

# Vehicle Number Plate Recognition using Raspberry pi3

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**Abstract:** There is necessity to recognize the vehicle number plate when it is kept in front of pi camera then the system must be capable of capturing image by camera automatically by using raspberry pi3. When number plate is recognized then the verification will take place if the condition satisfies then only the gate will be opened and when number plate is not recognized gate will remain closed. In this system, ALPR technique are used. Also the features like SMS or email notifications are provided.

**Keywords:** Raspberry pi3, ALPR (Automatic License Plate Recognition), DC motor.

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## 1. INTRODUCTION

As automation is on way of growth, revolution is taking place in existing systems. The proposed system will be comprising of Raspberry Pi3 processor. It will be a kind of heart of the project. This onboard computer is able to effectively as well as efficiently communicate with the output and input modules being used. The Raspberry pi is a credit-card sized single board computer which was developed in UK by the Raspberry pi foundation. Here, the operating system for the detection of vehicle number plate using Raspberry pi3 is the Raspbian JC. For the recognition purpose, Raspberry pi modelB+ is used. Raspberry pi is a SOC (system on chip) device has inbuilt 1.2 GHz BCM 2837 Arm Cortex processor. The arm cortex processor is of 64 bits. Raspberry pi has 1GB Ram. The average power is ranging from 1.5 to 6.7 watt. Raspberry pi has 40 digital input output pins out of which 27 pins are GPIO (General Purpose Input Output). The operating system is installed in external SD card for booting and storage purposes. As in many industries, they do not allow the unknown vehicles for the security issues. Their security is very important for industries thus a system is required to help for recognize of unknown vehicle on gate. Recognizing vehicle number plates is a difficult but much required system for today's world. This is very useful in the places like automating toll booths, automated signal breakers identification and identifying traffic rule breakers. Thus we propose a Raspberry Pi based vehicle number plate recognition system which automatically recognizes number plates of vehicles. The system uses a camera circuit interfaced to a Raspberry pi. The system processes incoming camera footage to find or detect any trace of number plates. On placing a number plate in front of the camera, it further processes the camera input, extracts the number plate part from the provided image. Processes the extracted image using ALPR and extracts the number plate number from given input. Hence we put forward a vehicle number plate recognition system using Raspberry Pi3.

## 2. LITERATURE SURVEY

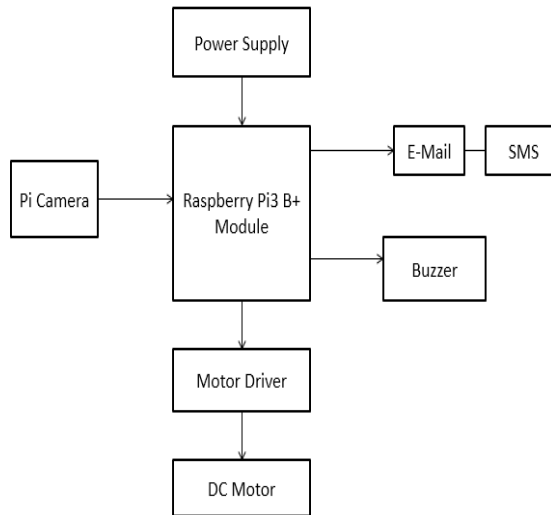
This paper focuses on security of parking at any premises. The implementation of Vehicle number plate recognition was achieved using Raspberry pi [1].

The main objective of this project is to design and develop an Automatic registration number of the vehicles automatically without any human intervention [2].

This paper is helpful for the identification and detection of vehicle number plate using raspberry pi2 [3].

**Proposed System**

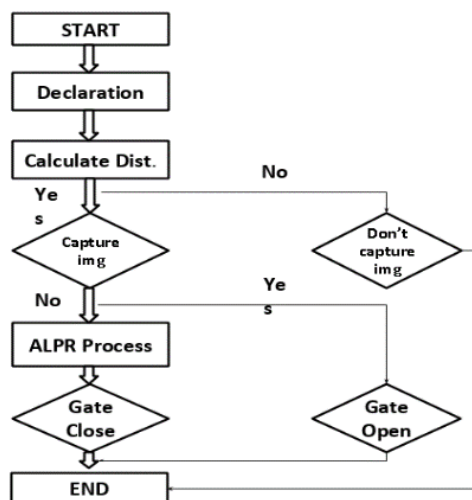
In this system we are going to use Raspberry pi microprocessor. Also we have done the interfacing of camera to Raspberry pi on a port where we interfacing of camera is required.



**Fig. Block Diagram**

The camera plays important role in capturing images of vehicle number plate in this system. Here the ALPR (Automatic License Plate Recognition) technique is used for recognition of characters on vehicle number plate. When number plate gets detected further the verification takes place as the raspberry is connected with the cloud server the characters of vehicle number are send to the cloud.

The predefine information present on the cloud is shown. Later on if the condition gets verified then DC motor opens the gate otherwise the buzzer blows when the vehicle is unknown. Figure shows the complete execution process of recognition of vehicle number plate using Raspberry pi.



**Fig. Flow Chart**

A private cloud server can be connected with Raspberry Pi3 which could be used as a storage device for applications where real time signals are involved. As Raspberry Pi is a cheaper microprocessor where cloud computing infrastructure can be used for acquiring the predefine information related to the vehicle model. Real time signals acquired by any sensor that measures environmental factors are analog in nature.

Below are the listed hardware required for the proposed system

1) Raspberry Pi 3: Raspberry pi3 is a credit card sized single board computer which was developed in UK by raspberry pi foundation. Raspberry pi3 have 40 pins out of which 27 pins is of General purpose

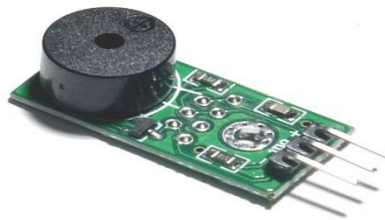
input and output (GPIO) and remaining 13 pins are used for VCC and GND. It is the minicomputer which it has inbuilt operating system, but it

Requires inbuilt SD card for booting and long term storage. Due to this drawback one can use desktop computer.



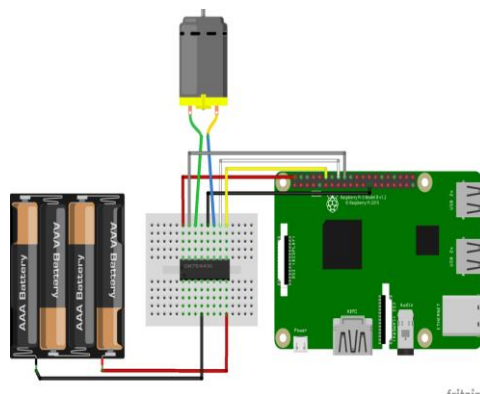
**Fig. Raspberry Pi3**

2) Buzzer: Buzzer is an electrical device that makes a buzzing noise and is used for signaling. It makes noisy sound irrespective of the voltage variation applied to buzzer. It Provides 3 to 27 volt and sound in the range 2 to 4KHZ



**Fig. Buzzer**

3) DC Motor: The main principle in controlling a DC Motor with Raspberry Pi deals with the Motor Driver. A Motor Driver is a circuit or IC that provides the power (or rather the current) to the motor for smooth as well as safe operation. Even a small 5V DC Motor draws a high initial current of around 300 – 400 mA.



**Fig. DC Motor**

4) Camera: This camera is able to capture an image of 5Mp and Resolution of camera 5 Megapixel. It is capable of 2592\*1944 pixel static images and also supports 1080P30, 720P60 and 640\*480P 60/90 video.



**Fig. Pi Camera**

#### **Advantages**

1. A cloud server can be set up in a Raspberry Pi which could be used as a storage device for applications involving real time signals.
2. Raspberry Pi is a cheaper microprocessor in which cloud computing infrastructure can be obtained using cloud platforms.
3. Authentication of vehicle number plate would become much easier using cloud computing.
4. The use of real time data storage for quicker responses
5. Also the use of notification features like SMS, email.

### **3. CONCLUSION**

This system which is able to captures the image of the number plate of a vehicle and these details of number plate were verified with the predefined details present on cloud using Raspberry Pi processor for authentication. The system alerts the authorities when any unauthorized image of number plate was detected through camera using buzzer. License plate extraction method is designed for real-time license plate extraction. Input to the system is an image which contains the license plate, acquired by a pi camera which is connected to raspberry pi3; and its output is the license plate region. After camera recognizes the number plate the information is sent to cloud through wifi module. System checks and authenticates vehicle number plate. If there is any unauthorized number plate of vehicle is observed then buzzer will blows automatically. Experimental results shows the proposed system using Raspberry pi can authenticate the system successfully.

### **REFERENCES**

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