

Automated Car Number Plate Detection System to detect far number plates

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Abstract -The Automatic number plate recognition (ANPR) is a mass surveillance method that uses optical character recognition on images to read the license plates on vehicles. They can use existing closed-circuit television or road-rule enforcement cameras, or ones specifically designed for the task. They are used by various police forces and as a method of electronic toll collection on pay-per-use roads and monitoring traffic activity, such as red light adherence in an intersection. ANPR can be used to store the images captured by the cameras as well as the text from the license plate, with some configurable to store a photograph of the driver. Systems commonly use infrared lighting to allow the camera to take the picture at any time of the day. A powerful flash is included in at least one version of the intersection monitoring cameras, serving both to illuminate the picture and to make the offender aware of his or her mistake. ANPR technology tends to be region-specific, owing to plate variation from place to place. A various recognition techniques have been developed and number plate recognition systems are today used in various traffic and security applications, such as parking, access and border control, or tracking of stolen cars. Till now, all the

LPR systems have been developed using neural networks. In this work proposes to implement the system using Gabor filter, OCR and Vision Assistant to make the system faster and more efficient.

Keywords – ANPR, Localization, segmentation, recognition, Optical Character Recognition (OCR)

1. INTRODUCTION

ANPR is an image-processing technology which is used to recognize vehicles by their license plates. This expertise is in advance popularity in security and traffic installation. License Plate Recognition System is an application of computer vision. Computer vision is a method of using a computer to take out high level information from a digital image. The useless homogeneity among different license plate such as its dimension and the outline of the License Plate.

The ANPR system consists of following steps:-

- i. Vehicle image capture.
- ii. Preprocessing.
- iii. Number plate extraction.
- iv. Character segmentation.
- v. Character recognition.

The ANPR system works in these steps, the first step is the detection of the vehicle and capturing a vehicle image of front or back view of the vehicle, the second step is the localization of Number Plate and then extraction of vehicle Number Plate is an image. The final step use image segmentation technique, for the segmentation several methods neural network, mathematical morphology, color analysis and histogram analysis. Segmentation is for individual character recognition. Optical Character Recognition (OCR) is one of the methods to recognize the each character with the help of database stored for respective alphanumeric character.

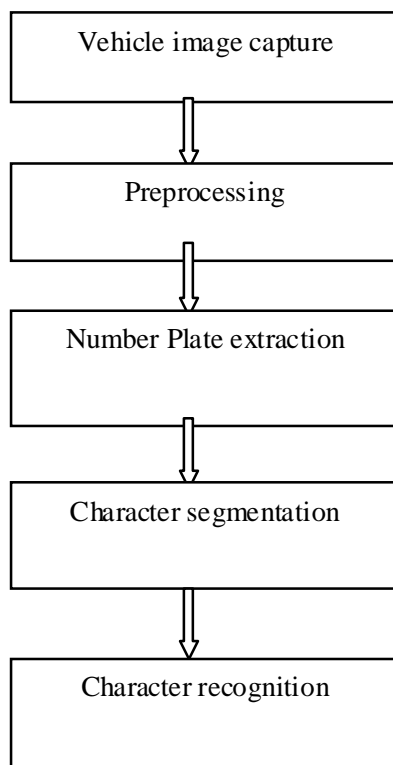


Fig1.1:- Block diagram of ANPR system

2. LITERATURE REVIEW

Muhammad TahirQadriIn this project [2] for the recognition the OCR methods is used which is

susceptible to misalignment and to different sizes. The affine transformation can be used to progress the OCR recognition from different size and angles. The automatic vehicle identification system using vehicle license plate is presented. A series of image processing techniques of the system for identifying the vehicle from the database stored in the PC.

S.Kranthi, K.PranathiIn this paper they [3] proposed that Automatic Number Plate Recognition (ANPR) is a procedure that captures the vehicle image and verified their license number. ANPR can be used in the exposure of stolen vehicles. ANPR can be used in different manner by using to detect it stolen vehicle on the highway.

AbdKadirMahamadIn this paper they explained [8] an automatic number plate inspection of alphabets of plate using image processing and optical character recognition. An important system has been developed of training interface using LABVIEW software.

Kuldeepak et al. In this paper [1] they introduced that high degree of accuracy has been required by the number plate recognition when roads are busy and number of vehicles are passing through. In this paper, by optimizing various parameters, they have achieved an accuracy of 98%. It is necessary that for the tracking stolen vehicles and monitoring of vehicles of an accuracy of 100% cannot be compromised with. Therefore to achieve better accuracy optimization is required. Also, the issues like stains, blurred regions, smudges with different font style and sizes should be kept in mind. This work can be further unlimited to minimize the errors due to them.

AmrBadr et al.In this paper [8] Automatic recognition of car license plate number became indispensable part in our daily life. This paper mainly explains an Automatic Number Plate Recognition System (ANPR) using Morphological operations, Histogram manipulation and Edge detection Techniques for plate localization and characters segmentation. Artificial Neural Networks are used for Character classification and recognition.

3. ANPR SYSTEM MODEL

Typical ANPR system consists of four steps these are Image Acquisition, License Plate extraction, character segmentation, and character recognition.

3.1 IMAGE ACQUISITION

The first step is the Acquisition of an image i.e., getting an image using the digital camera connected to the computer. These

Captured images are in RGB format so it can be further process for the Number Plate Extraction. The database system that contains the personal information of the vehicle owner and several plate vehicle images, abbreviations and acronyms



Fig3.1:- Captured image by digital camera

3.2 IMAGE PROCESSING

Captured RGB image is shown in fig2. The captured image is affected by many factors like: Optical system distortion, system noise, lack of exposure or excessive relative motion of camera or vehicle etc. result is the degradation of a captured vehicle image. And the adverse influence to the further image processing. Therefore before the main image processing pre-processing of the captured image should be taken out which includes converting RGB

to gray in fig3, noise removal, border enhancement for brightness.



Fig3.2:- converted from color image to gray image



Fig3.2: - Pre-Processed image

3.3 PLATE LOCALIZATION

The Basic step in recognition of vehicle Number Plate is to detect the plate size. In general number plates are rectangular plate mat lab toolbox function provides a function called region props. It measures a set of properties for each labeled region in the matrix. We used bounding box to measure the properties of the image region. After labeling the connected components, the region will be extracting from the input image. Number plate localization is shown in figure.



Fig3.3:- Vehicle Number Plate Localization

3.4 PLATE SEGMENTATION

Number plate segmentation plays an important role in ANPR system. The fundamental idea after region growing is to recognize one or more criteria that are quality for the desired region. After establishing the criteria, the image is searched for any pixels that fulfill the requirements. Whenever such a pixel is encountered, its neighbors are checked, and if any of the neighbors also equal the criteria, both the pixels are measured as belong to the same region. We get individual character and number image by using, vertical and horizontal scanning method. Fig shows the plate segmentation example.

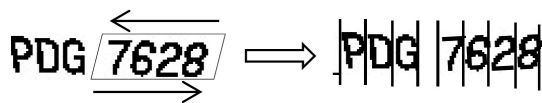


Fig3.4:- Example of Plate Segmentation.

3.5 CHARACTER RECOGNITION

This is the most important and critical stage of the ANPR system. It presents the methods that were used to categorize and then recognize the individual characters. The classification is based on the extracted features. These features are then classified using either the statistical, syntactic or neural approaches.

Different methods were used for character recognition, letters and characters in the paper. Finish the identification by calculating the similarity of features. For the similar characters, make the second identification with the method of feature point matching. Another approach is that Once the lines in an extracted vehicle number plate are separated, the line separation process is now applied column wise so that individual character can be separated. The separated individual characters are then stored in separate variables. The extracted characters taken from number plate and the characters on database which we have stored are now matched. The next phase is template matching. Template matching is an efficient algorithm for character recognition. The characters image is match up to our given database and the best resembling is considered. Another method for character recognition is the optical character recognition (OCR) is used to compare the each individual character against the complete alphanumeric database. The OCR actually uses correlation method to match individual character and finally the number is identified and stored in string format in a variable. The character is then compared with the database for the vehicle authorization. The resultant signals are given according to the result of comparison. Templates will exist for all the characters i.e. A-Z and 0-9 as shown in figure.

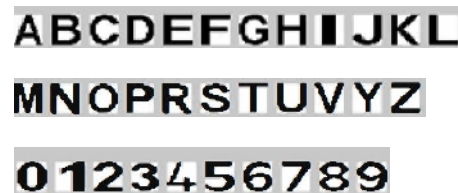


Fig3.5:- Database of templates.

4. Proposed Methodology

To recognize number plate first of all add templates from A-z and 0-9 and add them into mat file.

After that read the image and convert that image into grey scale. Now the next step is to find out threshold value of the image. After finding T-value convert that image into binary.

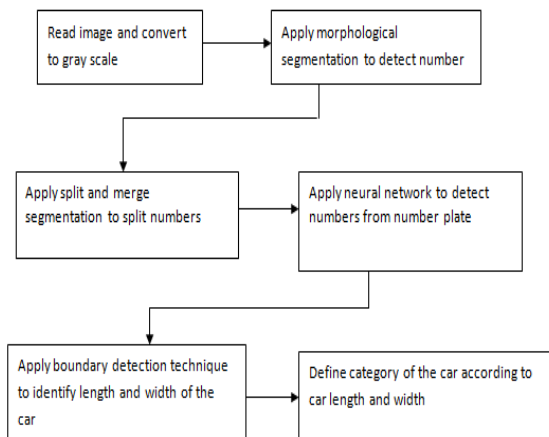


Fig.4.1: Flowchart

As shown in the figure, the block diagram of the proposed technique is shown. In the proposed diagram the input image is converted to gray scale and on the grayscale image technique of morphological scanning is implemented which will scan the image and detect number plate part from the car. The detected number plate will be given as input to spit segmentation which will split each and every character and every character will be matched with the existing dataset. The maximum matched will detected which will be merged to generate final result.

5. Experimental Results

The whole scenario has been implemented on MATLAB.

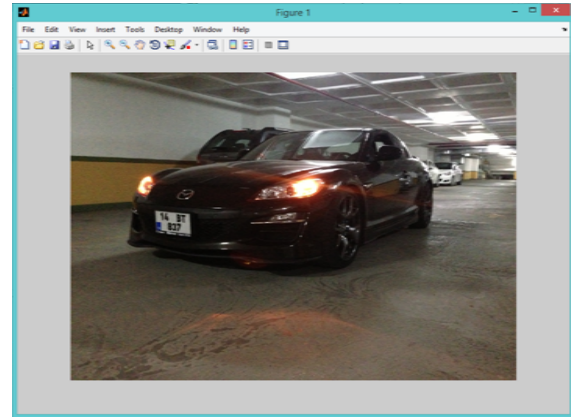


Fig.5.1: Car input for number plate detection

As shown in the figure 5.1, the interface is designed which will detect the number plate from the car and also detect car body . The car image is given as input to detect number plate from the car.

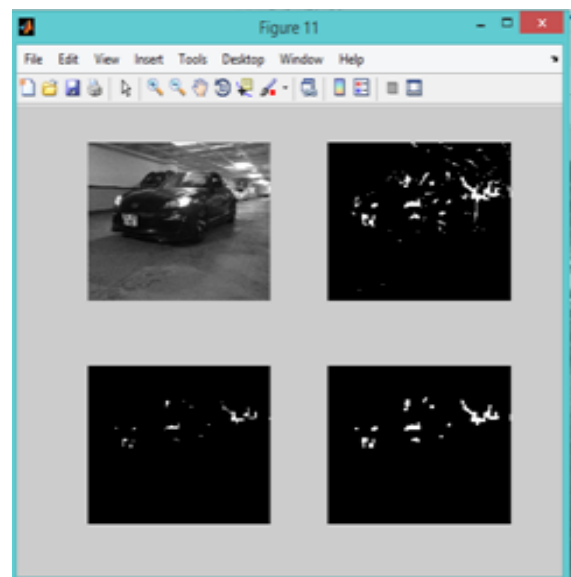


Fig.5.2 Car image slicing

As shown in the figure 5.2, the interface is designed which will detect the number plate from the car and also detect car body . The car image is given as input to detect number plate from the car . The car image is converted into gary scale to recognize number plate. The gray scaleimage is sliced into many parts and

each part will be treated independently. The slicing is applied to detect number plate area from the image.

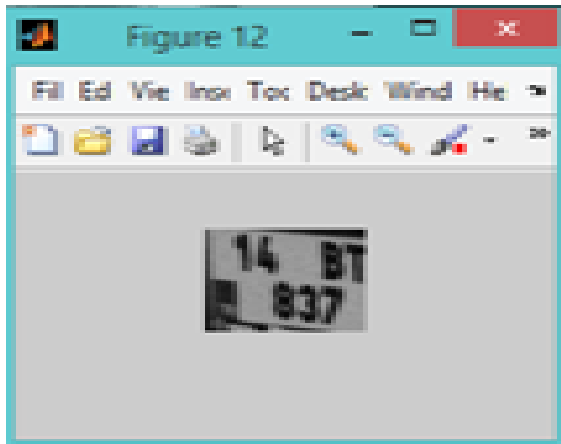


Fig. 5.3 Number Plate Detection

As shown in the figure 5.3, the interface is designed which will detect the number plate from the car and also detect car body . The car image is given as input to detect number plate from the car . The car image is converted into gary scale to recognize number plate. The gray scaleimage is sliced into many parts and each part will be treated independently. The slicing is applied to detect number plate area from the image. When the car number plate is detected, the number plate is recognized from the car image.

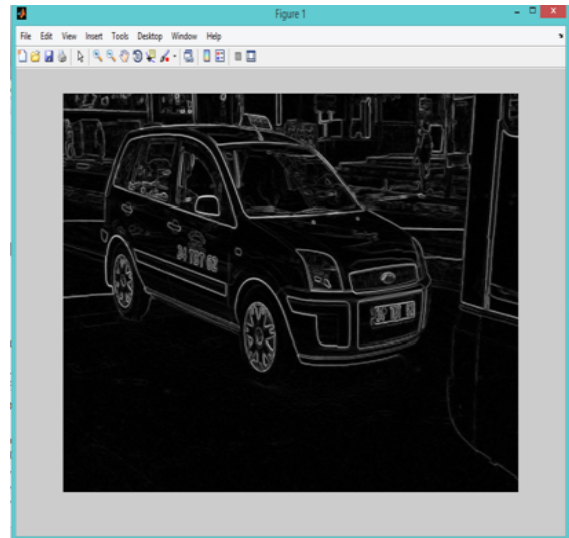


Fig. 5.4 Car image for body Detection

As shown in figure 5.4, the image is given as input to detect the car body. The image which is given as input will be converted into gray scale.

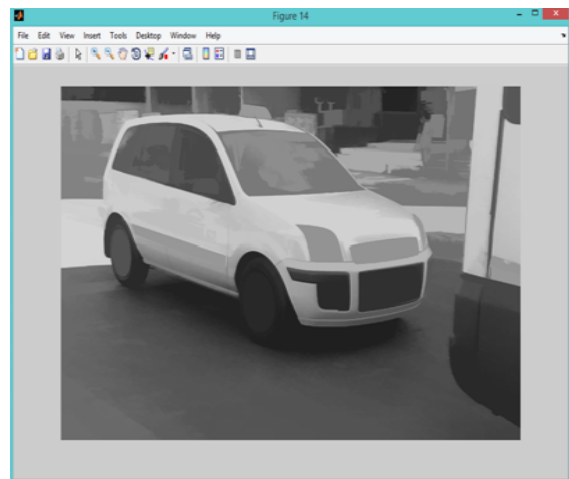


Fig.5.5 : Detection of car body

As shown in figure 5.5, the image is given as input to detect the car body. The image which is given as input will be converted into gray scale. The body of the car is detected and car body is marked with white color and other part with the black color.

6. CONCLUSION

In this paper, the automatic number plate recognition system using vehicle license plate is presented. The system use image processing techniques for identifying the vehicle from the database stored in the computer. The system works satisfactorily for wide variation of conditions and different types of number plates. The system is implemented and executed in Matlab and performance is tested on genuine images. In the existing work, work has been done on distorted number plates. This technique has a problem of noise and image is taken from distance. In proposed work a novel technique has been proposed for denoising and for the better character recognition using standard classifier of neural networks and provide better body detection.

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