INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH IN ENGINEERING AND MANAGEMENT (IJSREM)
VOLUME: 05 ISSUE: 07 | JULY - 2021 ISSN: 2582-3930

Number Plate Identification Based on Morphological Image Processing Techniques

MR. JOSHI SANJAY BHASKARRAO * MR. MANDHARE SUNIL SHIVAJI **

* DEPARTMENTOF ELECTRICAL ENGINEERING, DVVP COE,AHMEDNAGAR
** Department of Electrical Engineering, DVVP COE,Ahmednagar

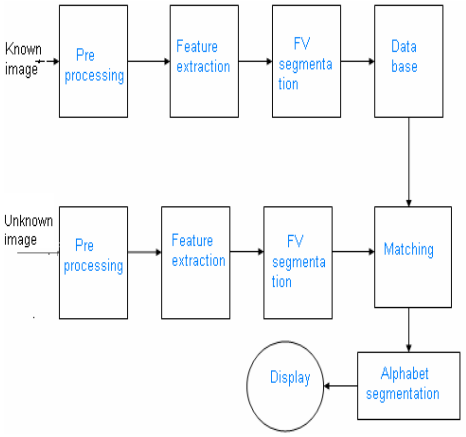
***Abstract*— A License plate identification system can be used for numerous applications such as unattended parking lots , automatic toll collection. System captures images of vehicle and identifies number plate automatically here I present result of a system in identifying the vehicle number plate through photographic image based on image processing techniques the developed algorithm is based on two processing stages; locating the number plate, and identifying the individual digit and character in the number plate. In this I have taken number of images of the vehicle as input and recognize number and character in the number plate as output.**

Key words: Median filter, Edge detection, Morphology

I Introduction

Many methods have been proposed to detect number plates from vehicle images; ranging from simple statistical methods to neural network algorithms and genetic algorithms However in real-time monitoring systems simple procedures have Advantages over complex procedures. Thus, in this work performance of a simple procedure to extract the plate region of images of rear side of vehicles (yellow number plate) was tested. The basic, method for extracting the plate region can be described by The following steps.

1. Input of the original (RGB) image
2. Identification of the yellow regions
3. Edge detection
4. Morphological operation
5. Finding the number plate region
6. Extraction of the plate region (RGB) image for number recognition



Block diagram

II METHODOLOGY

The only input to the system were the image of the vehicles captured by a digital camera. The captured images were taken from approximately 3-5 meters away from the vehicle so that number plate were clearly visible in the view. In this RGB colour space was directly handled by extracting the yellow regions. Since there are pattern recognition problems arising due to poor image quality caused by varying ambient lighting conditions, number plate are often difficult to detect accurately in real situations. The captured images is first converted to binary images where the yellow region is assigned as 1's and others where assigned as 0's. Fig.1 shows one of the Original input image and Fig.2 shows histogram image of an original image. histogram is used for image enhancement intensity of different repeated pixels in The image is calculated and equalized to

same level Fig.3 shows histogram equalized image of original image.

Fig. 1 Captured Original Image

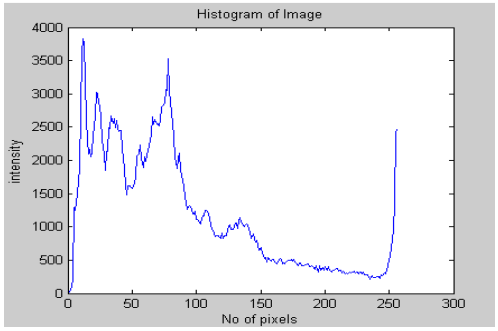


Fig. 2 Histogram of Original Image

Fig. 3 Equalized Histogram Image

Next step median filter (5*5) is to applied to The equalized histogram image in order to remove the noise. The median filter is anon linear filter which replaces each pixel by a value obtained by computing the median of values of pixels in an , in this case 5*5 neighborhood of the original pixel . Fig.4 shows result of the median filter to the original image.

Fig.4 Filtered Image

The next step was to find t he edges of the original image edge detection is the process for detecting discontinuities in intensity values such discontinuities can be detected by using standard first or second order edge detection operator In this sobel edge operator find edges by moving sobel operator horizontical and vertical. Matrix used for horizontal edge detection is [1 2 1; 0 0 0 ; -1 -2 -1] and [1 0 -1; 2 0 -2; 1 0 -1] fig. 5 shows the image after processing through the edge detection operator.

Fig.5 Edge Detection Image

After extracting edges morphological operation “dilation” is applied to the Images for specifying the plate location. Dilation is an operation that grows or thickens object in a binary image. mathematical morphology is a tool for extracting image components that are useful in the representation of shape region such as boundaries shown in fig.6

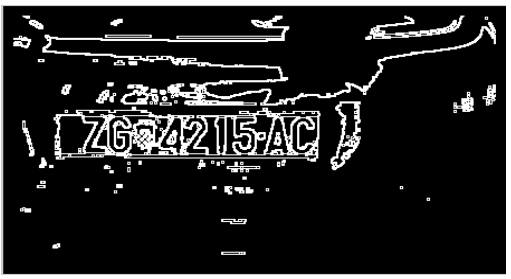


Fig.6 Morphology Image

III Character Location

Next step involves finding regions in the Original preprocessed image that are to be characters. We start by thresholding the preprocessed image to obtain binary picture. Change gray values of image in to binary values. The local neighborhood of a pixel is found if the difference between the max and min is less than the threshold t, the hole neighborhood is considered approximately the same shade of gray; therefore I assign the values of new pixels based that old pixels are bright or dark. if the difference between the max and min is greater than or equal to threshold I assign the values of a new pixel to be foreground the old pixel is closer to maximum. Fig.7 shows result of thresholding the image.

Fig.7 Threshold Image

Next, step morphological reconstruction was applied to the dilate image by using flood fill algorithm. It is very important to consider accurate bounding boxes along the specified areas by selecting the correct dimension. Number plate min area = 2670 mm Number plate max ratio = 0.67 Number plate min ratio = 0.16Selecting the number plate from the candidate choose area is the deepest region in the frame area >NP min area NP min ratio <= height/width <= NP max ratio.Area > = max (area of the candidate) /3.5 depth = -1

By selecting the bounding boxes I have got the extracted region of number plate shown in fig.8 some fellow components outside the number plate area still appears on the image and one must use the cropping process to separate other yellow region from the number plate region.

Fig.8 Extracted Plate Region

IV Result Table

Test result of plate detection module

Sub-component	Accuracy	Percentage
Extraction of plate region	27/30	91%

Test result of execution time

Image quality	Average execution time
1600*1200	40±1 second
640*480	08±1 second

In test result number of sampled images to be processed while calculating the result of accurately extraction of plate region I have got 91% accuracy for the 30 sampled images. For calculating the execution time the image is executed on computer using MATLAB software. Images were executed for different pixels intensity.

V Future work

Number and character are not separated clearly from the background by processing the image using threshold values the gray image of the number plate were converted to black and white (binarised image) with number and character appears in black colours .Algorithm has limitation that it can detect number plate in only yellow background this limitation will have to overcome.

VI Conclusion

In this paper , I presented an image processing technique designed for the extraction of the plate region of yellow colour vehicle number plate with black letters from photograph of vehicle. First the yellow region were extracted and through a mathematical morphology operation the plate region were extracted.

Reference

[1] W. K. I. L .Wanniarachchi, D. U. J. Sonnadara and M. K. *Jayananda* "License Plate Identification Based on Image Processing Techniques" *Second International Conference on Industrial and Information Systems, ICIIS 2007, 8 – 11 August 2007, Sri Lanka*

[2] C´eline Mancas-Thillou, Bernard osselin " *Character Segmentation by- Recognition Using Log- Gabor Filter"* The 18th International Conference on Pattern Recognition (ICPR'06)

[3] Haifng Lis, Thieriy rtiires', Patrick Gallinaria and Bernadette Dorizz *"VQ- Based on line hand written character recognition through learning and adaptive edit distance"Proceedings of the 9th* InternatIona1 Conference on Neural Information Processing (ICONIP'OZ) , Vol. 4

[4] R.C Gonzalez, R.E. Woods, "Digital image processing using Matlab" , Prentice Hall

[5] D. Zheng, Y. Zhao, and J. Wang, "An efficient method of license plate location", Pattern Recognition Letters 26, pp . 2431

[6] Farhad Faradji, Amir Hossein Rezaie, Majid Ziaratban *"A Morphological based license plate location* 1-4244-1437-7/07/$20.00 © 2007 IEEE

[7] Bei CHEN, Wenlun CAO, Hongcai ZHANG" An Efficient Algorithm on Vehicle License Plate Location" *Proceedings of the IEEEInternational Conference on Automation and Logistis Qingdao, China September 2008*

[8] Xiangjian He#1, Lihong Zheng*2, Qiang Wu#1, Wenjing Jia#1, Bijanamali#3 and arimuthu Palaniswami" Segmentation of Characters on Car License Plates" 978-1-4244-2295-1/08/$25.00 © 2008 IEEE