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Recognition of Vehicle Number Plate Using Matlab

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ABSTRACT: As the count of number of vehicles is increasing day by day the manual process of detecting a moving object has become challenging and difficult. So we need an alternate method which will replace this manual method and can give us accurate results. This can be achieved by the video surveillance which is based on the image processing. In the recent days the video surveillance system can be used at many applications like military, ATM/Banking security, Traffic management etc.This ANPR Proposes a method for the detection and identification of vehicle number plates that will help in the detection of number plates so called as NPR of authorized and unauthorized vehicles. This presents an approach based on simple but efficient morphological operations and this approach is simplified to segmented all the letters and numbers used in the number plate by using the Bounding Box method. After segmentation of numbers and characters present on the number plate, the template matching approach is used to recognize numbers and characters. Finally we use OCR by 2d correlation to display the NP of the Vehicle. The concentrate is given to locate the number plate region properly to segment all the numbers and letters to identify each number separately and print letters in ASCII text format.

KEYWORDS: Automatic Number Plate Recognition (ANPR), Number Plate Recognition (NPR), Optical Character Recognition (OCR), Number Plate (NP), American Standard Code for Information Interchange (ASCII),Bounding Box, 2d correlation, Morphological operations.

I. INTRODUCTION

In current days the vehicle plays very important role in transportation and the use of the vehicle is also increasing day by day. Due to these increase of vehicles the illegal activities and the traffic management has become difficult. As the vehicles consists of unique and licensed number plates. The vehicle can be identifiedby their unique number plates. This proposes Automatic Number Plate Recognition (ANPR).

"VehicleNumberPlateRecognition"systemusesOpticalCharacterRecognition (OCR) software to convert images of vehicle registration numbers into information for real time or retrospective matching with law enforcement and otherdatabases.Thissystemisanintegratedhardware-softwaredevicethatreadsthevehicles number plate and outputs the number plate number in ASCII - to some dataprocessing system. This system is also known as License Plate Recognition (LPR)and Automatic License Plate Recognition(ALPR)systems.

II. EXISTING SYSTEM

In the previous existing systems, they have used different methodologies for the character extraction and character segmentation like Threshold segmentation, Edge-Based Segmentation, Region-Bases Segmentation, Clustering Based Segmentation methods are used, for the extraction of the number plate Region we use the Edge Segmentation methods. In Previous some used Sobel Edge detection, Robert Edge Detection, Prewitt Edge Detection. For Character segmentation they are Explicit Segmentation (Pure Segmentation), Implicit Segmentation (Recognition Based Segmentation) and Holistic (Segmentation Free)**.** Most rottenly using methods are image binarization method.

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III. PROPOSED SYSTEM

Our proposed system is such that it may overcome the disadvantage of all the existing systems like:

1. Misidentification:

Ifin case the vehicle number is read Incomplete or partially, then the system might identify the number plate wrongly or would not be able to identify the correct number at all.

2. Hazy Images:

Hazy images can also make the detection process erroneous or there is a possibility of no detection at all.

3. Flaws in angular detection:

Angular detection is not possible in case of ANPR as the shape of the number plate changes, as it follows the rectangular algorithm, implemented in OCR is not possible when the characters may be misread/ overlapped.

We first introduce in a way that it reads an input image file format, then color conversion to rgb to gray and image enhancement, then the gray image is converted to binary image, the later we remove all the noises from the images, major step of the processes is Number plate extraction, later on character segmentation, finally displays the output in command prompt and notepad file.

III. TECHNIQUES

BOUNDING BOX TECHNIQUE

Bounding box technique helps in locating high frequency areas. If the image is binarised then most of the detail is lost from the image, leaving our area of interest more prominent. Taking row wise or column wise of an image gives the information about the less detailed and more detailed areas of the image. So it becomes easy to find out the areas with high frequencies.

Once the image is binaries its row wise histogram (sum of white or black pixels in each row) or signature is taken to find out which number of rows is showing ridges. These ridges are basically high frequency areas and one of these ridges will definitely be a number plate. A threshold value is used to indicate the starting and ending point of the ridge. The best results were shown by taking the average of the minimum point and the median of the row as the threshold. Once the ridges in the row of the image are obtained, column wise of those row ridges is calculated. This will further refine the candidate image by removing those columns from the row ridge which do not possess much detail. This is done by choosing the ridges out of the column histogram of the ridge area in the row histogram.

The extracted characters are then given to the OCR module.

OCR by 2D Correlation:

Given the chosen license plate and the coordinates that indicate where the characters are, we begin the OCR process by 2D correlation. We correlate each character with either the alphabet or the numeral templates then choose the value of each character based on the result of the correlation. The first three characters on the standard License Plates are alphabets; therefore, we correlate each one of them with the 26 alphabet templates. The latter four characters on the standard License Plates are numerals; therefore, we correlate each one of them with the 10 numeral templates. The result OCR is chosen based on the maximum values of the correlation for each character. However, we realized that certain characters are frequently confused. As a quick solution, we implanted a scheme to display possible alternatives. Those characters that are identified as easily misinterpreted are subjected to a correlation comparison with an array of other characters that is historically known to be easily confused with the originals. If there is a possibility that a letter or number can be confused with more than one character, the characters are listed in the output in the order of decreasing likelihood. This likelihood is based on the correlation values of the character with the various templates, where high correlation denotes a good possibility.

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IV. FLOW DIAGRAM

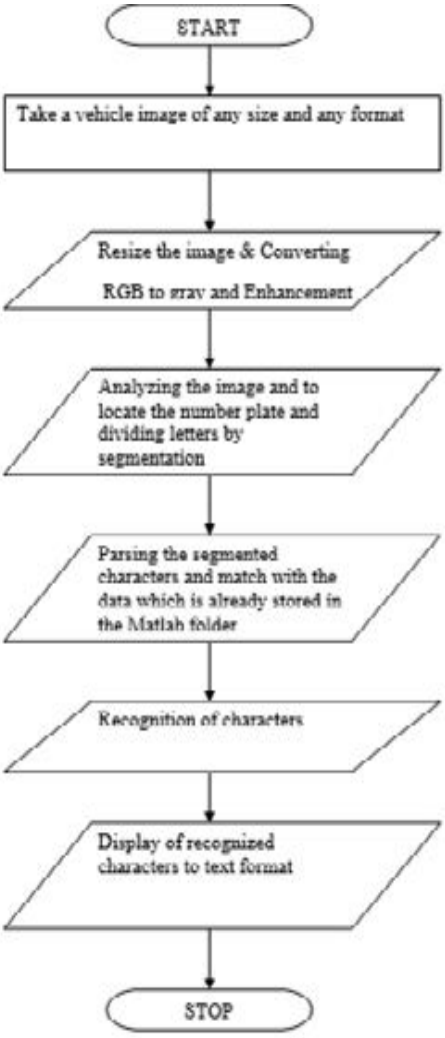

Figure 1: Flow Diagram

The following methods are used in this technology:

a) Image Capturing from Camera:

This is first phase of the system in which image from the camera is captured. It is a normal image from normal camera following RGB format. We will be using imread(img_name) function from MATLAB Library to read the image.

Figure 2: Input Capturing

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b) Pre Processing:

In this step the noises from the image are required to be cleared to obtain an accurate result.

Gray Processing: Image resize and image enhancement will takes place with the help of imerode and imitate functions**.** This steps involves in the conversion of RGB Image into a gray scale image. According to the RGB values of the image, Gray value is calculated.

1 Gray= 0.114*R + 0.587*G + 0.299*B

Figure 3: Input Image

Medium Filtering: This step involves in the removal of noise in the image,Filtering is used to make the image free from noise.

Figure 4: Gray Scale Image

c) Extraction of Number Plate: The extraction of number plate can be done by using Bounding Box Technique.Binary image form of the Gray image, which is the output of im2bw function.

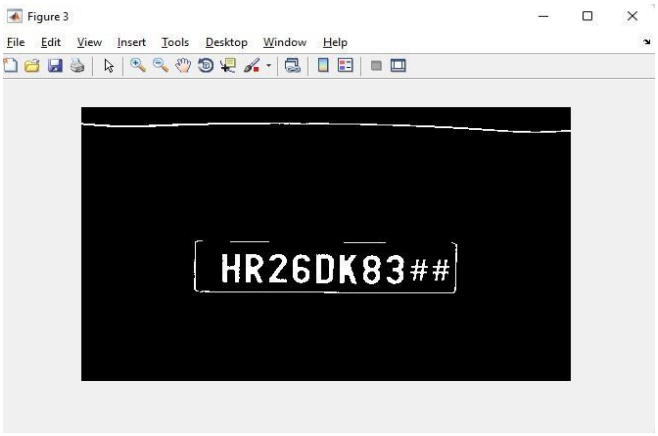

Figure 5: Number Plate Extraction

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d) Character Segmentation: Character segmentation is an operation to decompose an image into the sub-image of individual symbols.

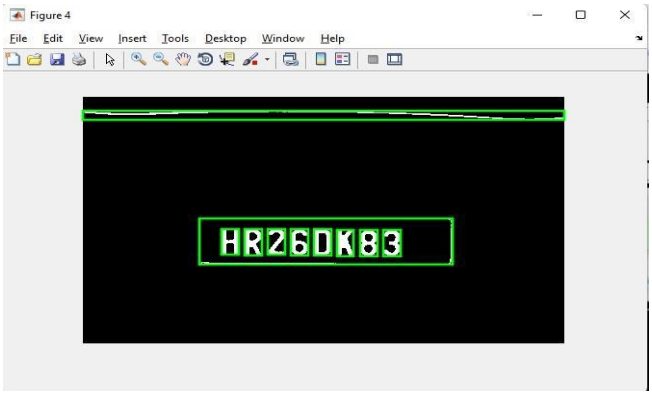

Figure 6: Character Segmentation

e) Character Recognition: After the segmented images are matched with template images which were already stored as templates. Mat file and it is the last stage in vehicle number plate recognition**.**

Figure 7: Bitmap images

f) Display Vehicle Number: This is the final stage of Number Plate Detection.The output of Number Plate is displayed on the Screen in two types.

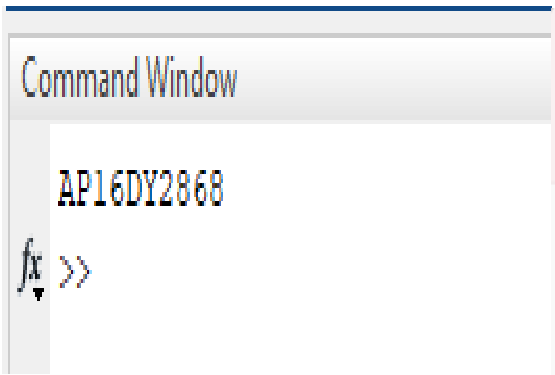

Figure 8: Output in Command Prompt

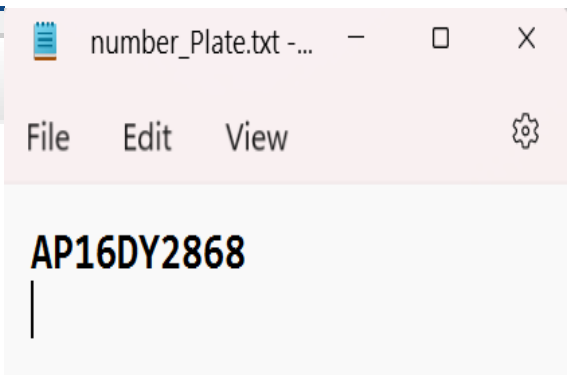

Figure 9: Output in Notepad

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V. FUTURE SCOPE

The software can be used along with camera to serve many applications and we can even make the system automatic. An additional camera can focus on the driver's face and save the image for security reasons. In order to reduce the execution time of the code this can be implemented using c/c++ or any other object oriented programming languages like Python and Java.

VI. CONCLUSION

As described in the project, this system provides characters of the Vehicle number plate in ASCII text format that can be used for various applications. This is a comprehensive step providing traffic management, security, control and offender identification. This technology is simple and does not need any installations on Vehicles.

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