Scientific Journal of Impact Factor (SJIF): 5.71

e-ISSN (O): 2348-4470
p-ISSN (P): 2348-6406

International Journal of Advance Engineering and Research Development

Volume 5, Issue 06, June -2018

AUTOMATIC DETECTION AND RECOGNITION OF VEHICLE PLATE NUMBERS USING SVM

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Abstract:- *The Automatic license plate reorganization (ALPR) is one of the solutions of such kind of problem. There is a number of methodologies but it is challenging task as some of the factors like high speed of vehicles, languages of number plate & mostly non-uniform letter on number plate effects a lot in recognition. The license plate recognition (LPR) system have many application like payment of parking fees; toll fee on highway; traffic monitoring system; border security system; signal system etc. In this paper, the different method of license plate recognition is discussed. The systems first detects the vehicle and capture the image then the number plate of vehicle is extracted from the image using image Segmentation optical character recognition technique is used for the character recognition. Then the resulting data is compared with the database record so we come up with the License plate number such as is observed that developed system successfully detects & recognizes the vehicle number plate on real image even when the pixel is of low resolution and details. The Automatic Number Plate Recognition (ANPR) was invented in 1976 at the Police Scientific Development Branch in the UK. However, it gained much popularity during the last decade along with the improvement of digital camera and the increase in processing speed. ANPR is an image processing technology which enables to extract vehicle license plate number form digital images. It consists of a camera that has the capability to capture an image, finds the location of the number plate in the image and then extracts the characters using character recognition tool that translate the pixels into alphanumerically readable character or string. ANPR can be used in many areas from speed enforcement and tool collection to management of parking lots, etc. At present, in ANPR there are several techniques used for the recognition plate's number such as pattern matching [8], neural network character recognition [1], and image processing technology [2].which are computationally expensive or use artificial neural network which involves complex mathematics.*

I. INTRODUCTION

The ANPR (Automatic Number Plate Recognition) plays an important role in many systems like traffic monitoring system, Crime detection system, Stolen vehicle detection etc. Thus, ANPR is used by the city traffic department to monitor the traffic as well as to track the stolen vehicle. Though ANPR is a very old research area in image processing but still it is s evolving year by year, because Detecting the number plate from the image or from the video is not that easy task as like counting the vehicle from stream of video. So far many of the researchers came with their own algorithm to detect the number plate, but each has some limitations. For some images it works perfectly, and for some images it is not working properly. That's the reason this area is still growing and still imperfect. Detecting the number plate is the challenging task as the number plate writing style is changing from country to country. In case of India the number plate writing style changes from state to state. In India the number plate is different for two wheelers and four wheelers. For four wheelers the number plate's backgrounds are also different, i.e. yellow for tourist and white for private cars. These are the basic challenges keep in mind before implementing the ALPR system.ALPR has predefined four basic steps to recognize the number plate as explained in the various research papers and journal paper. i)Image Capture: In this step video image has to Be captured by any standard camera or by extracting the interested frame from stream of video . Capturing the image from the video stream and its requires an additional work.

ii)Image Preprocessing: Once the interested image is being captured in which number plate clearly visible and fine texture pattern, then the further processing of the image is carried out. It has many steps: resize the image resolution, removal of noise from image, and conversion of the image from RGB to gray and then Binary (black and white).

iii)Character segmentation: After preprocessing the number plate region of the image is extracted.

iv) Optical character recognition (OCR): Electronic conversion of handwritten or printed text images into machine - encoded text. Here OCR used to recognize the number from the segmented image.

Image processing is a method to convert an image into digital form and perform some operations on it, in order to get an enhanced image or to extract some useful information from it. It is a type of signal dispensation in which input is image, like video frame or photograph and output may be image or characteristics associated with that image. Usually **Image Processing** system includes treating images as two dimensional signals while applying already set signal processing methods to them.

It is among rapidly growing technologies today, with its applications in various aspects of a business. Image Processing forms core research area within engineering and computer science disciplines too.

Image processing basically includes the following three steps.

· Importing the image with optical scanner or by digital photography.
· Analyzing and manipulating the image which includes data compression and image enhancement and spotting patterns that are not to human eyes like satellite photographs.
· Output is the last stage in which result can be altered image or report that is based on image analysis.

II.LITERATURE SURVEY

AMIR HOSSEIN ASHTARI--In this paper, an Iranian vehicle license plate recognition system based on a new localization approach, which is modified to reflect the local context, is proposed, along with a hybrid classifier that recognizes license plate characters. The method presented here is based on a modified template-matching technique by the analysis of target color pixels to detect the location of a vehicle's license plate. A modified strip search enables localization of the standard color-geometric template utilized in Iran and several European countries. This approach uses periodic strip search to find the hue of each pixel on demand. In addition, when a group of target pixels is detected, it is analyzed to verify that its shape and aspect ratio match those of the standard license plate. In addition to being scale and rotation invariant, this method avoids time-consuming image algorithms and transformations for the whole image pixels, such as resizing and Hough, Fourier, and wavelet transforms, thereby cutting down the detection response time. License plate characters are recognized by a hybrid classifier that comprises a decision tree and a support vector machine with a homogeneous fifth-degree polynomial kernel. The performance detection rate and the overall system performance achieved are 96% and 94%, respectively

SOUMITRA KAR - in recent years, license plate recognition (LPR) has become a core technology of security and traffic applications that range from traffic surveillance to parking lot access control to information manage-ment for monitoring purposes.1Simply stated, LPR helps identify vehicles and provides a reference for further vehicle tracking and activity analysis. A key LPR challenge is the large variety of license plates, which differ with respect to color, shape, size, and pattern. Other obstacles include severe weather conditions, poor lighting, and low camera resolution as they affect image quality when the plate is captured by a camera in real time. A moving vehicle also can affect the camera's aperture speed, causing a blurring effect. Several approaches have attempted to deal with these challenges, including optical character recognition, the indirect Fourier transform (IFT)-based fast method, and the mor-phologic method (see the sidebar for additional approaches). But these were only valid for cases with specific constraints.2,3We describe here a method for LPR that uses Daubechies wavelet transforms to overcome multiple limitations.**XIUZI YE--**Color is an important feature of the Chinese license plate. In this paper, a license plate location method totally based on color information for the most common blue and yellow plates is proposed. First, use a special way to generate a grayscale image, highlighting the blue and yellow regions of the original image. Then by using the color concomitant property and transitions between the background and the characters, fake plates are removed, and real plates reserved. Finally, use the color information again to get a more accurate location result and remove the fake plates by using the relationship between the stroke width and the character size. The proposed method adopts two kinds of threshold methods: global threshold method and adaptive block threshold method. By automatically judging the illumination distribution of an image, the algorithm can decide which to use. The proposed method can be used to locate license plates in multi-lane with complex background, and works

well even on images with uneven illumination.**SAMIUL AZAM**--Automatic detection of license plate (LP) is to localize a license plate region from an image without human involvement. So far a number of methods have been introduced for automatic license plate detection (ALPD), but most of them do not consider various hazardous image conditions that exist in many real driving situations. Hazardous image condition means an image can have rainy or foggy weather effects, low contrast environments, objects similar to LP in the background, and horizontally tilted LP area. All these issues create challenges in developing effective ALPD method. In this paper, we propose a new ALPD method which effectively detects LP area from an image in the hazardous conditions. For rain removal we apply a novel method that uses frequency domain mask to filter rain streaks from an image. A new contrast enhancement method with a statistical linearization approach is introduced in the proposed ALPD for handling low contrast indoor, night, blurry and foggy images. For correcting tilted LP, we apply Radon transform based tilt correction method for the first time. To filter non-LP regions, a new condition is used which is based on image entropy. We test the proposed ALPD method on 850 car images having different hazardous conditions, and achieve satisfactory results in LP detection.**WENGANG ZHOU** -- As the unique identification of a vehicle, license plate is a key clue to uncover over-speed vehicles or the ones involved in hit-and-run accidents. However, the snapshot of over-speed vehicle captured by surveillance camera is frequently blurred due to fast motion, which is even unrecognizable by human. Those observed plate images are usually in low resolution and suffer severe loss of edge information, which cast great challenge to existing blind deblurring methods. For license plate image blurring caused by fast motion, the blur kernel can be viewed as linear uniform convolution and parametrically modeled with angle and length. In this paper, we propose a novel scheme based on sparse representation to identify the blur kernel. By analyzing the sparse representation coefficients of the recovered image, we determine the angle of the kernel based on the observation that the recovered image has the most sparse representation when the kernel angle corresponds to the genuine motion angle. Then, we estimate the length of the motion kernel with Radon transform in Fourier domain. Our scheme can well handle large motion blur even when the license plate is unrecognizable by human.We evaluate our approach on real-world images and compare with several popular state-of-the-art blind image deblurring algorithms. Experimental results demonstrate the superiority of our proposed approach in terms of effectiveness and robustness.**KUNFENG WANG** This paper presents a vehicle license plate recognition method based on character-specific extremal regions (ERs) and hybrid discriminative restricted Boltzmann machines (HDRBMs). First, coarse license plate detection (LPD) is performed by top-hat transformation, vertical edge detection, morphological operations, and various validations. Then, character-specific ERs are extracted as character regions in license plate candidates. Followed by suit- able selection of ERs, the segmentation of characters and coarse- to-fine LPD are achieved simultaneously. Finally, an offline trained pattern classifier of HDRBM is applied to recognize the characters. The proposed method is robust to illumination changes and weather conditions during 24 h or one day. Experimental results on thorough data sets are reported to demonstrate the effectiveness of the proposed approach in complex traffic environments.**XINAN WANG**--This paper presents a robust and efficient method for license plate detection with the purpose of accurately localizing vehicle license plates from complex scenes in real time. A simple yet effective image downscaling method is first proposed to substantially accelerate license plate localization without sacrificing detection performance compared with that achieved using the original image. Furthermore, a novel line density filter approach is proposed to extract candidate regions, thereby significantly reducing the area to be analyzed for license plate localization. Moreover, a cascaded license plate classifier based on linear SVMs using color saliency features is introduced to identify the true license plate from among the candidate regions. For performance evaluation, a dataset consisting of 3828 images captured from diverse scenes under different conditions is also presented. Extensive experiments on the widely used Caltech li- cense plate dataset and our newly introduced dataset demonstrate that the proposed approach substantially outperforms state-of- the-art methods in terms of both detection accuracy and run-time efficiency, increasing the detection ratio from 91.09% to 96.62% while decreasing the run time from 672 ms to 42 ms for processing an image with a resolution of 1082/728. The executable code and our collected dataset are publicly available.

III.PROPOSED SYSTEM

Input image is caught by camera Input image will be converted to gray scale value. Then that gray scale is converted into binary image by thresholding method. So we have various filtering techniques, in which we have to select the suitable to reduce the noise. And then we have to apply masks to get neighbors of a pixel and their corresponding gray value. Next we have to detect the size of the number plate. But in general the plates are rectangular in shape hence the edges of the plate are

detected. Then the detection techniques are applied to measure the properties of the image region. So soon after the labeling the connected components, the region will be extracting from the input image. Now segmentation methods are applied to get individual character and number image. Finally identification techniques are applied for identification of divided characters and numbers. Traffic control, stolen cars etc. The system has color image inputs of a vehicle and the output has the registration number of that vehicle. The system first senses the vehicle and then gets an image of vehicle from the front or back view of the vehicle. The system has four main steps to get the required information. These are image acquisition, plate localization, character segmentation and character recognition. This system is implemented and simulated in Matlab 2010a. In proposed add to detail of the person name,id and lisence etc

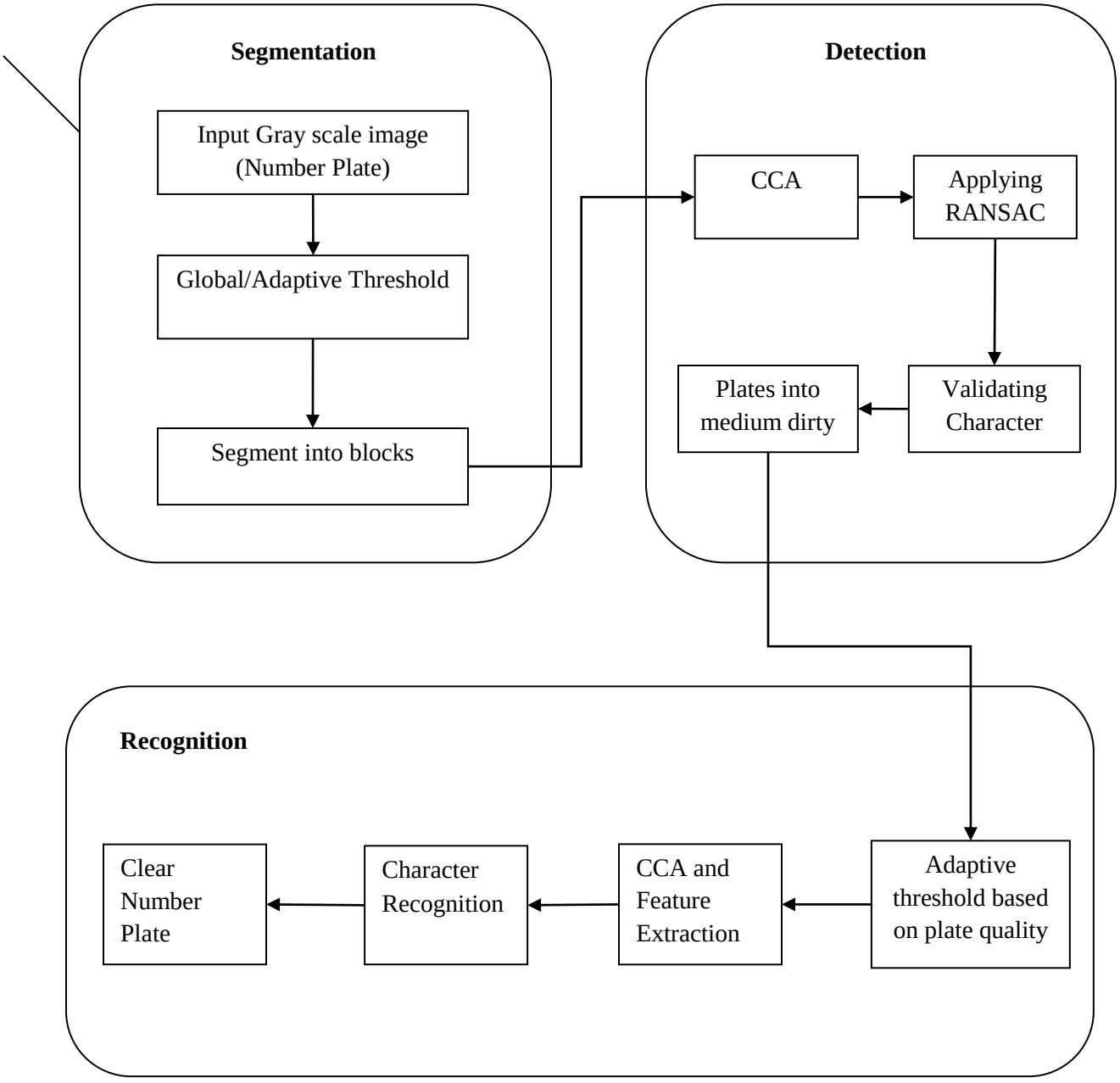
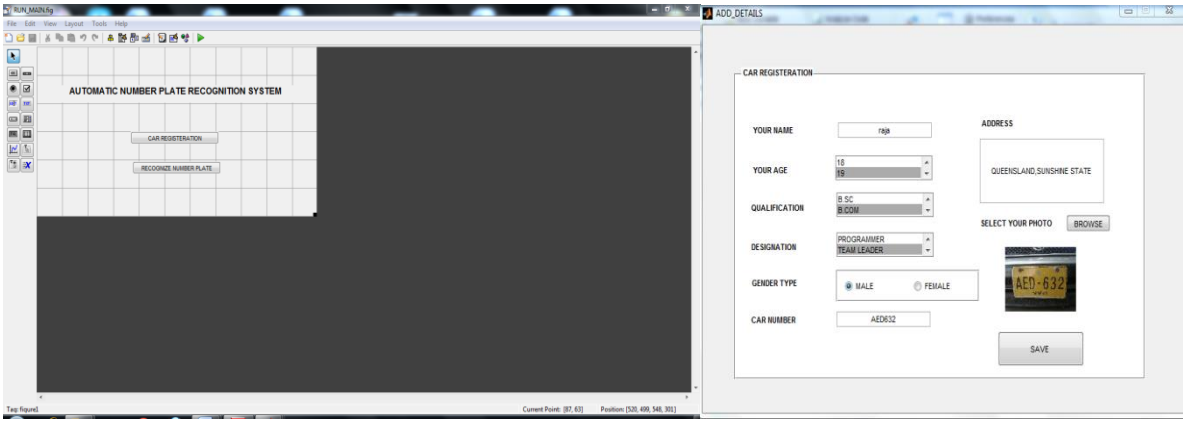
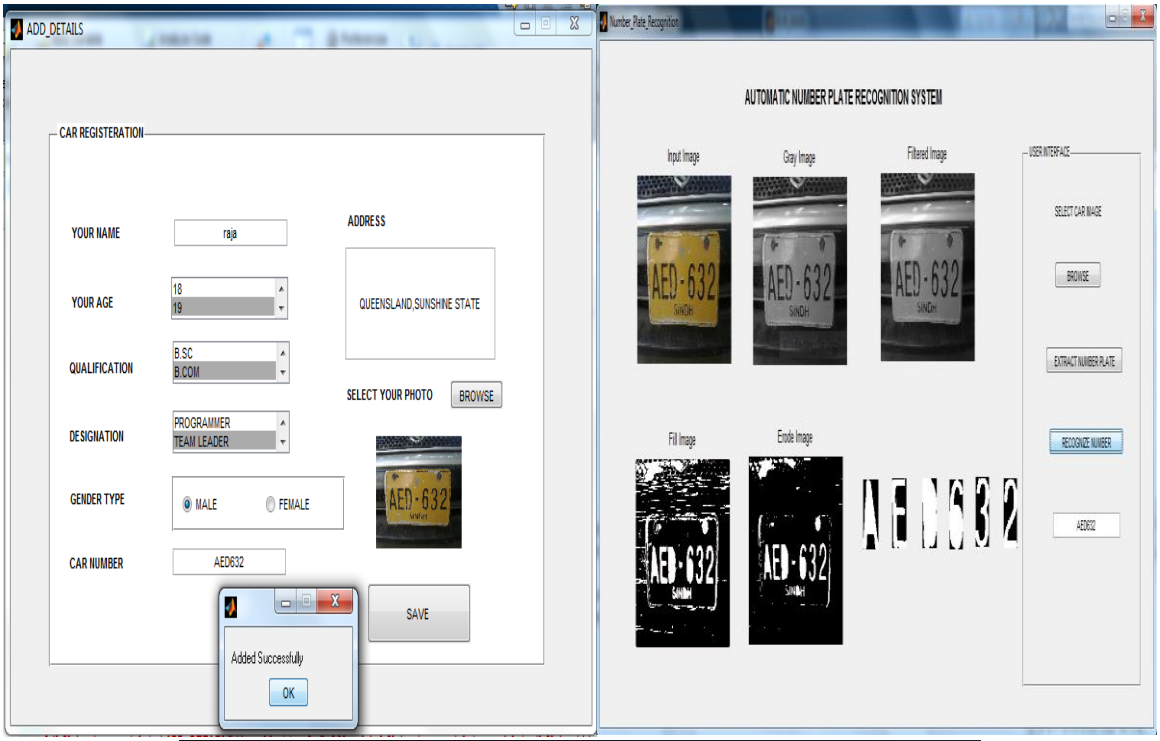
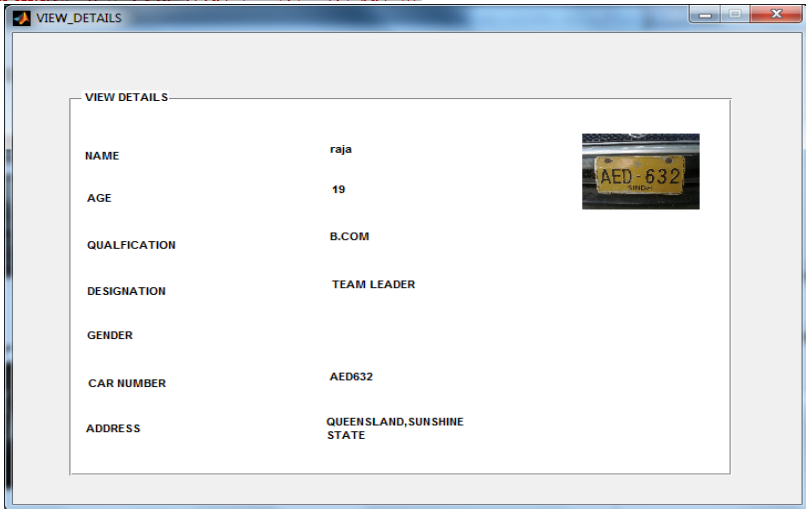


Fig.1 proposed framework

IV SIMULATION RESULTS







V.EXPERIMENTAL STUDY

The proposed system had been analysed to measure the performance and accuracy of the number plate detection and owner details identification. The system was tested by 150 car number plates under several illumination conditions. The characters and numbers were clearly and correctly identified in different weather conditions, new plate that played an easy role for identification. The identification was 92%. The failed identification came from mostly motion blurred or overlapped by other Vehicle's body or slant, different font,different language and dirty in the plates.

VI.CONCLUSION

License plate recognition system mainly consists of four steps such as vehicle image capture from video, preprocessing, character segmentation and character recognition In this paper different Number Plate Identification strategies have been examined in subtle elements which were utilized by several researchers. The Number Plate Identification (VNPI) framework predominantly includes three noteworthy strides, number plate localization, character division and character identification. Also utilization of various methods and techniques which are proposed by researchers beforehand are discussed. We have even mentioned the basic and common steps involved in the vehicle number plate identification. From the papers surveyed, it is realized that there are different methods and algorithms used for license plate detection, character segmentation and character recognition. In character recognition, methods like template matching are used.

