

## AUTOMATED E- PARKING SYSTEM

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**Abstract** - On an average 500 people die per year in parking lot accidents, and statistics shows that there are more than 50,000 accidents in the Parking areas in an annual basis. This paper aims at developing an automated e-parking system which helps the driver to find out the parking space without human intervention. The implementation of the system has been attained by combining several components such as Arduino, IR sensors, wi-fi esp8266 and Blynk application. Using wi-fi esp8266 and Blynk application, the parking slots can be monitored for a particular range which is present in the parking area. It helps to improve safety, efficiency, mobility and optimizes the parking area which increases the economic performance and also helps in avoiding traffic congestion and hence reduces pollution.

**Key Words:** Parking lots, Arduino, Wi-Fi esp8266, Blynk Application, IoT

### 1. INTRODUCTION

In this modern world around us we see a great number of vehicles and struggle to manage their efficiency in a proper way. As the human population is expected to grow by around 80 million by 2022 possibly adding another 80 million vehicles to our national stock. Parking vehicle is one of the stress causing factor particularly in urban areas due to over-population. This task may look simple on side roads but when comes to individual parking in malls, multistorey parking space the real problem steps in when there are several hundred other cars are parked and it becomes a very tedious task to find a spot. It may be easiest task to find a parking space or may be most difficult when it involves extensive acres of space distributed over one level or several levels. This will usually cause your vehicle to consume more fuel and time than usual. The easiest way is to let the driver know of his parking slot atleast while he is at the entrance of the parking area. [6] Hence the Smart Parking System consists of a deployment of an IoT module which is used to monitor and indicate the availability of parking spaces.

Automated E-Parking System-In this Project, we will learn how to do an Automated parking system using Arduino, Wi-fi esp8266 configure with Blynk Application. [3] The Parking area has 4 Slots and every slot has one infrared sensors. Each sensor is placed in the slot to detect the

presence of car in that particular area. If a car is parked in the slot, the microcontroller sends a command to Wi-fi esp8266 and further to blynk application. [4]The Internet of Things platform used over here is Blynk.

### 1.1 OBJECTIVE

One goal of smart parking system is to reduce the time and inconvenience of locating an available parking space. Other design goals of smart parking systems include: simplifying the process of the parking system, ensuring the driver to be hassle-free, to increase the parking revenue and to reduce traffic congestion. This system helps to organize the parking lot and makes it easier for the driver to reach the slot before-handedly knowing which space is vacant. It enhances the security with simplifying parking system and it also creates energy efficient by using efficient management.

### 2. LITERATURE SURVEY

We Proposed a model to save a time, effort and apparently fuel consumption while searching for parking slot. [1]This was to propose the design of an Automated Car Parking System controlled by an Android application that manages the number of cars to be parked on labelled parking area by automating the Parking and departing of the car with the use of Commands of an Android Application. [2] The IOT based smart parking system consists of an IoT module which is used to monitor and represents the availability of the parking spaces in that particular area. [5] Autonomous parking carrier for intelligent vehicle parking method for the autonomous vehicle in an underground car park, beginning from the configuration given by the vehicle owner, the first one is control the movement of vehicle from his residence to the parking area. [7]Automated car parking system provides the smart and an automated car parking model which would help the users in booking their parking slots earlier and the vehicle would be able to park automatically once it is available in the parking zone.

### 3. PROPOSED METHODOLOGY

In this paper, the IR sensors are used in the object detection technique for assigning parking slots to the vehicles. [10] When a vehicle approaches the IR sensor, the signal is sent to Arduino UNO through which it is connected to the IR sensors. The Arduino is used for connecting multiple IR sensors where each IR signal corresponds to their respective parking slot. A serial type communication between Arduino and Wi-fi ESP8266 is represented as the Wi-fi module. The output of Arduino is sent to the wi-fi module which sends an output signal to Blynk app. [8] In Blynk app, the availability of parking slots is monitored and also the LCD will display the number of vacant slots and occupied slots.

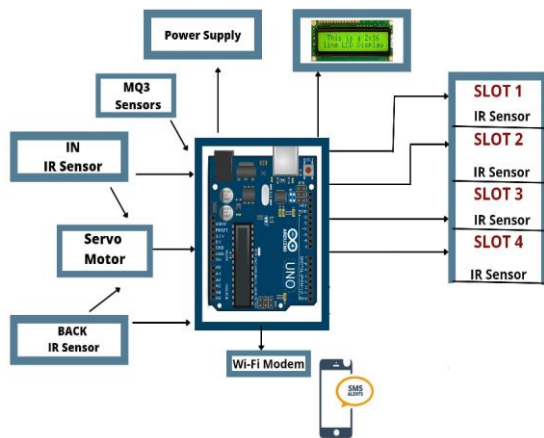


Fig 1- Block diagram

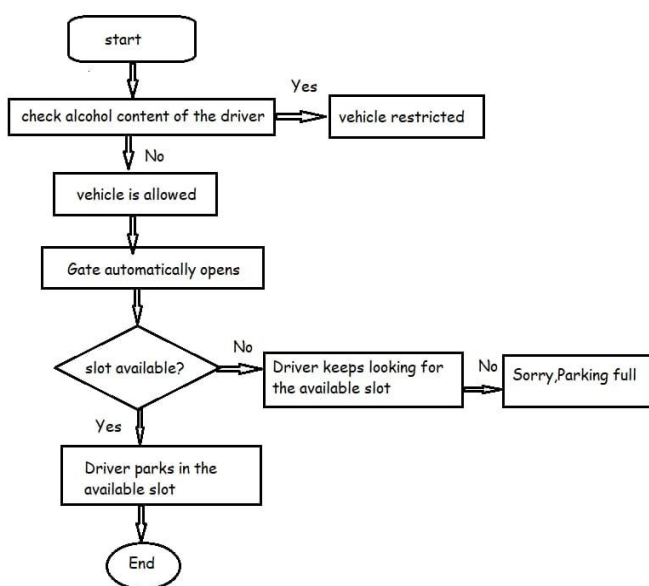


Fig 2 - Flowchart

### 4. TECHNICAL BACKGROUND

#### 4.1 HARDWARE DESCRIPTION

**IR Sensor module:** The IR sensors which are used in this project is used for the purpose of vehicle detection. The three male headers are labelled as VCC, GND and OUT. Connections are made between VCC pin of the IR sensor and to the 5V pin of Arduino UNO. Similarly, the GND pin of the IR sensor is connected to the ground pin of Arduino UNO. And the OUT pin of the IR sensor is to the IO pins of Arduino UNO. Meanwhile the black and white LEDs are the IR transmitter and receiver respectively.

**The Wi-Fi ESP8266 Module:** With the help of Wi-Fi ESP8266 Module, the vacancy of the car parking slots can be monitored within a specific range from the parking area. All the pins of the Wi-fi module are labelled. [9] The Wi-Fi ESP8266 Module should not be powered up by 5V pin of Arduino. If powered, then the Wi-fi module needs to be reset often. To solve this problem, a separate power supply can be designed using LM7805 voltage regulator. **Blynk Application:** Blynk application can be downloaded in android or iPhones through the App or PlayStore. After downloading the Blynk application, it can be registered for free using mail ID or Facebook ID. This app provides a user-friendly frontend experience.

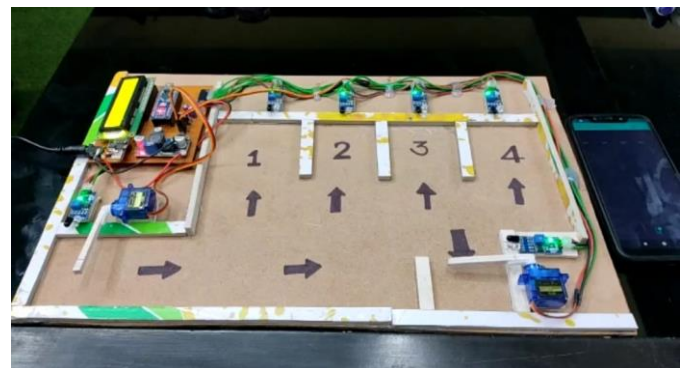


Fig 3 - Automated E - Parking System

#### 4.2 SOFTWARE DESCRIPTION: PROTEUS

This system is designed using Proteus software and it provides us an outlook or overview of all the components present in the circuit. Sensors are used to sense the inputs from other circuit components. And the controller is used to control the above mentioned components. Proteus is an open source physical computing platform which stands as a developing environment for software writing on a circuit board. It is mainly based on processing the multimedia programming environment. In addition to this Blynk application is a free software platform that allows you to quickly build interfaces for controlling and monitoring the hardware components from the Mobile Phone.

#### 4.2.1 EXPERIMENTAL RESULTS

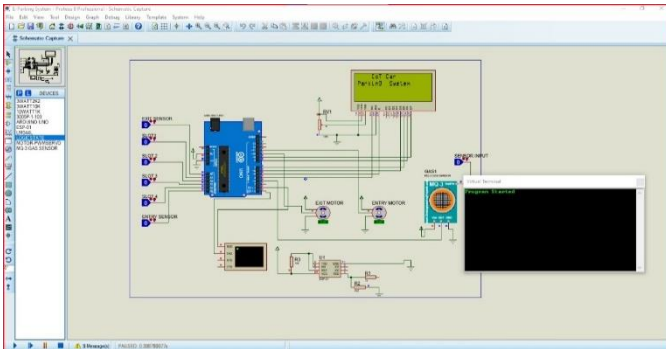


Fig 4 – IOT Car Parking System

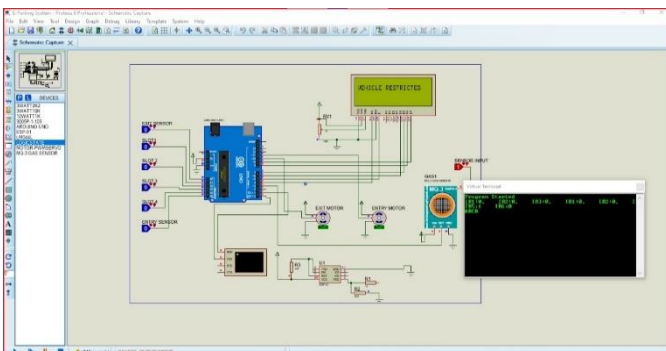


Fig 5 – When Alcohol is Detected

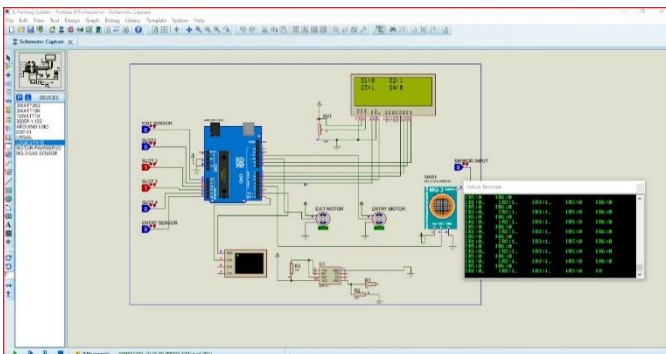


Fig 6 – Availability Of Parking lots

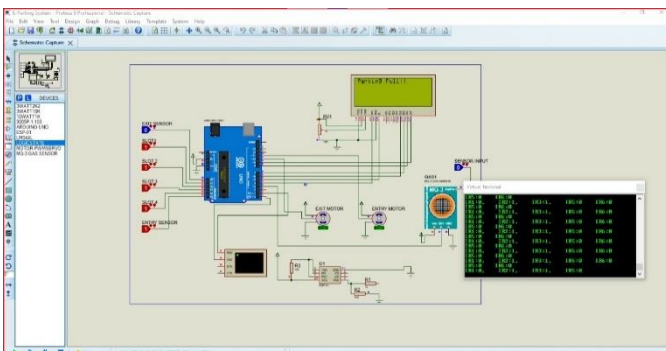


Fig 7 – Parking Full

#### 5. ADVANTAGES

Drivers are directed straight to the vacant parking slot rather than lingering around the parking area to look out for any vacant slot thereby wasting few meters of driving. Additionally, you will save valuable time resulting in spending less money on petrol. This will benefit traffic flow and will reduce congestions in neighbourhood which has a limited availability of parking space. It is highly feasible for small areas which does not have the capacity to accommodate the conventionally used parking structure.

#### 6. CONCLUSION

This parking system design is flexible and can be fitted even in tight and constrained spaces. Therefore we can conclude that by connecting some electronic components and by programming it, we can automate the parking system in an optimized manner thereby decreasing fuel and time consumption as well as making the whole parking process a lot easier and comfortable.

#### 7. FUTURE SCOPE

- The breath alcohol ignition interlock device can be installed in each cars which interrupts the signal from the ignition to the starter and stop the engine itself.
- Multi-level car parking that provides parking for vehicles on multiple levels which are stacked vertically to get the maximum amount of number of parking spaces can be automated using this project design.
- This project can be upgraded for tracking the vehicle speed on the roads also.

#### REFERENCES

- [1] D. J. Bonde, R. S. Shende, K. S. Gaikwad, A. S. Kedari, and A.U. Bhokre, "Automated car parking system commanded by Android application," in Proc. Int. Conf. Comput. Commun. Inform. (ICCCI), Volume 5, Issue 2014, pp. 1\_4.
- [2] J A. Khanna and R. Anand, "IoT based smart parking system," 2016 International Conference on Internet of Things and Applications (IOTA), January 2016, pp. 266- 270, doi: 10.1109/IOTA.2016.756273
- [3] Abd Kadir, M. M., Osman, M. N., Othman, N. A., & Sedek, K. A, "IoT based Car Parking Management System using IR Sensor", Journal of Computing Research and Innovation, Volume 05, Issue 02, 2020.
- [4] Chakraborty Anwita , Shah Chirag Shrey , Kumar Sravana Yelithoti , Samant Tapaswini, Swayamsiddha Swati , Smart Parking System Based on the IR Sensor and Node MCU with the Blynk Application,

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- [5] E. Seignez, A. Lambert and T. Maurin, "Autonomous parking carrier for intelligent vehicle," IEEE Proceedings. Intelligent Vehicles Symposium, 2005., 2005, pp. 411-416, doi: 10.1109/IVS.2005.1505138.
- [6] Suvarna S. Nandyal, Sabiya Sultana and Sadaf Anjum, "Smart Car Parking System using Arduino UNO", International Journal of Computer Applications, July 2017, Volume 169.
- [7] D. Azshwanth, Mithul Titten Koshy and Mr.T. Balachander, "Automated car parking system", International Conference on Physics and Photonics Processes in Nano Sciences 2019, Volume 1362.
- [8] Mohmmmed Ahmed, Wang Guang Wei, 2014, Study on Automated Car Parking System Based on Microcontroller, International Journal of Engineering Research & Technology (IJERT) Volume 03, Issue 01 (January 2014)
- [9] L Anjari and A H S Budi, "The Development of Smart Parking System based on NodeMCU 1.0 using the Internet of Things", IOP Conf. Ser, International Symposium on Materials and Electrical Engineering (ISMEE) 2018, Volume 384.
- [10] Mujeeb Ur Rehman and Munam Ali Shah "A smart parking system to minimize searching time fuel consumption and CO2 emission" 2017 23rd International Conference on Automation and Computing (ICAC) 2017.
- [11] Yash Agarwal, Punit Ratnani, Umang Shah, Puru Jain, "IoT based Smart Parking System", Intelligent Computing and Control Systems (ICICCS) 2021 5th International Conference on, pp. 464-470, 2021.
- [12] Minal Patil Krushna Chetepawad Ashwanikumar Shahu and Shivshankar Swami "IOT based smart car parking system" International journal of advance Research Innovative ideas in education (IJARIIE) 2020.