



AUTOMATIC NUMBER PLATE RECOGNITION AND LICENSE PLATE DETECTION

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ABSTRACT

In the emerging world, violation of traffic rules have become a major issue in developing countries. The numbers of vehicles are multiplying day by day which leads to many traffic rules violations and deaths. This is due to the violation of traffic rules like over speeding of vehicles, red light crossing, wrong direction, no helmet. The solution to all these problems is the implementation of automated road traffic monitoring. Although the process of traffic management has become automated, it has very challenging problems and tasks, due to the different type of formats of plates, different scales, lightning and weather conditions. The Main purpose of this project is to control traffic rule violation precisely and cost effective. The proposed prototype includes an automated system which uses its sensors and camera based on raspberry pi to capture video. The project represents automatic number plate recognition (ANPR) technique and other picture processing for plate localization and optical recognition which makes it brisk and uncomplicated in recognising the number plate. After spotting the number from vehicle license plate the sms based module is used to inform the owner of the vehicle about violating traffic rules. An additional message is sent to regional transport office for tracking issues.

KEYWORDS

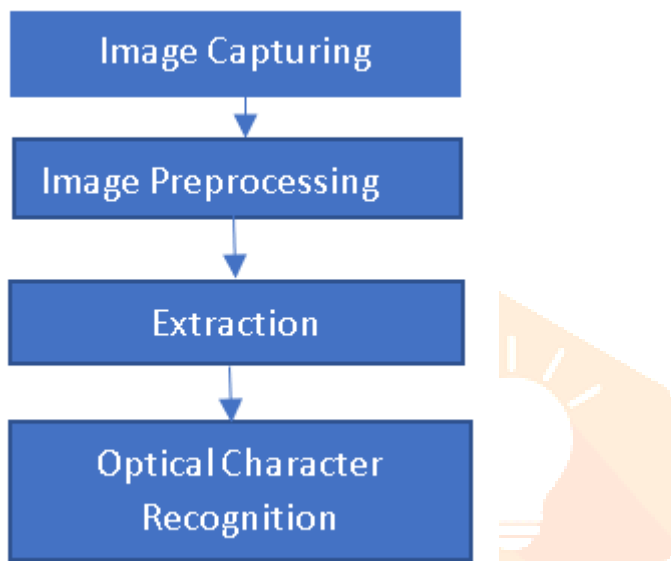
Automatic Number Plate Recognition (ANPR), Optical Character Recognition (OCR), Convolution neural network (CNN), Character Segmentation (CS), Edge based method, Grabcut algorithm.

1. INTRODUCTION

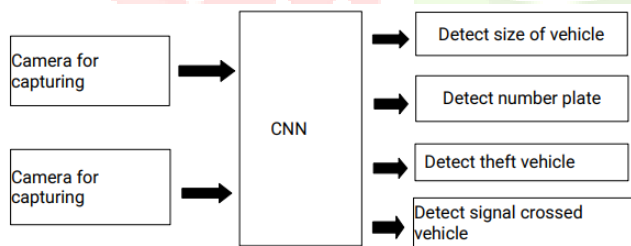
The ANPR (Automatic Number Plate Recognition) plays an important role in many systems like detection systems, vehicle tracking etc. Thus, ANPR is used by the city traffic department to monitor the traffic department to monitor the traffic as well as to track the stolen vehicle.

Number plate writing style is changing from country to country. In the case of India, the number plate picture is different for two wheelers and four wheelers. We have different approaches like edge detection, morphological operations character based approaches, texture based techniques, and statistical analysis. Recently, the field of deep learning and Convolution Neural Network (CNN) based methods helps us to identify the number plate as explained in many research and journal papers. In Image Capturing technique, we extract the interested frame from the video stream from CCTV footage. Image PreProcessing - Once the image is captured in which number plate is clearly visible,

the further process is carried out. In this we can modify the image size, removal of noise from image, converting image from RGB to gray and then Binary(black and white).Extraction-After preprocessing, the image is extracted from the number plate region and then converting the images into machine encoded text using Optical Character Recognition. Hence OCR is used to identify the number from the extracted image.



BLOCK DIAGRAM OF LICENSE PLATE RECOGNITION:



II.MATERIALS AND METHODOLOGY

Traffic rules are laid down to be followed for the good of each and everyone.But these rules are violated which leads to road accidents..The most habitual violations are traffic light jumping,over speeding,overtaking other vehicles in the wrong direction and not following lane manner.A model to monitor traffic rule violation is required which is also referred to as virtual police.

II.a.License plate detection and recognition:For identifying all possible outcomes taken from cameras at junctions,firstly detect the vehicles and then detect the number plate.[10]Detection can be classified based on edge-based, color-based, texture-based and character based methods[8].Based on vertical edges to detect the number plate ,used 2D-WD to extract the vertical edges.Then from the extracted region,high density of the edges are calculated to identify the number plate[6].Edge -based method is concerned on higher edge density than other areas to find the number plate[8].Grabcut algorithm is also use to perform identification and also to convert the image to grey-scale to remove all the possible blur in the image[2].



Vehicle license late detection.

II.b.Character Segmentation:Character segmentation is a notable phase for accelerating the recognition of the characters in the license plate[8].After ,the license plate is detected ,the characters in the license plate are segmented[1].The proceedings of character segmentation consists of many steps.First,the input image is converted to grayscale as shown in the image below II.b.1.Then ,grayscale converted image is binarised to remove noise as shown in the image II.b.2[10].Top-hat transformation is used to takeoff shapes like unfit characters,noise which do not fit[5].Later,the characters are divided uniquely for further process[10].



(a).input image

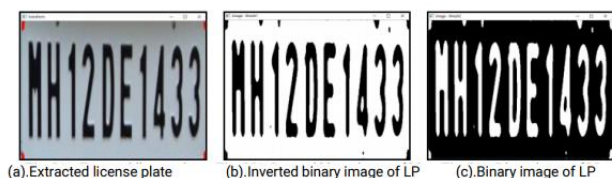


(b).converted to grayscale

II.b.1.Input image to grayscale conversion



II.b.2.a)Image with noise(b)Image with reduced noise



II.c.Binarization of the obtained image

II.d.Number plate recognition:Number plate recognition is one of the intelligent transport system that not only recognizes and count the number of vehicles but also differentiates them.After the binarization process,the images undergo recognition process for identification and grant the characters and numbers in the license plate[6].



(a).Number plate recognition

i)Character recognition: The segmented image of the license plate shown in the image is taken as a primary input for character recognition. In [8] they have described different types of classifiers for

III.DISCUSSION:

Many methodologies and techniques are implemented like Wavelet decomposition and CNN,deep learning methods,Edge detection methods,spatio temporal Markov algorithm,UAV trajectories,YOLOV3 object detection,contour detection technology,vehicular ad-hoc network

II.c.Binarization: Binarization is the process of converting image into image with two pixel values only i.e containing only black and white pixels only[4].Performing binarization before detecting and extracting license plate from the image will make the task of detecting license plate as edges more clearly in binary image as shown in the image II.c.[2].

character recognition which include SVMs(Support vector mechanism),Hidden Markov models,and ANN(Artificial neural network).To recognise the obtained characters in [6] use 42-class CNN classifier is upskilled.From these classifier the characters of the number plate are identified as shown in II.d.ii.



II.d.i.Segmentation of characters



II.d.ii.Obtained characters from the license plate

which produced quite good results but did not meet the required expectations.Our proposed model gives more accurate and efficient results when compared to others.

IV .LITERATURE SURVEY

In [1],the license plate recognition system uses algorithm for identification and extraction of number plate and characters,recognition is done by template matchin.However the proposed system ggives an effeciency of 96%.

In [2],image recognition for automatic number plate is effecient and fast computing technique for identifying vehicle number plate.The proposed method uses image processing technology for identification of vehicles.It gives an accuracy of 94%.This is used in highly populated areas and highly restricted areas.

In [3],Implementing ALPR for detection of traffic violations uses information and communication technologies and is a step in sustainable transportation.By capturing an image of the vehicle's license plate by placing camera at suitable places gives the required output.It gives an accuracy of 93%.

In [4] ,License plate recognition using CNN uses OCR technology to detect the number plate ,and image processing technology to get enchanced image followed by character segmentation where each character is recognised individually.At last each character is recognised using CNN which is trained on large data sets.

In [5],An effecient license plate recognition system using CNN,which includes various stages like license plate localization,character segmentation,character recognition.The YOLO V2 and SVM are used to capture license plate with high accuracy.The LPRCNN is used in character recognition which has high accuracy.

In [6],Deep learning based segmentation free license plate recognition using roadway survaillance camera imagesuses deep learning based object detection techniques in character detection and recognition.The proposed model gives an effeciency of around 73.3% on a test set consisting of 200 real life images.

In [7],Smart transport system using automatic number plate recognition,uses canny edge recognition for optical character recognition tp recognise yhe characters present on number plate.This is implemented using matlab.This method is used to capture letters present on plate starting from video capture,segmentation and canny edge detection .

V.CONCLUSION:

Although there are several methods and ways to detect license plate,but the proposed method works in efficient way to automatically identify and recognize license plate The major contribution of this paper has been to provide a brief source of reference for researchers involved in LP detection and recognition.LPR may also support intelligent vehicle management and warning vehicle re identification in an integrated highway management system is also proposed with numerous practical traffic applications. The main challenging task is the detection of traffic violations through video surveillance because there are so many vehicles on road and detection time is lower for higher dense traffic flow and also different light conditions,language of vehicle number,different font and background colour.

Vi. REFERENCES

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