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Vehicle Identification Using Digital Camera

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***Abstract*—**All vehicles approximately in the world should have a license number as the identifier. In this growing technology more and more number of techniques are developed for license plate recognition. These methods are employed in many areas such as electronic payment systems, traffic activity monitoring and automatic vehicle ticketing. Many techniques are available for LPR System the last decade and various commercial products are reliable under some ideal environments, but it is still a compunction task to recognize license plates from difficult images. The our fully loaded system should work successfully under a different conditions such as sunny day, night time as well as with different colors and complex backgrounds. In this system one important thing is that when any vehicle break the signal captures it image and send the E-mail to that person " you have break the signal and you should pay this amount of fine". And also this system is useful at any authorized location for security purpose.

Keywords-Image processing, Raspberry pi, security

I. Introduction

In today's life use of a vehicle is increasing day to day and due to more number of vehicles, traffic rules are break, theft of vehicles, accidents increases and also increases the crime rates of cities. For this, we need one system to overcome this kind of problems. If you identify any vehicle then vehicle license plate identification will play a most important role in this world. This system is commonly used in security and safety section, To detect the number plate of the vehicle from some distance LPDR plays a vital role. Previously researcher says that generally in India there are two types of number plates such as black letters with white background. black letters with yellow background. Indian License number plate identification is not easy as compared to foreign license plates because Indian license plates do not follow any standard aspects ratio. Previous license plate recognition method was applicable only for black and white background.

After that system another system overcomes this problem. In that system color based license plates are easily detects. but this system also haves some limitations like it detects only white, black, red, and green color plates as well as numbers, but in our system any kind of license plates are easily detects.

Figure 1: color number plate

II. Literature Survey

In this paper researcher says that in India, basically two types of number plates are used white letters with black background and Yellow letters with black background. But Some difficulties along that such as Blur Images, Damage Number Plate are not recognize. And Similarities between some characters such as O and D; 5 and S; 8 and B, E; O and 0...etc [1]

In this paper License-plate recognition system is proposed for in motion vehicles on the road by using a car video camera. In this system camera located on the front side of the car to capture the front vehicles license plate. But it is complicated to mount the camera on every car.[2]

In this paper a group of sensors scatter around the road network. Its Goal is to detect convoys. Each sensor catch

data of the form vehicle 'A' was observed at 'B' location at times'' a centralized decision maker must identify which, vehicles are traveling as convoys.[3]

This paper proposes a novel suspected vehicle detection (SVD) system to catch vehicles moving on roads without a license plate. [4]

This all things are covered in this proposed system and also all above disadvantages are overcome.

III. Detail Description of Method

A. pre-processing*:*

In pre-processing the image of the vehicle is capture through the camera, intensity of image is adjusted, unwanted pixel is removal using filters here noise means unwanted pixel. Here Morphological operation is used to remove the noise this operation requires two input image and kernel for this erosion, dilalation. Gradient of an image is important. To do this binary image is more suitable. Erosion removes the boundaries of the images in binary image. In a binary image, white is the front side and black is the backside. All the pixels at the borders of the white front side image are made zero, thus slimming the image and eroding away the boundary. Dilation is exactly reverse of erosion; it enlarge the front side image borders and flattens it. The morphological gradient of an image is the difference between dilation and erosion. It will return the outline of an image.

B. Extractions*:*

Extractions of license plate region consist of finding the edges in the image where exact location of licenses plate is located. Extraction involves decrease the amount of sources required to describe a large set of data. From this exact location of number plate is localized Units.

C. Segmentation:

Segmentation plays an important role in vehicle licenses plate recognition. The clarity of plate number recognition completely depends on the segmentation done. Finally, identification of each character is done. And divide it into rectangular frame.

D. Template matching method:

The template matching method is nothing but a database and is used for identifying separate character in the vehicle license plate. here template is a database which will be store already with us from any authorized committee when image is capture and preprocessing is done on that image then that image will be compare with the database by using pixel information of image if the capture image will be match with the database then character of license plate will be recognize if that capture image is not available in the database then also that image will be recognize the character of the number plate. and database will be update with the new image.

IV. Design

The things that are needed for this project are divided into two parts that is ,functional and non functional .In functional part includes detail information about that when captures the image and using what component and in nonfunctional part includes what actions to be done after the capturing the image.

4.1 Hardware details

1. Raspberry pi

There are different types of RPI Board's are available .such as RPI A, A+, RPI 3 In this system I am using Raspberry Pi 3 (model B version). I select this Board because this is having a SD card slot and we can interface any type of SD card so we can enlarge the memory of this board. and also this is having

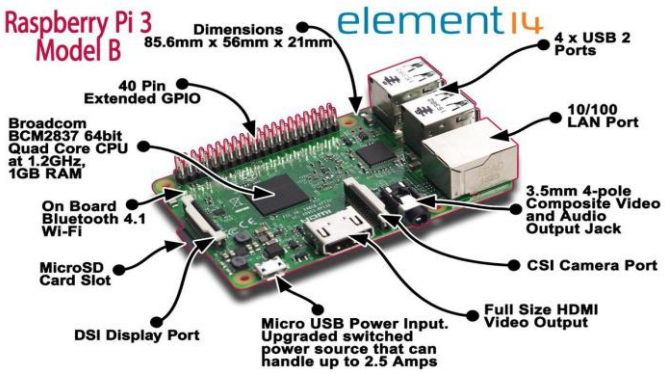

Figure 2: Details of raspberry Pi Board [2]

The WI-FI facility so we can send the data through internet by using Wi-Fi connectivity.

2. IR sensor

IR sensor (Infrared sensor) is a electronic device that is useful to sense some characteristics of its surrounding. There are different types of sensor such as inductive sensor is used to detect metal target and capacitive sensor is used to indicate plastic target. Here in proposed system require inductive sensor but, but this the prototype model so I used Obstacle avoidance sensor to detect any obstacle because other sensors having more range.

3. Zebronics web camera

In this system Zebronics web camera is used it is having the maximum resolution 640*480.it is having the plug and play facility. it is having the built in microphone. it is use to capture the image of the vehicle.

4. LED

Here Red Led is used for indication of traffic signal.

5. Buzzer
In this system Buzzer is on when IR sensor sense that vehicle is present and break the traffic signal.

V. Block diagram of system

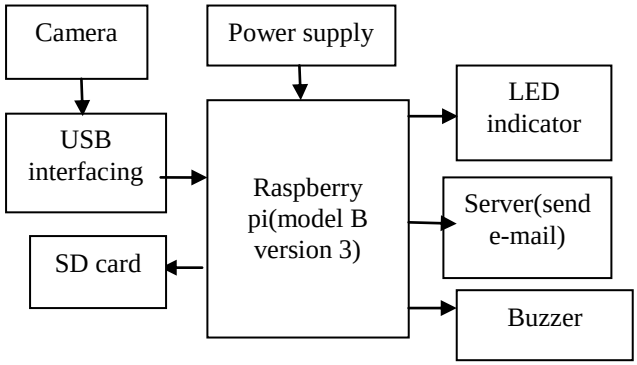

Figure 3: Block diagram of system

This project is helpful for recognition of license plate. Due to this application it is useful in security purpose. In this system there is a one database in that various number plates are store. So when vehicle is coming IR sensor sense that vehicle is present and by using camera it captures the image of the vehicle. If capture image is available in database then we have a message on display that image is identified. Otherwise display message 'unauthorized car' this type of application is used at any authorized location. If one character of number plate is damage for e.g. 'H' looks like 'I' but original number plate is store then this current number plate is identified. and also if any one character is hide but it is stored in database then it will identified. Other application of this system is that when any vehicle breaks the traffic signal then it captures the image of the vehicle and send E-mail to that person that you have break the signal you should pay this amount of fine through server by using SMTP protocol.

VI. Software Details

Raspberry PI supports the many languages such as java , C++, scratch , python etc. among this python is easy language and ten times smaller than other languages. it is object oriented language. NOOBS operating system is used for Raspberry pi.
This system consist of image processing application so it requires image processing library for this OPENCV is install into Raspberry Pi for image related operation. and SMTP protocol is used to send the E-mail.

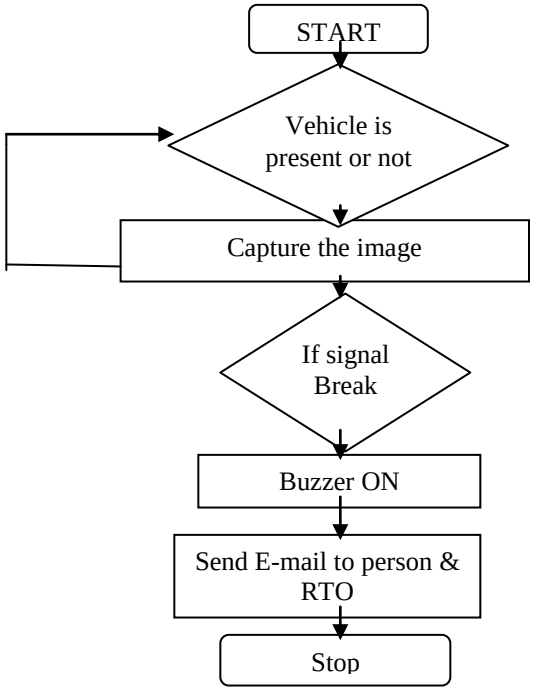

Figure 4:overall system flow chart

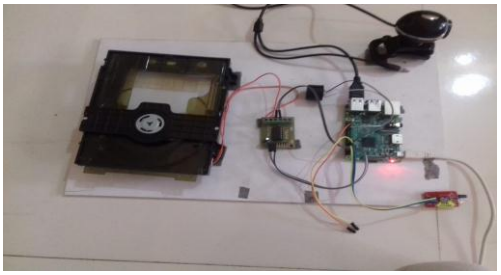

Figure 5: Experimental set up

RESULT:

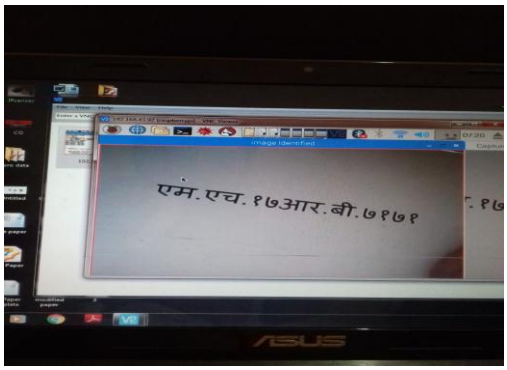

Figure 6: Case I- Marathi Number Plate

This figure shows that system can be Recognized Marathi Number plate also.

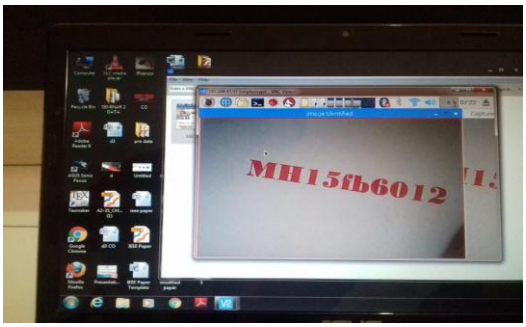

Figure 7: Case II: color number plate

This System can be identify color number also.

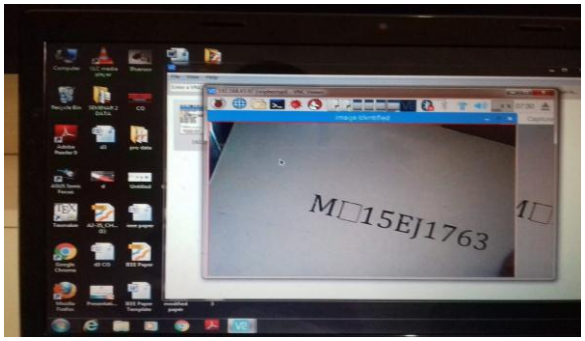

Figure 8 : Case III: Damage number plate

This System can identify damage number plate also .

Figure 9 :Send the E-mail

This system also send the E-mail to a person about Car'details using SMTP protocol

VIII. CONCLUSION AND FUTURE SCOPE

This system is accurately identified vehicle license number plate. this system is useful in authorized area to enter into authorized car's and also useful on signal to capture the image of the vehicle .and if signal is break then send an email to that person that you have break the signal and you have pay this amount of fine. In future we can track the vehicle location by using the GPS and GPRS.

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