ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 4, April 2016

An Automated Vehicle License Plate Recognition for Indian Road Way Transportation System

G.Dhivya, R.Rajasekar

M.E Student, CMS College of Engineering, Namakkal, Tamilnadu, India

Associate Professor/Head of CSE Dept, CMS College of Engineering, Namakkal, Tamilnadu, India

ABSTRACT: Most vehicle license plate recognition use neural network techniques to enhance its computing capability. The image of the vehicle license plate is captured and processed to produce a textual output for further processing. This paper reviews image processing and feature extraction, segmentation and recognition in such way to remove the noise of the image, to enhance the image quality and to expedite the computing process by converting the characters in the image in to respective text. An exemplary experiment has been done in **DOT NET Framework** to show the basic process of the image processing especially for license plate. An algorithm is adopted into the solution for parking management & Toll Booth Entry system. The solution then is implemented as proof of concept to the algorithm. A smart and simple algorithm is presented for vehicle's license plate recognition system. The proposed algorithm consists of three major parts: Extraction of plate region, segmentation of characters and recognition of plate characters. For extracting the plate region edge detection and morphological operations are used. In segmentation part scan line algorithm is used. The experiment results show a good performance of this new segmentation algorithm.

KEYWORDS: Image processing, Pre-processing, filtering, feature extraction, segmentation, recognition, experiment.

I. INTRODUCTION

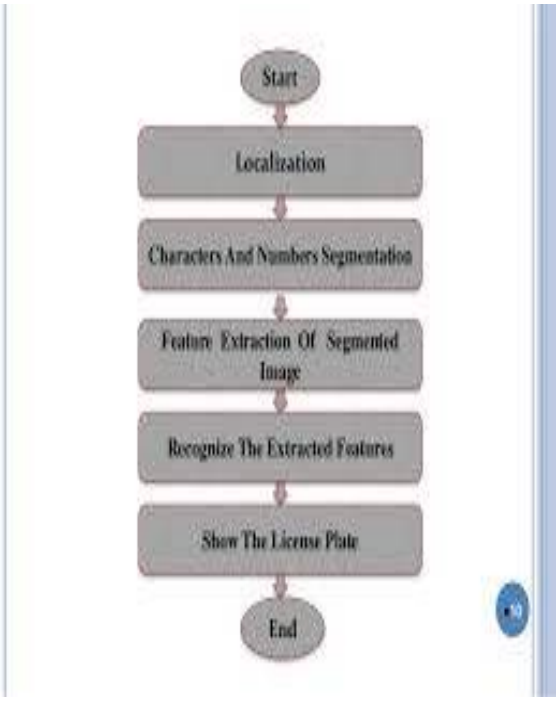
The advanced of computer application processing more than textual data solving everyday problems. Inputs from optical device are used in domain application such as medical, security, monitoring and control and engineering. Ability for computer to process image and translate it into something meaningful has become more popular. Therefore, the technology of image processing has adopted in managing vehicle parking system, vehicle access to restricted area, traffic monitoring system and highway electronic toll collection. For this purpose, the computer needs to capture the vehicle licence plate number and process it into the computer. A camera captures the image of the vehicle license plate. The image then feed into the computer for further processing. The output of from the process is the vehicle license plate number in textual form. For a parking system, the output is used for car identification, parking payment and authorization to access into parking space. This paper reviews the processing of vehicle license plate that uses image processing and neural network technique.

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 4, April 2016



I. **FIGURE 1: LICENSE RECOGNITION**

II. RELATED WORK

License plate localization is a necessary pre-cursor to license plate recognition (LPR). We can group the methods used to locate the license plates location or region in images or videos in the literature into three processing categories: binary image, gray-level, and colour. Character segmentation is an important pre-cursor to character recognition, which we can similarly break down into the same three categories. To recognize segmented characters, several algorithms use pattern/template matching or learning-based classification.

Binary image processing

To extract license plate regions from background images, techniques based on combinations of edge statistics and morphology can achieve good results. Some researchers have applied edge operations on a gray image after smoothing and normalizing to extract horizontal and vertical edge maps. They then perform statistical analysis on the edges to detect the license plates. The final decision is based on connected component analysis (CCA).

Gray level processing

Some researchers have exploited the contrast between the characters and the background-for example, Hsi-Jian Lee and colleagues considered blocks with a high edge magnitude and variance as the license plate region. Researchers have also applied image transformation methods based on the Hough transform and Gabor filters. However, this method is valid only when the image background is simple. Another disadvantage of this method is that Hough transform's computational complexity very high.

Colour processing

In many countries, license plate text and background colours are strictly fixed, based on algorithm design, but such algorithms still fail because of varying lighting conditions. Accurate plate location is fundamental to the whole recognition process's success. Some researchers propose the use of colour features to localize the plate, but this approach fails when plates have multiple colours. Yu-Chiun Chiou and colleagues proposed using vertical edge matching for plate recognition, but varying plate sizes are poor contrast between the plate and the car body make this method unreliable. Mu-Liang Wang and colleagues used horizontal scans of repeating contrast changes for plate recognition, but it suffers from ringing effect that occurs along the edges of the filtered spatial domain image.

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 4, April 2016

III. IMAGE CAPTURE AND PLATE LOCALIZATION

In the first phase, we capture the image of the vehicle and normalize to a standard dimension of 400*300 pixels.

As our candidate for plate localization and performed a wavelet decomposition to compute the approximation and details coefficient matrices. Figure lb shows the four frequency bands representing low, horizontal, vertical, and diagonal frequency energy, respectively. The horizontal and vertical frequency energies can locate the license plate because the plate has a high frequency, so the find the plate's vertical location, we plate the pixel intensity's energy curve for each row of the vertical frequency band. Similarly, to find the plate's horizontal location, we plot the pixel intensity's energy curve for each column of the horizontal frequency band. Figure 2a shows the plots.

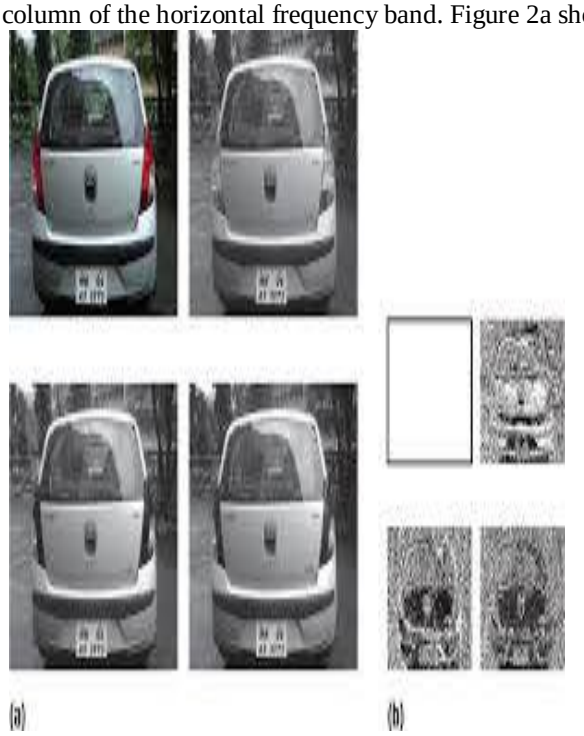


Figure 2: Image capture and plate localization

IV. NUMBER RECOGNITION

To recognize and identify plate numbers, we convert the extracted gray-colored plate in figure into the black-and-white image in figure. we start by setting the pixel intensities to 255 and 0, where pixel intensity is greater than or equal to and less than 128, respectively. The next step is character segmentation. We know that the numbers are written line-wise-plates in India normally have two lines, so to separate them; we plot the vertical frequency's energy curve as in figure .the number of sub curves that start and end with 0 represent the number of lines in the license plate. Figures and show the result. To perform character segmentation, we plot the energy curve,

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 4, April 2016

Figure 3: Gray and black Image

Figure 4: White Image

Column-wise, as in figure. Smoothing of this curve is not required because we converted the gray image into black and white. The area between the points at which the curve stars falling toward the x-axis represents a single character. Figure shows the segmented characters. We have taken a margin of 1 pixel on both sides of a character.

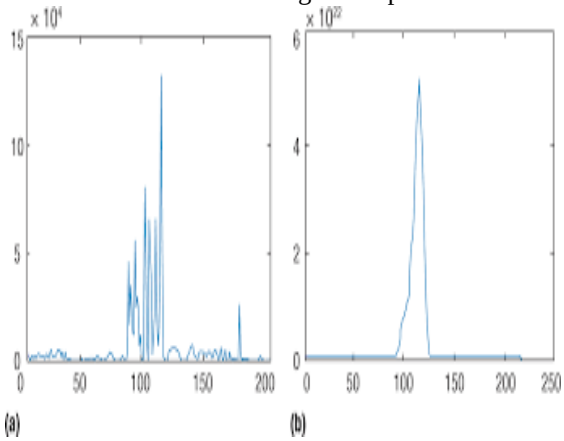


Figure 5: Energy and Smoothing curves

After the segmentation process, we need to normalize the characters to refine them into a block containing no extra white spaces in any border.

V. EXPERIMENTAL ANALYSIS

To measure our approach's accuracy, we performed experiments on 40 different models of cars with different shapes, sizes, and colours of plates under carrying lighting conditions and distances. The input coloured images were 400*300

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 4, April 2016

pixels, and we took 250 license plate images. Table 1 summarizes the results. Our approach is based on single level wavelet transform, and we have proven it to be efficient in varying conditions and therefore useful for real applications. In our future work, we shall try to devise a technique for skewed and distorted license plates.

Figure 6: License plate detection

VI. CONCLUSION AND FUTURE WORK

To conclude this paper, we have presented the review of image processing techniques for license plate recognition with various approaches. The experiment has been done in **DOT NET Framework** to show the basic process of the image processing especially for license plate. There are many more techniques and approaches have been studied for in varies stage of image processing as well as there are also lack of studies in image processing stages, for example pal and pal in [134] reveals that earlier reviews on colour image segmentation have not given much attention.

.

REFERENCES

1 Jing-Ming Gue et al., License Plate Localization and Character segmentation with feedback self learning and Hybrid Binarization Technique IEEE Transations on Vehicular Technology Vol.No.7, No.3, May 2008.
2 FarhadFaradji, Amir HosseinRezaie, MajidZiaratban A morphological based license detection, IEEE 2007, pp-57, 2007.
3 D. Zheng, Y. Zhao, and J. Wang, "An efficient method of license plate location", Pattern Recognition Letters 26, pp. 2431–2438, 2005.
4 Yungang Zhang, Changshui Zhang, A New Algorithm for Character Segmentation of License Plate, 2003 IEEE.
5 M. Shridhar, J. W. Miller, G. Houle, and L. Bijnagte, "Recognition of license plate images: Issues and perspectives". In Proceedings of International Conference on Document Analysis and Recognition, pages 17-20. 1999.
6 Sunghoon Kim, Daechul Kim, YounbokRyu, and Gyeonghwan Kim "A Roust License-Plate Extraction Method under Complex Image Conditions, IEEE, 2002.
7 Bihai Hong, Chenhui Yang "An Approach to License Plate Locating in Intelligence Transportation System", IEEE 2007.
8 Yungang Zhang, Changshui Zhang, A New Algorithm for Character Segmentation of License Plate, 2003 IEEE.
9 Wangchao Le and Shaofa Li, "A Hybrid License Plate Extraction Method for Complex Scenes", The 18th International Conference on Pattern Recognition (ICPR'06), IEEE.
10 H.-M. Suen, et al. segmentation of uniform coloured text from colour graphic background. IEEE Proc.-Vis. Image Signal Processing.1997,144(6): 317-322.

BIOGRAPHY

Miss.G.Dhivya is a ME-Computer Science and Engineering Student in the Computer Science and Engineering Department of CMS College of Engineering, Namakkal and Affiliated to Anna University, Chennai. She received BTech-IT degree in 2014 from M.Kumarasamy College of Engineering, Karur, Tamilnadu, India. Her research interest's areas are Data Mining, Graphics and Animation, Artificial Intelligence, Image Processing, Cloud Computing, Wireless Networks, etc.