AUTOMATIC VEHICLE NUMBER PLATE DETECTION SYSTEM USING CNN

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ABSTRACT
Increasing population has also increased the traffic graph. India was ranked number 1 among 199 countries for the most number of road accidents by world road statistics in 2018. So, a system is required to maintain and detect traffic rule violations.

An automatic traffic rule violation detection and number plate recognition vehicle is a method and a step ahead in controlling traffic. ANPR is used to detect traffic violations and detect the vehicle number plate so that it is legally registered to collect toll at electronic toll collection and also to obtain a database of the vehicle owners.

This system was invented in 1976 at The Police Scientific Development Branch in Britain.

ANPR mechanisms are generally divided into four stages:
1. Vehicle image capture
2. Number plate detection
3. Character segmentation
4. Character recognition

In this paper, we have used CNN for the system.

CNN is a special architecture of artificial neural networks and the best referring model to classify images.

The camera acquires the images of the vehicle which violate the traffic rule then from the captured image number plate is detected from different image processing techniques from the recognised number plate all the characters are segmented and the CNN identifies the segmented character and compares the vehicle number with the already present database.

This system covers components such as to find out vehicle registration number and for automatic vehicle concerned person.

KEYWORDS
Convolutional neural network (CNN), License plate number plate detection. CNN, methods with accuracy.

INTRODUCTION

Automatic license plate recognition (ANPR) is a method which uses optical character recognition to identify the characters and also read them from vehicle number plate. It uses cameras which are specifically designed for this task.

ANPR is mainly used by traffic police to detect the vehicles which violate traffic rules to know the vehicle is number plate detection. For each method restrictions like speed, accuracy, performance, and image size are reported.

But CNN methods are stability and is reliable for implementation.

The system will be more reliable and vehicle detection.
LITERATURE SURVEY

In this section, we study ALPR work in literature and also work about deep learning in this area.

(1) Vehicle Image capture and License plate detection

License plate detection is a very important step in the proposed method, where its efficiency plays a big role in the detection and recognition of license plate characters [2]. It is a location of an LP in an image or a video stream. In the literature, researchers have used a lot of techniques of computer vision and image processing. Yet, there have been other authors who have opted for using machine-learning and classification methods. For that, we can categorize these methods into: edge-based, color-based, texture-based and character-based methods [10]. All these methods are efficient in identifying the vehicle license plate.

Using a camera placed at a point image of the vehicle violating traffic rules are captured [1]. Then the captured images are identified by training a CNN classifier [2].
(3) Character recognition

After segmentation the characters are cropped from license plate image by using separating columns. To recognize and identify the characters of the image another 42 class CNN classifier is trained, 10 digits, 26 upper letters plus 6 arabic letters. In this proposed system we have used moroccan license plates to test performance of the system and for this reason arabic characters are also treated in moroccan license. The CNN model is used to classify the characters, which is open source, pretrained inception-V3 model[2]. These recognised characters are then identified and compared with the stored database.

(2) License plate segmentation

Once the license plate is detected, the character segmentation is the second stage in the ALPR. Segmentation is applied to implicate the image into a more specific distribution of pixels[4]. The license plate characters are generally separated and each character is far from the other character by the same distance. Based on this separation space, the characters have been segmented[2]. The detected license plate is scanned and the number of black pixels are computed. If the number of black pixels in the column exceed that of the predefined value, that is considered as the part of a character. Segmentation clips off such that only the numbers of the vehicle license plate are extracted and also filters the noise level in the image[5]. Several methods for blurring technique include Gaussian, Median, Kalman etc. All characters that are segmented are printed.

(i) License plate recognition

CONCLUSION

Traffic is a major problem in metropolitan cities. Traffic police find it difficult to identify the vehicle which violates traffic rules. This system can be a solution for growing traffic. In this paper we have discussed about CNN model for license plate detection which can elegantly solve the traffic rule violation problem and this model can be deployed in real-time circumstances. This model can also help in controlling Car park usage, Pedestrian crossing usage, Identifying number of vehicles along a road, areas of low and high congestion frequency, identifying location and cause of road works. Cameras installed for this model allows for traffic management decisions to be made in real-time.

Further enhancement to this model can improve the efficiency and accuracy and also overcome all possible complex cases which include high speed, language and different color of the number plate. Further implemented for location tracking and to send back an SMS to the vehicle owner making it easier to pay a penalty.
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