Automatic Number Plate Recognition

Dhiraj Dabhade[1] , Rajani Sajjan[2]

Department of Computer Science and Engineering, MIT School of Engineering, MIT Art Design and Technology

1.Introduction:

In the last few years, Automatic Number Plate Recognition (ANPR) systems have become widely used in the safety, the security, and the commercial aspects. Automation is the most common term in the electronics industry. Through automation, existing technologies have undergone a revolution. This paper makes use of SSD Mobnet, with a pre-trained model, which is customized to undergo 10,000 steps. SSD has two components: a backbone model and SSD head. Backbone model usually is a pre-trained image classification network as a feature extractor. This is typically a network like ResNet trained on ImageNet from which the final fully connected classification layer has been removed. We are thus left with a deep neural network that is able to extract semantic meaning from the input image ‘while preserving the spatial structure of the image albeit at a lower resolution. It acts as the brain of the project. SSD uses a matching phase while training, to match the appropriate anchor box with the bounding boxes of each ground truth object within an image. Essentially, the anchor box with the highest degree of overlap with an object is responsible for predicting that object's class and its location. Basically, the operating system for the detection of vehicle number plates has been done using this technology.

For the recognition purpose, we are currently using a 5mp camera via our computer and processing the result in the same as a prototype model to check the viability and feasibility beforehand. Identifying a license plate from tiny and distorted pictures will reveal a lot of effort. One answer is to use a CCD camera with panning, tilting, and zooming (PTZ) capturing functions [2]. Different researchers have proposed different techniques for every step and an individual technique has its own advantages and disadvantages. The method for recognizing license plates includes the three main steps. It is a region of extraction of interest, plate number extraction and character recognition. The system which we are developing recognizes a ten digit license plate which could be also modified to detect various other types of license plates as well

In this paper we use a method based on transfer learning for developing pretrained model. The system takes images as input and using the SSD Mobnet model we predict the text of the car number plate.

Table 1 : Literature Survey

SR. No	Author Name	Method	Observation
1.	Cheng-Hung Lin	YOLOv2 Model	In this paper a three-stage license plate recognition system based on Mask-RCNN which was used for various shooting angles and numerous oblique images.
2.	Rupali Gala	Using Neural Net with image processing	In this paper the system identifies and detects the number plate based on neural net.
3.	Sagar Khedkar	Using Machine Learning Algorithms	In this paper machine learning algorithm is used to develop number plate recognition.
4.	Anisha Goyal	Image processing techniques	In this paper system is implemented in MATLAB
5.	AmrBadr et al	Using ANN	ANPR system is proposed using morphological operations.

2. Proposed System :

The system captures an image from the camera then that image will be converted into binary image file to increase the processing speed and that binary image is pass to the SSD Mobnet Model for training. The text from the trained image is extracted using EasyOCR.

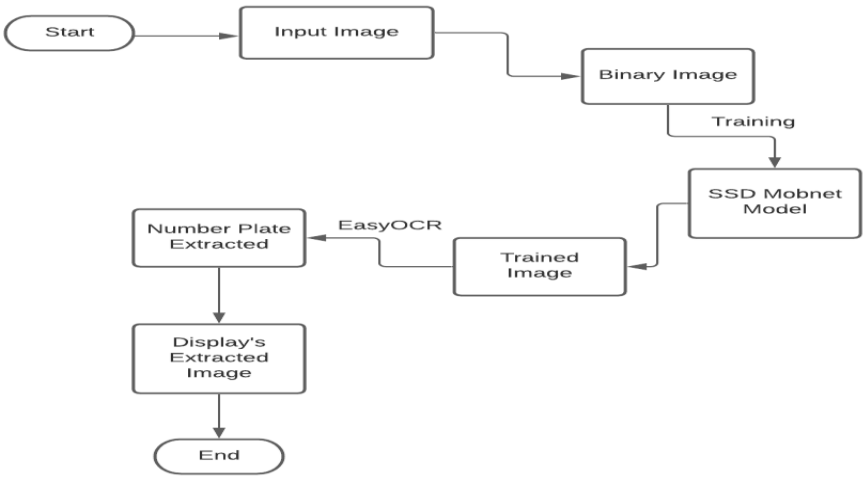

Fig 2 : Automatic Number Plate Recognition diagrammatical overview

Dataset:

In this project we used a kaggle dataset called as **car-plate-detection** Dataset that contains 489 training images and 30 testing images. The dataset has different size RGB images. For checking the accuracy of the model the model was trained on 489 images and tested on 30 images which gives us the accuracy of 72.56%. While implementing the project in real time the model has been trained on 400 images.

```
[ ]  ! mkdir ~/.kaggle

[ ]  ! cp /content/kaggle.json ~/.kaggle

[ ]  ! chmod 600 ~/.kaggle/kaggle.json

[ ]  ! kaggle datasets download -d andrewmvd/car-plate-detection
```

```
Downloading car-plate-detection.zip to /content/drive/My Drive/ANPR
 98% 199M/203M [00:01<00:00, 121MB/s]
100% 203M/203M [00:01<00:00, 117MB/s]
```

Fig 4: Downloading Dataset from Kaggle

Results:

In this project, SSD Mobnet model was used for predicting various car number plates. We were able to achieve an accuracy of 72.56%.

Fig 5 : Demonstration of Project

Conclusion

This document outlines a study on the identification of vehicle registration plates in automobile monitoring. ANPR is very helpful and reliable for efficient traffic monitoring. ANPR systems play a significant role in the development of the smart transportation network. Recognition may use image processing technology combined with neural networks to identify license plates or oblique or lateral images, moving distance images, numbering scheme, and number plate type (background) can be further improved. The detection of objects and neural networks is useful for detecting lateral or tilted images and images in remote motion. For potential recognition systems, the choice is to use high-resolution cameras with an increased number of frames for precision and improvement of accuracy for recognition.

Abstract

Automatic Number Plate Recognition has been a subject for many practical applications. It has three stages: Automatic Number Plate detection, Character Segmentation and Character Recognition. The main aim of this project is to detect the number plate characters from image. We have used Transfer learning technique to detect number plate. We have got an accuracy of 69.76% using the car-plate-detection dataset on the model.

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