Vehicle Number Plate Recognition using MATLAB

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Abstract— *The VPR (Vehicle Number plate Recognition) system is based on image processing technology. It is one of the necessary systems designed to detect the vehicle number plate. In today's world with the increasing number of vehicle day by day it's not possible to manually keep a record of the entire vehicle. With the development of this system it becomes easy to keep a record and use it whenever required. The main objective here is to design an efficient automatic vehicle identification system by using vehicle number plate. The system first would capture the vehicles image as soon as the vehicle reaches the security checking area. The captured images are then extracted by using the segmentation process. Optical character recognition is used to identify the characters. The obtained data is then compared with the data stored in their database. The system is implemented and simulated on MATLAB and performance is tested on real images. This type of system is widely used in Traffic control areas, tolling, parking area .etc. This system is mainly designed for the purpose of security system. Basically video surveillance system is used for security purpose as well as monitoring systems. But Detection of moving object is a challenging part of video surveillance. Video surveillance system is used for Home security, Military applications, Banking /ATM security, Traffic monitoring etc. Now a day's due to decreasing costs of high quality video surveillance systems, human activity detection and tracking has become increasingly in practical. Accordingly, automated systems have been designed for numerous detection tasks, but the task of detecting illegally parked vehicles has been left largely to the human operators of surveillance systems. The detection of Indian vehicles by their number plates is the most interesting and challenging research topic from past few years.*

Keywords— *Optical character Recognition, Image processing, Segmentation, VPN, Digital Proccessing.*

I. INTRODUCTION

Automatic vehicle identification is an image processing technique of identify vehicles by their number plates. Automatic vehicle identification systems are used for the purpose of effective traffic control and security applications such as access control to restricted areas and tracking of wanted vehicles. Number plate recognition (NPR) is easier method for Vehicle identification. NPR system for Indian license plate is difficult compared to the foreign license plate s there is no standard followed for the aspect ratio of licence plate. The identification task is challenging because of the nature of the light.

In VPN system spectral analysis approach is used were acquiring the image, extract the region of interest, recognized and stored in database. character segmentation using SVM feature extraction techniques. The advantage of this approach is success full

recognition of a moving vehicle. It is difficult to detect the boundary of the Number plate from the input car images in outdoors scene due to colour of characters of the number plate and Background of the Number plate the gradients of the original image is adopted to detect candidate number plate regions. There are also algorithms which are based on a combination of morphological operation, segmentation and Canny edge detector. License plate location algorithm consist of steps like as Edge Detection, Morphological operation like dilation and erosion, Smoothing, segmentation of characters and recognition of plate characters.

II. METHODOLOGY USED

In this system we will be working on CCTV footage or input image of four wheeler car. The CCTV footage must be clean and clear to extract the Vehicle number

from the image taken as Input for the processing . The brightness and contrast must be clear and the number plate must be in format according to given by Indian government. We tested the project only on the vehicles following Indian Government Rules and Regulations. The following methods is used in this technology: -

a) Image capturing from camera

b) RGB to Gray scale

c) Detect license plate from image

d) Character segmentation from number plate

e) Character recognition
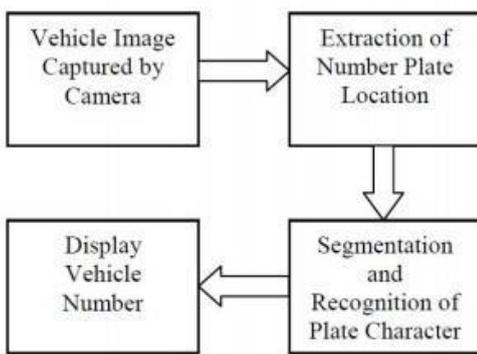
f) Display vehicle number

Fig.1: Block Diagram

Image Capturing from Camera

This is first phase of the system. We will be capturing the image from CCTV footage. It is a normal image from normal camera following RGB format. We have used matlab function to read image from library files. We will be using imread function. The function used to read image as input is given below: -

image = imread(imagefile);
axes(handles.axes1);
imshow(image);

Fig.2: Car Image

RGB to GRAY scale

This is second phase in the system. We will work on the image taken as the input from above step. It is in RGB format. We will be converting that image into gray scale using MATLAB.

Fig.3: RGB to Gray Format

Detect License plate from image

This is the third phase in the number plate detection system. We will be working on the image which was converted to gray scale from RGB format in above phases. We will be detecting the number plate from the gray scale image using the MATLAB function. We will be performing further more methods on that number plate detected using the given function: -

umberplate = find_number_plate(image); numpllates = char(numberplate); numplates = numplates';

Fig.4: Number Plate Detected

Character segmentation from number plate

This is the fourth phase in vehicle plate detection system. We will be working on the image which is extracted from the gray scale image which we obtained from above phases i.e. the number plate which is detected. We will divide each character of the number plate which is being detected to find the number from number plate. Now we will be implementing fifth phase of vehicle plate detection system. We will be performing further more methods on the segmented image.

Character Recognition

This is the fifth phase for vehicle number plate detection. We will be working on the segmented image of each character that we obtained from above phases. We will be detecting each and single character using Optical Character Recognition technique. Now there each character is recognized individually in this phase. Then those character are combined to form a whole number i.e. vehicle plate number which is present on the number plate which is taken in the form of image.

Display Vehicle Number

This is the final phase of the vehicle plate detection. We have performed all the methods of vehicle number plate detection using MATLAB. We will be displaying that number on the screen.

disp(numplates);

III. APPLICATIONS

- Traffic control: - It will be helpful in traffic control by telling intensity of vehicles in different areas.

- Airport: - It will be useful in airport parking to reduce frauds.

- Tolling: -It will be helpful at tolling poll to collect fine if vehicle found guilty.

IV. CONCLUSION

In this vehicle number plate detection project, we made a software which detect the vehicle number plate number using MATLAB and image processing. It will be finding the plate number for four wheelers. Though we have tried to make efficient software but there are some condition for this software to work: -

- Vehicle number plate should be white and according to rule given by government of India.

- Image should be clean and clear.

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