THE NATIONAL INSTITUTE OF ENGINEERING

MYSURU-570008

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

MINI PROJECT [EC0201] –VI Semester

Synopsis On

Vehicle License Plate Number Detection Using Image Processing

Under the guidance of:

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ABSTRACT

The ultimate aim in a large number of image processing applications is to extract important features from image data, from which a description, interpretation on, or understanding of the scene can be provided by the machine. Image processing can be defined as, the processing or altering an existing image in a desired manner. This system allows the user to take hard copy of the image using printer routines and allows the user to store screen image into the disk file using file format (bmp ,jpg , gif). Image processing in its general form pertains to the alteration and analysis of pictorial information. We find instances of image processing occurring all the time in our daily lives. Probably the most powerful image processing system is the human brain together with the eye. The system receives, enhances and stores in images at enormous rates of speed.

The objective of image processing is to visually enhance statistically evaluate some aspect of an image not readily apparent in its original form. The basic principle of image processing operations carried out will assist us in greater perception and vision but does not add any information content. This objective is carried out through development and implementation of processing means necessary to operate upon images.

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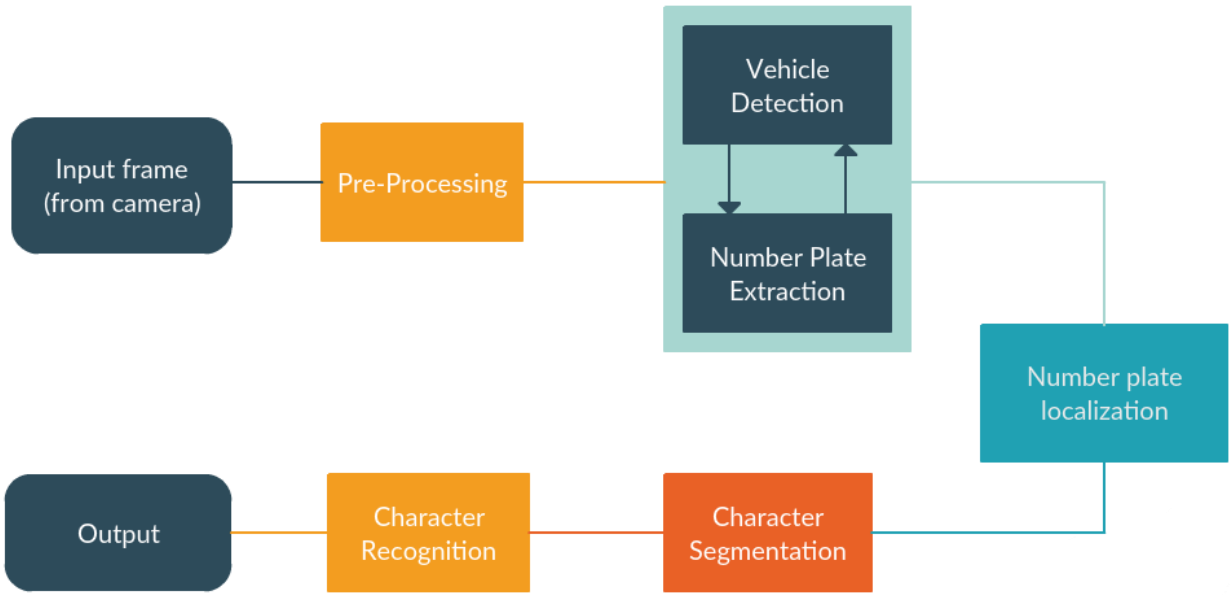
INTRODUCTION

Real Time Number Plate Recognition System is an image processing technology which uses number (license) plate to identify the vehicle. The objective is to design an efficient automatic authorized vehicle identification system by using the vehicle number plate. Number plate recognition (NPR) can be used in various fields such as vehicle tracking, traffic monitoring, automatic payment of tolls on highways or bridges, surveillance systems, tolls collection points, and parking management systems. The developed system first detects the vehicle and then captures the vehicle image. Vehicle number plate region is localized using Neural Network then image segmentation is done on the image. Character recognition technique is used for the character extraction from the plate. The resulting data is then stored in a database along with the time-stamp. The system is implemented and simulated in python, and its performance is tested on real image.

BLOCK DIAGRAM:



Steps involved in License Plate Recognition using OpenCV and tesseract-OCR:

License Plate Recognition or LPR for short, involves three major steps. The steps are as follows

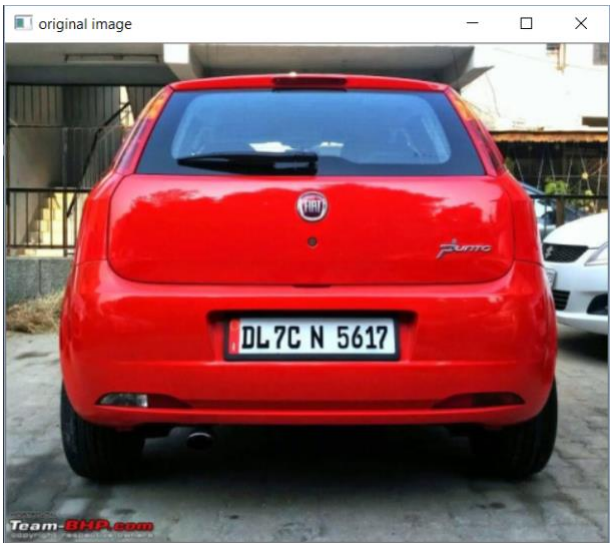
1. License Plate Detection: The first step is to detect the License plate from the car. We will use the contour option in OpenCV to detect for rectangular objects to find the number plate. The accuracy can be improved if we know the exact size, color and approximate location of the number plate. Normally the detection algorithm is trained based on the position of camera and type of number plate used in that particular country. This gets trickier if the image does not even have a car, in this case we will an additional step to detect the car and then the license plate.

2. Character Segmentation: Once we have detected the License Plate we have to crop it out and save it as a new image. Again this can be done easily using OpenCV.

3. Character Recognition: Now, the new image that we obtained in the previous step is sure to have some characters (Numbers/Alphabets) written on it. So, we can perform OCR (Optical Character Recognition) on it to detect the number.

1. License Plate Detection

Let’s take a sample image of a car and start with detecting the License Plate on that car. We will then use the same image for Character Segmentation and Character Recognition as well.

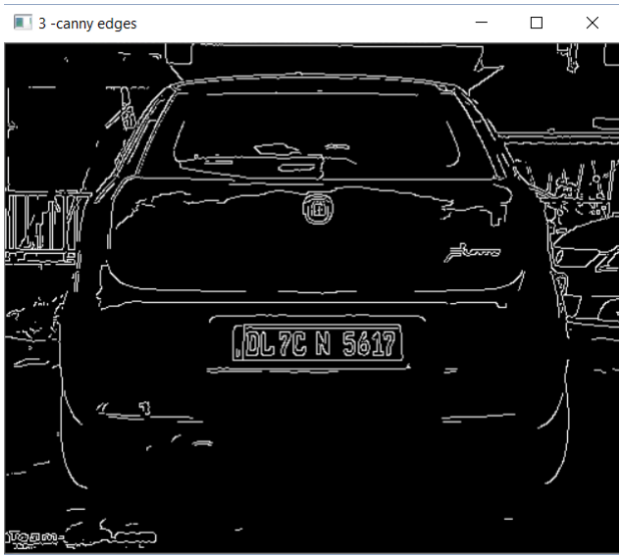


Step 1: Resize the image to the required size and then grayscale it.

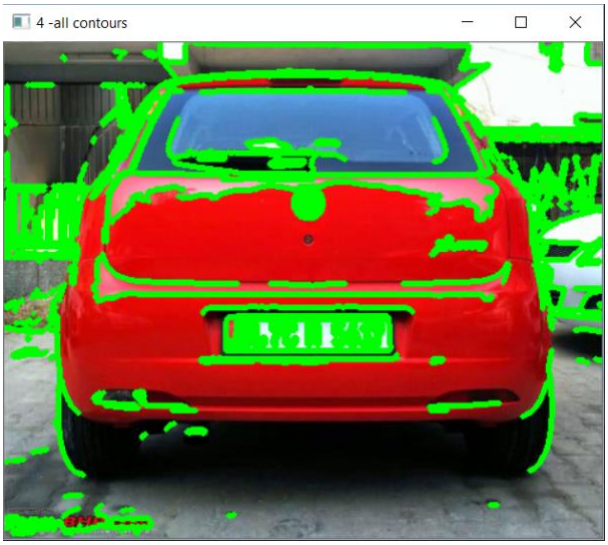
Resizing we help us to avoid any problems with bigger resolution images, make sure the number plate still remains in the frame after resizing. Gray scaling is common in all image processing steps. This speeds up other following process since we no longer have to deal with the color details when processing an image. The image would be transformed something like this when this step is done.

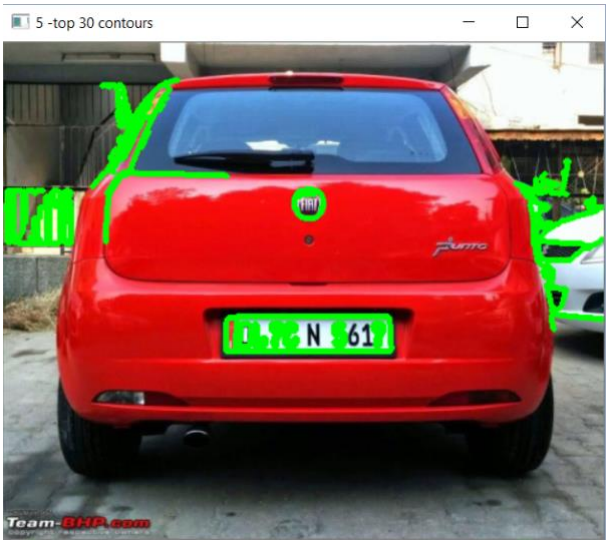
Step 2: Every image will have useful and useless information, in this case for us only the license plate is the useful information the rest are pretty much useless for our program. This useless information is called noise. Normally using a bilateral filter (Bluring) will remove the unwanted details from an image**.**

Step 3: The next step is where we perform edge detection. There are many ways to do it, the most easy and popular way is to use the canny edge method from OpenCV**.**

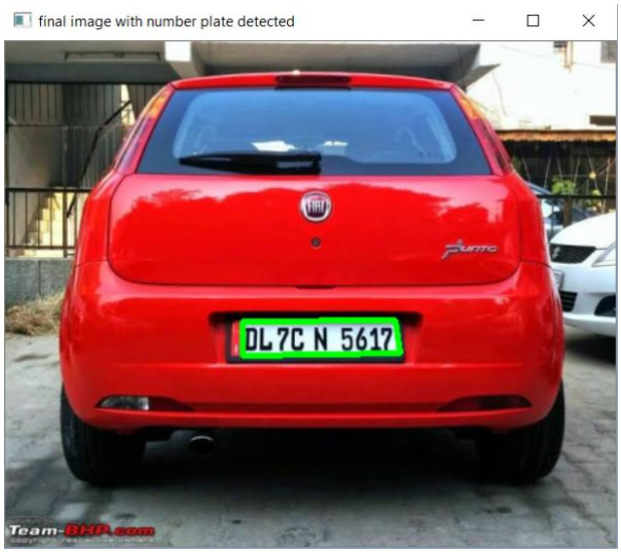


Step 4: Now we can start looking for contours on our image.Once the counters have been detected we sort them from big to small and consider only the first 30 results ignoring the others. In our image the counter could be anything that has a closed surface but of all the obtained results the license plate number will also be there since it is also a closed surface.





Step 5: To filter the license plate image among the obtained results, we will loop though all the results and check which has a rectangle shape contour with four sides and closed figure. Since a license plate would definitely be a rectangle four sided figure.

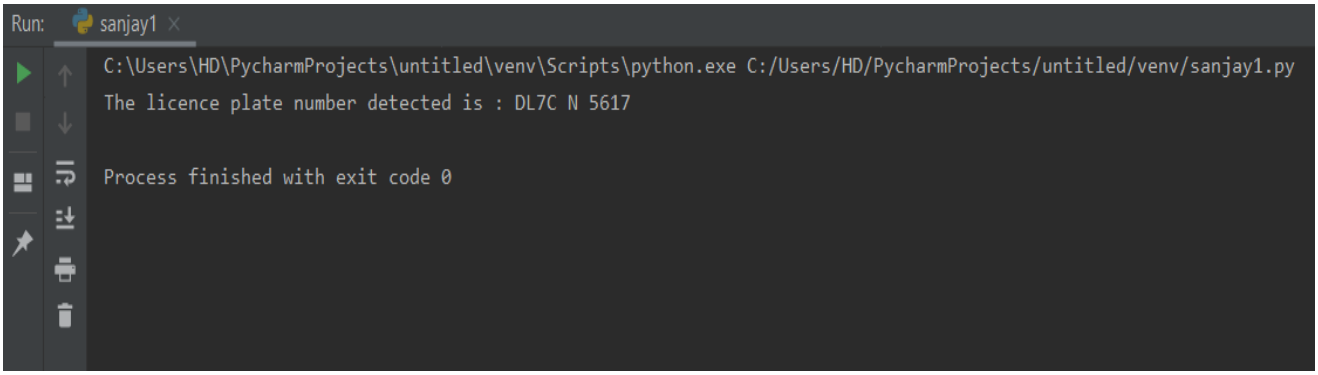


2. Character Segmentation

The next step in Number Plate Recognition is to segment the license plate out of the image by cropping it and saving it as a new image**.** We can then use this image to detect the character in it.

3. **Character Recognition**

The Final step in this Number Plate Recognition is to actually read the number plate information from the segmented image**.** We will use the pytesseract package to read characters from image.



HARDWARE REQUIREMENTS

1. PC/ Laptop/Server

2. Surveillance Camera

SOFTWARE REQUIREMENTS

1. Python 3.7 & Open CV

2. Tesseract

3. Pycharm

APPLICATION

1.vehicle owner identification
2.vehicle model identification
3.vehicle location tracking

LIMITATIONS

1.Camera should be of good quality. Otherwise correct text from image could not be extracted properly.

2.If the image contains more than one rectangular contour it may not detect the number plate.

FUTURE ENHANCEMENT

Most of the Automatic number plate recognition focus on processing one vehicle number plate but in real-time there can be more than one vehicle number plates

while the images are being captured.

REFERENCE

https://aihubprojects.com/real-time-number-plate-recognition-system/

https://towardsdatascience.com/automatic-license-plate-detection-recognition-using-deep-learning-624def07eaaf