

## VEHICLE LICENCE PLATE RECOGNITION AND COMMUNICATION USING IOT

**Sandhyarani.L, Shalini.T.N, Shilpa.N,**

**Sindhura.K.J, Geetha D.D**

*School of ECE, REVA University*

### ABSTRACT

*The main objective of this paper is to capture the design of a Vehicle Number Plate Recognition System which can be used to identify the number plate, extract the character plate and then display the same on the screen. The next step is to compare the extracted number plate with the database which stores the valid set of number plate. These system can be used for a wide variety of applications in toll, universities, and parking spaces. The camera captures the image then pre-processing, segmentation, OCR, cloud, display these are the steps which are followed after the image has been clicked.*

**Keywords:** *Vehicle Number Plate Recognition System, pre-processing, Segmentation, OCR, cloud*

### I. INTRODUCTION

The number of vehicles is increasing day by day. The security to these vehicles is a must. The vehicle number plate recognition system is one of the ways that provides security. In this model we are using raspberry Pi with a Pi camera which are the essential components for this project. There are number of steps involved for the recognition of number plate. At first the camera captures the image of the number plate then followed by preprocessing of the image, the area of the plate will be detected using plate detection, further it will be segmented, each character will be differentiated then the comparison will be done. If the extracted number plate matches with the number plate database then the number plate is valid. This will be displayed on the display screen.

We are using cloud technology to store huge amount of number plate. In this we have added additional features such as to check if the license has to be renewed. If yes then the message will be sent to the owner regarding licence renewal.

This technology can be used widely such as in toll booths, parking places, checkpoints, educational institutions, offices and in business places.

The main use of this system is the tracking of the lost vehicles. It has become easy to find the missing vehicles through this method.

#### 1.1 Objectives of the system

- To implement the license plate extraction using python.
- To test the project for the gate for vehicles entering and leaving the campus.
- To keep the log of vehicles entering and leaving the campus with time.

- Classify the student, faculty and guest vehicles.

## II. RELATED WORK

Several methods have already been proposed and implemented regarding the design and development of vehicle license plate recognition and communication using Raspberry Pi.

In [1] paper presents a method for locating a car license plate using neural networks. Neural networks are used as filters for analysing small window of an image and deciding each window is having a license plate.

In [2] paper author works on principle of image processing which identifies vehicle based on number plate. The objective of this is to design an efficient automatic authorised vehicle identification System using number plate.

In [3] paper the author implements fully automated license plate recognition system through Optical Character Recognition (OCR) which takes input from the image of the license plate by using raspberry Pi with Pi camera.

## III. PROPOSED WORK

### 3.1 Working of the model

There are mainly 5 steps involved in this project.

**Camera:** This is a device that we use to capture the image of the vehicle. The image has license plate.

**Pre-processing:** As we all know that an image consists of pixels. Each pixels have different values. Based on the value they have different shape. These shapes give the image. The main objective of pre-processing is to consider the required part of the image i.e. license plate and convert that image into a matrix with the values of each pixel in each index. This phase mainly involves conversion of image into matrix of pixel values.

**Plate detection:** We have to select the area that has the license plate in the picture that is captured.

**Segmentation:** We now have the extracted area of number plate for recognition. It is recommended to segment the license plate. Each segment consists of a character of number plate.

**OCR:** This is an important phase of this project. Based on the curves and edges present in each segment of the image, it gives the character present on the segment. These data are stored in the form of a string.

**Storage:** we store this in data base with other data like the time of entry, time of departure ,etc

We have used cloud storage to store a huge amount of data. This stores the information such as the company of the car, model, state at which it was purchased. To store these information a

data base which can store large amount of data is required,therefore cloud technology is best suited for this project.

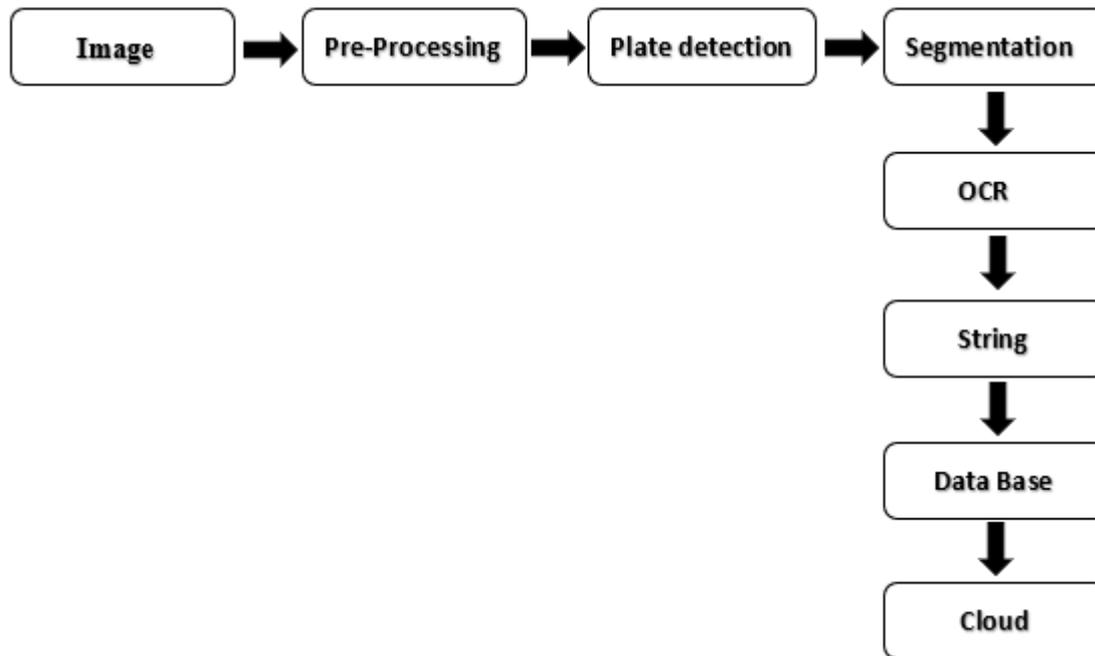


Fig3.1 Flowchart of vehicle license plate recognition and communication using IoT

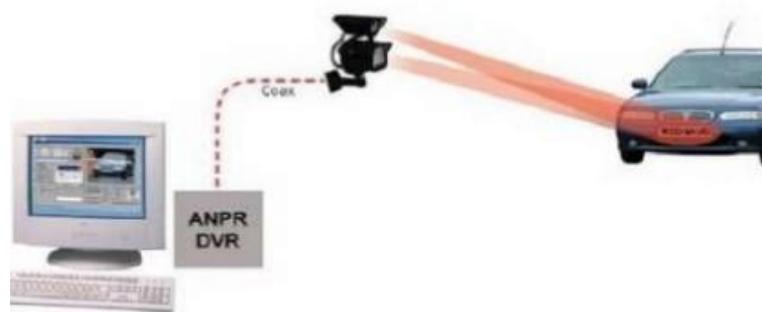


Fig 3.2 Pictorial Representation

### 3.1 Software Description

#### Raspberry Pi(Raspbian)

Raspbian is a software used in Raspberry Pi. Raspberry pi is a small individual board computer which has less memory compared to a computer.Raspberry pi has total 40 pins in

which 27 pins is of GPIO (General purpose input and output) 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.

### Linux

Linux is a operating system.It is free open-source software,it is based on linux kernel, it was first released on September 17, 1991 by Linus Torvalds. Linux has been typically packaged in a Linux distribution. Linux is a software that sits underneath all of the other software on a computer, receiving requests from those programs and relaying these requests to the computer's hardware.

### 3.2 The Hardware Setup

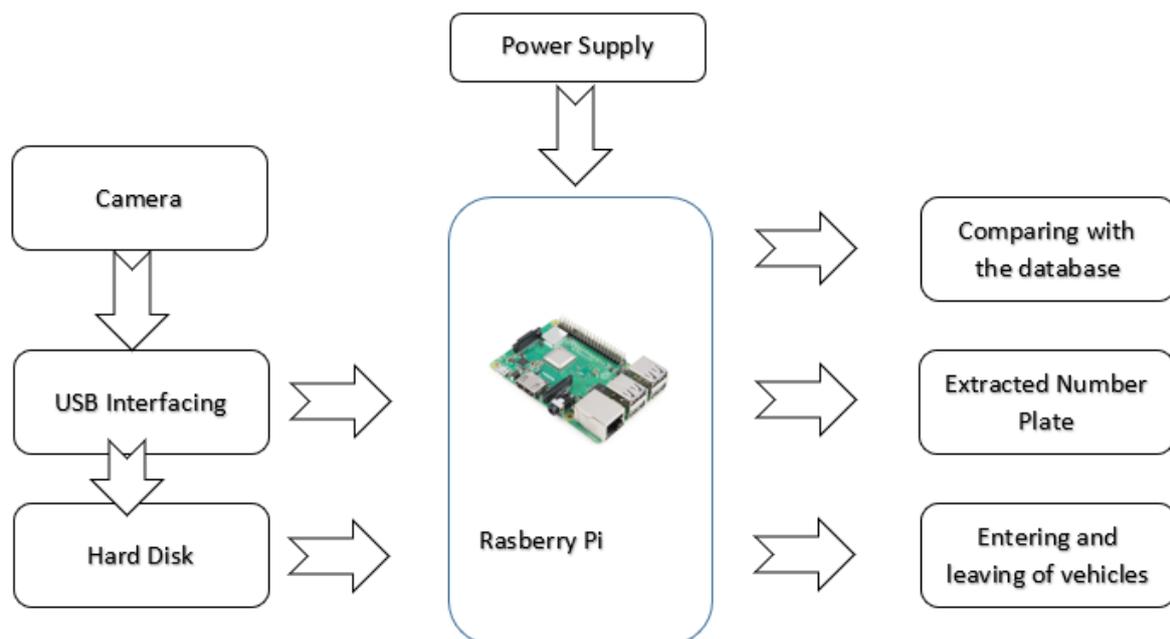


Fig 3.3 The figure shows the hardware setup of the vehicle license plate recognition and communication using IOT.

#### 4 HARDWARE AND SOFTWARE REQUIREMENTS

Table 4.1 hardware and Software requirements

Hardware Requirements	Software Requirements
1.Raspberry Pi 2.Pi camera 3.Monitor 4.Power Supply	1.Raspbian 2.Linux 3.Python 4.Open CV framework

#### 5 RESULTS

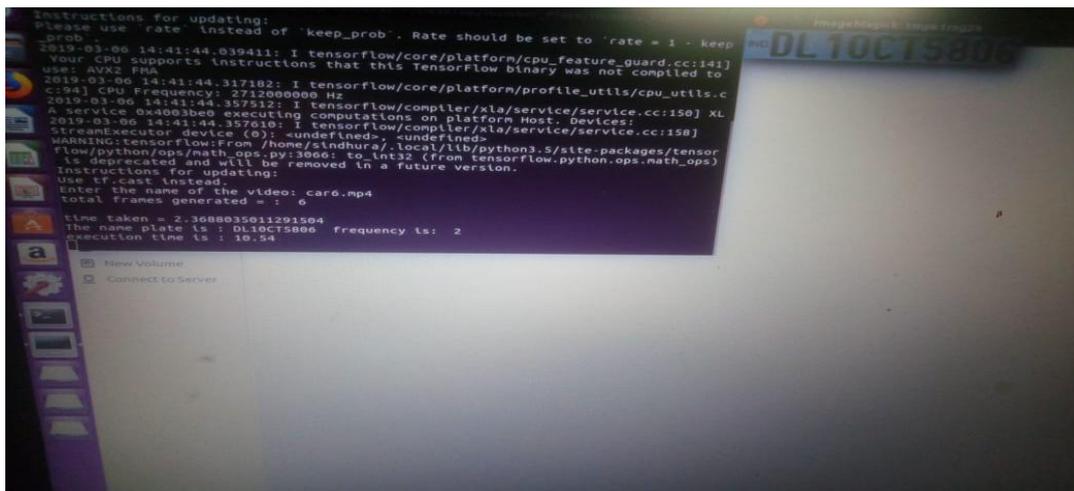


Fig 5.1 Result of vehicle license plate recognition and communication using IOT

In the above figure 5.1 the reading of the number plate is displayed on the monitor

#### 6 CONCLUSION

The proposed system is successful in identifying and recognising texts in the vehicle number plates with accuracy. Although some factors such as lighting, camera quality and other environmental factors do determine the success of the system but given ideal conditions the system performs as intended and gives satisfactory results. This system can be used for implementation in many places such as toll, parking spaces, Universities and also for tracking of the lost vehicles.

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