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**Abstract** – Internet of Things (IoT) plays an important role in connecting the thing in our surrounding to the network and makes it easy to use these non-internet things from any location. The main purpose of this project is to provide the efficient and easy way for the user who is searching for the parking places. In urban areas, we can see most of the peoples waste their time in searching the parking places. The main idea beyond this project is to change the way of searching the parking places so that the user can easily find out the available places for parking and access all the parking related information at one point. The user can get the information related to the parking and able to select the parking slots. This is the easy and fastest way for parking the vehicles without wasting the time.

**Key Words:** Apache Server, IR sensors, Internet of Things (IoT), LED displays, Microcontrollers.

## 1. INTRODUCTION

As the number of population increases in the metropolitan cities, the need of vehicles also got increased. Ultimately, it causes problems in parking which leads to traffic congestion, driver frustration, and air pollution. When we visit the different public places like Shopping malls, multiplex cinema hall & hotels during the festival time or weekends it creates a lot of the parking problem. According to the recent research found that a driver takes nearly 8 minutes to park his vehicle because he spend more time in searching he parking slot. This searching leads to 30 to 40% of traffic congestion.

There is a common situation is to drive to the parking lot, obviously there are remaining parking spaces, but still need to spend a lot of time to find, this situation is not only a waste of time but also a fuel consumption and effects onto an environmental protection. If the parking lot can provide a way to inform the driver of the remaining vacancies and guide to the empty parking spaces, not only it can shorten the time of driver to find parking spaces time, but it can also effects in reducing the consumption of the fuel and also the environment can become friendly, and also effectively control the use of parking spaces. We proposed an architecture which consists of software and

hardware to serve as a parking guidance system. The hardware contains a variety of IOT (Internet of Things) sensors such as IR (Infrared) sensors, RFID chips, LED displays and wireless communication devices.

The IR sensors are mounted on the parking floor to detect the parking status being empty or occupied. The LED display is installed above the parking spaces to display its usage state. The driver can drive over from distance away, given a green light sign indicates an empty spot and the red light sign indicates that the slot is booked for the another user The central server makes use of the (Wi-Fi) wireless signal for communication with background control system to determine which section of the car is located in the parking lot, and this information is also used in the guidance system to determine the location of the vehicle in order to tell to the user about the empty spaces available in the parking places.

## 2. LITERATURE SURVEY

Noor HazrinHanyMohamadHanif [1] proposed this system that provides a unique algorithm which increases the capability of the current cloud based smart Parking system and it also develops a network architecture based on the Internet of Things technology. It enhanced security due to password requirement and system can be used and applied anywhere due to ease of usage.

YanfengGeng [2] proposed system that determine reservation of the desired parking slot and show the available parking slot and efficient resource allocation and management using MILP (Mixed Integer Linear Programming).

P. Dharma Reddy, A. RajeshwarRao, Dr. Syed Musthak Ahmed [3] proposed the system that uses image processing technique to identifies car only but if any object other than car is at parking slot it doesn't considered that slot is booked but it shows real time information.

Hilal Al-Kharusi, Ibrahim Al-Bahadly [4] proposed the Intelligent parking system that aims to manage the parking area by capturing the number plates of each vehicle for unique identification of vehicle. This information is then used for payment calculation of each user. The system captures and processes the rounded image and produces the information of the empty car parking spaces also camera is used as a sensor to take photos to show the occupancy of car parks.

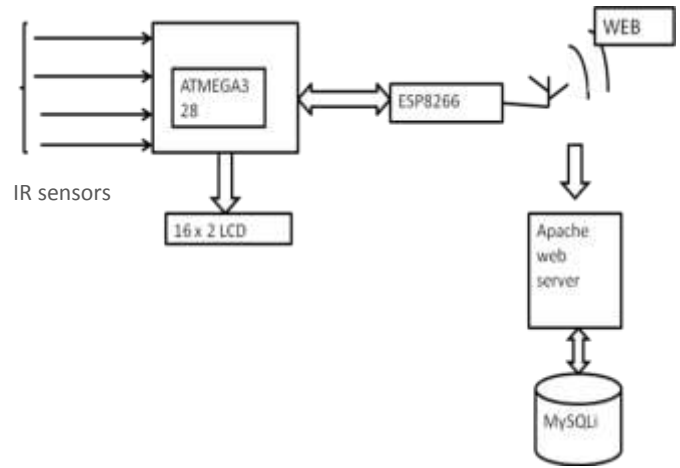
Harmeet Singh, Chetan Anand, Vinay Kumar, Ankit Sharma proposed [5] the Automated parking system that uses Bluetooth device to find a vacant space in the parking area and the information about the vacant parking space can be obtained only within the range of the Bluetooth. The system uses the mobile's Bluetooth for identification and registration. It automatically detects the unique registration numbers to read in the Bluetooth chip to check if the new vehicle is to be parked.

EIMouatezbillahKarbab, DjamlDjenouri, SaharBoulkaboul, Antoine Bagula [6] proposed the system that uses networked wireless sensors in order to monitor the cars in the parking area. Every car consists of an active RFID tag embedded in it in order to uniquely identify. The main advantage of the gate management model is its low cost and simplicity over slot management model.

### 3. PROPOSD SYSTEM

The parking system is designed in such a way that it is applicable for covered parks, open parks and street side parking. The fig.1 shows the cloud based IOT architecture for smart parking system which contains cloud service provider which provides cloud storage to store information about status of parking slots in a parking area. The centralized server which manages to store entire smart parking systems information such as number of slots, availability of vehicles etc. And this information will be accessed through some secured gateways through network. This smart parking system which consists of several components. And theirs functionality includes:

- IR sensor: - The IR (infrared) sensor is use to sense the object when comes near to the sensor.
- Microcontroller: - The micro-controller (ATMEGA328) is use to process the overall information given by the IR sensor.
- WIFI module: - The Wi-Fi module (ESP8266) is use to provide the information interaction between micro-controller and web server.
- Display: - The 16x2 LCD display is use to display the availability of free parking slot on the LCD screen. In this, the parking slot indicated by two color red and green, red indicate the parking slot is not available and green indicate that parking slot is available.



### 5.2 Communication between Clients and Server.

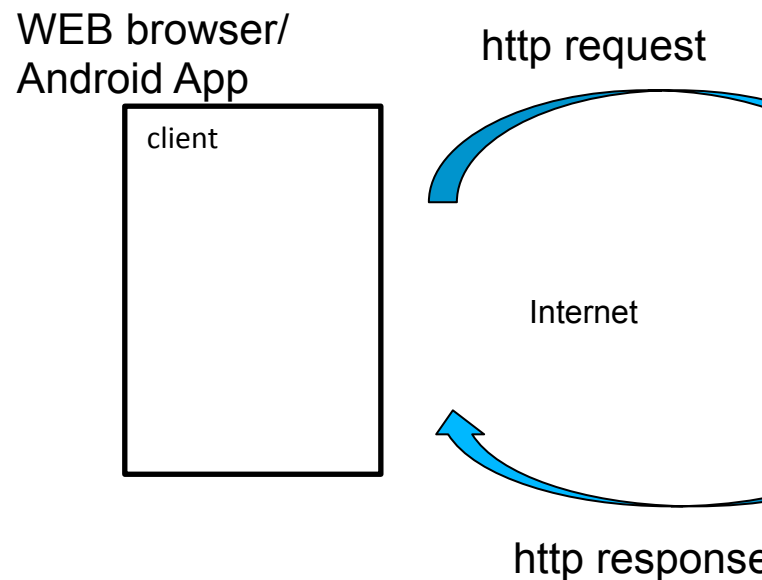
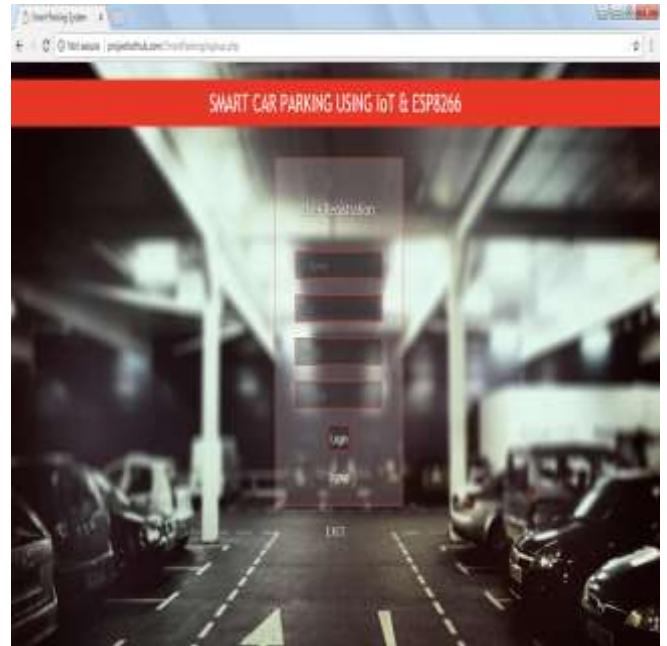


Fig 5.2:- Communication between the client and server.

When the availability of parking slots changes, immediately the information is updated to the apache server. Then user can access this stored information using internet from any location. And this information is used by parking operators to determine free parking areas and statistics can be measured at different times in a day on each parking space. The fig 2. shows the communication between clients and server. Such that single client can access the information of many parking areas in the city. So by observing the availability of parking slots the user can choose their convenient parking area.

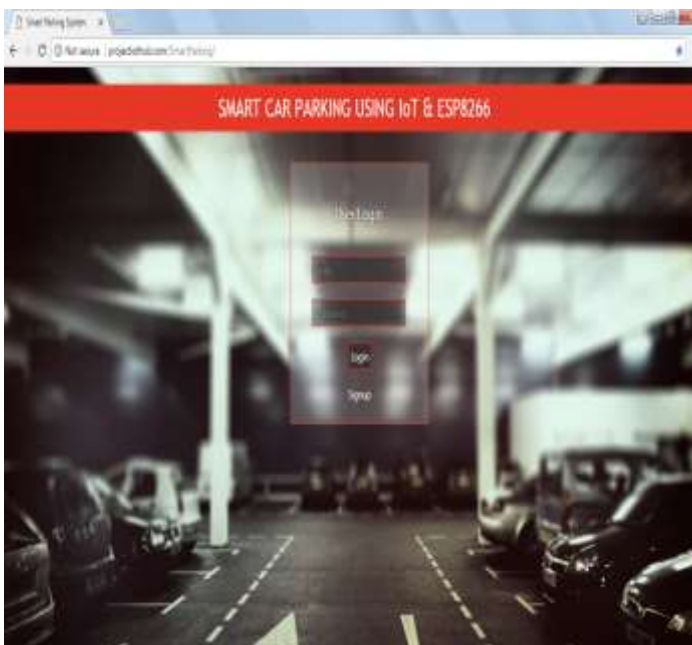
### 4. OBJECTIVE

1. To create a user-friendly and adaptable system that can be implemented in large, multi-level parking spaces in order to reduce parking problem.
2. The actual goal of this project is that the ideas and planning demonstrated through this project can then be easily upgraded to an actual parking facility.
3. To eliminate the driver's unnecessary frustration.
4. To reduce the wastage of time that drivers experience as they waste their precious time in circling parking spaces looking for the free parking slot.
5. To provide better traffic flow within the parking spaces.
6. To create a safer environment for both drivers and pedestrians.
7. To offer safe and secure parking slots within limited area.



## 5. RESULT

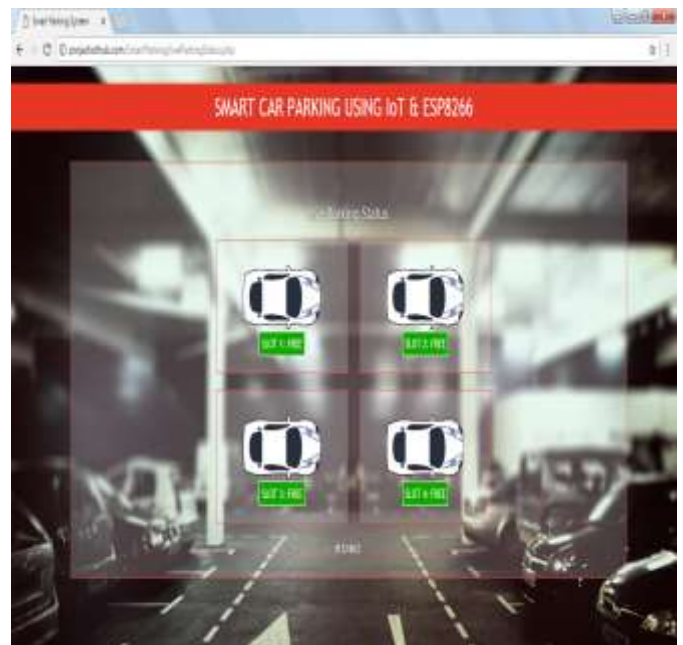
### 5.1 User login module:-



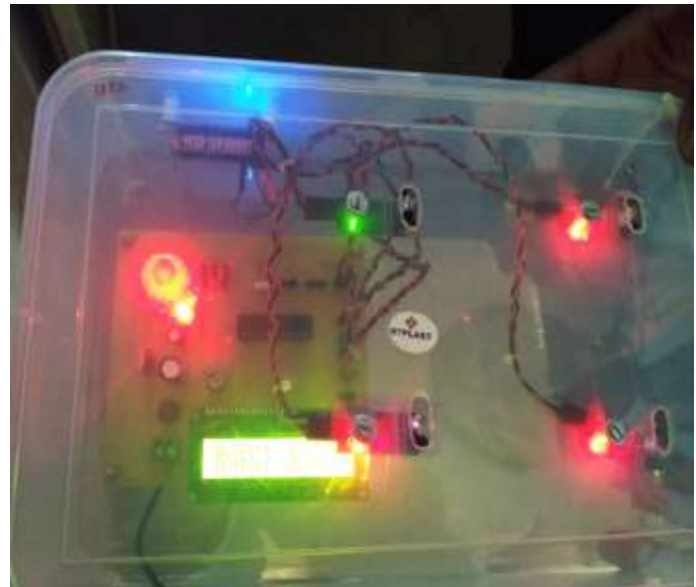
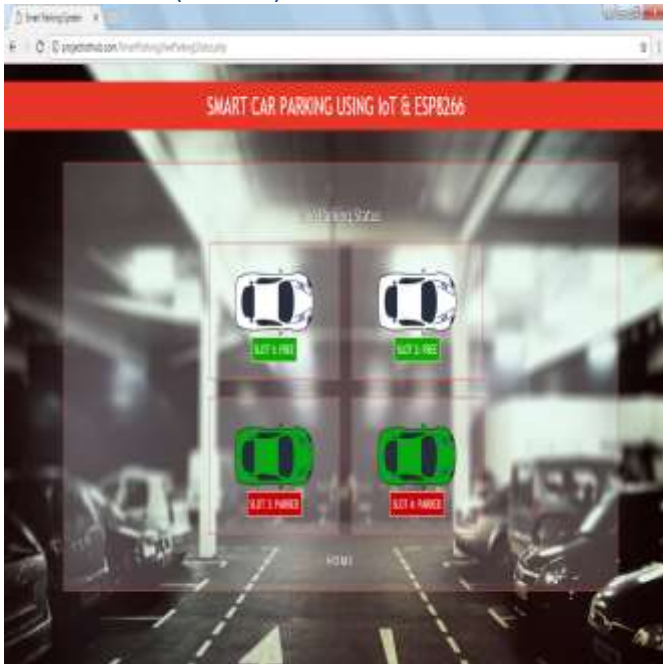
### 5.2 User Registration module:-

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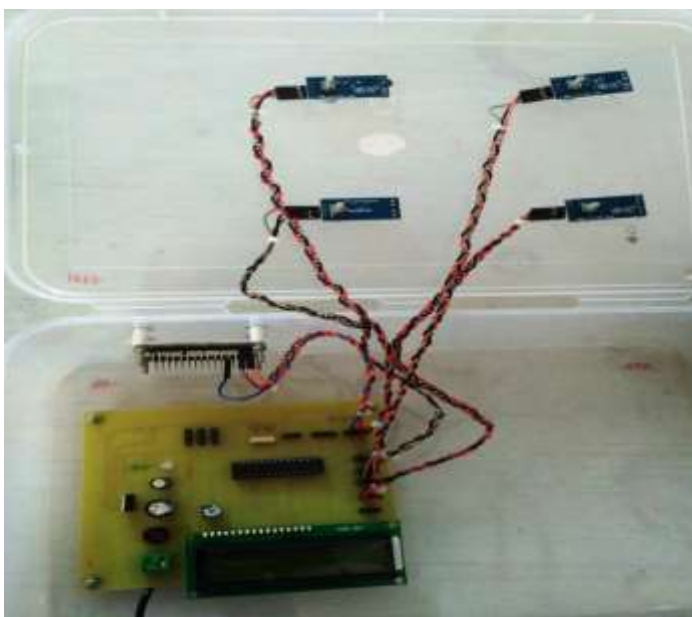
### 5.3 Parking slot module with free slot:-



### 5.4 Parking slot module with parked:-



**5.5 Hardware module:-**



**5.6 Running module:-**

**6. CONCLUSION**

This designed smart parking system which is simple, easy to access, economic and provides effective solution to reduce the pollution in the atmosphere. It is well managed and maintain to access and map the status of parking places from any remote location through web browser or using the app provide by system for the android phones. Thus it reduces the time of finding the parking slots in any parking area and also it eliminates unnecessary travelling of drivers across the filled parking places in a city. So it reduces time and its cost of implementation is also less.

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