AUTOMATIC LICENSE PLATE RECOGNITION

V.THIRUMURUGAN
Assistant Professor, Department of EEE
The Kavery Engineering College, Salem, India
powerthirumurugan@gmail.co***m***

P.AGALYA
Post Graduate Student, M.E (Embedded systems)
The Kavery Engineering College,Salem,India.
agalya.palanisamy61@gmail.com

Abstract **- In the proposed system using MATLAB the vehicle's License Plate is recognized. Using Web Camera mounted over the exposure system image of the license plate is captured and the image is processed to extract the license number. The system is designed with the purpose to check traffic violation. The arrangement checks for red signal. If in a red signal a vehicle tries to cross, its license number is extracted and information regarding the offense along with the license plate no is sent to the Traffic Control Section for further legal actions to be taken. An alarm is raised to inform the on field policeman about the offense.**

Keywords – vehicles license plate, traffic control section, alarm

I INTRODUCTION

In the last few years, there is lot of progress in the ALPR techniques. There are various techniques developed to manage various climatic disturbances and other disorders.

An effectual ALPR system ought to have the skill to pact with multistyle plates, e.g., diverse national plates with different fonts and various syntaxes. There are four critical factors projected to deal with the multistyle plate problem. They are plate rotation angle, the character line number, the alphanumeric types and character formats. Experimental results showed 90% overall success in a data set of 16 800 images.

The processing speed using the lower resolution images is about 8 f/s. The optical character recognition is managed by a hybrid stratagem. A proficient probabilistic edit distance is used for only if an explicit video-based ALPR. Cognitive loops were introduced at essential stages of the algorithm.

In the currently used ALPR systems, the still image or few frames of the image is used for analyzing and segment the license number. But using video this disadvantage is removed and the continuous image frames is used to process the license number from the sequence of images.

Essentially, using the sequential information consists of tracking vehicles to estimate the license plate motions and the recognition step are made more efficient. There are two types of strategies to attain that target. One strategy is using the tracking output to outline a high resolution image by joining multiple, subpixel shift, low-resolution images. This technique is recognized as super-resolution reconstruction. The license plate is detected using an AdaBoost classifier, and is tracked using a data-association approach.

A new compact cost function is to produce images of higher resolution from low resolution frame sequences. It can be used for real time processing. Another strategy that is alternate to super-resolution techniques, we can combine the high-level outputs of the recognition to compose a final decision. A real-time video based method utilizing post-processing of Kalman tracker is used widely. Viola-Jones' object detector is used to sense the plate position. The support vector machine is used to identify characters. To fully utilize the video information, a Kalman tracker is used to forecast the plate positions in the succeeding frames to shrink the detector searching area. The final character detection uses the interframe information to improve the recognition concert.

The resolution of up to date ALPR video cameras is low. High clarity cameras are used in license plate recognition systems since these cameras conserve object details at a longer distance from the camera. However, large amount of information has to be processed, the computational expenses are high. A scanning method, operator context scanning (OCS) was used which uses pixel operators in the structure of a sliding window, associating a pixel and its locality to the possibility of belonging to the object that the method is looking for. This OCS technique increases the processing speed of the original SCW process by 250%.
On the basis of active local binary pattern operator, a low-computational advanced linear binary pattern operator was introduced as feature extraction for low resolution Chinese character identification of vehicle license plate. A recognition method for blurred vehicle license plate is based on natural image matting. Segmentation and recognition are two important errands in ALPR.

Traditionally, these two odd jobs were implemented in a cascade fashion independently and successively. In recent times, there has been an increasing interest in exploring the interaction linking the two tasks. For example, the preceding knowledge on the characters to be predictable is engaged for segmentation and the recognition outputs are fed back to the segmentation process.

A two-layer Markov network was anticipated to plan the joint segmentation and recognition problem in a 1-D case. Both the low-level characteristics and high-level facts are incorporated into a two-layer Markov system where the two tasks are achieved at once as the results of the certainty propagation assumption.

II ALPR SYSTEM PROCESSING STAGES

Automatic license plate recognition (ALPR) is a technique used to capture the license plate numbers from the moving vehicles. A sequence of images is captured when the vehicle violates the rules of the traffic. The proposed system captures the image from the moving vehicle and segments it to get the license number.

The image is captured using the infrared camera which penetrates the fog, mist and other climatic disturbances. The captured image is segmented and the characters are recognized using optical character recognition. The license number is clearly recognized.

The recognized license number is then combined with the information giving the traffic signal where the vehicle violates the signal. The location where the violation takes place is obtained by the GSM module. GSM module provides the location of the traffic signal where the image is captured. The license number with its location is then sent to the control room of the police department stating the violation of the traffic rules. Additionally, an alarm is also attached with the

system so that an immediate alarm sound is also raised to indicate the abuse.

IMAGE ACQUISITION

Webcams are recognized for their low manufacturing cost and flexibility, building them the lowest cost form of video telephony. They have also happen to a source of safety measures and privacy issues, as some built-in webcams can be tenuously activated by means of spyware.

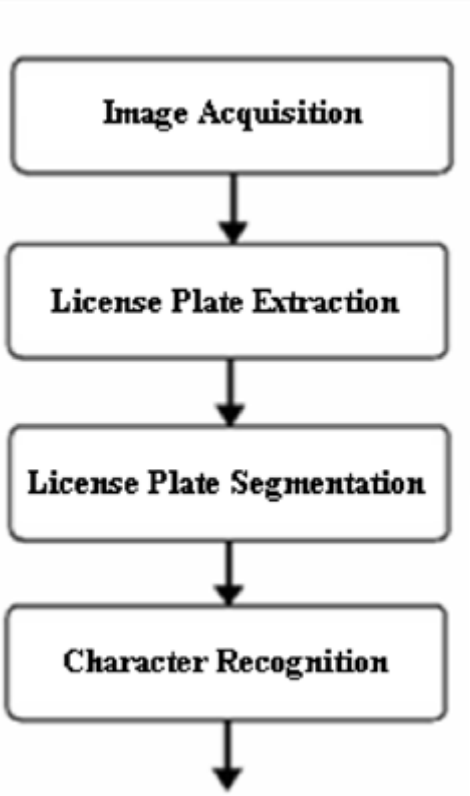

FIG 1 – ALPR SYSTEM PHASES

Webcams naturally includes a lens, an image sensor with supported electronics, and may also embrace a microphone for sound. Various lenses are obtainable, the most common in consumer-grade webcams being a plastic lens that can be screwed in and out to focus the camera. Fixed focus lenses, which have no stipulation for adjustment, are also reachable. As a camera system's depth of field is greater for small image formats and is larger for lenses with a large f-number, the systems worn in webcams have a adequately large depth of field that make use of a fixed focus lens does not bang image sharpness to a great coverage. Image sensors can be CMOS or CCD, the previous being dominant for low-cost cameras, but CCD cameras do not necessarily smash CMOS-based cameras in the low cost price range.

LICENSE PLATE EXTRACTION

The license plate extraction phase influences the exactness of ALPR coordination. The key to this stage is a car image, and the output is a segment of the image containing the probable license plate. The license plate can be present anywhere in the image. Instead of dealing out every pixel in the picture, which increases the handing out time, the license plate can be renowned by its description, and therefore the system processes only the pixels that have these characters. The features are imitative from the license plate layout and the characters constituting it. License plate color is one of the characteristics since some jurisdictions (i.e., countries, states, or provinces) have definite colors for their license plates.

The rectangular shape of the license plate frontier is another feature that is used to extort the license plate. The color change linking the characters and the license plate background, identified as the texture, is used to dig out the license plate region from the image.

The survival of the characters can be used as a feature to spot the license plate section. Few features are combined to identify the license plate.

LICENSE PLATE SEGMENTATION

The isolated license plate is followed by segmentation to take out the characters for identification. An extracted license plate from the earlier stage may have some trouble, such as tilt and non uniform brightness. The segmentation algorithms ought to prevail over all of these struggles in a pre processing step. The bilinear transformation is worn to map the slanted extracted license plate to a straight rectangle. A least-squares method is used to cope with horizontal tilt and vertical tilt in license plate imagery. Based on Karhunen–Loeve transform, the coordinates of characters are in order to a 2-D covariance matrix.

The eigenvector and the rotation angle α are computed in go round. Subsequently image horizontal tilt rectification is performed. For vertical tilt modification, three methods K-L transform, the line fitting based on *K*-means clustering, and the line fitting base on least squares are set forward to calculate the vertical tilt angle θ. A line fitting mode based on the least-squares fitting with upright offsets was introduced for correcting a license plate tilt in the horizontal direction. Tilt amendment in the vertical direction by minimizing the variation of coordinates of the outcrop points was anticipated. Character segmentation is performed after horizontal adjustment and character points are projected by the side of the vertical track after shear transform.
An unfortunate threshold for the binarization of the extracted license plate grades in united characters. These characters create the segmentation very tricky. License plates with an adjacent frame are furthermore difficult to segment ever since after binarization, a few characters may be tied with the frame.
Enhancing the image quality before binarization helps in choosing the proper threshold.The dimension of the characters is measured to be more or less than 20% of the size of license plate. The grey-scale level is scaled to 0–100, and then leading 20% pixels are multiplied by 255. Only characters are improved at the same time as noise pixels are condensed. Ever since binarization with single global threshold cannot at all time produce tolerable results, adaptive local binarization methods are generally used.

Local thresholding is used for every pixel. The threshold is computed by subtracting a constant *c* as of the mean grey level in an $m \times n$ pane centered at the pixel. The threshold is specified by the Niblack binarization formula to fluctuate the threshold more than the image, based on the local mean and the benchmark difference.

CHARACTER RECOGNITION

The extracted characters are then recognized and the output is the license plate number. Character detection in ALPR system may have a few complications. Due to the camera zoom aspect, the obtained characters do not have the same size and the same breadth. Resizing the font into one size before detection helps triumph over this problem.

The characters' font is not the same all the time when various countries' license plates use different fonts. The extracted characters may have several noise or they may be bust down. The extracted characters may possibly also be slanted.

III BLOCK DIAGRAM DESCRIPTION

The block diagram of the proposed ALPR system is shown as follows. The processing of the image is done in the processing stages which is then authenticated and then recognized.

The embedded microcontroller is used to execute the programmed operation of the ALPR system. The microcontroller controls the function of the GSM modem, alarm circuit, traffic signal setup simultaneously.

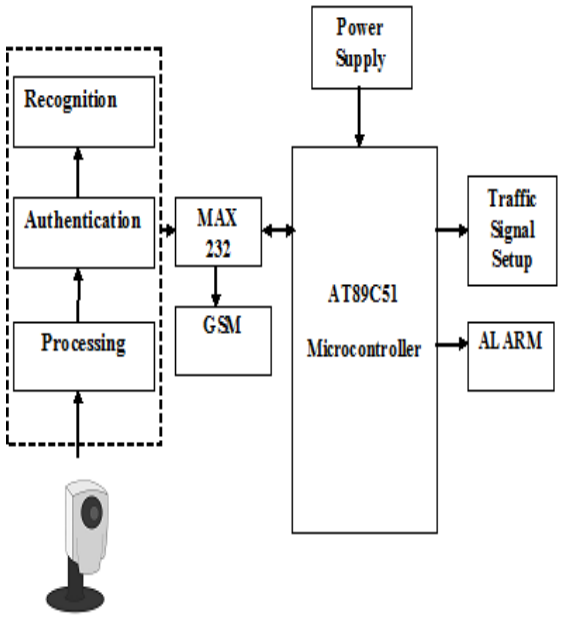

Fig 2 – Block Diagram of ALPR System

The power supply section is the significant one. It should convey constant output synchronized power supply for victorious working of the plan. A 0-12V/1 mA transformer is used for this intention.The primary of this transformer is associated into main supply through on/off switch& fuse for shielding from overload and short circuit defence. The secondary is coupled to the diodes to convert 12V AC to 12V DC voltage. It is then filtered by the capacitors, which are more synchronized to +5v, by using IC 7805.

The MAX232 is a dual driver/receiver that includes a capacitive voltage generator to deliver RS 232 voltage levels from a particular 5v supply. The receiver converts RS-232 to 5v TTL/CMOS levels. Then the driver converts TLL/CMOS input levels into EIA-232 levels.

The P3_0 (RX) and P3_1 (TX) pin of controller is related to the max 232 driver and the TX and RX pin of max 232 is attached to the GSM modem or computer. In this path the microcontroller transmitter pin is united in the MAX232 T2IN pin which converts input 5v TTL/CMOS level to RS232 level. Then T2OUT pin is attached to reviver pin of 9 pin D type serial connector which is directly joined to PC.

The functioning of GSM modem is based on commands, the commands always commence with AT (which means Attention) and terminate with a <CR> character. For example, the dialling command is ATD<number>; ATD3314629080; here the dialling command ends with semicolon.

The AT (which means Attention) commands are specified to the GSM modem with the aid of PC or controller. The GSM modem is consecutively interfaced with the controller with the help of MAX 232. The MAX 232 acts as a driver which converts TTL levels to the RS 232 levels. The GSM modem requires the signal based on RS 232 levels for serial interface. The T1_OUT and R1_IN pin of MAX 232 is linked to the TX and RX pin of GSM modem.

The ATMAL 89C51 microcontroller has nothing striking in appearance:

- 4 Kb of ROM
- 128Kb of RAM (including SFRs)
- 4 ports having in total of 32 input/output lines. These are sufficient to make all necessary connections to peripheral environment.

The whole arrangement is apparently thought of as to satisfy the requirements of most programmers functioning on improvement of automation devices. One of its compensation is that nothing is missing and nothing is too much.

In accordance to the standard user‘s taste and needs.

Other advantages are RAM organization, the act of Central Processor Unit (CPU) and ports which completely use all recourses and enable further promote.

An alarm circuit is used to immediately signal the traffic violation. The traffic signal setup is interfaced with the microcontroller so that it detects the violation condition that is when a vehicle force to cross the red signal in the traffic prone areas.

Any violation occurs, the occurrence of the event is immediately identified and the image of the vehicle is captured and the information is signaled to the control station of the police department.

IV CONCLUSION

In the proposed paper, the license plate number is automatically identified using the ALPR system stages. The recognized characters are then combined with the GSM module information and then the message is sent to the control room of the police department using GSM sim card. The system also senses the violation of the signal rules using the traffic signal setup and an alarm signal is raised as soon as the traffic violation occur. Thus the proposed system helps to protect the traffic rules and easily identify the offender along with the vehicle that violates the rules.

V REFERENCES

[1]. C. Nelson Kennedy Babu and K. Nallaperumal, “An efficient geometric feature based license plate localization and recognition,” Int. J. Imaging Sci. Eng., vol. 2, no. 2, pp. 189–194, 2008.

[2]. C.-N. E. Anagnostopoulos, I. E. Anagnostopoulos, I. D. Psoroulas, V. Loumos, and E. Kayafas, “License plate recognition from still images and video sequences: A survey,” IEEE Trans. Intell. Transp. Syst., vol. 9, no. 3, pp. 377–391, Sep. 2008.

a. characters with different appearances,” in Proc. Int. Conf. Intell. Transp.

[3]. F. Faradji, A. H. Rezaie, and M. Ziaratban, “A morphological-based license plate location,” in Proc. IEEE Int. Conf. Image Process., vol. 1. Sep.–Oct. 2007, pp. 57–60.

[4]. S. Kranthi, K. Pranathi, and A. Srisaila, “Automatic number plate recognition,” Int. J. Adv. Tech., vol. 2, no. 3, pp. 408–422, 2011.

[5]. Shan Du, Mohmoud Ibrahim,Mohamed shehata and Wael Badawy,”automatic license plate recognition (ALPR): A State-of-the-Art Review,” in IEEE Transactions on circuits and systems for video technology vol. 23, No. 2, 2013.

AUTHOR BIOGRAPHY

V.THIRUMURUGAN, obtained his Master Degree in Power Electronics and Drives, from Anna University, Chennai. He has 4 years of teaching experience. He has presented 4 research papers in International/ National conference.

P AGALYA is pursuing M.E in The Kavery Engineering College. She completed her Bachelor’s degree in Mahendra Engineering College, Mallasamudram, Namakkal.