

Automatic Number Plate Recognition System Using CNN

Prof. M.V. Sadaphule, Kshitij Patil, Aniruddha Patil, Kunal Waghmare, Supriya Nikale

#1234 Department of Computer Engineering,
SINHGAD COLLEGE OF ENGINEERING, PUNE-41

Abstract: Automatic number plate recognition (ANPR) is a picture processing technology which uses a number (license) plate to spot the vehicle. The main objective is to efficiently design an automatic vehicle identification system by using the vehicle's number plate. The system is implemented in traffic rules and regulation, Parking Management etc. It can be also used in on the entrance for security control of a highly restricted area like military zones or areas around top government offices e.g. Military Base, Parliament, Supreme Court etc. The developed system initially detects the vehicle then captures the vehicle image. Vehicle number plate region is captured using the image segmentation in a picture. CNN is used to improve the plate detection The resulting data is then can be used to compare with the records on a database so as to come up with the specific information like the vehicle owner, place of registration, address, etc. The system is implemented using Python and OpenCV as an image processing library, and its performance is tested on real images. It is observed from the experiment that the developed system conveniently recognizes and detects the vehicle's number plate on real images.

Keywords: ANPR, CNN, OpenCV, Number Detection.

I. INTRODUCTION

Currently In this project, a Digital Image Processing-based prototype is developed. Actions such as Image Acquisition, enhancement that is pre-processing, Segmentation of the license plate and then application of OCR (Optical Character Recognition) is applied to store the number on text form. The plate number is displayed as text on the terminal using the principal of OCR with help of pytesseract and Tesseract engine. It is seen that the security forces and authorities face problems whenever security forces chase a vehicle or they can't catch a vehicle which broke traffic rules. Authorities find it very hectic on a busy day to log the vehicle numbers manually in a parking lot. So, in order to make the entire process autonomous, we can install this system so as to automatically detect the vehicle which breaks the traffic rules, take a picture of it and store the number in the database so as to fine the respective owner afterwards. The system can be used in parking so as to take the picture of the vehicle and log the vehicle number in the database (or the cloud, if connected to the internet). This technology reduces the unnecessary hectic manual work required on any busy day, saves the labor cost and is far more efficient than humans. The number of any vehicle once obtained as text, can be displayed, saved in the database or can be searched through the entire database for the details. 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.



Fig 1. Overall System

Problem Statement:

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

II. LITERATURE SURVEY

[1] Vehicle body detection system utilizes the color characteristics of the barking lights to carry out detection. It first detects the location of the two barking lights in the captured image. Then set license plate detection region using the probability distribution of the license plate between the two lights, thus quickly locate the license plate. This method can eliminate any environmental interference during the license plate detection. From the results of experiment, it is determined that this system can effectively and quickly capture the vehicle image, detect and recognize the license plate whether it is dark, raining or under complicated environments.

[2] In this paper author proposed a system to localization of number plate mainly for the vehicles in West Bengal (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. Author also presents a simple approach to segmented all the letters and numbers used in the number

plate. After reducing noise from the input image we try to enhance the contrast of the binarized image using histogram equalization. The system mainly concentrate on two steps; one is to locate the number plate and second is to segment all the number and letters to identify each number separately This method can eliminate any environmental interference during the license plate detection and improve the rate of accuracy of license plate detection and recognition.

[3] 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. Character segmentation is done by using connected component and vertical projection analysis. Character recognition is carried out using Support Vector machine (SVM). 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.

[4] The system first senses the vehicle and then gets an image of vehicle from the front or back view of the vehicle. The system has four main steps to get the required information. These are image acquisition, plate localization, character segmentation and character recognition. This system is implemented and simulated in Matlab. The objective is to design an efficient automatic vehicle identification system by using the vehicle number plate, and to implement it for various applications such as automatic toll tax collection, parking system, Border crossings, Traffic control, stolen cars etc. The system has color image inputs of a vehicle and the output has the registration number of that vehicle. The system first senses the vehicle and then gets an image of vehicle from the front or back view of the vehicle. The system has four main steps to get the required information. These are image acquisition, plate localization, character segmentation and character recognition. This system is implemented and simulated in Matlab 2010a.

[5] Here Vehicle number plate is extracted by using the image segmentation and Optical character recognition technique which is used for the recognizing the character. And then resulting data is used to compare with the records on a database and data extracted from RFID. And in database there can be specific information like vehicle's owner name, place of registration, or address, etc. The developed system firstly detects the vehicle RFID and then it captures the vehicle number plate. Here Vehicle number plate is extracted by using the image segmentation and Optical character recognition technique which is used for the recognizing the character. And then resulting data is used to compare with the records on a database and data extracted from RFID. And in database there can be specific information like vehicle's owner name, place of registration, or address, etc. If the ID and the number are matches with the database then it show the message "authorized person" else "unauthorized person". Both should be match with the database. If single one condition is true then it shows "unauthorized person". Here the system also adding the advantage of identifying and auto information about theft and crime vehicles.

III. PROPOSED SYSTEM

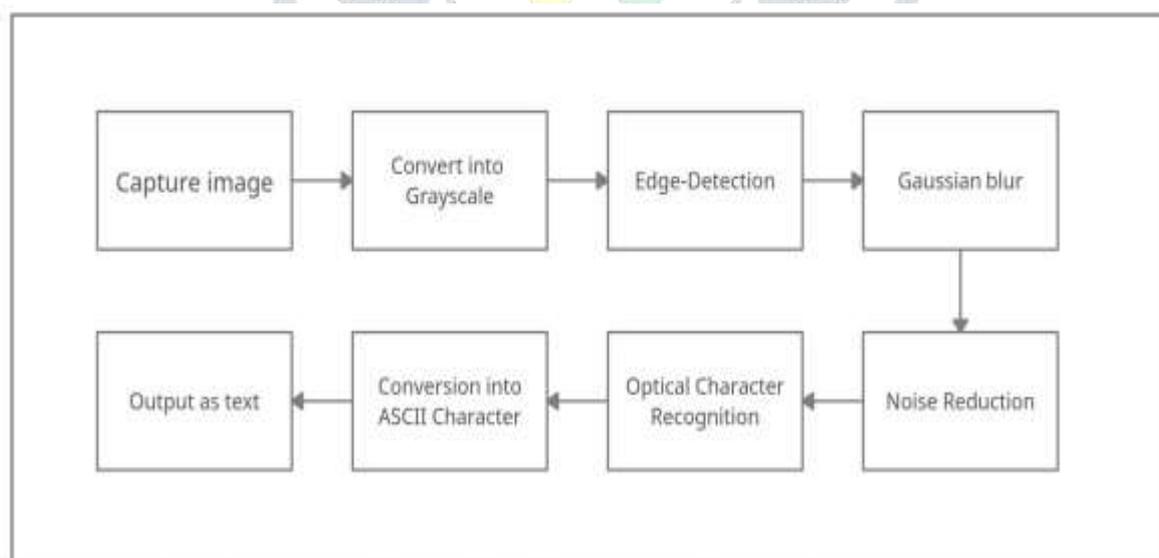


Fig 2. System diagram

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. Algorithm Steps:

Step 1: Input Image of number plate

Step 2: It is loaded (Image) classified as being ONE, TWO or THREE

Step 3: Preprocess() on number plate image

Step 4: It is determined the a priori probability for each class of digit and character

Step 5: Remove() all background data.

Let (i,j) It is calculated the words and number.

Step 6: Clustering () of words character and digit details.

Step 7: Recognition() all words.

Step 8: Stop

C. CNN Process:

We have used total of 6 layers in CNN to increase the accuracy of the number plate detection, without using CNN we observed that number plates in only certain images were detected i.e image had to be straight and clear such that number plate on the vehicle had to be straight even slightly skewed or tilted plates were not detected. But after implementing CNN all images were detected even the skewed and tilted plates were also detected regardless of the quality of the image Implementing CNN increased accuracy of 9% that is from 82% to 90.80 %

IV. RESULT



Fig 3. Result

V. CONCLUSION

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.

VI. REFERENCES

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