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Recognition Vehicle Number Plate Using MATLAB

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***Abstract*: The Number plate Recognition system is based on image processing technology. It is one of the necessary systems designed to detect the vehicle number plate. In today's world with the increasing number of vehicle day by day it's not possible to manually keep a record of the entire vehicle. With the development of this system it becomes easy to keep a record and use it whenever required. The main objective here is to design an efficient automatic vehicle identification system by using vehicle number plate.**

***Keywords*: Number plate recognition, gray processing, image acquisition, image binarization, template matching**

1. Introduction

With the increasing number of vehicle in today's world it's not possible to manually keep a record of the entire vehicle. There need to be a man standing 24*7 to note down the number. It's a time consuming process and require manpower. Furthermore the data. Stored manually is not readable after a long time. So to overcome all these limitations here we tried to develop a system which would automatically detect the number plate and store it in its database. Later on when the information is required one can get it and use it. This process also helps to get the correct result compared to manually one. The process of working involves that as soon as the vehicle enters the secured area the system automatically captures the images and stores it. The processing of the image is done through the software stored in the system. If the vehicle matches the already stored information then it's allowed to pass the gate. And if the vehicle is not recognized or if it's marked in the blocked list then it's not allowed to cross the gate and further checking process are followed.

2. Methodology

The working of full NPR system can be divided in to two sections. The hardware part and the software part. The working mechanism of all the parts is described in details below.

1) Software model

The first and the most important part in this process is the software model. The software model uses the image processing technology. The programs are implemented in MATLAB. The algorithm is divided into following parts: Capture image, Pre-Processing, Plate region extraction, Segmentation of character in the extracted number plate, Character recognition, Comparison with database and Indicate result. The flow chart of license plate recognition system implementation in this work is shown in the following figure. There are various steps in this approach and these are implementation in MATLAB.

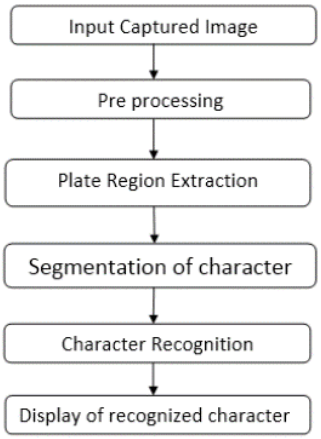

Fig. 2. Flow diagram of number plate recognition

3. The General NPR System

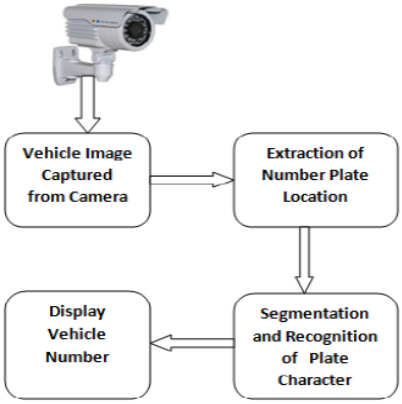

Fig. 1. Block Diagram of Number plate Recognition

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4. NPR Implementation Using Matlab

1) Vehicle Image Captured By Camera

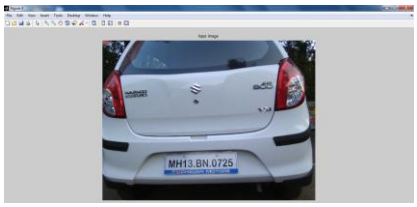

Fig. 3. Image captured by camera

The image of the vehicle whose number plate is to be identified is captured using digital camera.

2) Extraction of Number Plate Location:

RGB to gray-scale conversion is adopted, in order to facilitate the plate extraction, and increase the processing speed. This conversion is used I_gray=0.114*R+0.587*G+0.299*B.

Fig. 4. Binary image

3) Remove Connected Objects on Border

The region of interest has been successfully segmented, but it is not the only object that has been found. Any objects that are connected to the border of the image can be removed using the imclearborder MATLAB function.

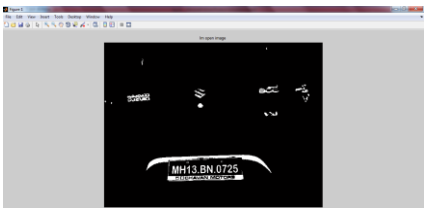

Fig. 5. Clear image after removing boundary objects

4) Character Segmentation

Segmentation is one of the most important processes in the number plate recognition, because all further steps rely on it. If the segmentation fails, a character can be improperly divided into two pieces, or two characters. The ultimate solution on this problem is to use bounding box technique. Once a bounding box created over each character and numbers presented on number plate, each character & number is separate out for recognition of number plate.

The binary's image input	After labelling process
11000000000 11001110011 11001110011 00000000011	11000000000 11002220033 11002220033 00000000033

Fig. 6. Image objects labeling

5) Template Matching

Template matching is useful for recognition of fixed sized characters. It can be also used for detection of objects generally in face detection and medical image processing. It is further divided in two parts: feature based matching and template based matching. Feature based approach is useful when template image has strong features otherwise template based approach can be useful, here we had used template based matching. Figure shows the templates used in this project.

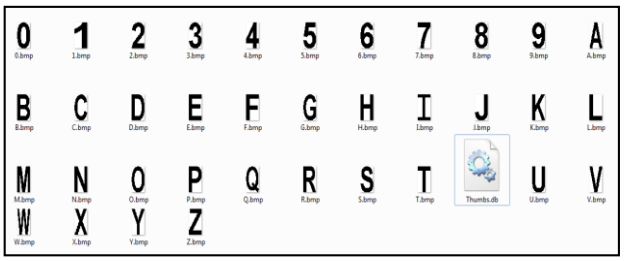

Fig. 7. Templates used in matching process

6) Detect number plate from image:

In this phase number plate detection system working on the image which was converted to gray scale from RGB format. We will detecting the number plate from gray scale image using matlab function

Fid =fopen(licen_plate_No.txt,'wt,)

Fprint (fid,.'%n',licence plateNo.)

Fig. 8. Recognized number plate

7) Hardware Model

The hardware model consists microcontroller for controlling the complete hardware of the ANPR system. The ANPR algorithm on a PC receives the image and performs the processing, which Yields the vehicle number. This Number is then compared to standard database and finally provides signal to microcontroller to control the system Hardware. If the inputted plate contains the authorized number then the green indication light will be switched on w, and if the inputted plate contains an unauthorized number then red indication will be switched-on.

5. Experimental Result

In this section presents the simulation results of the developed NPR system. Here we show two number plates taken and stored in PC. The simulation and result displays below

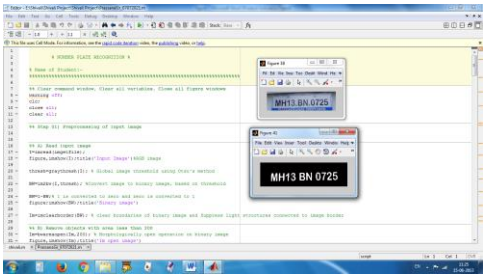

Fig. 9. Simulation and result of car 1

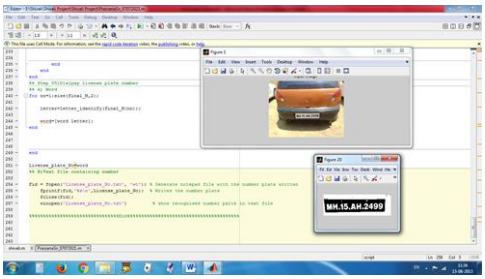

Fig. 10. Simulation result of car 2

6. Applications

- Parking
- Access Control
- Motorway Road Tolling
- Border Control
- Journey Time Measurement
- Law Enforcement

7. Conclusion

In this vehicle number plate detection project, we made a software which detect the vehicle number plate number using MATLAB and image processing. It will be finding the plate number for four wheelers. Though we have tried to make efficient software but there are some condition for this software to work: -

- Vehicle number plate should be white and according to rule given by government of India.
- Image should be clean and clear.

References

[1] P. K. Suri, Ekta Walia, Er. Amit Verma," Vehicle Number Plate Detection using Sobel Edge Detection Technique", *International Journal of Computer Science and Technology*, IJCST vol. 1, no. 2, December 2010.

[2] Kumar Parasuraman and P.Vasantha Kumar, "An Efficient Method for Indian Vehicle License Plate Extraction and Character Segmentation", IEEE International Conference on Computational Intelligence and Computing Research, 2010.

[3] R. Radha and C. P. Sumathi, "A Novel approach to extract text from license plate of vehicle", Signal & Image Processing" *An International Journal (SIPIJ*) vol.3, no.4, August 2012.

[4] Narendra Singh Tomar, Prakhar Sachan, Pranav Mittal, Shivani Agarwal "Vehicle Number Plate Detection Using MATLAB "*International Research Journal of Engineering and Technology* (IRJET) vol. 5, no. 05, May-2018

[5] Sarbjit Kaur "An Automatic Number Plate Recognition System under Image Processing" *I.J. Intelligent Systems and Applications*, vol. 3, pp. 14-25, 2016.

[6] Shilpi Chauhan and Vishal Srivastava "Matlab Based Vehicle Number Plate Recognition" *International Journal of Computational Intelligence Research*, vol. 13, no. 9, pp. 2283-2288, 2017.

[7] Aniruddh Puranic, Deepak K. T. Umadevi V. "Vehicle Number Plate Recognition System: A Literature Review and Implementation using Template Matching"

[8] Ami Kumar Parida1, S. H Mayuri ,Pallabi Nayk ,Nidhi Bharti" Recognition Of Vehicle Number Plate Using MATLAB" *International Research Journal of Engineering and Technology* (IRJET), vol. 03, no. 05 | May-2016.

[9] Nizar Zarka, Bassel Shanwar Reham Faour "Recognition of vehicle number plate using MATLAB"