International Journal of Innovative Technology and Exploring Engineering (IJITEE)
ISSN: 2278-3075 (Online), Volume-8 Issue-10, August 2019

Revolution by using Optical Character Recognition Technique to Identify Registered Number Plate

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Abstract: ***From past few years, the most interesting research topic is ANPR which registration of vehicles by their number plates. The purpose of this system is used for identifying number plate of numerous automobile. From automobile images, only number plate is extracted using binary mask method. And Optical Character Recognition (OCR) technique will be done with segmentation method. In segmentation, the numbers or characters on number plate are separated into small parts which is used to recognize using template matching in optical character recognition algorithm. As a result, the recognized number plate will be displayed. Also the result of this number plate is registered or not registered number plate will be displayed as a result.***
Keywords: Car images; NPR; Character Separation; OCR.

I. INTRODUCTION

Automatic Number Plate Recognition system utilizes OCR technique for reading number plate as well as storing information of vehicle place. ANPR is used by police force in which investigates of vehicles that vehicle is authorized or fake. This is main purpose of this application. It is also used for road utilization tax, tracing a missing vehicle, controlling traffic rules. The software design utilizes different technique to improve automobile image, to extract number plate, to segment this character on number plate and then to use optical character recognition technique. All vehicles are labeled with authorized number. Vehicle number is provided by the district level Regional Transport Office (R.T.O) which has main authority on road matters.

In any accidents or criminal incidents, all information about car and its owner will be received through it. In this type of incident, help to identify the number plate is registered or not. If the number plate is registered, it can find all information about the owner with the help of R.T.O office. But if the number plate is not registered, then it will display this number is fake. This is a main application used in this project.

II. LITERATURE REVIEW

This system is used for identifying vehicle number plates for the purpose of security system. The purpose of the paper is to implement recognition of vehicle license plate automatically which is authorized. In highly restricted area, this system is utilized in front of gate only for safety purpose.

Manuscript published on 30 August 2019.
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When the vehicle enters into a gate, number plate of vehicle is automatically detected. This data stored in database so that black listed numbers will not be allowed to enter [10]. Ms. Suhama et.al [13] have presented this system. Due to different shape, size, colour in different countries on number plate, to recognize vehicle number plate is difficult. Therefore, this area is challenging. This paper propose a system to localize of vehicle license plate in West Bengal (India). After reducing noise from vehicle images, to improve images. After that, all numbers and characters are segmented then they are identified each number separately.

Katrtikey et.al [4] have proposed a system named as smart vehicle identification system using OCR. The system is designed to park vehicles using OCR. Also designed to detect vehicle images and instantly to update the database. This is main application of this paper.

Ragini et.al [12] have presented different techniques which is simple for many applications. Also segmentation process carried out by using bounding box method. After segmentation, to recognize number and characters using template matching.

III. SOFTWARE DESIGN

ANPR system can be implemented as follows:

1. Pre-processing: To convert RGB into gray scale.
2. Plate region extraction: To extract number.
3. Character segmentation: To separate numbers on extracted number plate.
4. Optical character recognition: To recognize output of segmentation using template matching.
5. Number Plate Recognition: To display number plate using optical character recognition technique.
6. Check for Authorization: To check the number is authorized or not.

Detailed information of above processes are given below:

1. Pre-processing:

The pre-processing process is used for improving automobile images with unwanted noise. RGB image is converted into gray image as shown in below fig (a) and (b).

Fig (a): RGB image

Fig (b): Gray image

2. Plate region extraction :

Different paper have suggested different methods to extract the number plate. We used binary mask method. The number plate is a region of interest by creating binary mask as shown in below fig (c). The figure of masked outside region is shown in below fig (d). And then finally output of this process is shown below fig (e). This is an extracted number plate.

Fig (c)

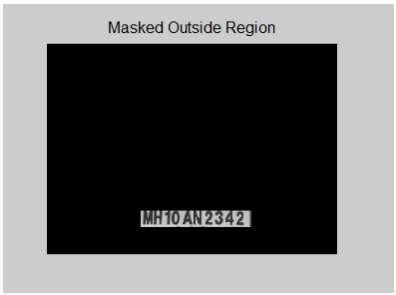


Fig (d): Masked outside region

Fig (e): Extracted number plate

3. Character segmentation :

Segmentation is carried out after plate region extraction process. Extracted number plate cannot be used as it is. It needs to be divided into small parts. This is called as segmentation process. Output of this process is shown in below.

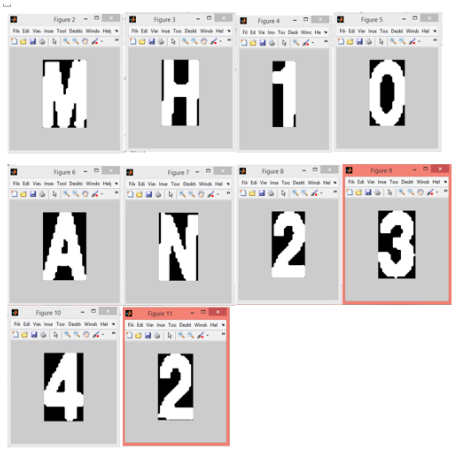


Fig (f): Character and number segmented

4. Optical Character Recognition :

After segmentation, OCR algorithm is performed. OCR convert image in printed form, typed or handwritten document into machine encoded text. This OCR technique is depend on template matching as shown in below fig (g).

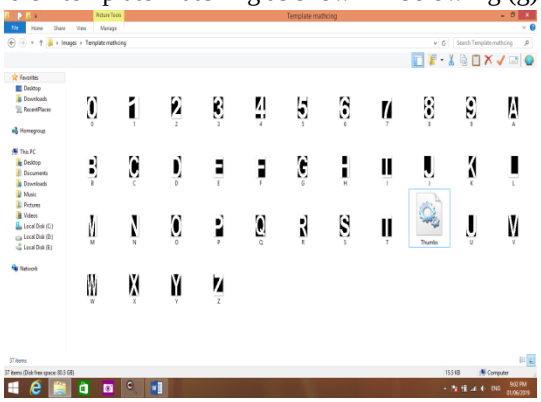


Fig (g): Template matching chart

5. Number Plate Recognition :

The ANPR with OCR will use for converting data which will make possible to built-up database network from extracted database.

Retrieval Number: I8643078919/19©BEIESP
DOI: 10.35940/ijitee.I8643.0881019
Journal Website: www.ijitee.org

Published By:
Blue Eyes Intelligence Engineering and Sciences Publication (BEIESP)

Commercial organizations, large scale industry can use automatic number plate recognition for their own business and effective time management using OCR tracking. The final output of number plate recognition system is shown in below fig (h).

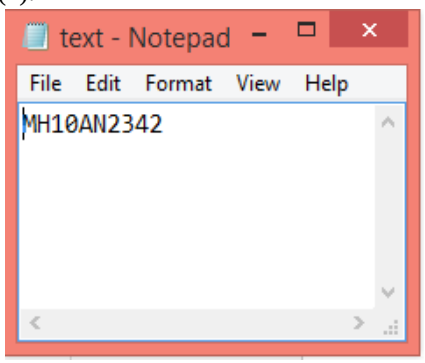


Fig (h): Number plate

6. Check for Authorization :

This paper check the number plate is registered or not registered. The output of optical character recognition algorithm compare with the database which is given from Regional Transport Office. If the number matches with the database, it will display as "The vehicle number is registered with RTO" as shown in below fig (i).

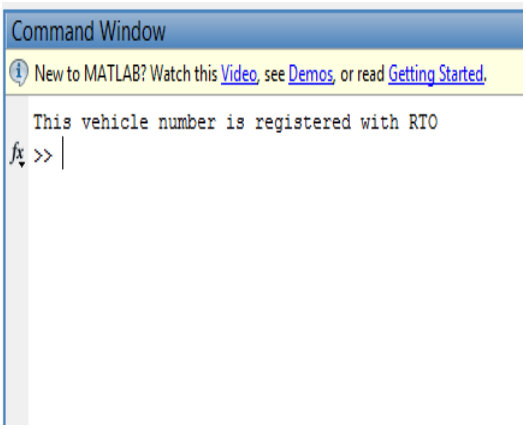
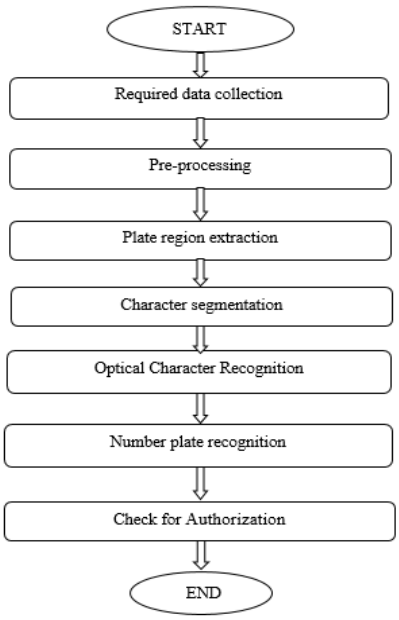


Fig (i)

Flow chart



IV. EXPERIMENTAL RESULTS

A database consists of different typed coloured images. Total 22 car images taken for performing above processes. The images are taken from car parked in parking slot or mall or driven on road. Following table 1.1 shows the performance rate of this processes.

Table 1.1 Performance rate of OCRT

Algorithm	Accuracy	Percentage
Plate Region Extraction	21/22	95%
Character Segmentation	21/22	95%
Optical Character Recognition	21/22	95%

This system has limitation such that while extracting number plate. Vehicle image is captured neither too close nor too far with number plate. If and only if number plate is extracted properly then this number plate is recognized correctly.

V. CONCLUSION

The important applications are identification of car number and registration of car number. This applications are used for identifying number plate is authorized or fake. For all the vehicle images in database number were successfully extracted and detected using optical character recognition algorithm. An additional application was performed for registration of car number. An extracted car number from whole image was compared with database and if it exists in database then the number was displayed as registered number plate, if not it was displayed as not registered number plate.

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