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IoT Based Car Parking using Arduino and Blynk Application

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Abstract: ***IoT based Car parking system using Arduino, wifi module and Blynk application. With the help of wifi module and Blynk application, the parking slots can be monitored from anywhere.***
The Parking Area is divided into two Parking: Parking1, Parking 2. Each Parking has 3 Slots and every slot has one infrared sensor. So, we have total of 6 infrared sensors. Each sensor is used to detect the presence of car in the Slot. These infrared sensors are connected with the Arduino. Whenever a Car is parked in the slot, the Arduino sends a command to the wifi module, and then wifi module sends the command to the Blynk application.
Keywords: IoT, Arduino, wifi module, Blynk application, infrared sensor.

I. INTRODUCTION

The internet of things, or IoT, is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers (UIDs) and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction [1]. IoT contains two prominent words "Internet" and "Things", where Internet is a vast network for connecting servers with devices [2]. In today's world traffic congestion caused by vehicle is an alarming problem at a global scale. Searching for the free space to park the vehicles is very difficult. In order to get the space for parking vehicles have to move here and there which leads to the wastage of fuel as while as increases the pollution such as air population and sound pollution.

The solution to this problem can be "IoT Car Parking System Using Arduino and Blynk Application". IoT Car Parking System is an integrated system to organize cars in public areas. A smart vehicle parking is a system that helps people to find a vacant spot using sensors by detecting the presence or absence of a vehicle. In this work, data collected using IR sensor and these data are analyzed by using arduino. IoT car parking system is divided into two parking area named as parking1 and parking2. Each parking area has IR sensor that is attached with arduino.

Whenever the car gets parked in the parking slot IR sensor senses it and sends the signal to the arduino. After arduino get the input signal from the IR sensor output pin, it updates the Blynk Application showing the slot is occupied. With the help of WiFi module and Blynk application the user gets information about parking slot availability. Green color in the parking slot indicates the parking slot is occupied where as black color indicates parking slot is free.

II. LITERATURE SURVEY

Many researchers have contributed to this issue and formalized with various methods to better optimize the parking lot to serve the needs. The author proposed smart parking reservation system using short message services (SMS), for that he uses Global System for Mobile (GSM) with microcontroller to enhance security [3]. The ZigBee technique is used along with the GSM module for parking management and reservation [4].

The author uses Global Positioning System (GPS) and Android platform to show available parking spaces. However, reservation for the same is not available [5].

[6] Smart parking using IoT technology helps to designs and develops a real smart parking system which provides information for vacant spaces and also helps the user to locate the nearest availability. This paper uses a computer vision to detect vehicle number plate in order to enhance the security.

The user can pay for the parking space prior to the entry of the car through mobile payment insuring the reservation of the parking. Intelligent Transport System (ITS) and Electronic toll collection (ETC) using optical character recognition (OCR) creates a record for all entering vehicle. This creates tag less entry for all vehicles in the parking lot, but it does not assign a slot to the user. A universal OCR algorithm is not available, making it difficult to create said records [7].

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III. SYSTEM ARCHITECTURE

"IoT Based Car Parking System Using Arduino and Blynk Application" has two major sections. First section consists of arduino and IR sensor. 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.

The second section consists of WiFi module and Blynk application which is used to acknowledge about the availability of free parking space. With the help of this application user can acknowledge about the parking slot availability from the remote place.

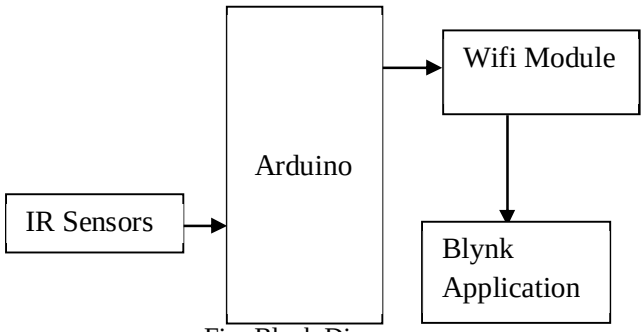


Fig: Block Diagram

A. Hardware Requirement

The different hardware's required are Arduino, IR Sensors, Battery and wifi Modules.

1) Arduino: It is a microcontroller board which contains microchip ATMEGA328P. There are 14 digital pins and 6 analog I/O pins. Arduino IDE software is used to program this board. A type B cable is used to connect computer and Arduino board. An external source between 7-20 volts can be used to power this board. The microchip ATMEGA328P is pre-programmed. Boot-loader is used to upload new code in this microchip. It has flash, EEPROM storage of 32 kb. 0.5kb of this 32kb is used by boot loader. Operating voltage of this board is 5v. It consists of 2kb SRAM memory. Weight is around 25g. 6 of the digital pins give PWM output. This board has various facilities for communication with other microcontrollers. There is a library named software serial, which allows serial communication for all digital pins.

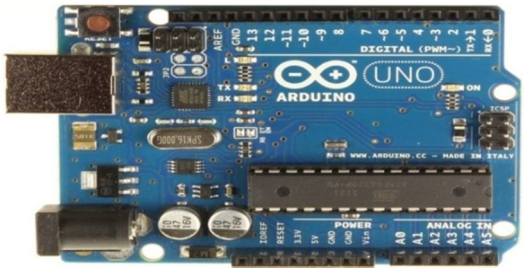


Fig: Arduino

2) *IR Sensor:* An infrared sensor is an electronic device that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion [9]. If the IR Sensor does not get back any IR light that means there is no any object.

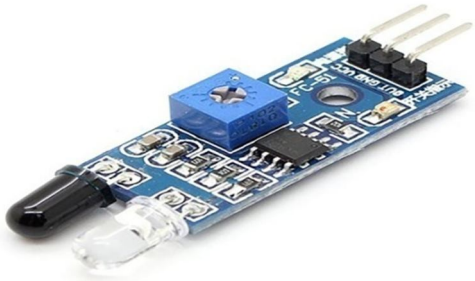


Fig: IR Sensor

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3) *WiFi Module:* WiFi Module is a self contained SoC with integrated TCP/IP protocol stack that can give access to WiFi network (or the device can act as an access point).



Fig: WiFi Module

B. Software Requirement

1) *Arduino IDE:* The open source Arduino software (IDE) was used to write the code. This software makes very easy to write and upload code in Arduino UNO board. We can run it either on Windows or MAC OS. The code is written in java and based on other open source software. The code is uploaded to Arduino Uno board using USB cable. The Arduino IDE supports the languages C and C++ using special rules of code structuring.
2) *Blynk Application:* Blynk is a platform where we can develop the application for Android OS or IOS. It provides GUI to user. User gets information about parking slots through Blynk Application.

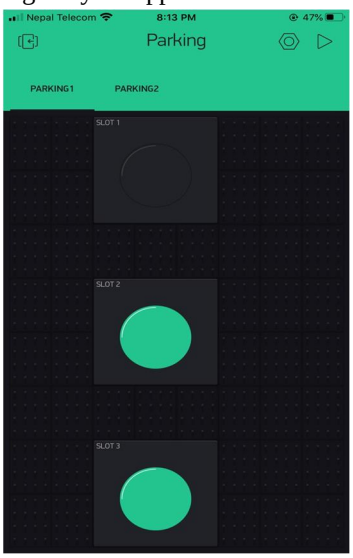


Fig: Application Using Blynk

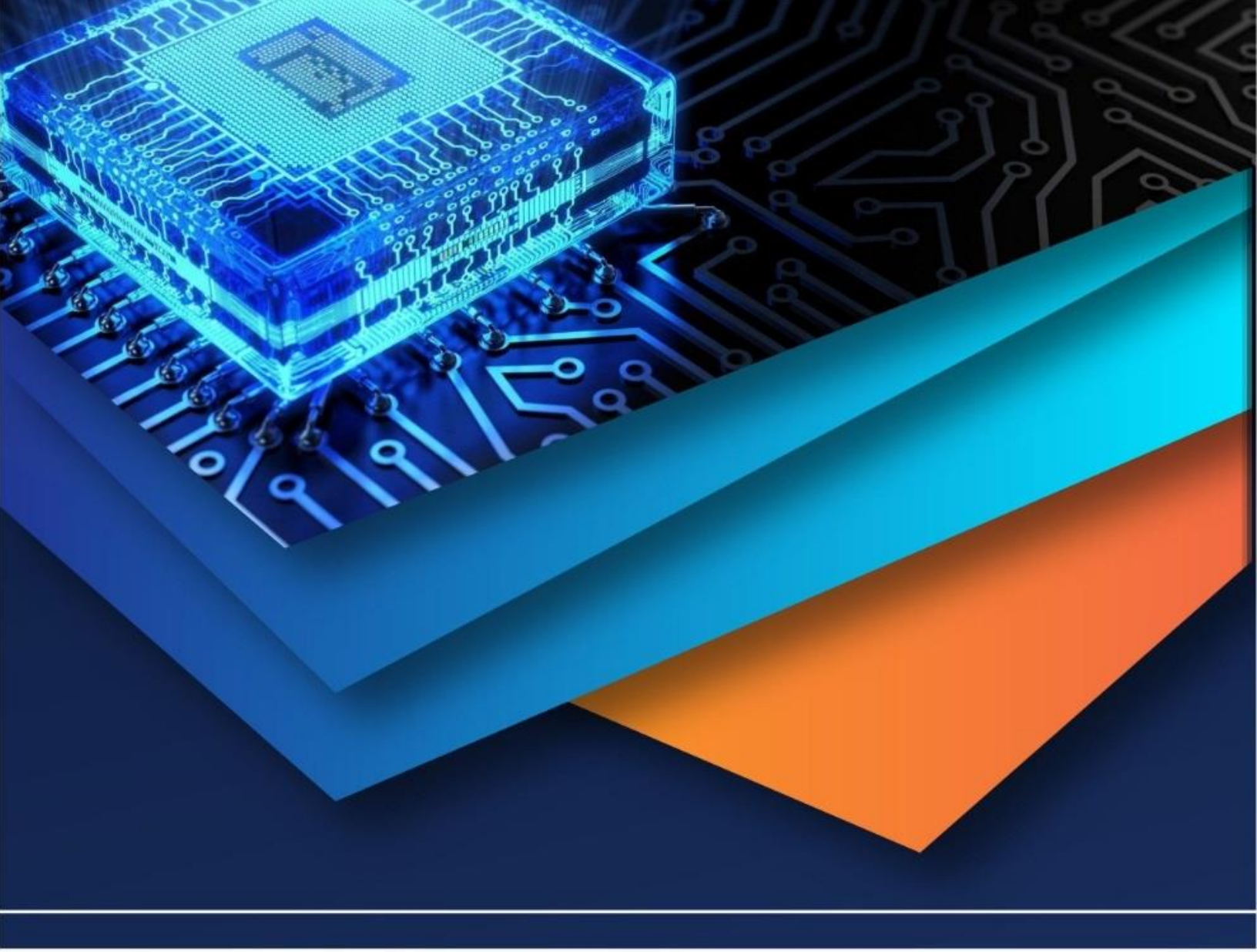
IV. CONCLUSION

Getting the free space for parking easily has been the most difficult work in today's world. By the implementation of this work we can easily overcome the problem that arises with searching the free parking space. This project helps us to build smart cities and helps to save time that were spend on searching the parking space and also saves the fuel consumption.

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