Recognition Vehicle Number Plate Using MATLAB

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ABSTRACT: The 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.

Keywords: Number Plate Recognition, Gray Processing, Image Acquisition, Image Binarization, Template Matching

I. INTRODUCTION

With the increasing number of vehicle in today's world it's not possible to manually keep a record of the entire vehicle. There need to be a man standing 24*7 to note down the number. It's a time consuming process and require manpower. Furthermore the data

Stored manually is not readable after a long time. So to overcome all these limitations here we tried to develop a system which would automatically detect the number plate and store it in its database. Later on when the information is required one can get itand use it.

This process also helps to get the correct result compared to manually one. The process of working involves that as soon as the vehicle enters the secured area the system automatically captures the images and stores it. The processing of the image is done through the software stored in the system. If the vehicle matches the already stored information then it's allowed to pass the gate. And if the vehicle is not recognized or if its marked in the blocked list then it's not allowed to cross the gate and further checking process are followed.

THE GENERAL NPR SYSTEM:
Block Diagram of Number plate Recognition is shown in Figure. 1:
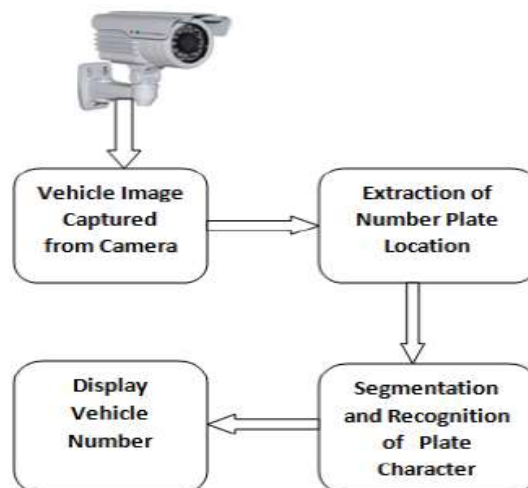
II.   LITERATURE REVIEW

Number Plate Recognition System finds its utility in number of applications including border crossing monitoring, toll management, parking management, traffic control etc. Owing to its significant application in so many fields, it has intrigued scientists since 1980's [1] and has remained an active area of research ever since. Implementation of such an efficient security system can give tangible leads to criminal activities if not curb them.

|	Reference name	Publication at	abstrct
1.	Recognition of Vehicle Number Plate Using MATLAB	International Research Journal of Engineering and Technology (IRJET) by Mr. Ami Kumar Parida1, SH Mayuri2 ,Pallabi Nayk3 ,Nidhi Bharti4 (2016)	It define video analytics as computer-vision-based surveillance algorithms and systems to extract contextual information from video. Currently most reliable approach is through the recognition of number plates, i.e., automatic number plate recognition (ANPR), which is also known as automatic license plate recognition (ALPR), or radio frequency transponders.
2.	Car Plate Recognition System	2012 Fifth International Conference on Intelligent Networks and Intelligent Systems	This paper presents about car plate recognition system. It describes, design algorithm and future of implementation. The system has color image inputs of a car and the output has the registration number of that car. The system has three main steps to get the desired information. Those are plate localization, character segmentation and character recognition.
3	Advanced Vehicle Monitoring System with Multi-Object Automatic Number Plates Detection	2019 Global Conference for Advancement in Technology (GCAT)	The ANPR (Automatic Number plate Recognition) system is based on image processing technology which automates number plate detection and use it whenever required. The process is done by implementing steps such as Image acquisition, gray processing, image binarization, number plate recognition and template matching using OCR in MATLAB
4	Matlab Based Vehicle Number Plate Recognition	International Journal of Computational Intelligence Research (2017)	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.

III.   METHODOLOGY

The working of full NPR system can be divided in to two sections. The hardware part and the software part. The working mechanism of all the parts is described in details below.

Software Model

The first and the most important part in this process is the software model. The software model uses the image processing technology. The programs are implemented in MATLAB. The algorithm is divided into following parts: Capture image, Pre-processing, Plate region extraction, Segmentation of character in the extracted number plate, Character

recognition, Comparison with database and Indicate result. The flow chart of license plate recognition system implementation in this work is shown in the following figure. There are various steps in this approach and these are implementation in MATLAB.
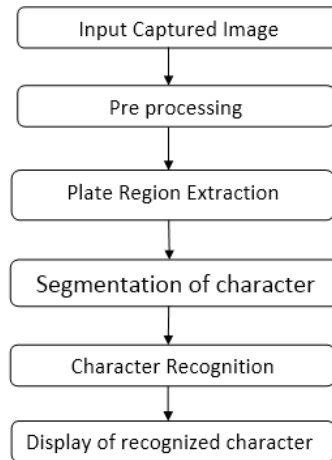
Flow diagram of number plate recognition

NPR Implementation Using Matlab:
Vehicle Image Captured By Camera:
The image of the vehicle whose number plate is to be identified is captured using digital camera

Fig1: image captured by camera

Extraction Of Number Plate Location:
RGB to gray-scale conversion is adopted, in order to facilitate the plate extraction, and increase the processing speed.Thisconversion is used I_gray=0.114*R+0.587*G+0.299*B.

Fig 2:binary image

Remove Connected Objects On Border:

The region of interest has been successfully segmented, but it is not the only object that has been found. Any objects that are connected to the border of the image can be removed using the imclearborder MATLAB function.

Fig 3: clear image after removing boundry objects

Character Segmentation:

Segmentation is one of the most important processes in the number plate recognition, because all further steps rely on it. If the segmentation fails, a character can be improperly divided into two pieces, or two characters. The ultimate solution on this problem is to use bounding box technique. Once a bounding box created over each character and numbers presented on number plate, each character & number is separate out for recognition of number plate.


Image objects labeling

Template Matching

Template matching is useful for recognition of fixed sized characters. It can be also used for detection of objects generally in face detection and medical image processing. It is further divided in two parts: feature based matching and template based matching. Feature based approach is useful when template image has strong features otherwise template based approach can be useful, here we had used template based matching. Figure shows the templates used in this project.
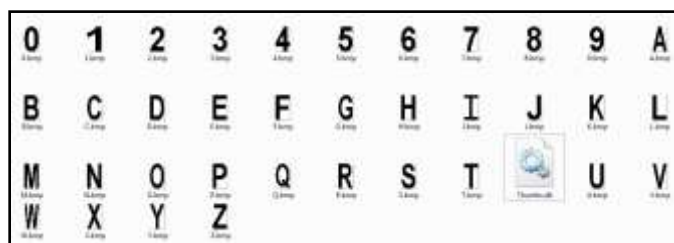
Templates used in matching process

Detect number plate from image:

In this phase number plate detection system working on the image which was converted to gray scale from RGB format

We will detecting the number plate from gray scale image using matlab function

Fid =fopen(licen_plate_No.txt,'wt,)

Fprint (fid,.'%n',licenceplateNo.)

Fig 4 :recognised numberplate

Hardware Model

The hardware model consists microcontroller for controlling the complete hardware of the ANPR system. The ANPR algorithm on a PC receives the image and performs the processing, which Yields the vehicle number. This Number is then compared to standard database and finally provides signal to microcontroller to control the system Hardware. If the inputted plate contains the authorized number then the green indication light will be switched on w, and if the inputted plate contains an unauthorized number then red indication will be switched-on.

Experimental result

In this section presentsthe simulation results of the developed NPR system .here we show two number plates taken and stored in PC.
The simulation and result displays below
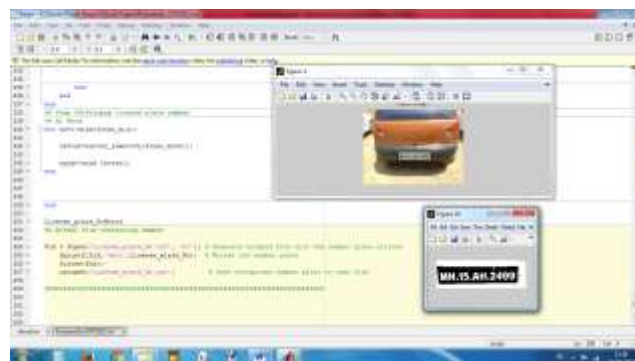

Fig 5: simulation and result of car 1

Fig 6 : simulation resultof car 2

Applications
- Parking
- Access Control
- Motorway Road Tolling
- Border Control
- Journey Time Measurement
- Law Enforcement

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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