iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 8 **Issue:** VI **Month of publication:** June 2020

DOI: http://doi.org/10.22214/ijraset.2020.6063

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 8 Issue VI June 2020- Available at www.ijraset.com

Self Parking Vehicle

Akash Undale[1], Shruti Mendgule[2], Nisha Metkari[3], Darshana Savairam[4], Prof. J. P. Kharat[5]
[1, 2, 3, 4, 5]*Department of Electronics Engineering, D.K.T.E. Society's Textile and Engineering Institute (An Autonomous Institute), Rajwada, Ichalkaranji, Maharashtra 416115*

Abstract: ***The aim of this project is to automate the car and the car parking as well. It discusses a project which presents a miniature model of an automated car parking system that can be parked in a given space. Automated parking is a method of parking and exiting cars using sensing devices. The entering to or leaving from the parking lot is commanded by an Android based application. We have studied some of the existing systems and it shows that most of the existing systems aren't completely automated and require a certain level of human interference or interaction in or with the system. The difference between our system and the other existing systems is that we aim to make our system as less human dependent as possible by automating the cars .The existing systems require human personnel (or the car owner) to park the car themselves. To prove the effectiveness of the system proposed by us we have developed and presented a model which will be discussed in brief further in the paper.***

Keywords: Automated Parking, Android Application

I. INTRODUCTION

THE aim of this project is to automate the car park for allowing the cars into the parking. Currently, the researches on automatic parking mainly include the following topics. They are visual perception, ultrasonic sensor and radar technology, path planning, control algorithms based on fuzzy theory, neural network, image processing and recognition technology, and digital signal processing technology.

Current parking products can be divided into two categories. They are parking assist system and automatic parking system. The former is a manual control parking system which provides drivers with broader perspectives and prompts relevant operations by radars, ultrasonic sensors and video cameras. However, all the operations steering wheel, accelerator pedal and brake pedal need to be completed by drivers. The latter is automatically controlled. Automatic parking system can intelligently control steering wheel to complete parking operations through the environmental information collected by sensors. Sensor technology of parking assist system is the foundation for the development of automatic parking system.

A. Significance of Automatic Parking

Automatic parking system can increase driving safety. It helps drivers to learn the environment around vehicle during parking process through various sensors. Human computer interaction system with sounds or video displays prompts drivers to make correct operations. Vehicle collisions owing to the lack of human experiences can be avoided through steering wheel operations controlled by automatic parking system. Automatic parking system can also increase driving comfort. It does not need a driver's laborious observations around his vehicle. The driver only needs to control the acceleration and brake to park his vehicle into parking space. It can reduce fatigue strength of drivers and largely improve driving comfort. Therefore, drivers are easier to enjoy the driving fun. It also plays an important role in military applications. It is one of the features that ground mobile robots must have. Meanwhile, it is also one of the technical bases of multi robot coordination, and can be extended to more complex tactical planning. In addition, automatic parking system is an important part of intelligent traffic system (ITS). ITS is an application of information technology, computer communication, and sensor technology in transportation system, whose goal is to strengthen highways, urban roads, public transports, and rail transit facilities management to achieve safer, more convenient, and more efficient freight transport environments.

Because of a large number of traffic accidents and requirements of drivers, automatic parking system draws an infinite attention of automotive engineering field. A large number of car manufacturers and research institutions conduct the research and development of automatic parking system.

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 8 Issue VI June 2020- Available at www.ijraset.com

II. LITERATURE SURVEY

Various methods are prevalent for development of autonomous or intelligent parking systems. Study of these systems shows that these require a little or more human intervention for the functioning.

Audi's automatic parking system represents the latest research—"one key type of parking". Through an application program of intelligent mobile phone, parking operations can be completed automatically. For example, one can only operate one key on his cell phone to make his car find and reach the parking space automatically, and if the command "out of the garage" is issued by the application program, the car can go out of the garage and come near its driver automatically. However, the whole parking procedure is based on the laser scanners arranged in parking lot. One can keep communications with his car by wireless fidelity, and ensure the car not to deviate from its trajectory and collide with obstacles.

One of the intelligent systems for car parking has been proposed by making use of Image processing. In this system, a brown rounded image on the parking slot is captured using camera and processed to detect the free parking slot. The information about the currently available parking spaces is displayed on the 7-segment display. Initially, the image of parking slots with brown-rounded image is taken. The image is segmented to create binary images. The noise is removed from this image and the object boundaries are identified. The image detection module determines which objects are round, by determining each object's area and perimeter. Accordingly, the free parking space is allocated.

A vision based car parking system is developed which uses two types of images (positive and negative) to detect free parking slot. In this method, the object classifier detects the required object within the input. Positive images contain the images of cars from various angles. Negative images do not contain any cars in them. The co-ordinates of parking lots specified are used as input to detect the presence of cars in the region. However, limitations may occur with this system with respect to the type of camera used. Also, the co-ordinate system used selects specific parking locations and thus camera has to be at a fixed location. Limited set of positive and negative images may put limitations on the system.

Number Plate Recognition technique for developing autonomous car parking system uses image processing basis to process the number plates of the vehicles. In this system, the image of the license number plate of the vehicle is acquired. It is further segmented to obtain individual characters in the number plate. Ultrasonic sensors are used to detect free-parking slots. Then the images of number plate are taken and analyzed. Simultaneously, the current timing is noted so as to calculate the parking fees. The LCD displays 'FULL' sign to indicate that a parking slot is not available. However some limitations with the system include background color being compulsorily black and character color white. Also, analysis is limited to number plates with just one row.

Smart Parking system designed proposed a mechanical model with an image processing facility. The car would be parked with the use of lift at multiple levels. Also, image processing is used to capture the number plate and store in database for comparison to avoid illegal car entry.

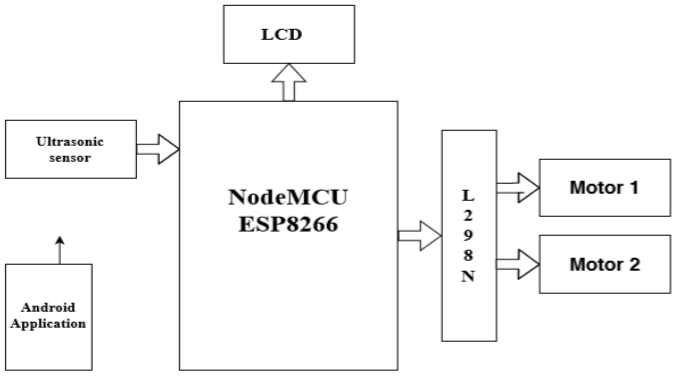
Thus, we aim to design a car parking system that represents a fully automated model with minimum human intervention and overcome the limitations of previous systems.

III. PROPOSED MODEL

Our project model presents the prototype of a car which can be controlled through android application. The system contains a microcontroller that is NodeMCU. It is heart of system. We have connected ultrasonic sensors to detect obstacles. Some other components used in our system are l298N motor driver to control the dc motors, and LCD to display modes.

III-1 Proposed Model

The prototype model is made of foam as it will look like a car and all the components were mounted on it. To control the car we are using android application. NodeMCU is a development board which runs on the ESP8266, and hardware based on the ESP-12 module. It has an on chip Wifi Transceiver which we are using to connect the android application and system mounted on module.



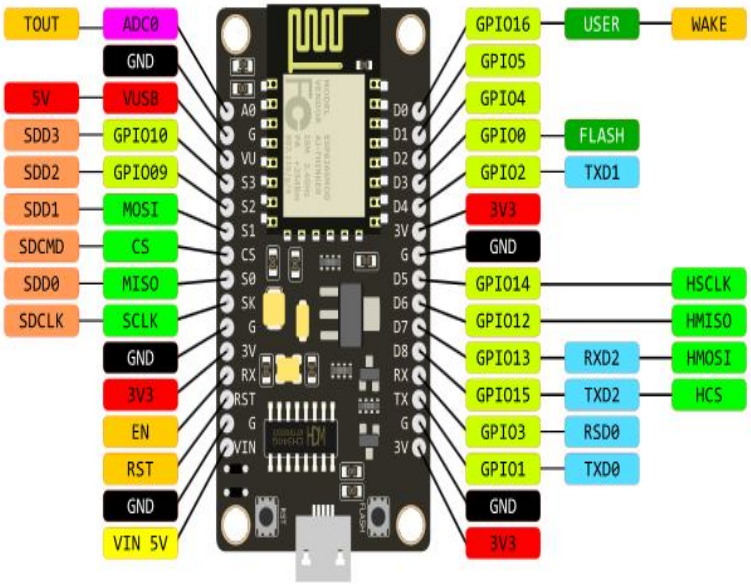
III-2 Block Diagram

IV. COMPONENTS

A. NODEMCU

Features

1) Low cost, compact and powerful Wi-Fi Module
2) Power Supply: +3.3V only
3) Current Consumption: 100mA
4) I/O Voltage: 3.6V (max)
5) I/O source current: 12mA (max)
6) Built-in low power 32-bit MCU @ 80MHz
7) 512kB Flash Memory
8) Can be used as Station or Access Point or both combined
9) Supports Deep sleep (<10uA)
10) Supports serial communication hence compatible with many development platform like Arduino
11) Can be programmed using Arduino IDE or AT-commands or Lua Script



ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 8 Issue VI June 2020- Available at www.ijraset.com

B. Ultrasonic Sensor

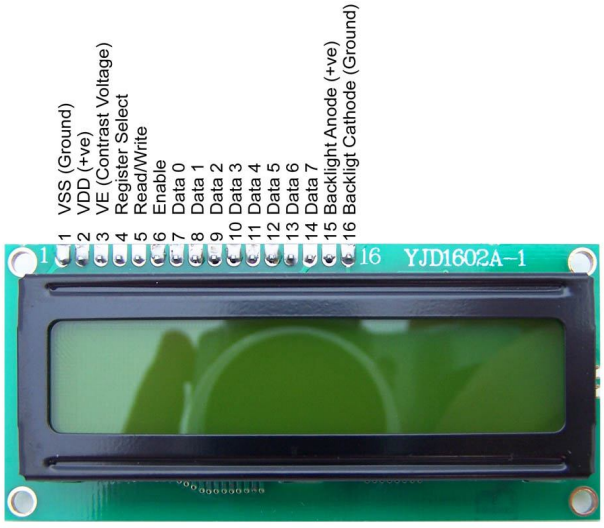
Features

1) Power Supply :+5V DC
2) Quiescent Current : <2mA
3) Working Current: 15mA
4) Effectual Angle: <15°
5) Ranging Distance : 2cm – 400 cm/1″ – 13ft
6) Resolution : 0.3 cm
7) Measuring Angle: 30 degree
8) Trigger Input Pulse width: 10uS
9) Dimension: 45mm x 20mm x 15mm

C. LCD(Liquid Crystal Display)

Features

1) Operating Voltage is 4.7V to 5.3V
2) Current consumption is 1mA without backlight
3) Alphanumeric LCD display module, meaning can display alphabets and numbers
4) Consists of two rows and each row can print 16 characters.
5) Each character is build by a 5×8 pixel box
6) Can work on both 8-bit and 4-bit mode
7) It can also display any custom generated characters
8) Available in Green and Blue Backlight

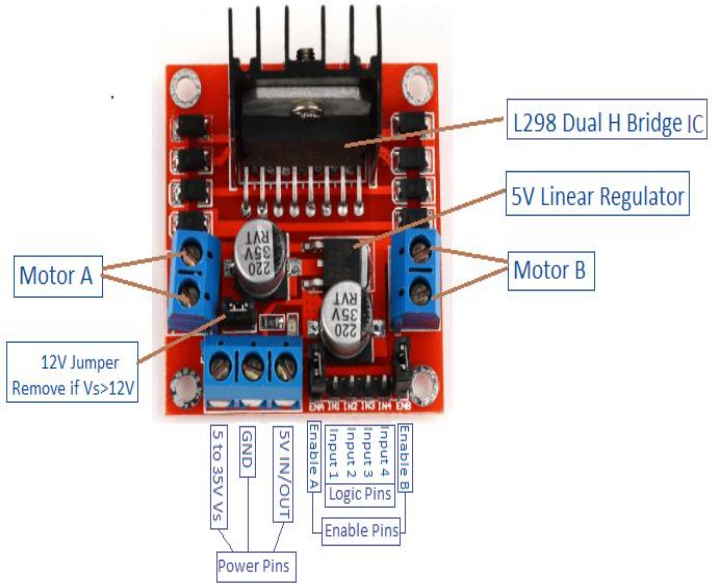


D. DC Motor

Features-

1) DC supply: 4 to 12V
2) RPM: 200 at 12V
3) Total length: 46mm
4) Motor diameter: 36mm
5) Motor length: 25mm
6) Brush type: Precious metal
7) Gear head diameter: 37mm
8) Gear head length: 21mm
9) Output shaft: Centred
10) Shaft diameter: 6mm
11) Shaft length: 22mm
12) Gear assembly: Spur
13) Motor weight: 90gms

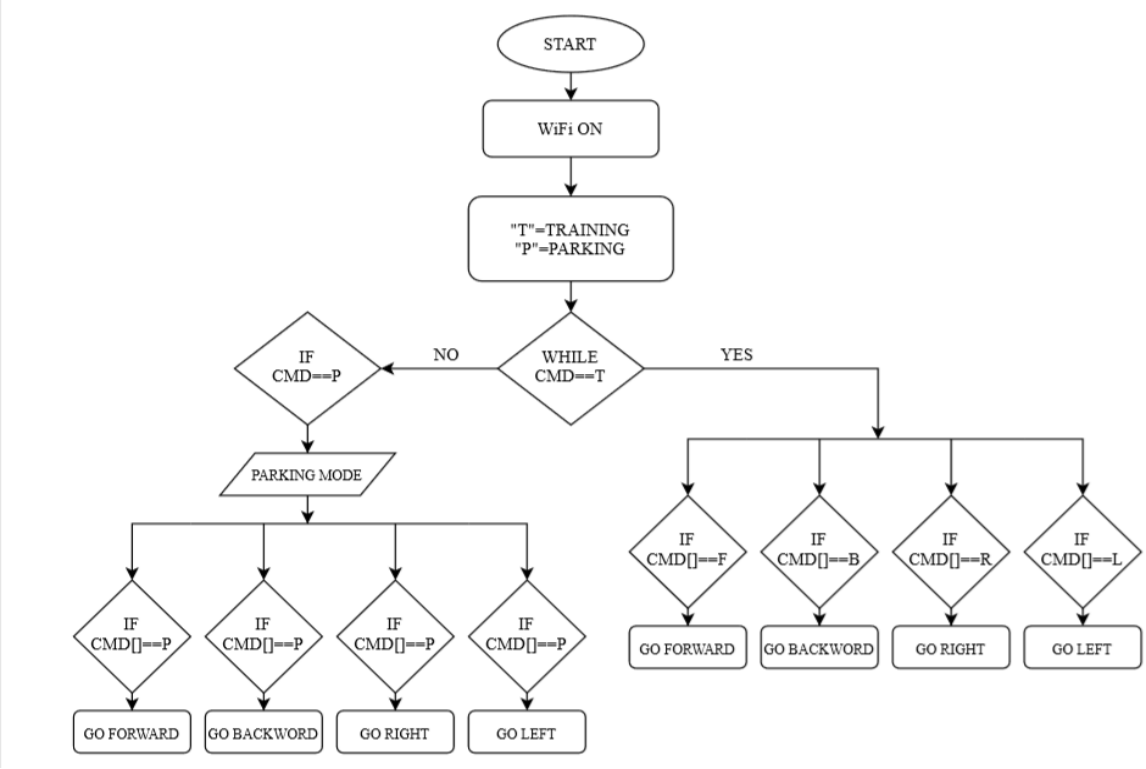
E. Motor Driver(L298N)



ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 8 Issue VI June 2020- Available at www.ijraset.com

V. PROPOSED WORK

In this paper, we present the proposed architecture of our system. We aim to develop an autonomous car parking system which is commanded by Android application and thus aim to provide an efficient car parking system.



V-1 Flow Chart

1) The system will work in two main modes first is training mode and another is parking mode.

2) First is training mode. In training mode we will drive the demo car in assigned in parking slot. Different commands are given by android application There are different commands like “F”, ”B”, ”L”, ”R”, etc. By using these commands we can move our system at parking place.

3) With every command android application will send a special string. System will store those string for different commands. These string is stored in a same sequence these are received by system in a Array.

4) After completing the parking once we press the stop button array of sequence of string is stored and training mode is completed.

5) The ESP8266 module allows to connect android application and send commands.

6) Access point will be created automatically on the start of ESP8266 device. That can be changed in arduino file at the top.

7) Using the ESP8266 library create the server with following code using ssid and password.

a) WiFi.mode(WIFI_AP);

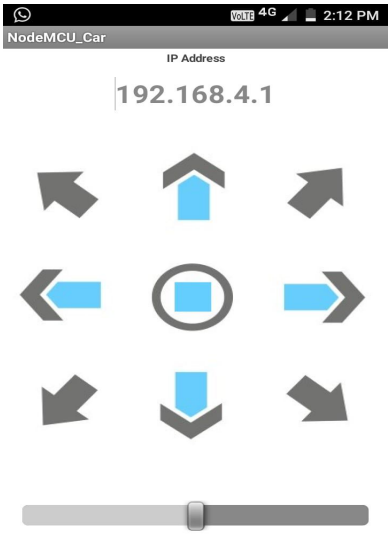
b) WiFi.softAP(ssid,password,1,1);

8) WiFi.softAP takes 4 parameters the 1st is ssid used for the network name ,the 2nd is password,the third parameter is channel and 4th is to make network hidden.

9) Next, in loop check if WiFi access point is available once it is available check if any incoming request we have. a simple HTML page is created and the browser which opens this web page acts as a client. Whenever you click on the web page, corresponding information will be transmitted to the Server (ESP8266).

10) We are using android application to communicate with the ESP8266 module from android device.

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 8 Issue VI June 2020- Available at www.ijraset.com



V-2 Android Application

11) Android application have different keys to perform different modes. First we keep the prototype in training mode by sending the command "T".
12) Now the main strategy of our training is, we can save the moves in array when user press different modes like left, right, forward, reverse.
13) For example, suppose user press forward first then prototype run forward for particular delay and then stop. Likewise by pressing the forward key again and again we can move the prototype forward.
14) Once he done with forward position, he can go towards next move. then controller will save all the count of forward that is previous moves in an array.
15) Likewise we can save the count of every move in an array when we press the next move. This will be our data to retrieve while parking mode.
16) Finally, when we done with all the moves, we have to press the key which is for parking mode. Once we press the key controller will save the count of all the moves simultaneously in array.
17) By using that data stored in array prototype will move automatically and park prototype at correct place.

A. Modular Description

1) *Interfacing LCD with Microcontroller:* Interfacing of microcontroller with LCD Unit is mainly used for displaying the mode and data stored in the system user. The LCD module can represent data in alpha-numeric data along with some pre-defined characters. The LCD module communicates with the node mcu and displays the number of commands given to prototype.
2) *Interfacing Motor Driver with Node MCU:* Motor driver used in this system is L298N. This is used to drive the DC motors. The 12V supply is given to drive the motor the output 5v is given to the controller. GND of motor driver module and mode mcu make common.
3) *Interfacing Ultrasonic Module with Node MCU*

B. Expected Result

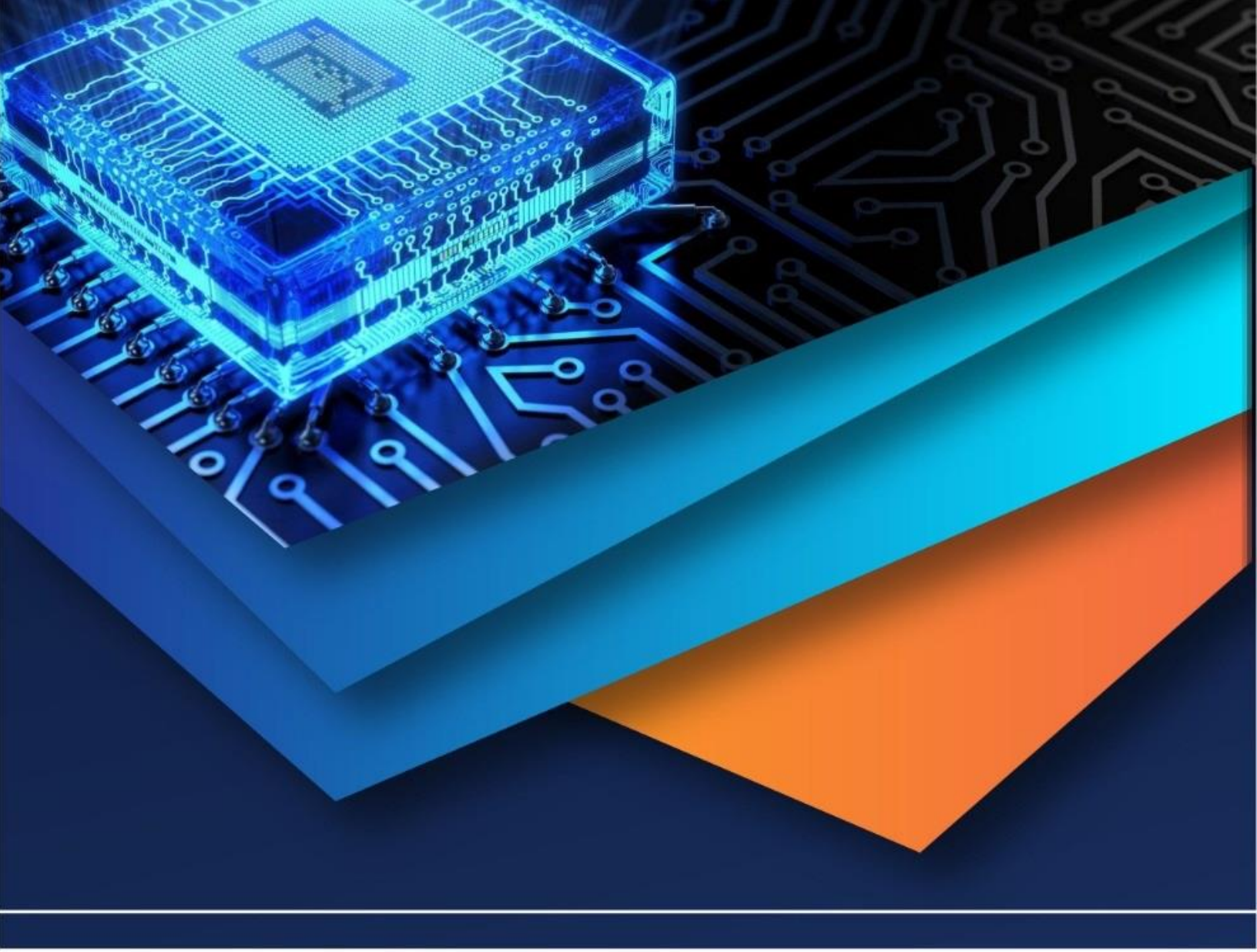
A proposed system on Autonomous Car parking commanded by an Android application has been discussed in this paper. The result expected from successful implementation of the system is an efficient car parking and retrieval method. The successful implementation of system consists of allotment of free parking slot to the car and a proper path-tracing to the slot. Also data on the LCD display is updated as per allotment and de-allotment. If the parking space is full, no car is allowed to enter the parking space until any of the parking slots, is made available.

VI. CONCLUSION

A proposed architecture of the automated car parking system commanded by Android application is presented in this paper. The allotment of the parking slot by an autonomous searching method makes the parking of vehicles at public places more efficient. The searching and allotment of parking slot, based on the status of available slots, as communicated to the microcontroller, makes the path-tracing for the vehicle, to the appropriate free slot, easier. The proposed system makes use of Android application to facilitate the parking and retrieval of the vehicle, for the user. We hereby aim to reduce the human efforts required for parking of vehicle at public places like shopping malls, public parking, 5- star hotels etc. Thus, the proposed design would provide an efficient car parking system by using an efficient searching method, supported by the efficient functioning of the GSM Module, RF Module and the microcontroller

REFERENCES

[1] https://peer.asee.org/automatic-parking-vehicle-system.pdf
[2] https://en.wikipedia.org/wiki/NodeMCU
[3] https://www.electronicwings.com/nodemcu/nodemcu-development-kitboard
[4] https://www.youtube.com/watch?v=dyZolgNOomk&feature=youtu.be
[5] https://www.youtube.com/watch?v=txueGsf92Ts&feature=youtu.be
[6] https://www.researchgate.net/publication/319853826_automatic_parking_of_self-driving_car_based_on_lidar
[7] https://www.researchgate.net/publication/329391902_Self_Parking_car_prototype
[8] "Research on Automatic Parking Systems Based on Parking Scene Recognition",date of publication October 18, 2017.
[9] "Self Parking car prototype",Conference Paper · September 2018 DOI: 10.1109/ICACCI.2018.8554543.
[10] 2014 International Conference on Computer Communication and Informatics (ICCCI -2014), Jan. 03 – 05, 2014, Coimbatore, india. "automated car parking system commanded by android application".
[11] ISSN: 2278 – 7798 International Journal of Science, Engineering and Technology Research (IJSETR) Volume 2, Issue 4, January 2013 "Autonomous Self Parking and Self Retrieving Vehicle With GPS Less Keyfob for Vehicle Tracking"



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY