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Real Time Management of Parking System Using IOT

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ABSTRACT: Parking shortage is one of the essential answers that may be provided by smart parking systems. The number of automobiles on the road expanded dramatically as the population grew. This causes traffic congestion and delays in finding parking spaces, resulting in jams and pollution. This study discusses the use of sensors and Android apps in an intelligent parking system using algorithms. IR sensors are utilized to determine the location of the parking space. Blynk application algorithm techniques are used to locate the nearest and most appropriate parking place that is both vacant and occupied by individuals. Parking spaces can be viewed from any location using the sensor and the Blynk app. The sensor detects cardetection in Slot. These infrared sensors are connected to an Arduino. When a car is parked in a building, the Arduino sends a command to the IR sensor, which forwards the command to the Blynk app.

KEYWORDS: NODEMCU, 12CMODULE, IRSensors, ServoMotors, LEDlights, LEDDisplay Arduino IDE, BLYNK IOT CLOUD.

I. INTRODUCTION

Almost everyone in the modern virtual generation owns a smartphone, ensuring that additional hardware for user interfaces may not be necessary. City towns typically have at least one car that they can easily afford to buy. Consequently, a greater number of parking issues have arisen in urban areas. It results in an issue with parking places, which fuels a lot of pollutants and high traffic. This is the issue that many of today's cities are dealing with. Most of the time, drivers of vehicles waste searching for open parking spaces. We'll look at examples of ways to reduce these parking issues and implement effective cloud-based parking services in later parts. Parking Guidance and Information (PGI) technology for good parking is a modern parking guidance that has been implemented by several metropolitan traffic management systems. The largest city groups in the world can be built at an incredible rate thanks to IoT, which also allows for integrated auto parking. The goal of the project is to increase the number of vehicles equipped with auto slot detectors by using reputation detection techniques to increase the number of parking apps that offer free parking. We are using some blink applications in this article. Within the context of internet security, we talk about authentication protection in this manuscript. Nearly every resident in an urban region drives a car due to the rapidly expanding population. We may access transactional data regarding parking in smart cities thanks to this technology. The manual parking guidance system has a number of drawbacks, including duplicate data entering, a very high maintenance cost, and a lengthy turnaround time for results. In today's scenario, parking space is hard to search in a day to day life for the people. According to the recent survey, there will be a rapid increase in the vehicle's population of over 1.6 billion around 2035 [7]. Around one million barrels of world's oil is being burnt everyday [4]. Thus, smart parking system is the key solution to reduce the waste stage of the fuel. The solution for



the problems that is being raised. The smart parking can be a solution to minimise user's time and efficiency as well as the overall cost of the fuel burnt in search of the parking space. In this, the data is collected from the sensor and through analysing and processing, the output is obtained.

II. LITERATURE SURVEY

The rapid industrial growth in the world is reflected in increased number of cars on the roads globally. It is expected that the number of cars in the world will increase significantly from 841 million cars in 2008 to over 1.6 billion cars in 2035. Nowadays, the shortage of available car spaces is evident in many public places such as stadiums, market areas, hospitals, shopping malls and airports, hence, governments are looking to improve their existing transportation systems and infrastructures. However, the slow progression of city planning has broadened the issue even more. Finding unoccupied parking spaces is a common problem in most modern cities, especially during peak times of various festivals. This problem appears mostly in the modern cities; individuals come by their cars, resulting in a high number of cars competing for a few unoccupied parking spaces and security for their parked cars. Moreover, in indoor car parks, most of the time is wasted on searching for unoccupied parking place which also creates traffic jam. The situation becomes worse when there are multiple parking slots in every parking lane. Another issue is the air pollution caused by cars in halt, be it in the outdoor or indoor car parks. In addition, most of the population use their own cars for traveling, which leads to more congestion in cities which in turn delays the process of finding an unoccupied parking space for the rest of the drivers. An important issue to be considered is how to reduce such data transmission cost and how to save energy as well as provide real-time information quickly - these issues require urgent resolution. The idea of smart car parking systems is recently attracting more attention in many countries owing to the need for a new way of finding available parking places. The IoT provides the capacity to deal with such challenges, as it can be designed to capture sensors data for monitoring points of interest in smart cities.

Recently, researchers have explored the potential use of the IoT in public transportation services and urban computing. Several models have been proposed to provide drivers with real-time information about available car parking bays nearby. Additionally, some of them proposed solution to collect and send the data to the cloud processing center which determines the solutions and provides these back to the car parks. Only a few studies have been conducted where the data about available car parkings on-street parkings was gathered more effectively. It was done by checking the road status if there was a traffic congestion or not and if the parking location was near the user. Adding on that, some research papers proposed that there is a need to develop a smart car parking that indicates directly the availability of unoccupied parking spaces in the nearest car parks to users while at the same time it makes users avoid the traffic congestion on the user's way to the chosen parking. Optional choice could be added to make the web service display only free-of-charge car parking places to the user. A visual sensor network for parking lot occupancy detection in smart cities," in Internet of Things (WF-IoT) proposed Solutions based on computer vision yield good performance in terms of accuracy and are deployable on top of visual sensor networks. Since the problem of detecting vacant parking lots is usually distributed over multiple cameras, adhoc algorithms for content acquisition and transmission are to be devised. A traditional paradigm consists in acquiring and encoding images or videos and transmitting them to a central controller, which is responsible for analyzing such content. A novel paradigm, which moves part of the analysis to sensing devices, is quickly becoming popular. We proposed a 3system for distributed parking lot occupancy detection based on the the latter paradigm, showing that onboard analysis and transmission of simple features yield better performance with respect to the traditional paradigm in terms of the overall rate-energy-accuracy performance. M.Suresh, P. S. Kumar, and T. Sundararajan, proposed "IoT based airport parking system,". The proliferation of technology paves way to new kind of devices that can communicate with other devices to produce output mostly on wireless communication. Wirelessly communicating embedded devices are brought to one another in a single link over Internet called IoT (Internet of Things). If all objects and people in daily life were equipped with identifiers, computers could manage and inventory them. Besides using RFID, the tagging of things may be achieved through such technologies as near field communication, barcodes, QR codes and digital watermarking. Here new method of using embedded technology to provide such application, Arduino is used as an embedded controller to interface Ethernet shield with a PC/Laptop to provide IoT over Ethernet. A user can use this parking service in the airport scenario provided by airport authority with user ID and password. Whenever a user need to check the vehicle in the parking lot, uses the ID and password to logon into the airport web link and view the status of the car in the parking lot using IoT. IoT Based Airport Parking System is discussed here to implement Arduino environment as IoT application.

III. PROPOSED SYSTEM

IOT based car parking system using arduino and blynk application has following two major sections. They are as follows:

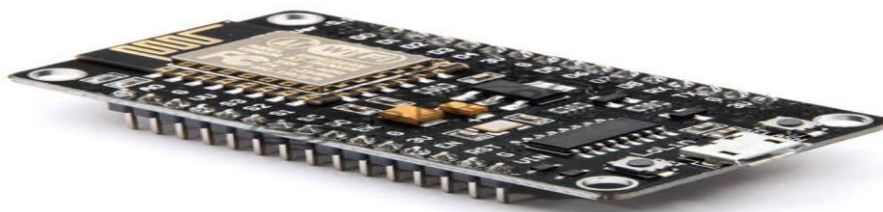
1. Section consists of IR sensor, LCD 16X2, Servomotor, led or buzzer connecting with jumper wires all of these connected with arduino. Hence whenever the car gets into the parking slots IR sensor detects the presence of car and sets its output to high and sends it to the arduino board.
2. Section consists of blynk application which is used to acknowledge about the availability of free parking space. With the help of this application user can know about the parking slot availability from the remote area and all of them should be controlled by the blynk application.

Hardware

Requirement The different hardware's required are:-

1. NODEMCU (ESP-8266 12E) Wi-Fi Module

ESP-8266 12E Wi-Fi module is developed by Ai-thinker Team. core processor ESP8266 in smaller sizes of the module encapsulates Tensilica L106 integrates industry-leading ultra low power 32-bit MCU micro, with the 16-bit short mode, Clock speed support 80 MHz, 160 MHz, supports the RTOS, integrated Wi-Fi MAC/BB/RF/PA/LNA, on-board antenna. The module supports standard IEEE802.11 b/g/n agreement, complete TCP/IP protocol stack. Users can use the add modules to an existing device networking, or building a separate network controller. ESP8266 is high integration wireless SOCs, designed for space and power constrained mobile platform designers. It provides unsurpassed ability to embed Wi-Fi capabilities within other systems, or to function as a standalone application, with the lowest cost, and minimal space requirement.



2. IR Sensors:-

The infrared sensor is an output device that detect certain environmental features. The IR sensor can be measure the temperature of an object more as it detects movement.

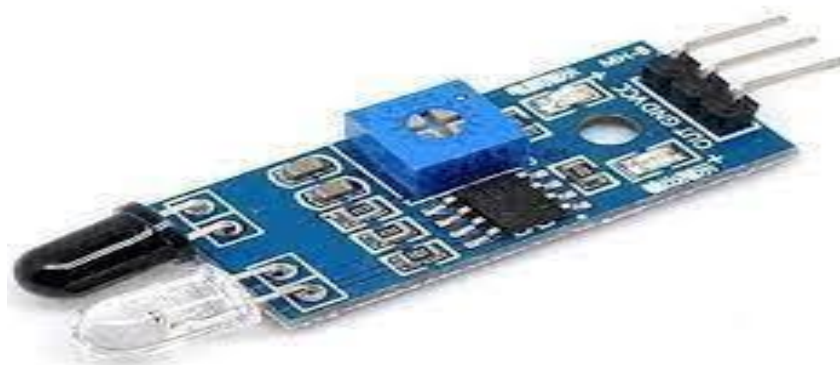


Fig:3.2 IRSensors

3.Servomotor:-

The Servo car is recognized to represent the gate of the system's barriers, and finding the presence of a car near the entrance system. In this project, a servo motor is connected to the Arduino Uno R3 to represent as an entry barrier. After the car verification, the barrier gate is manually opened by the controller with an app that will only be accessed by the controller.

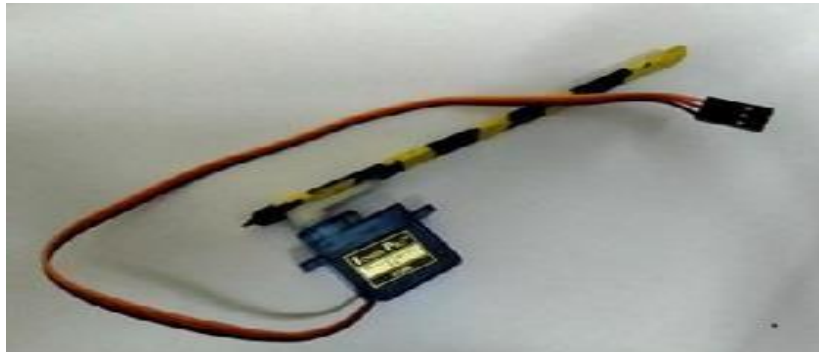


Fig:-3.3 Servomotor

4.LCD DISPLAY:-

Liquid Display (LCD) is an electronic display module which is used in circuits when translating 16-character displays in each of the two such lines. The LCD is placed on board and connected to the Arduino Uno R3. With the purpose of displaying user parking fees. Balance from the arduino app.



Fig:-3.4.16xLCD DISLAY

Requirement The different software's required are:-

Software

1.Arduino IDE: This software makes it very easy to write and upload code to the Arduino UNO board. The code is based on open source software. The code was uploaded to the Arduino Uno board using a USB cable. Arduino IDE supports C++ languages using special coding rules.

Blynk Application: Blynk is the most popular IoT platform for connecting your devices to the cloud. It is known for allowing users to design apps to control their IoT devices, analyze telemetry data, and manage your scaled products. Blynk is a platform where we can upgrade an Android IOS operating system user. The user gets information about parking through the blynk Application can control the hardware remotely, can display sensor data, can store data, and visualize it. Blynk is a new platform that allows you to quickly build ways to control and monitor your hardware projects from your IOS and Android device. After downloading the blynk app, you can create a project dashboard and edit buttons, slides, graphs and other widgets on the screen.

IV. IMPLEMENTING

In this the sensor is activated in the parking lots to find cars and send this data to the server and also find out how many empty spaces in a particular parking lot. There are a few steps involved in this process:-

4.1 STEPS OF ONLINE PARKING SYSTEM:-

STEP 1. First of all we install the app then check the parking availability and find a quick route to the parking lot.

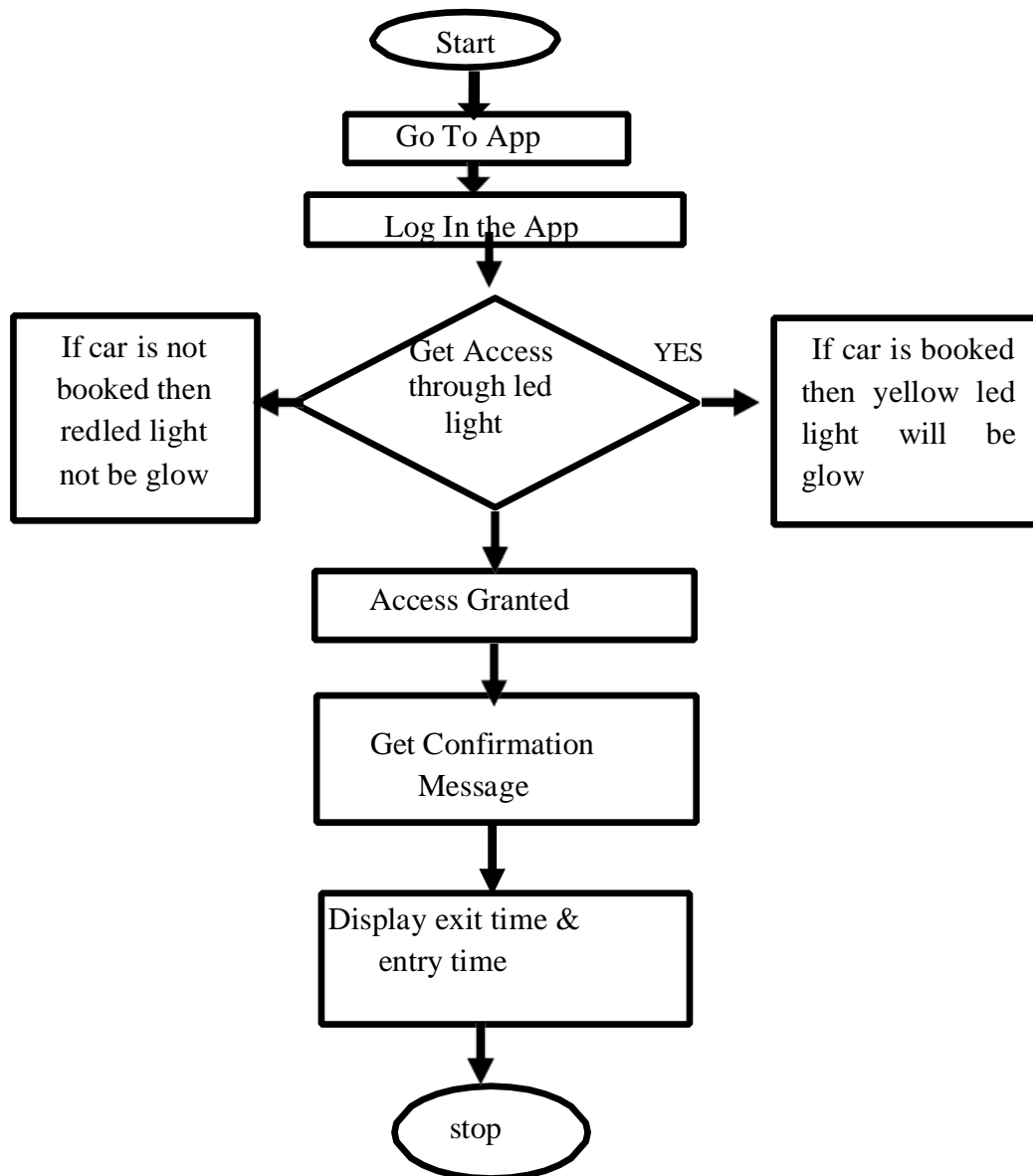
STEP 2. After checking the route we book the slot by hand and find our car in the parking slot and go to app or websites and login and booked a slot.

STEP 3. After booking the slot, information received through user such as registration number and message relating to userbooking details.

STEP 4. After getting registration details and booking a slot the user access with led light and token in the parking lot.

STEP 5. Thus at the time of the user's exit access to the led light and payment is deducted automatically. In this way onlineparking system has been designed.

Fig 4.1 Online booking system



4.2 STEPS OF HARDWARE DESIGN PARKING SYSTEM:-

STEP 1. First of all we install the app then connect the arduino through the blynk application.

STEP 2. After connecting the arduino through the blynk application IR sensor and servomotor are also connected.

STEP 3. Again connecting sensor, led, jumper wire and servomotor and it gives the information of car parking occupied and unoccupied parking slot in parking area.

STEP 4. After connecting all the components with arduino and jumper wires gives the details of car arrives and departure time.

STEP 5. If car arrives in slot 2 then it gives information of parking space is full and yellow light will be glow and if car departure in slot 1 then it gives information of parking space is empty and red led will be glow.

STEP 6. Thus, it gives the information of the car user's exit and entry time and car information full and empty slot should be displayed on the LCD display.

STEP 7. At the last all of them connected with the server and arduino cable should be connected with power supply and also after that all the working process of the components it should be controlled through the blynk application and in this way our hardware has been Designed.

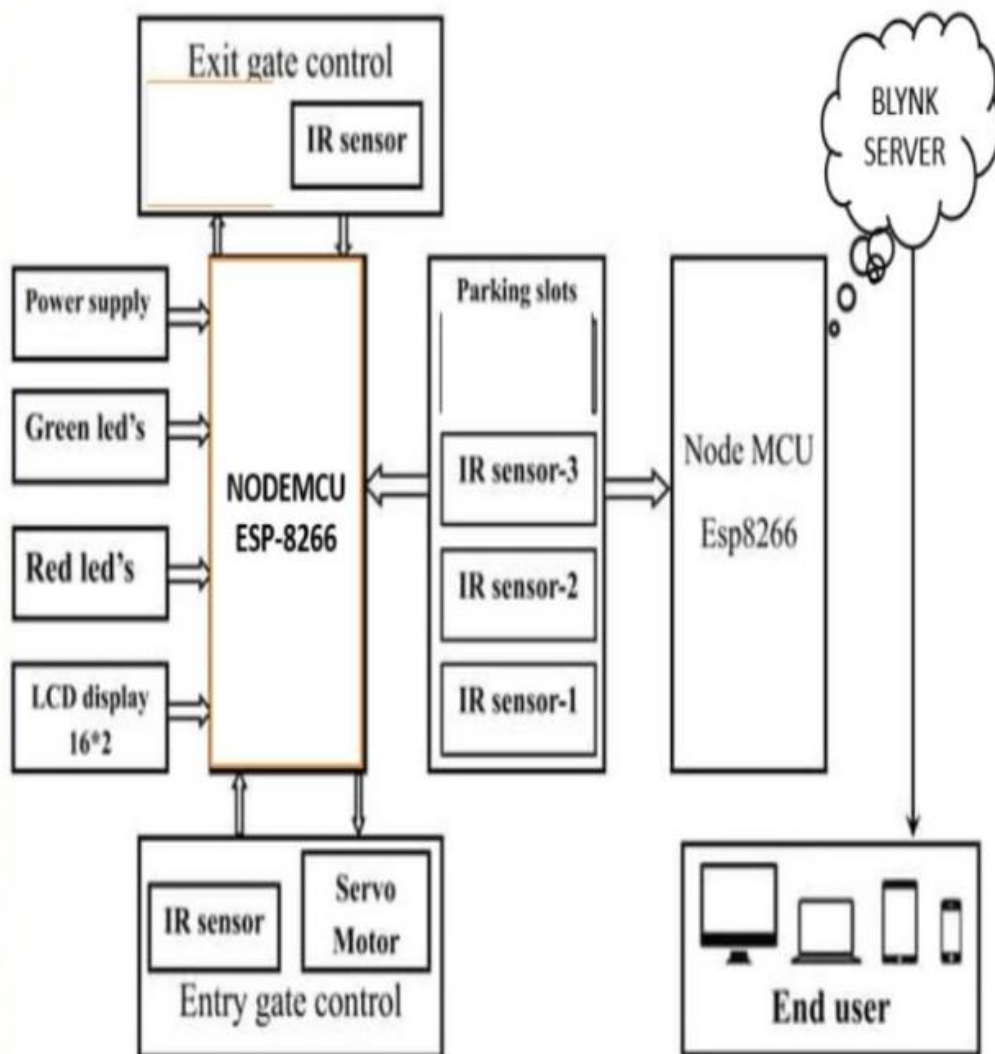


Fig:-4.2 Hardware Connection of Sensor and Blynk App

V. RESULT & DISCUSSION

The demand of smart parking system is increasing significantly. This allows user to involve real time access of the availability of the parking space. The existing system in today's world doesn't contains the facilities of parking reservation and parking slot availability checker. The existing system was vision-based monitoring system [7] which estimates the number of the parking slots available in the area by counting the number of incoming and outing cars which consumes lot of time and efforts. The next existing system was sensor-based system which uses ultrasonic sound waves for detecting the presence of vehicles and then two-tier parking came into existence which used the concept of parking cars one above another. The result of the paper is to make the parking area connected with the world as well as reduces time and can be cost effective for the user. The result of this paper is to reduce car theft. This paper reduces overall fuel energy of the vehicle which is consumed in the search of the car.

VI. CONCLUSION

The concept of Smart Cities have always been a dream for humanity. Since the past couple of years large advancements have been made in making smart cities a reality. The growth of Internet of Things and Cloud technologies have give rise to new possibilities in terms of smart cities. Smart parking facilities and traffic management systems have always been at the core of constructing smart cities. In this paper, we address the issue of parking and present an IoT based Cloud integrated smart parking system. The system that we propose provides real time information regarding availability of parking slots in a parking area. Users from remote locations could check whether a parking slot is available or not.

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