Image Recognition for Automatic Number Plate Surveillance

P.Meghana, S. SagarImambi, P. Sivateja, K. Sairam

Abstract: Automatic number plate recognition is a well known proposal in todays world due to the rapid growth of cars, bikes and other vehicles. This automatic number plate recognition system uses image processing technology for identification of the vehicles. This system can be used in highly populated areas and higly restricted areas to easily identify traffic rule violated vehicles and owners name, address and other information can be retrieved using this system. This system can be automated and it is used to recognize vehicles without authorization ,vehicles that violated rules at populated areas like malls, universities, hospitals and other car parking lots. This can also be used in the case of car usage in terrorist activites, smuggling, invalid number plates, stolen cars and other illegal activities. It can also be used in highway electronic toll collection. Image of the car number plate is captured and detection is done by image processing ,character segmentation which locate the alpha numeric characters on a number plate.Then the segmented characters are translated into text entries using optical character recognition(ocr).ANPR systems are already available but efficiency is not gained thoroughly. These systems are developed using different methodologies butsome factors like vehicle speed, different font styles,font sizes, language of vehicle number and light conditions are required to be explored .These can affect a lot in the overall recognition rate. ANPR systems use (ocr) optical character recognition to scan the vehical number plates, and it can be retrieved whenever required. The other details of the owners of the vehicles like address and mobile number can be manipulated whenever necessary by contacting the system administrative. The purpose of this paper is to recognize a car number plate using ann, image segmentation. We intended to develop a system in mat lab which can perform detection as well as recognition of a car number plate.

Keywords: ANPR, histogram approach, OCR, template matching

I.INTRODUCTION

Vehicle plate detection and recognition is used in many of the applications, including travel time estimation, car counting on highways, traffic violations detection, and surveillance applications. With the growing population, vehicles number also drastically increased .This made it difficult to find a car park these days for a large number of students and faculty at Educational Institutions. Most of the car parks are managed manually by security guards who may not keep record of the vehicles in the parking lot.

Hence, the vehicle driver have to keep wandering in the parking lot for finding a slot for car parking. The absence of the security guards may also lead to vehicle thefts and also may cause quarrels between drivers inorder to get parking space. Automated Number Plate Recognition (ANPR) is also known as Automated License Plate Recognition (ALPR). Automatic Number Plate Recognition or ANPR is a technology that uses pattern recognition to 'read' vehicle number plates. In simple terms ANPR cameras 'photograph' the number plates of the vehicles that pass by violating the rules. This 'photograph' is then fed in a computer system to find out details about the driver and owner of the vehicle and details about the vehicle itself. ANPR consists of cc's operated via acomputer . As a vehicle passes,ANPR 'reads' Vehicle Registration Marks – more commonly known as number plates - from digital images,takenthrough cameras located either in a mobile unit,in-built in traffic monitoring vehicals. Computer vision and character recognition, algorithms for license plate recognition play an vital role in the recognition of the number plate . Therefore they form the core modules in any ANPR system. The system for automatic car license plate recognition includes a static camera, a framer , a computer, and custom designed software for image processing, analysis and recognition
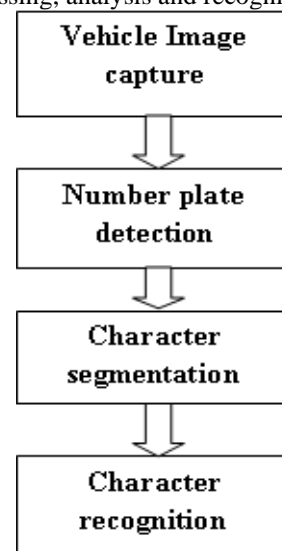

Fig-Convetional ANPR System

Parking lots would be benefited with this application .It would be very useful to develop this recognition system in a university so that everything goes in a sequential maner with less time consumption. Tollgates is one of the best application too. It is very difficult in a rushy hours for manual toll gate ticket generation. Hence these models can be used in coordination with employees. This would be very useful in terrible weather conditions

II. SURVEY OF LITERATURE

Number plate recognition systems have the following modules:

a) Color or monochrome static camera, b) Image conversion systems, and c) the image processing board. Each section must be chosen properly for a specific application.[1]

Basically, the License Plate Recognition (LPR) process isdivided into three main parts based on the thesis of S. D. Palmer and O. N. Aharoni [2] Plate Detection, Character Segmentation,and Character Recognition. Every module plays a vital role in gaining efficiency and accuracy.The challenges here are fontsize and style variations, angle of the picture, low contrast light effect, speed of the vehicals. Machine learning algorithms are fed through unsupervised learning[3].

III. PROPOSED METHODOLOGY
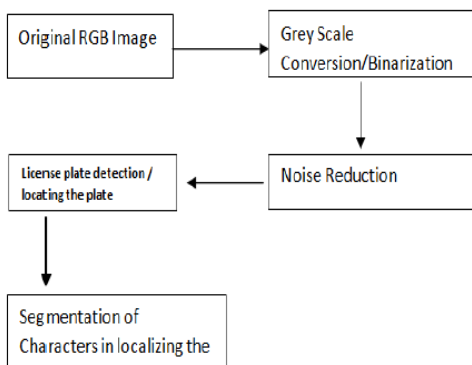
A.   Input-Original Raw Image-

Input the image of the car captured

Rgb(red green blue) to a gray scale image

The image that is acquired from the camera(input) can be an Rgb color image or a gray scale intensity image. The algorithm has to check for the Rgb image and then has to be converted to a gray scale image because all the further processing is done in gray scale format. Gray scale is chosen because of its simplicity in processing[2]

B.   Noise filtering

We intend to use median filters-low pass and high pass filters used to correlate the pixels neighboring and this can reduce the noise

Localizing the plate

Detection and localization of the text region is done by extracting edges in the image.Usually text and the background will have difference in contrast for the easy detection of the text .Hence edge features can be used in identifying the text pixels.

C.   Imagebinarization

Image binarization is a process to convert an image to black and white. In this method, certain threshold is chosen to classify certain pixels as black and certain pixels as white. The main challenge is the assaigning of the threshold values for an image. Sometimes it becomes very difficult or impossible to select optimal threshold value. This challenge can be overcome using the technique called Adaptive Thresholding. A threshold can be selected by user manually or it can be selected by an algorithm automatically which is known as automatic thresholding

D.   Edge Detection

Edge location is the principle technique for feature detection or feature extraction.It turns out to be extremely hard to apply this stategy to complex pictures as it may come about with question limit with not connected curves .Distinctive edge identification for example canny, sobel, prewitt & Roberts cross are utilized for edge recognition. Many edge extraction strategies can be partitioned into two primary stages. The first is discovering pixels in the image where edges are probably going to happen by searching for discontinuities in angles. Hopeful focuses for edges in the image are typically called edges focuses ,edge pixels or edges. The second one is connecting these edge indicates someow creates portrayals of edges as far lines bends and so forth.[3]

Edge Linking

Dge detectors point discovering pixels in a picture around the edges. It is important to gather those pixels together into set of edges. The issues with this system are little missing pieces or the incredible edges that can be showed up because of the noise. There are global and neighborhood edge connectors .
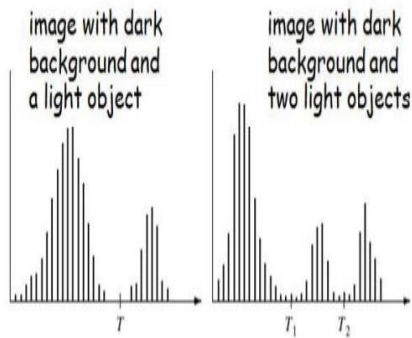
E.   Template Matching

In image recognition this technique is used for finding small parts of an image (which is called as the template image)

| Input Image | Target Image | Output Image |
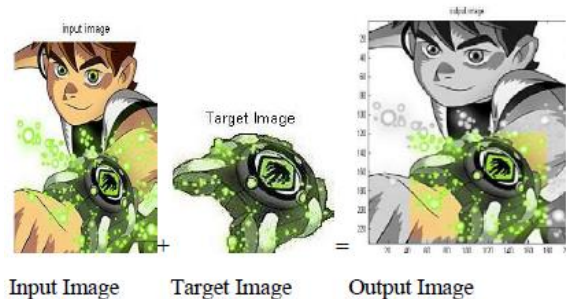
F.   Histogram Approach

It is a equalization method to process images in order to adjust the contrast of an image by modifying the intensity distribution of the histogram. The main objective of this technique is to give a linear trend to the cumulative probability function associated to the image. The histogram plots the number of pixels in the image (vertical axis) with a particular brightness wave(horizontal axis)

Optical character recognition (OCR):Identification of handwritten, typewritten or printed text characters, in an image is called OCR. It is generally used for editing or indexing of text.[7]

G. OCR using Template Matching

Template matching is one of the best Character Recognition techniques because it is easily implemented.The very first thing that is done in the template matching is to give a template that has to be matched with the image.This process of finding the location of the sub image(template image) is called as the template matching.The image inside a image is found to be localized. Template matching shows the similarities between a given template and the image that should be matched with it[8].It works by pixel-by-pixel comparison of the image and the template for each possible displacement of the template. This process involves the use of a database of characters or templates. There exists a template for all possible input characters. Templates are created for each of the alphanumeric characters.

Moreover, this proposed methodology might be able to overcome the drawbacks of the existing methodology like cost efficiency, over speed tracking and extreme weather conditions.

IV.CONCLUSION

This thesis explains different recognition methodologies, their advantages and drawbacks and gives the best of all those to opt for a user friendly, efficient system that works in any climatic conditions unaffected. That system should not be effected by the factors like speed, light, font size and styles.

V.RESULTS

By using matlab ,a number plate recognition system have been developed and the results are as follows

REFERENCES

1. Rahim Panahi, Iman Gholampour. "Accurate Detection and Recognition of Dirty Vehicle Plate Numbers for High-Speed Applications", IEEE Transactions on Intelligent Transportation Systems, 2017
2. H. Caner, H. S. Gecim, and A. Z. Alkar, "Efficient embedded neural network- based license plate recognition system," IEEE Trans. Veh. Technol., vol. 57, no. 5, pp. 2675–2683, Sep. 2008.
3. Unsupervised Category Modeling, Recognition, and Segmentation in Images Sinisa Todorovic, Member, IEEE, and Narendra Ahuja, Fellow, IEEE
4. V. Abolghasemi and A. Ahmadyfard, "An edge-based color-aided method for license plate detection," Image Vis. Comput., vol. 27, no. 8, pp. 1134–1142, Jul. 2009.
5. Semantic Image Segmentation with Contextual Hierarchical Models Mojtaba Seyedhosseini and Tolga Tasdizen, Senior Member, IEEE.
6. A Complete System for Vehicle Plate Localization, Segmentation and Recognition in Real Life Scene A.Conci, J. E. R. de Carvalho, T. W. Rauber
7. M. H. Glauberman, "Character recognition for business machines," Electronics, vol. 29, pp. 132–136, 1956.
8. Automatic License Plate Recognition Shyang-Lih Chang, Li-Shien Chen, Yun-Chung Chung, and Sei-Wan Chen, *Senior Member, IEEE*
9. Automatic License-Plate Location and Recognition Based on Feature Salience Zhen-Xue Chen, Cheng-Yun Liu, Fa-Liang Chang, and Guo-You Wang

AUTHORS PROFILE

P. Meghana, is a student at the department of Computer Science and Engineering at K L Educational foundation, Deemed to be University, Vaddeswaram ,Andhra Pradesh. She is doing her research work in knowledge engineering.

Dr. S. SagarImambi, PhD, is an Associate Professor at the department of Computer Science and Engineering at K L Educational foundation, Deemed to be University, Vaddeswaram ,Andhra Pradesh. She is having 20 years of teaching and 10 years of research experience. She has published 24 peer review research articles in various journals,20 articles at various international conferences and a Book chapter(De Gyter Publications, NewJersy). She is also an editorial board member of 3 academic journals. Her main areas of research interest are Data mining, Text mining, and Machine learning.

P. Sivateja, is a student at the department of Computer Science and Engineering at K L Educational foundation, Deemed to be University, Vaddeswaram ,Andhra Pradesh.He is doing her research work in knowledge engineering.

K. Sairam, is a student at the department of Computer Science and Engineering at K L Educational foundation, Deemed to be University, Vaddeswaram ,Andhra Pradesh.He is doing her research work in knowledge engineering.