot. Therefore, explicit parking is moved from the customer's current location.



**Fig.2: SPS and client sever communications**

The SPS, Client and Server has communications in between them. The consumer is provided with enough information about the access of the system using a computer program. The administrator is able to create a new parking space in the parking lot by exhibiting the information on the free parking areas and, together, can offer a series of parking lots in any explicit lot. even remove existing parking spaces during a lot. The updated temporary layout of each parking space is shown together with the distinctive range. And also this computer program provides navigation to your destination. Steps for configuring the good parking system: assemble the camera correctly so that the image captured evidently shows the parking spaces. The associate administrator in nursing marks the images of the parking areas. The management control points are designed as per the convenience of parking system. The configuration was saved, registered on the server and, finally, will be executed in the system.

#### IV. RESULTS

The end results of the previous proposed system can be summarized as client-server communications or SPS communications or communication between them. The clear information about the system is provided to the handler or consumer through a computer program which is enough provided with the intended information about the system. The new parking space can be made or created by the admin in the parking lot, providing the layout on the parking area and, together, can offer a series of parking lots in any explicit lot. even remove existing parking spaces during a lot. The updated temporary layout of each parking space is shown together with the distinctive range. And also this computer program provides navigation to your destination. The following sentences are the steps for configuring the moral and righteous parking system: The camera should be assembled in a right manner so that the apprehended image clearly shows the parking slots which are empty. The nursing associate administrator clearly marks the image of the empty parking slots on the image. The management notions are designed for the convenience of parking. The configuration was "saved", "registered" on to the server and, finally, the system was executed.

In the steps following:

i] A Pipark configuration is performed on the PC, which redirects it further to the administration window, which then proceeds to the parking slot window.

ii] After installing Pipark, a parking management window opens where you can add a parking space along with the description and other details.

iii] The details are added to the parking management system, there will be recording of the ever space with the details of the description.

iv] Thus, filled spaces are shown separately from empty slots and this ensures that empty slots are visible on the screen.

#### V. CONCLUSION

This intended automatic subtle parking system is modest, economical and delivers an operative resolution to diminish the carbon footprint in the troposphere. This is glowingly achieved to admittance and plot parking position from any isolated location via the web browser. Therefore, it lessens the jeopardy of discovery of parking places in any parking zone and also eradicates pointless vehicle journeys through the complete car parks of a city. Therefore, it reduces the time and its actual value together.

#### VI. FUTURE WORK

The forthcoming purpose of adopting this programmed intelligent parking slot(space) system; so that the accessibility of places can be exhibited in a "smartphone application" or even in a "satellite navigation device" so that drivers can invariably tune in if there are no areas without areas. And finally improves in sending notifications to smartphone handlers once the vehicle arrives places with a specific appearance and some roads in an extremely high city, etc.

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