

Automatic Vehicle Number Plate Detection System

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Abstract – Automatic Vehicle number plate detection system is a image processing prototype, which will first process on image, then identify the number plate to get information about the vehicle. The main objective is to correctly design an automatic car identity machine with the aid of the usage of the vehicle's number plate. If the vehicle is an un-authenticate, then it becomes a very tedious and time-consuming and very hard task to search that vehicle. Recognized number plate displays on graphical user interface and stored in a database. It can be also used in on the entrance for security manage of a e.g. shopping malls, college campus and so on. The evolved machine initially detects the car then captures the car picture. vehicle range plate place is captured the use of the photo segmentation in a photograph. CNN is used to enhance the plate detection The ensuing records is then can be used to evaluate with the information on a database to give you the unique records like the car owner, region of registration, and so forth. The machine is carried out on Python(Programming Language) and OpenCV as an image processing library, and its performance is tested on real photographs. It's has been determined from the experiment that the evolved device readily acknowledges and detects the automobile's quantity plate on real images.

Key Words: ANPR, OCR, CNN, OpenCV, Flask

1.Introduction

Presently in this project, a virtual photograph Processing-based totally prototype is developed. moves which include photo Acquisition, enhancement this is pre-processing, Segmentation of the license plate and then software of OCR (Optical individual recognition) is carried out to shop the wide variety on textual content shape. The plate variety is displayed as textual content on the terminal the usage of the primary of OCR with help of Pytesseract and Tesseract engine. it is seen that the safety forces and government face issues each time protection forces chase a automobile or they can't seize a vehicle which broke traffic policies. government find it very aggravating on a hectic day to log the vehicle numbers manually in a parking zone. ANPR has grown into a beneficial technique for vehicle's inspection and detection. This project is so versatile that it can be used as an entire application once converted to a software or can be used as a part of any big project.

2. Problem Statement:

This project implements automatic number plate extraction by working on the image of the Number plate and performing localization ,character segmentation and recognition using OCR technology.

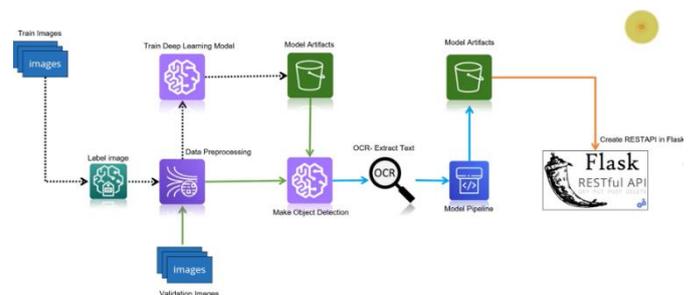
3. Literature Review:

In this paper author proposed a system to localization of number plate mainly for the vehicles in(India) and segmented the numbers as to identify each number separately. This presents an approach based on simple and efficient morphological operation and sobel edge detection method. It also presents a simple approach to segmented all the letters and numbers used in the number.

In India, number plate models are not followed strictly. Characters on plate are in different Indian languages, as well as in English. Due to variations in the representation of number plates, vehicle number plate extraction, character segmentation and recognition are crucial. The segmentation accuracy is 80% and recognition rate is 79.84 %. In this present the number plate extraction, character segmentation and recognition work, with English characters. Number plate extraction is done using Sobel filter, morphological operations and connected component analysis. Character segmentation is done by using connected component and vertical projection analysis.

The system has four main steps to get the required information. These are image labelling, plate localization, character segmentation and character recognition. This system is implemented and simulated in PascalVOC. The objective is to design an efficient automatic vehicle identification system by using the vehicle number plate, and to implement it for various applications. The system has color image inputs of a vehicle and the output has the registration number of that vehicle. The system has four main steps to get the required information. These are image acquisition, plate localization, character segmentation and character recognition.

4. Proposed System:



A. Explanation:

A license plate is the unique identification of a vehicle. The basic issues in real-time number plate recognition are the accuracy and the recognition speed. Number Plate Recognition (NPR) has been applied in numerous applications such as automatically identifying vehicles in parking lots, access control in a restricted area and detecting and verifying stolen vehicles. Quality of algorithms used in a license plate detector determines the speed and accuracy of the number plate detection. In the past, a number of techniques have been proposed for locating the plate through visual image processing. The number plate region from the given image is located and isolated. Quality of the image plays an important part hence prior to this stage pre-processing of the image is necessary. So first image is pre-processed by converting RGB into Gray-scale, noise reduction using Gaussian blur and edge detection. Then, the number plate is located by different image processing technique.

B. Working Principle:

Step 1: Image Processing:

In this step the image of the number plate is processed to segment the characters on the number plate. Then the character are segmented.

A.) RGB To Gray Conversion-Color image does not help to identify important edges and other features. Processing of RGB image is complex and it requires more processing time, so first we have to convert colored image to gray scale image.

B.) Image Enhancement-Adaptive histogram equalization is to enhance contrast of image (gray color image). In this we construct several histograms each for distinct region in image. This is advantageous because in ordinary histogram, single histogram is for entire image.

C.) Median Filtering-To remove noise in the image.

D.) Edge Detection- Edge is a boundary between two regions with relatively distinct gray level properties. It detects discontinuities in intensity values. The basic step in recognition of plate is to detect plate size (rectangle), thus we have to detect edge of rectangular plate. Using the sobel operator, the edges in image are highlighted. This in turn reduces amount of data in the image and processes the required data for further use.

E.) Morphological Image Processing-Structuring element is to create output of same size. Using dilation and by adding pixels to the boundary of the object to increase the thickness of the edges. Using Shrinking operation, thinning the image to eliminate irrelevant parts.

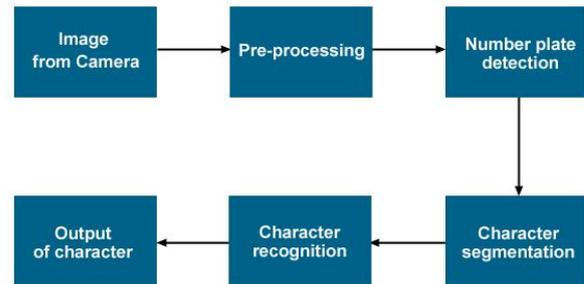
F.) Threshold-In this method, two distinct levels are awarded to pixels that are above and below to the selected threshold value. To separate the object from a background image is converted in binary form. Gray level threshold is a simple process. The value of threshold (T) is selected and compared with the pixel of the image. It also transforms the input image (K) into an output binary image (F) which is being segmented. In global threshold, the histogram of the image is partitioned using a single threshold value. Threshold means the volume of gray level falling between baseline boundary which lies amongst the pixels found in the foreground and background.

$$= 0 \quad \text{If } K(x,y) < T$$

$$F(x,y) = 1 \quad \text{For Image Object}$$

$$F(x,y) = 0 \quad \text{For Background Object}$$

T= Threshold



Step 2: Character segmentation

It is a bridge between a number plate extraction and character recognition. In this, different characters on a number plate area are segmented. Various reasons such as lighting variance, plate frames and rotation are those which hinder the segmentation work. A segmentation method is also known as a boundary box analysis. By this method, characters are assigned to connected components and these are extracted using the boundary box analysis. The segmentation process is completed upon reduction of noise in the image.

Step 3: Character Recognition

The method of character recognition is completed by using feature extraction to extract the features of characters and their different classification techniques. A machine learning algorithm is used for recognition of characters from the number plate.

Step 4: Output:



Fig -1: Figure

$$F(x,y) = 1 \quad \text{If } K(x,y) \geq T$$

5. Results

To measure our method and precision we tend to perform our experiment on several prototypes of vehicles with entirely different forms, and dimensions below changing conditions. The method of segmentation did not produce desired results for plates at an associated degree and plates at the edge of picture taken, this confined the accuracy of the algorithm.

5. Conclusions And Future Work

We have successfully detected number plate. There is a need of such kind of Automatic Number Plate Recognition system in India as there are problems of traffic, stealing cars etc. We can avoid many things like theft of vehicles, breaking the laws and speeding the vehicles if we implement this system all over our country .Most of major cities have implemented it but we still need more of such things. Government should take some interest in developing this system as this system is very economical and Ecofriendly if applied effectively.

The execution of the project can be used in quantity of number plates of multiple vehicles in a solo photo body by way of the use of multi-level genetic algorithms. Additionally, an extra easier model of this can be carried out by way of capturing pictures from stationery clip and can be matched with database for better researching purpose.

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