
Matlab Based Algorithm for ANPR

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Abstract:

The world is developing day by day and with the developing world the number of vehicles is also increasing. This increasing number of vehicles has brought problems in traffic maintenance and security system. It has become very difficult to keep a track of all the vehicles properly. Here in order to solve this problem we have tried to develop a system which would automatically detect the vehicle number plate and can keep the record stored for a long time without any fault. We have here implemented Matlab coding to operate the system. Tracking number plate is very important in surveillance. This system is used in traffic control system, security area, parking, tolling.

Keywords:

Number plate Recognition, Matlab, Digital Image processing.

I. INTRODUCTION

Number plate recognition is a very hot topic of research in the field of Digital Image Processing. The recognition of vehicles number plate is based on Digital Image processing. It uses the Digital camera for capturing of the images. The captured images are converted into gray scale images. After the conversion, the holes present in the image needs to be filled for which it applies dilation process. Following this process horizontal and vertical edge processing is done and the histograms are passed through the low pass filter. The purpose of using Low pass filter

is to eliminate unwanted noises from the images. The image is then segmented and converted in to Binary form. Processing of binary images is more easy compared to coloured images. The binarization process is followed by extracting the alphanumeric character from number plate which is recognized with the help of template images of alpha numeric characters. Each of the alphanumeric character is stored in the file and later on the hole number plate is extracted successfully.

II. IMAGE PREPROCESSING

This section shows step by step pre processing of the images. The preprocessing is done in MATLAB. MATLAB has inbuilt tools which can be used for this purpose. The advantages of MATLAB are as aforesaid below:

1. For numerical computation it provides advanced algorithm.
2. For plotting and displaying data, two and three dimensional graphics are supported.

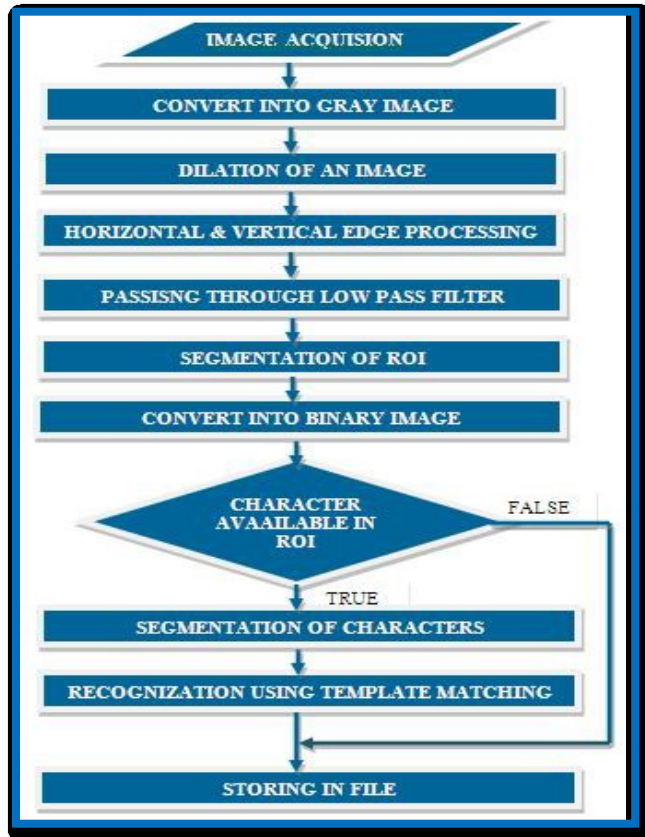


Fig1: Preprocessing of Images.

3. Online help is present which is very much helpful for new user
4. Several Tool boxes are provided which can be taken into use. Some tool boxes are Image processing Tool box, Speech processing tool box.

Image Acquisition: First step is the acquisition of image. In this stage image is captured with the help of digital camera. Images should be captured from a perfect angle so that the number plate is displayed properly.

Conversion to Gray scale: This step involves conversion of colored images in to gray scale images. For acquiring more information about the image and reducing the noises present in the captured images the coloured images is converted in to gray scale image.

Dilation of an image: Dilation steps also include removal of unwanted noises from the

image. Dilation is basically used for filling the holes in an image.

Horizontal and vertical edge processing: Horizontal and Vertical histogram are used to denotes the column wise and row wise histograms.

These histograms represent the row wise and column wise sum of difference of Gray scale values among neighboring pixel values.

Passing histograms through low pass filter: The values of Histogram are passed through low pass filter because the values of histogram between rows and columns changes rapidly, so in order to minimize the loss of information low pass filter are used. Here this step is used for both horizontal and vertical histograms. Histogram values are averaged on both sides.

Segmentation of Region of Interest: The segmentation of image is required to identify the regions which can provide information about license plate and also the coordinates of such region.

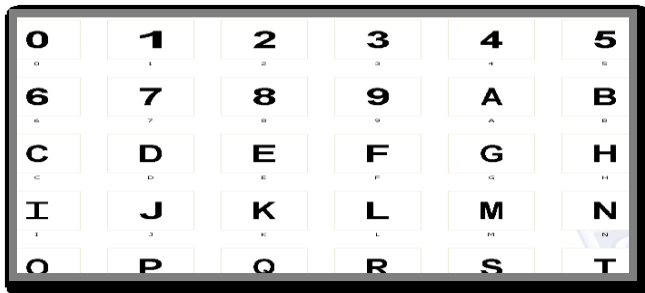
Extraction of region of interest: The section which has highest horizontal or vertical histogram values that value is identified and considered as the most probable region for number plate.

Convert into Binary Image: The gray scale image is converted in to Binary image and the intensity change value is calculated very easily as compared to gray scale and coloured images.

Segmentation of alphanumeric character: Next step involves segmentation of all alphanumeric characters. both horizontal and vertical histograms are taken in to consideration for segmentation. Smearing algorithm is used for segmentation. For vertical histogram vertical smearing algorithm is used and for horizontal histogram horizontal smearing is used. the purpose of smearing algorithm is to fill the space of inner part of character and to determine some threshold value.

Recognition of individual character:

Recognition of character is an important step in vehicle number plate recognition. Character recognition is done by using Template matching. In this method the segmented image is compared with the stored character in the database. The best result of the comparison is taken into account. The image which gives the highest correlation coefficient that image is considered to be the best matched image.



Storing in file: After the extraction process number plate is stored in file with all the complete information like the characters of the number plate, the date of extraction.

3. EXPERIMENT AND RESULT

The system delivers approximately 99% accuracy. The images should be captured properly with the digital camera maintaining proper angle so that the image can be visualized easily. We have mentioned that it provides 99% accuracy because there are some drawbacks where the system does not work properly. It does not extract number plate from gray scale due to luminance conditions or due to problematic background.

4. CONCLUSION

Number plate recognition in today's world is one of the widest field of research. The number plate recognition should be done carefully for proper recognition of vehicle in a traffic runny areas. It should be able to capture images properly and should provide with best accurate results. This system has been tested on more than 30 vehicles. We have here implemented Matlab coding to operate the system.

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