

Survey on Vehicle Number Plate Recognition Using MATLAB

¹Shivali S.Josh, Dr.N.D.Pergad

Submitted: 25-09-2021

Revised: 01-10-2021

Accepted: 05-10-2021

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

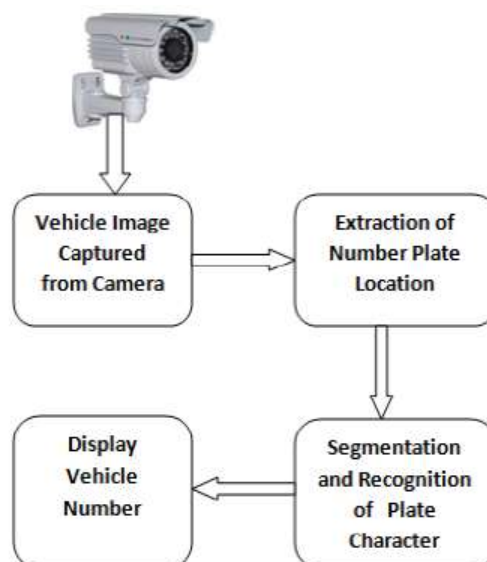
I. INTRODUCTION

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 its marked in the blocked list then it's not allowed to cross the gate and further checking process are followed.

I. THE GENERAL NPR SYSTEM:

Block Diagram of Number plate Recognition is shown in Figure. 1:

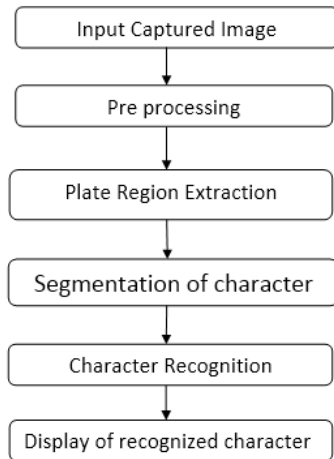


II. METHODOLOGY

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.

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.



flow diagram of number plate recognition

**NPR Implementation Using Matlab:
 Vehicle Image Captured By Camera:**

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



Fig1: image captured by camera

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 2: binary image

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 3: clear image after removing boundry objects

Character Segmentation:

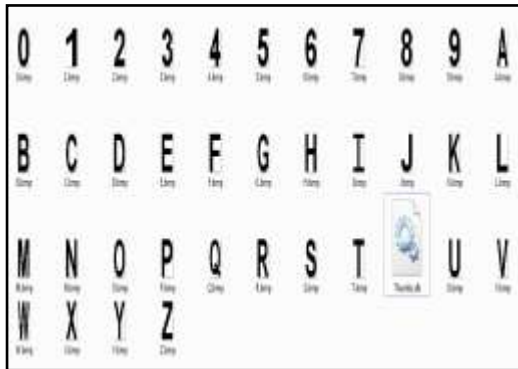
Segmentation is one of the most important processes in the number plate recognition, because all further steps rely on it. If the segmentation fails, a character can be improperly divided into two pieces, or two characters. The ultimate solution on this problem is to use bounding box technique. Once 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
1100000000	1100000000
11001110011	11002220033
11001110011	11002220033
00000000011	00000000033

Image objects labeling

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.



Templates used in matching process

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', licenceplateNo.)
```



Fig 4 :recognised numberplate

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.

Applications

- Parking
- Access Control
- Motorway Road Tolling

- Border Control
- Journey Time Measurement
- Law Enforcement

III. 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]. Dr. P.K.Suri, Dr. EktaWalia, Er. AmitVerma, "Vehicle Number Plate Detection using Sobel Edge Detection Technique", International Journal of Computer Science and Technology, ISSN : 2229 – 4333, IJCST Vol. 1, Issue 2, December 2010.
- [2]. Kumar Parasuraman and P.Vasanth 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.Radha1 and C.P.Sumathi2, "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 Tomar1, Prakhar Sachan2, Pranav Mittal3, Shivani Agarwal4 "VEHICLE NUMBER PLATE DETECTION USING MATLAB "International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056 Volume: 05 Issue: 05 | May-2018
- [5]. SarbjitKaur "An Automatic Number Plate Recognition System under Image Processing" I.J. Intelligent Systems and Applications, 2016, 3, 14-25 Published Online March 2016 in MECS (<http://www.mecs-press.org/>) DOI: 10.5815/ijisa.2016.03.02
- [6]. Ms. ShilpiChauhan and 2Vishal Srivastava "Matlab Based Vehicle Number Plate Recognition" International Journal of Computational Intelligence Research ISSN 0973-1873 Volume 13, Number 9 (2017), pp. 2283-2288
- [7]. AniruddhPuranic 2Deepak K. T. 3Umadevi V. "Vehicle Number Plate Recognition System: A

- Literature Review and Implementation using Template Matching”
- [8]. Mr. Ami Kumar Parida¹, SH Mayuri², Pallabi Nayk³, Nidhi Bharti⁴” Recognition Of Vehicle Number Plate Using MATLAB” International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395 -0056 Volume: 03 Issue: 05 | May-2016
- [9]. Dr. Nizar Zarka ²Eng. Bassel Shanwar ³Reham Faour “ RECOGNITION OF VEHICLE NUMBERPLATE USING MATLAB” <https://www.researchgate.net/publication/304625943> June 2016