License Plate cognizance by Ocular Character Perception

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Abstract: In Metropolitan cities, tracking vehicles number plate is quite challenging one, it requires intelligent solution. Here extraction and Recognising image of vehicles number plate has been performed using MATLAB. Here it is considered that images of the vehicle have been captured from Digital Camera. Alphanumeric Characters from the plate have been reckoned and recognization of these images was done using Optical Character Recognition(OCR). The new algorithm in MATLAB has been used for extraction of the number plate from the vehicle under various circumstances. These reckoned image of the number plate might be viewed in a text file for any security measures. These type of identification plays a major role in case of finding theft cars, car parking management system and identification of particular vehicle in traffic.

Keywords: Alphanumeric Characters, vehicles number plate, Optical Character Recognition(OCR).

1. Introduction:

The security management agencies among the entire nation have adopted automated license plate recognition technologies for their security purpose and for expanding the collection of relevant data. Police officers and other security enforcement practitioners make use of this, incase of detection of stolen cars and incase of terrorist activities and to detect any parking violation and to detect those who have failed to maintain registration with insurance requirements. LPR will capture an image of the license plate and convert them into particular image of alphanumeric characters by making using of optical character recognition,then the number plate will be compared with databases. The automatic capture of vehicle license plates and comparison occurs within seconds thereby alerting the officer immediately. The rest of this paper is organized as follows. In Section 2, the Identification of problems formulation related to the existing methods. Section 3 presents detailed description of proposed techniques for solving plant related issue. Experiment results and discussions are described in Section 4. Finally, the conclusion and further enhanced are given in Section 5.

2. Problem description and previous work:

Nowadays very good physical infrastructure exists along the roadways and in potentially threaten areas. These type of infrastructure might enormous advantage starting from reduction in costs, site setting, handly access. Previously there is no special character recognition scheme. So there might arise problem during character recognition. Since character recognition in such scenario getting fault character recognition might result in faulty detection.

There are many problems in the existing algorithms:

- Width to height ratio varies for each car to car and it will depend upon the distance between the car and the camera,
- Small vertical edges will difficult There exist an recognition problem because of small vertical edges since it changes the width between edges,
- There will be so much of objects with equal width to height ratio in the image.

3. Problem solution:

Optical Character Recognition (OCR) is the process by which makes use of machine vision software will be reading the text and characters in an image. Here the scanned digital image will be given as input into an OCR software engine which might be either machine printed or handily written script they were translated it into an machine readable digital text format . OCR initially performs pre-processing of digital image starting from smallest component parts for reckoning text blocks, line blocks, word blocks and character blocks.

Other features might be lines and graphics will be reckoned and discarded. These character blocks will be further broken down and comparison done by OCR engines incorporating large dictionary of characters consisting of fonts and languages of various format. Whenever correct match is found then it will be stored as an record and the set of characters in these word block will be in continue processing until all likely characters will be found.

The new advanced OCR engines extend these capability of accuracy into pre-processing for source images, sounds-like matching and for grammatical measurements for getting more accuracy.

These are the process of Automatic Number Plate Recognition:

1. Pre-processing
2. License plate localization
3. Character segmentation
4. Character recognition

An automatic system for pre processing the image is captured and converted it into Gray scale image. After performing conversion, process of dilation is adapted on image by doing this the unwanted holes in image gets filled. After performing dilation, horizontal and vertical edge processing takes place and then these histograms are passed through low pass filters. Here Sobel operators will be used. The sobel vertical edge project will find out strongest peak in the projection,whereas horizontal edge detector is used to perform smoothing in that projection.

These filters, filter out unwanted regions or noise from image. Then the image will be segmented and region of interest will be extracted and the image is converted into binary form. Binary images will get processed easily when comparing to colored images. Then each of the alphanumeric character on number plate will be extracted and recognization will be done with the help of these template images . Then these alphanumeric character will be stored in file and finally the entire number plate will be extracted successfully. The License Plate Recognition will be very much useful for crime fighting. Camera might also focus on capturing the face of driver and store it for an security purposes. Here are some of the non-constant variables which will be affecting the accuracy of recognition:

- Speed of the vehicle
- Weather condition
- Type of Vehicle
- Type of plate
- The orientation of vehicle license plate
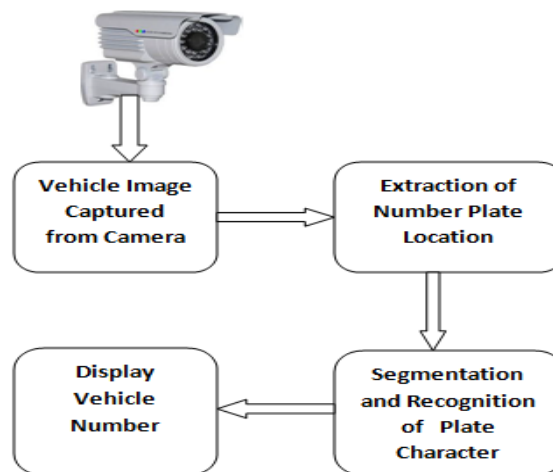- The vehicle fonts character

Fig.3.1 System Block Diagram

4. Results and discussion:

Step 1: Image Acquisition

Figure 4.1 shows the image captured by an camera. Image that is going to be captured should be from an fixed angle parallel to horizon. Here the vehicle should be a stationary one.

Fig 4.1 Image Acquisition

Step 2: Convert into Gray image

Here the algorithm works on Gray level image, for performing pre- processing and for reckoning the required information. Here the colored image will be converted into the Gray scale image .It is shown in Fig 4.2

Fig 4.2 Convert into Gray image

Step 3: Dilation of an Image

The Figure 4.3 shows the image that has been dilated. Dilation is the process of filling holes in an image for sharpening the edges of an object to maximize brightness and for connecting the broken lines. Dilation will remove unwanted noise existing in an image.


Fig 4.3 Dilation of an Image

Step 4: Horizontal & Vertical edge processing

Horizontal and Vertical histogram will represent the histograms in column wise and row wise. These are the sum of the differences existing between gray scale o neighbouring pixel in row wise and column wise. Initially the horizontal histogram is reckoned by traversing each column followed by vertical histogram by traversing each row.

Step 5: Passing histograms through low pass filter

Histogram values will be given to low pass filter because these values of histogram might changes between the consecutive row and column changes its because to minimize loss of information. Here the histogram value will be averaged among both sides. It will be performed for both horizontal and vertical histograms. During filtering all the unwanted regions of an image will get removed.It is in Fig 4.4
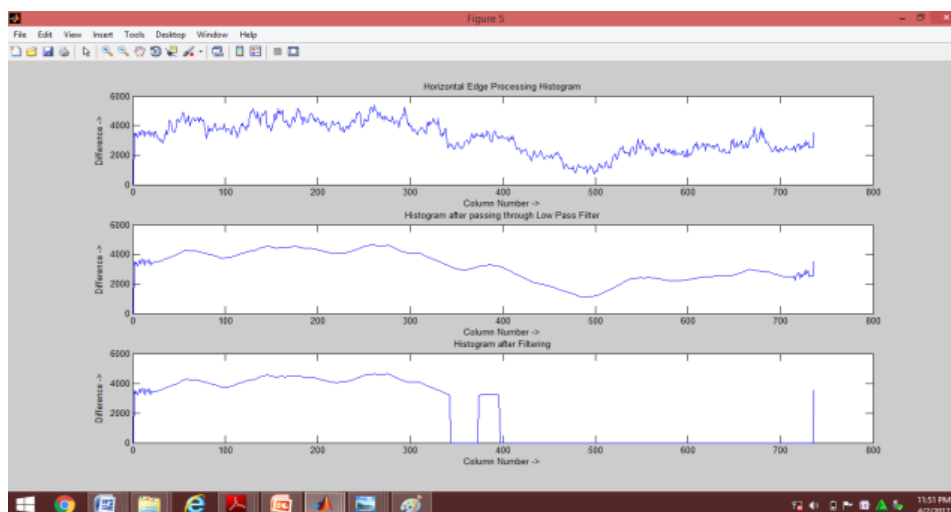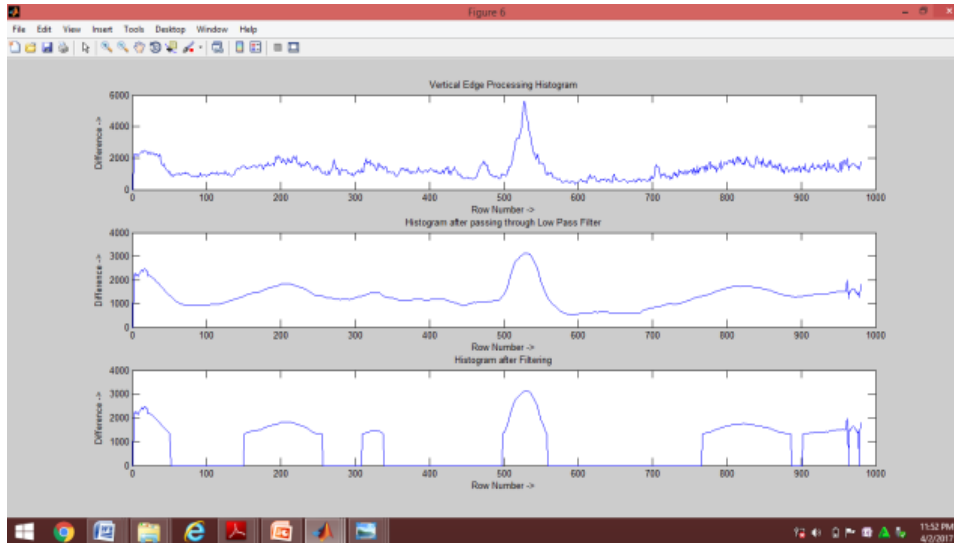
Fig 5.4 Passing histograms through low pass filter

Step 6: Segmentation of Region of Interest

Here the image gets segmented. In these stage all the regions which having probability of license plate will be get identified and these coordinates of region will been stored for any verification. The following Fig 4.5 shows the segmented region.
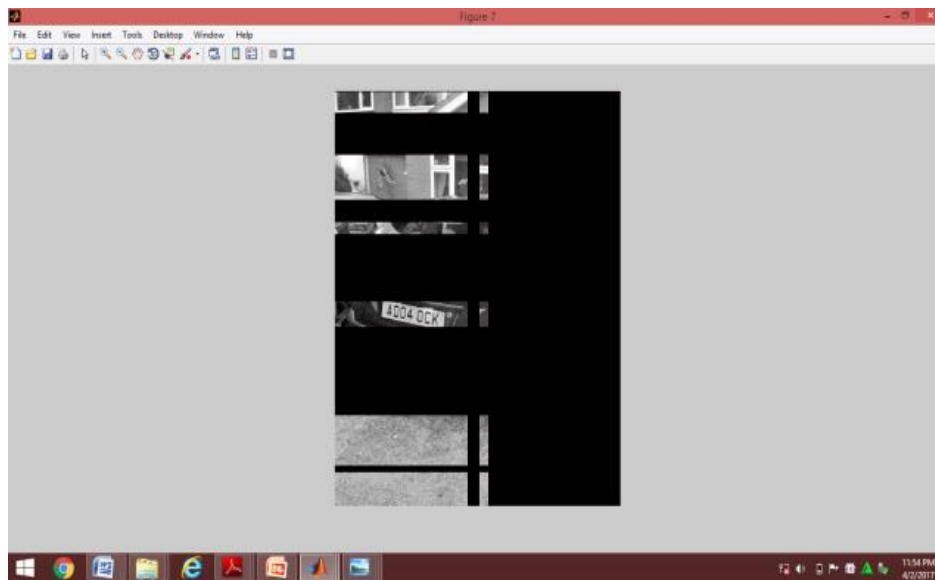

Fig 4.5 Segmentation of Region of Interest

Step 7: Extraction of region of interest

From these segmented image, region having maximum histogram value which having closest approximation will be considered as the most probable region for license plate. Among the entire regions, the region having largest horizontal and vertical histogram value will get reckoned. It is shown in Fig 4.6
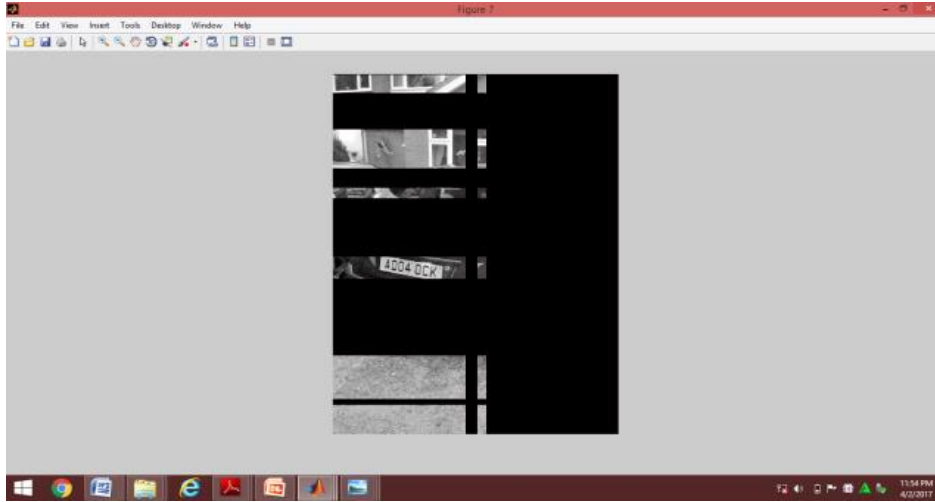
Fig 4.6 Extraction of region of interest

5. Conclusion and Future Enhancement:

License Plate Recognition process requires closest accuracy even when the image is captured from different angle, different distance. These types of scenarios should be taken into consideration for getting more accuracy. Here the image of license plate will be taken directtly and the distance should be within a limit. So here some license plate image might be detected improperly. Hence the future consideration is to work with different test images and from far distance and alternate angles. The another idea is to include more character samples with different shape and size into our database so as to achieve high level accuracy in recognition.

- There is an urge need of these kind of Automatic Number Plate Recognition system in India since problems of traffic, stealing cars increasing day by day.
- Government should take some important measures for development of such system since they are very economical and eco-friendly, if so implemented effectively .
- It will lead to the progress of the nation.

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