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Still Image Recognition Of License Plate System

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ABSTRACT

This project will focus on the design of algorithms used for extracting the license plate from a single image, isolating the characters of the plate and identifying the plate region. This section presents a method for extracting license plates based on the Hough transform. The algorithms were developed using a set of training images, and tested on images taken under varying conditions. License plate recognition (LPR) algorithms in images are generally composed of the following three processing steps: 1) extraction of a license plate region; 2) segmentation of the plate region characters; and 3) recognition of each character. This task is quite challenging due to the diversity of plate formats and the non uniform outdoor illumination conditions during image acquisition. In this paper present morphological operation and various filters in license plates. LPR is the hot research topic in Intelligent Transportation Systems. A license plate is an important phase of vehicle license plate recognition in intelligent transport system. In our proposed system generally composed three morphological operation and three various filters. The proposed algorithm consists of some morphological operations are Dilation, Closing and Threshold. In this next stage various filters are Sobel filter, Smoothing filter, Laplace filter. In this various filter help to comparing license plates.

Keywords -Image processing, Morphological operation and Filters, extraction, segmentation, recognition.

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1 INTRODUCTION:

Before isolating the characters of the license plate in the image, it is advantageous to extract the license plate. This chapter presents three different extraction strategies. First the theory behind each method is developed, then the strengths and weaknesses are summaize and finally, in the last section of this chapter, the three strategies are combined. The strategies are Hough transform, template matching and region growing. The common goal of all these strategies is, given an input image, to produce a number of candidate regions, which with high probability contains a license plate. The purpose of this chapter is not to develop three competing methods, since it is unlikely that one method will prove better in all cases. Instead the goal is to have the strengths of each method complement the weaknesses of the other methods and in this way improve the overall efficiency of the system.

To identify objects and to recognize patterns in an image are easy tasks for human beings. However if these tasks are done in a repetitive manner, they are subjected to errors. The same happens in vehicle license plate recognition, especially because the number of vehicles is very large. So recognition license plate applies to morphological operations and filters. It is an applicable to only still images. Thispaper presents a new morphology based method for license plate extraction from car images.

Morphological operations are used to fill the gaps between characters in edge image to make rectangular regions. The algorithm uses morphological operations on the preprocessed, edge images of the vehicles. Characteristic features such as license plate width and height, character height and spacing are considered for defining structural elements for morphological operations. Various algorithms have been suggested in both sections.

Threshold of its intuitive properties and simplicity of implementation, image thresholding enjoys a central position in application of image segmentation. Thresholding in a more formal way and extend it to techniques that are considerably more general. The basic morphological operations are erosion and dilation, dilation is used to fill the gaps or holes. Now we use a morphological operator. The image of once dilated horizontally and the other time vertically. Another horizontal dilation is employed on the common bright pixels.

The structuring elements of dilations are pixel horizontal or vertical lines. Due to digits and characters, a license plate contains many vertical edges. This feature is employed for locating the plate in an image. Many approaches have been proposed for edge detection. Sobel mask has a good performance compared with others; indeed, it is fast and simple. In general, there are two masks for Sobel, horizontal mask and vertical one. Closing also tends to smooth sections of contours but, as opposed to opening, it generally fuses narrow breaks and long thin gulfs, eliminates small holes, and fills gaps in the contour. Smooth filter as sharp filter.

2 PROPOSED SYSTEM:

The system not only recognizes and counts vehicles, but distinguishes each as unique. For some applications, such as electronic toll collection and red-light violation enforcement, the system records a license plate's alphanumeric so the vehicle owner can be assessed the appropriate toll or fine. In other applications like secure-access control, a vehicle's license plate is checked against a database of acceptable ones to determine whether a truck can bypass a weigh station or a car can enter a gated community or parking lot. The system can also be used to issue violations to speeders or even monitor the time it takes vehicles to travel one point to another, keeping traffic

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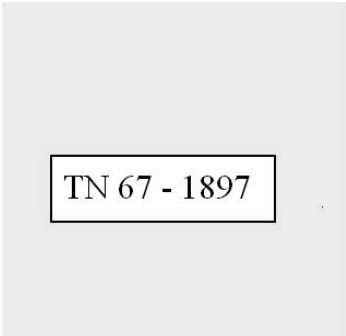
management centers apprised of transit times along busy streets and highways.

The system consists of four tasks; the first task selects the optimal frame of the incoming image sequence. The second task then extracts the region believed to contain the license plate. The third task isolates the seven characters and the last task identifies the individual characters. In this paper present morphological operation and various filters in license plates. The proposed algorithm consists of some morphological operations are Dilation, Closing and Threshold. In this next stage various filters are Sobel filter, Smoothing filter, Laplace filter. In this various filter help to comparing license plates.

2.1 Edge Detection:

Due to digits and characters, a license plate contains many vertical edges. This feature is employed for locating the plate in an image. Many approaches have been proposed for edge detection. Sobel mask has a good performance compared with others; indeed, it is fast and simple. In general, there are two masks for Sobel, horizontal mask and vertical one. Figure1 shows these masks. We just use the vertical mask of Sobel. Supposing that the input image is not highly tilted, vertical edge detecting plays its role well enough.



Sobel filter

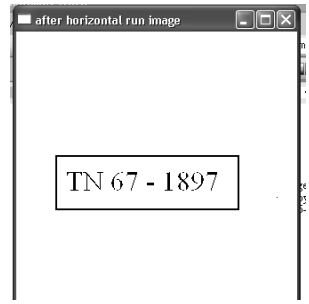
-1	0	1
-1	0	2
-1	0	1

1	2	1
0	0	0
-1	-2	-1

Sobel Mask Vertical mask Horizontal mask

2.2 Dilation:

Now we use a morphological operator. The image of figure2 is once dilated horizontally and the other time vertically. Another horizontal dilation is employed on the common bright pixels of these two dilated images. The structuring elements of dilations are 6-pixel horizontal or vertical lines.



Horizontal run image

2.3 Closing:

The expression for opening and closing of gray scale images has the same form as their binary counterparts. The closing of image f by sub image b, denoted $f \cdot b$ is

$f \cdot b = (f\ b)n$ ----- (1)

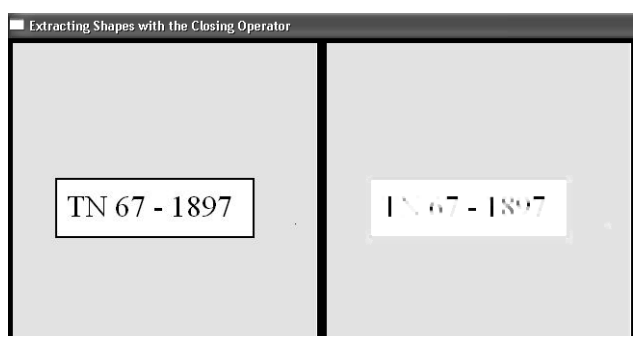
The closing of images have a simple geometric interpretation. Suppose that we view an image function $f(x, y)$ in 3-D perspective with the x and y-axes being the usual spatial coordinates and the third axis being gray level values. In this representation, the image appears as a discrete surface whose value at any point (x, y) is the value of f at those coordinate.

The closing operation satisfies the following properties.

i) $f(f \cdot b)$.

ii) if $(f_1 \cdot b)$ f_2 then $(f_1 \cdot b)$

iii) $(f \cdot b) \cdot (f_2 .b) = f \cdot b$



Closing operator

0	1	0
1	-4	1
0	1	0

2.4 Thresholding:

Image thresholding enjoys a central position in applications of image segmentation. There are two categories in thresholding. One is single and multiple thresholds. A threshold image g(x,y) is defined as

$$g(x,y)=\begin{cases} 1 \text{ if } f(x,y) > T \\ 0 \text{ if } f(x,y) \leq T \end{cases} \quad \text{----} (2)$$

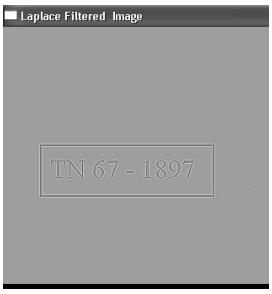
Threshold image

2.5LaplaceFilter:

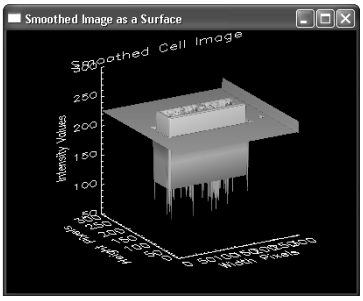
Laplacian filtered image and then subtracting it from the original image. Laplacian is a linear operator. This was done for instructional purposes to illustrate each step in the procedure. In following formula such as coefficient of negative and positive values as positive values as

$$g(x,y)=\begin{cases} f(x,y)^2 - f(x,y) \\ f(x,y)^2 + f(x,y) \end{cases} \quad \text{----------} (3)$$

if the mask is positive or negative



Laplacian filter image



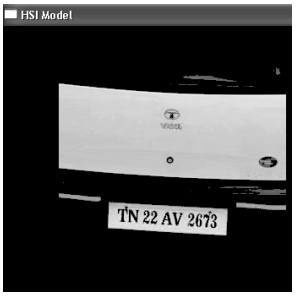
Smoothed image as surface

EXPERIMENT RESULT:

The sample model contains 400 images different in size, background, camera angle, distance, and illumination conditions. All output is correctly specified. We use a personal computer, Pentium-4 2.4 GHz, 256 MB RAM, for implementation. Some sample output are given below

Input Image

Search the Plate Location



HSI Model

Plate Edge Detection

Recognized Plate

CONCLUSION:

The test of the overall system established that by using region growing for license plate extraction and a Euclidean distance measure for the feature based identification, a total of 76.4% of the test images were successfully identified. The main cause of the failures was the license plate extraction, which caused 15 of the 17 errors. The results could be further enhanced, if some restrictions were imposed on the input images. If, for instance, the

images were taken in approximately the same distance from the vehicle (such as in the currently used system), the extraction of the license plate would be sign cantle easier to accomplish. In this paper, we proposed a real time and robust method for license plate morphological operation and plate recognition. Images of ourdatabase are complex and different in size, background, camera angle, distance etc. Considering all of these, the proposed method has the correct location rate of 83.50%. Various filters are very helpful in license plate operations.

FUTURE ENHANCEMENT:

Running image license plate recognition system based on image recognition.

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[14] Farhad Faradji, Amir Hossein Rezaie, Majid Ziaratban Electrical Engineering Department, Amirkabir University of Technology, Tehran, Iran A MORPHOLOGICAL-BASED LICENSE PLATE LOCATION.