

Number Plate Recognition using OPEN cv and pytesseract

Sayan Das



August 20, 2023

# Introduction

In today's rapidly advancing world of automation and digital intelligence, the ability to automatically recognize and read vehicle number plates has become increasingly essential. From security systems at gated communities to toll booth automations and traffic rule enforcement, the applications of Automatic Number Plate Recognition (ANPR) are diverse and growing. This project focuses on harnessing the power of computer vision, facilitated by the OpenCV (CV2) library, combined with the text extraction capabilities of PyTesseract to develop an efficient and accurate Number Plate Recognition system.

The OpenCV library offers a wide range of tools that can handle real-time image processing and contains functionalities that are essential for extracting and processing the regions of interest in vehicle images. On the other hand, PyTesseract, an OCR (Optical Character Recognition) tool, will be employed to extract textual data (the license plate numbers and letters) from these processed images. The synergy between these two powerful tools forms the backbone of our ANPR system.

# Objectives

The objective of the project is two-fold –

1. The first objective is to detect the position of the number plate in the image. The Open CV library will be used for this purpose.
2. In the next step the detected number plate needs to be read using, here the PyTesseract library will be utilised.

# Number Plate Detection

There is a model called “Haar-cascade Russian number plate” for the number plate detection, that has been integrated with the OpenCV library in python. This object detection model for detecting car number plates is used to detect the position of the number plate in the project. On using this model on a gray-scale image, it provides us with the co-ordinates of the box that contains the number plate.

# Image Processing

Once the number plate has been detected in the image, the image has been processed in the following way to enhance the portion of the image that contains the number plate.

1. In the first step, the area of the original image, that contains the number plate is cropped as separate image.
2. Then the image of the number plate has been converted in the grayscale image.
3. In the next step the image has been smoothed using Gaussian Blur
4. Next the contrast of the image has been increased.

# Reading the Number Plate

After enhancing the portion of the image, we go for the recognition of the number plate, for which we have used PyTesseract.

This Optical Character Reading has been done for the 52 sets of sample images, for which the original value of the number plates are known. Then after the OCR read, for each of the sample image we have a true value and a value read by the model prepared. Now we have used the Fuzzy String Matching algorithm to measure the similarity between the predicted value of the number plate and the original value of the number plate.

The accuracy has a median value 73.13%. Which means that almost 50% of the sample images have the accuracy value greater than 73.13%.

# Conclusion

In conclusion, it can be said that the 73.13% as a median accuracy is quite a good figure as a start, but the accuracy of the model could be increased if the clarity of the image provided is ensured. In most of the cases the quality of the image is so bad that the model could not properly detect the number plate or even if it can detect it could not read it. This short coming can be improved by applying more advanced image processing techniques, but one have to keep in mind about the problem of overfitting in case of a highly complicated model.