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Automatic Number Plate Recognition by Using MATLAB

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ABSTRACT: The video supervision systems are most well-liked for security observation; however, the detection of the dynamic or moving object may be a challenging part. In areas where automobile parking zone is taken by a particular vehicle, the incorrectly put vehicles are recognized. It's noted that the license plates of the vehicles are found in many forms, size and together they are completely different in color. This makes the detection of the amount plate of a vehicle, the foremost fascinating and tough analysis topic. Variety plate detection is helpful to find purloined cars, automobile parking management system and identification of the vehicle in traffic. In our analysis, we given a system that is used to find and identify the amount plate of a specific vehicle and store the information into text form. Alongside Sobel edge detection technique, the morphological operation is employed to find the amount plate characters followed by segmentation approach, within which bounding box procedure is used to segment and extract every character from the amount plate. When the segmentation, example matching approach is formed use of to match the variety and characters of the number plate. The number plate decoded are used more for identification, matching and documentation purpose of vehicle details

I. INTRODUCTION

The escalating increase of latest urban and national road networks over the last 3 decades emerged the necessity of efficient observance and management of road traffic. Standard techniques for traffic measurements, like inductive loops, sensors or EM microwave detectors, suffer from serious shortcomings, expensive to put in, they demand traffic disruption throughout installation or maintenance, they are large and that they are unable to discover slow or temporary stop vehicles. On the contrary, systems that are supported video are simple to put in, use the existing infrastructure of traffic surveillance. Moreover, they will be simply upgraded and that they provide the flexibility to redesign the system and its functionality by simply ever-changing the system algorithms. Those systems enable activity of vehicle's speed, counting the quantity of vehicles, classification of vehicles, and also the identification of traffic incidents (such as accidents or serious congestion). There is a good style of systems supported video and image process using totally different methodologies to detect vehicles and objects.

In the present period, the exponential rise of vehicular movement has changed into an enormous reason of worry amongst the population staying within the capitals, metropolitans and concrete areas. This after has created it hard for various law implementation offices to observe all of the vehicles on streets. These agencies are liable for nabbing the vehicles that are breaking several of the traffic rules. If we tend to think about violations against security and the way the culprits arrange to do their malign plans, we start to acknowledge precisely however often a vehicle is an element of it. Identification of the vehicle is additionally crucial for electronic toll machines. Thus, electronic toll accumulation depends deeply on recognizable proof of the vehicle space and exactly. Not simply that, identification of vehicles plays a vital role in national security likewise. In some countries, cross border security additionally needs the vehicle to be known before they cross into another country.

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II. PROPOSED METHODOLOGY

The number plate recognition of a vehicle is one of the important parts of an intelligent traffic control system. License number plate is unique identification of any vehicle. Due to growth of population and human needs, it becomes very difficult to control the vehicles. Hence range Plate Recognition is designed to create the task of controlling vehicles straightforward. Number plate recognition is largely a picture process technology that plays necessary role in maintaining traffic rules and enforcement. range Plate Recognition has type of applications like speed enforcement, toll collection, parking zone management, management and sight criminal activities, security control of restricted areas like military zones, border areas or high government office areas

Recognition of Number Plate

The block diagram for a general system for recognition of the number plate shown in figure 3.1. This process is generally complete four steps:

- Vehicle Image Captured by Camera
- Extraction of Number Plate
- Segmentation and Extraction of Plate Character
- Display plate number

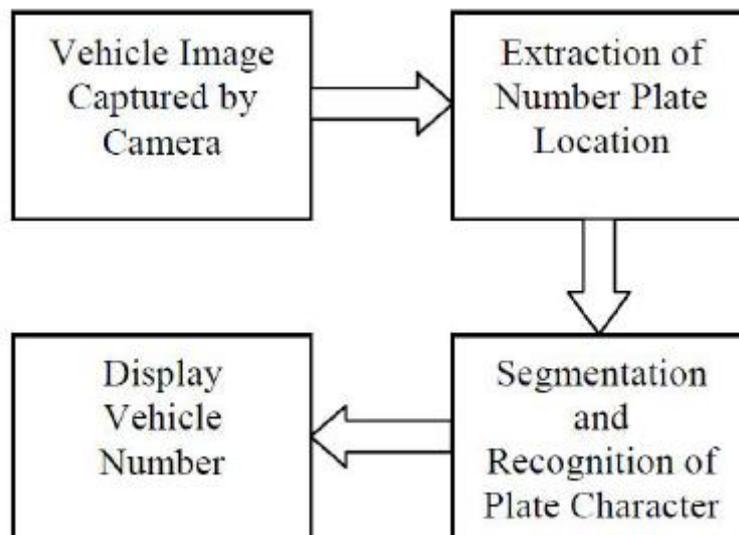


Figure 1 General System Block Diagram

Vehicle Image Captured by Camera

The photograph of the vehicle whose number plate presented in image given below as fig 3.2 is to be recognized is caught utilizing an advanced camera.

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Figure 3.2; Vehicle input image

Extraction of Number Plate

In this progression, the colour image that contains variety plate of a vehicle is reworked into Gray-Scale. Here scientific morphology is employed to find the areain conjunction with Sobel edge operations that are used to calculate the edge boundary. After this, we tend to get a dilated image. At that time, infill operate is employed to fill the gaps with the goal that we tend to get a reasonable binary image.

Segmentation and Extraction of Plate Character

For segmentation of the characters, the bounding box approach is employed. It's accustomed gauge properties of the Image at the region of interest. The essential step in acknowledgment of the quantity plate is by recognizing the plate options and size. Here the extracted image is increased by the grayscale image with the goal that we tend to only acquire the quantity plate space within the image of the vehicle.

Final Output

After performing the above every steps the number plate which is segmented and extracted is converted into the text from and displayed in MATLAB window

These linear holes vanish once the dilation of the Sobel image is created utilizing linear structuring elements. Structuring elements are in type of matrices that may be a characteristic of a particular structure and highlights to determine the state of an image that is employed to do another image process operation.

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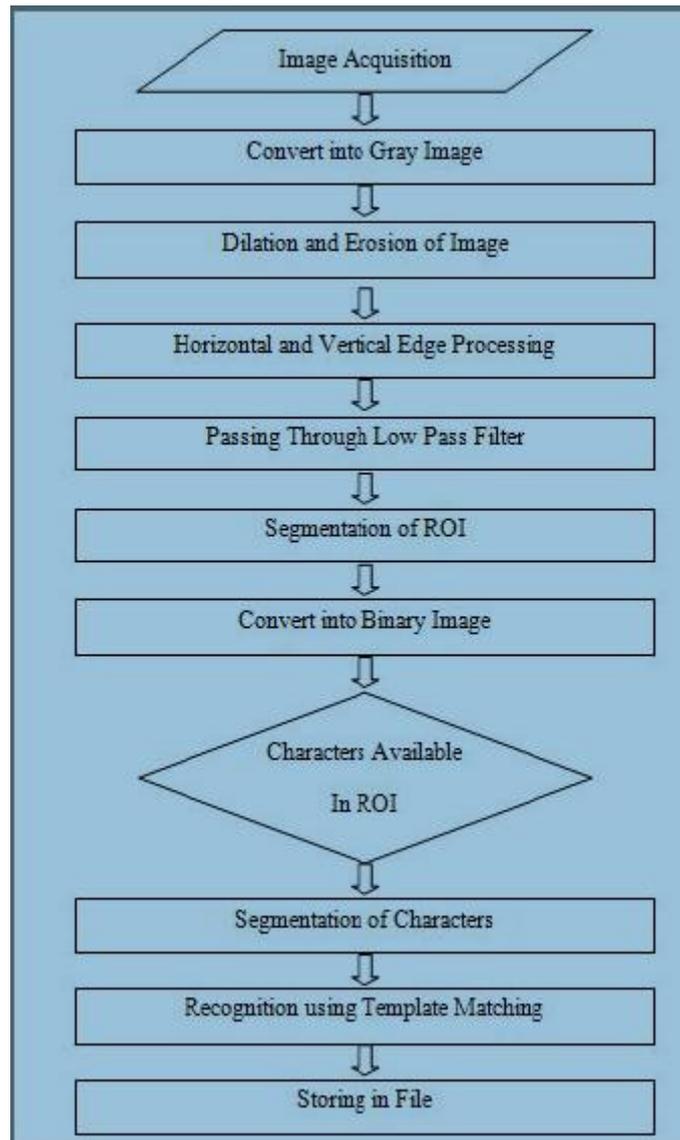


Figure 2: Flowchart of the process.

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Implementation

second stage after run the code file open the choose an input image. Any one of the input image choose from the folder.



Figure 3: Original Image



Figure 4: grayscale image

In this figure shows grayscale image. This step is the RGB to grayscale image conversion. The Color image to grayscale conversion is embraced, with a specific end goal to enhance the plate extraction efficiency, and increment in

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the processing speed. This step is necessary to get a binary image. This step takes the segmented image from the previous step and uses it for further processing.

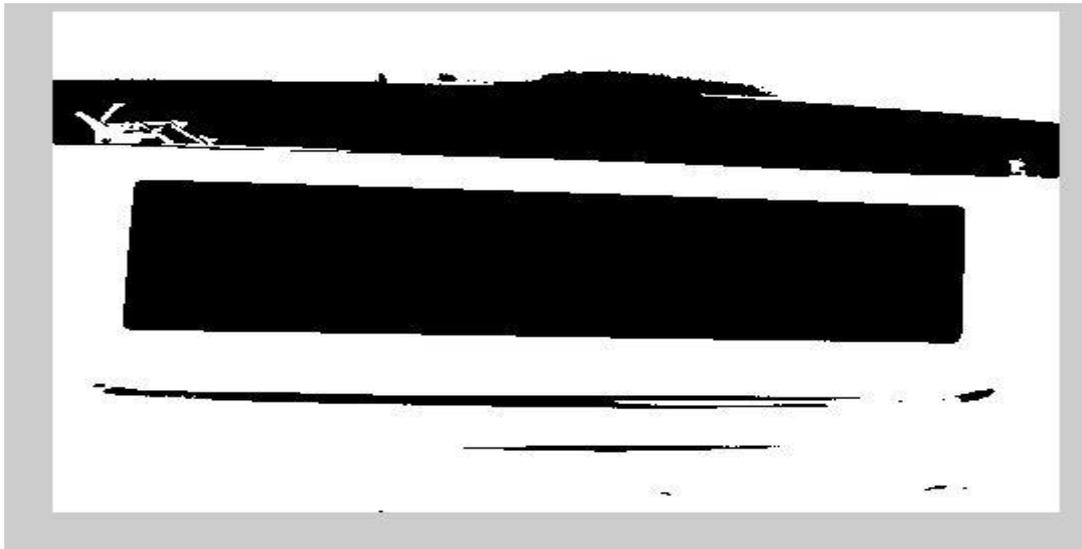


Figure 5 Binarization

This image shows the Binarization image. After computing gray scale image, it will be converted into binary image. For better output, convert image for binarization. Screenshot of the 'Binary image' is shown in Figure 5.



Figure 6: After Dilation, Erosion and converting it into Binary Image inverted image

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Here, a threshold value is used to remove the extra noise from the picture. In this step, the function removes pixels smaller than the threshold value. 5. An additional function is used to invert the image. The inverted black and white image is shown in Figure 4.6.



Figure 7: Building Boxes over Characters and numbers by bounding box method

Figure 7 demonstrates the use of bounding box method over characters of the number plate. The bounding box is used to gauge the properties of the image area. The bounding box is made over on every character introduced on the number plate, due to which every character and number is extracted out for identification.



Figure 8: Segmented Characters and Numbers

The segmented image is related to segmentation and labeling of characters. 'bwlable' and 'imcrop' functions are used for labeling and cropping of the characters from a single image. All the extracted characters will be displayed in sequence and individual segments so that we can compare them with the templates. The total number of segments is equal to the number of characters in the number plate.

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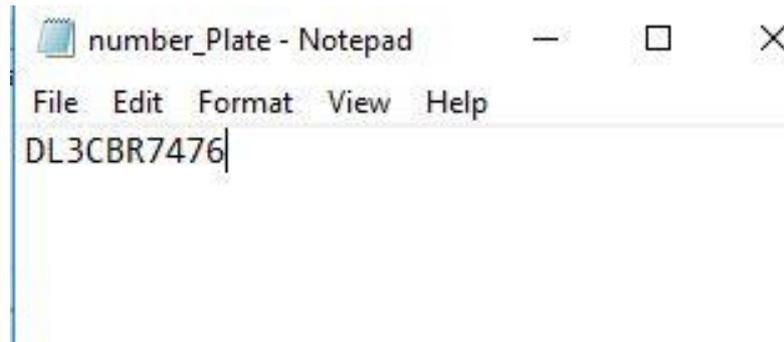


Figure 9 Final output stored in notepad file

Figure 9 demonstrates the final yield in a text frame. After the segmentation and labeling, the program compares the extracted characters with the templates. The final extracted output will be stored in a text file. This text file contains total number of extracted characters.

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