TRAFFIC VIOLATION DETECTION SYSTEM

BOOBALARAGAVAN.P, CHITRALEKA.G.V, KOWREESH.G, SANTHIYA.S

UG Scholars,
Department of Computing,
Coimbatore Institute of Technology, Coimbatore, India.

ABSTRACT

In this developing country there are many Technologies which is in use are solving the crisis nowadays but still the accidents which is happening in the roadways are too many. As soon as the population rate increases the amount of vehicles are being increased. The people as well as the government face many difficulties due to the some of the people who are violating the traffic rules. **So this can be overcome by finding the vehicle which is violating thetraffic rules with help of machine learning and deep learning techniques**. Also the modelis being **trained by the image dataset**. The vehicles are also being **classified** by the system. For example, the person with the vehicle is moving without a limited speed that time the chances of accident is more the police cannot note that vehicle number manually there. By using this Detection System we will be able to find out the vehicle number easily.

Keywords - Machine learning, Deep learning techiques,Violating traffic rules, Imagedataset, Detection system.
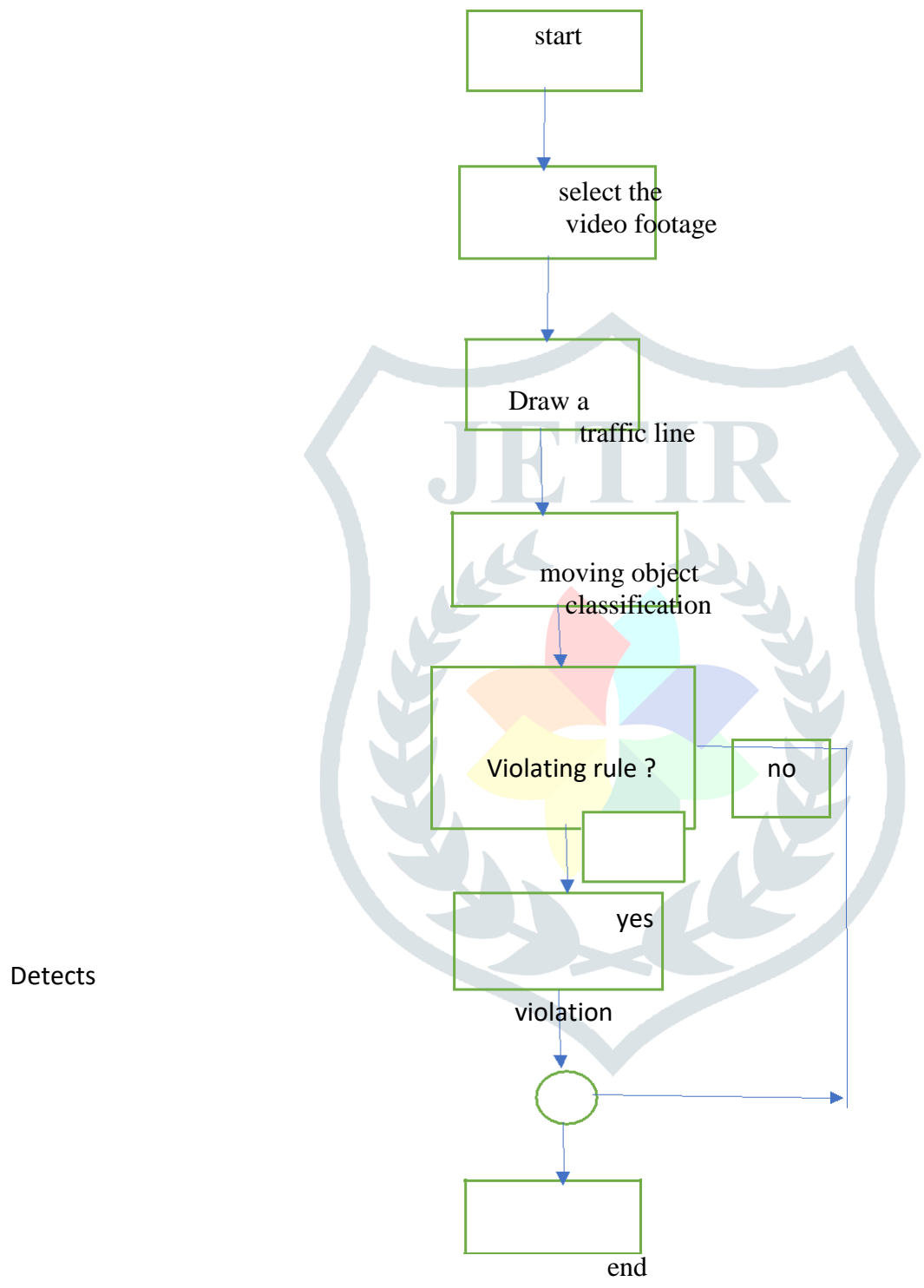
I.INTRODUCTION

Here instead of marking the vehicle number manually by the policeman, this system can be used effectively. The camera will be placed near the signal that camera will be detecting the number plates of the vehicles which is violating the traffic. For example the camera will be detecting the number plate of the vehicle which has been halted before that white line, because crossing the white line during the signal is a violation against the traffic rules . The model(camera) detect those traffic violation by machine learning and deep learning techniques.The camera(model) is trained which is being placed over the traffic signal. The model recognizes the number plate that is image recognition and the object detection. The model is trained by giving the dataset as an input. The Dataset is being provided like images and video,as soon as the training of the data is being trained and it is tested by giving the live input of the traffic scenario. It is based on the accuracy how that model find out that object. The condition will be given as input (crossing the white line and the vehicles in the wrong route)for the model . When the number is detected the information of the vehicle is being displayed and that people will be warned. When that warning exceed more than 3 times the next time the vehicle will be ceased by the policeman. Marking the vehicle number manually is not a easy task during this manual marking missing out of people who are violating the traffic will be more . This is the efficient way to control the accident and other traffic rules violation.

II.SYSTEM OVERVIEW

The workflow of the system,

Figure-1 : Flow diagram of traffic violation detection system.
vssssssstrat

start

select the
video footage

Draw a
traffic line

moving object
classification

Violating rule ?   no

yes

Detects

violation

end

This system has two components:

- **Detecting the vehicle**
- **Recognising the violation**

The video footage is sent to the system. The vehicles are being detected from the footage. The vehicles are tracked when it is supposed to violate the traffic rules.

III.DATA ANALYSIS

The dataset for making the model to detect the object is based in the images labelled and trained which is collected from Kaggle library.

IV.METHODOLOGY

4.1 Classification of Vehicles

When the footage is being received, the object are detected. Here to classify and detect the objects according to the respective classes. The algorithm used is YOLOv3(You Only Look Once). This algorithm is very efficient way to detect the object in the real time. The classifiers model is built with Darknet.

V.ALGORITHM

5.1 YOLOv3 algorithm - YOU ONLY LOOK ONCE

Object detection is the most common computer vision problem used to detect objects in today's computer technology. YOLOv3 is a most commonly used object recognition algorithm.It treats object recognition as a regression problem and it is a clever convolutional neural network used for object detection in the real time environment. A Neural network is applied to the image then the image is divided into grids and then the objects in the grids are classified.The neural network does not look at the entire image, after dividing into grids it looks the grids where it contains more number of objects.

5.2 Why YOLOv3 algorithm?

YOLOv3 algorithm is most popular because it is a faster algorithm and it achieves high accuracy while it is executed in real-time. And also it uses the entire image for the detection when training and test time.It also break the algorithms in its working and benefits.It has an ability to process 45 frames per second.

5.3 Procedural functioning

STEP 1– YOLOv3 algorithm takes image as an input.

STEP 2- then the input image is divided into grids (for example 3X3 or 4X4 or 5X5grids)[for example input image may have 100X100 and grid will have 3X3].

STEP 3- Before testing, for training we need to create a class for the objects what are goingto detect in the image(input).The class must contains different type of that particular object images captured in different real time environment.So it must be helpful for testing.

STEP 4- After training the model,during testing image classification is applied on eachgrid.Then the object is predicted.

VI. FEATURES

6.1 Bounding box predictions

YOLOv3 predicts the objectiveness using logistic regression. Where 1 means complete overlap of bounding box prior over the ground truth object. The other bounding box priors which would have objectiveness score more than the threshold but less than the best one.

6.2 Feature extractor

YOLOv3 uses Darknet-53.It has a convolutional layer, where it is deeper than YOLOv2.

VII.IMPLEMENTATION

7.1 Computer vision

OpenCV is an open source computer vision and machine learning library which is used in the system for image processing purpose. TensorFlow is used for vehicle classifier with darknet.

7.2 Violation detection

The vehicles are being detected by using YOLOv3 .After that the violation are checked. It is checked like an imaginary line which will be assumed else drawn over the footage . The line specifics the traffic light is red . If any vehicle crosses the line that will be considered as violation of traffic rules and vehicle number is being noted

Figure-2 : Detection of the vehicle with the accuracy.
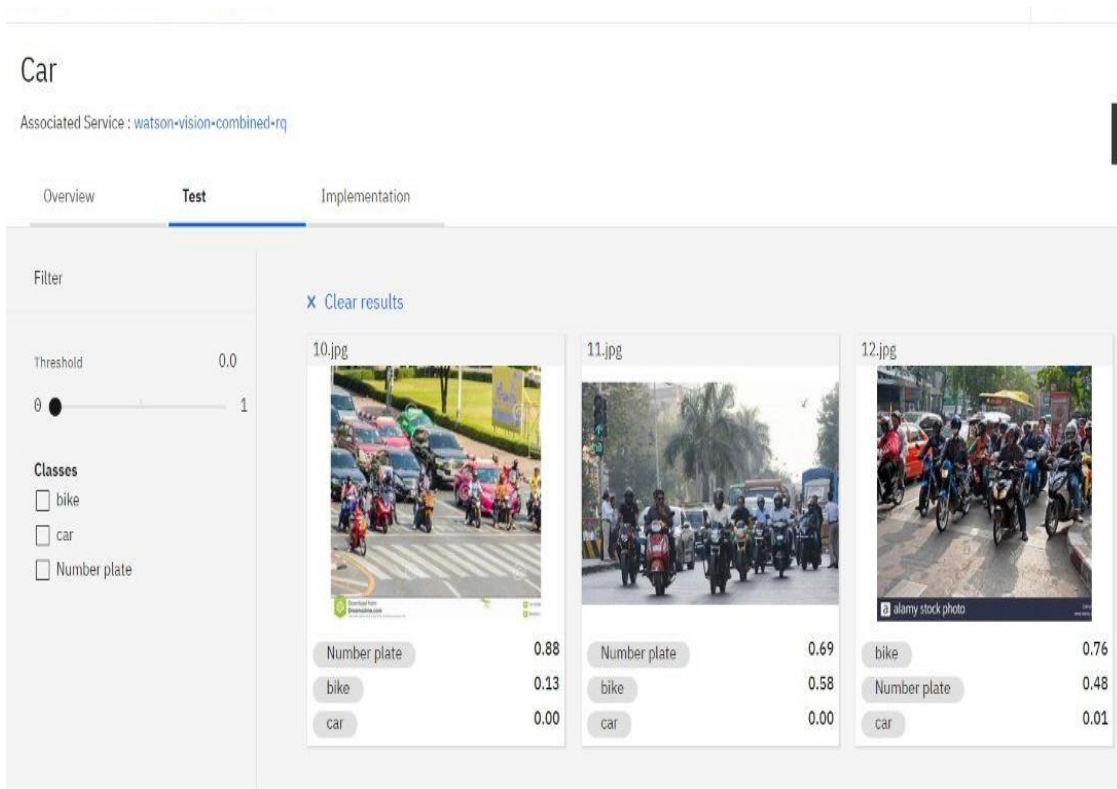
The image dataset is being trained and has been tested and the results have been detected with the accuracy. The accuracy of the prediction ranges from 0-1. The model predicts the dataset by which we have labelled and trained. In this we have considered 3 classes for example car, bike and number-plate. In each class we have given a set of dataset which consist of more than 500 images. Likely for each classes there will be a dataset which contain more than 500 images .So while training the model the prediction is being accurately provided.

Figure-3 : Model detects the object by YOLOv3
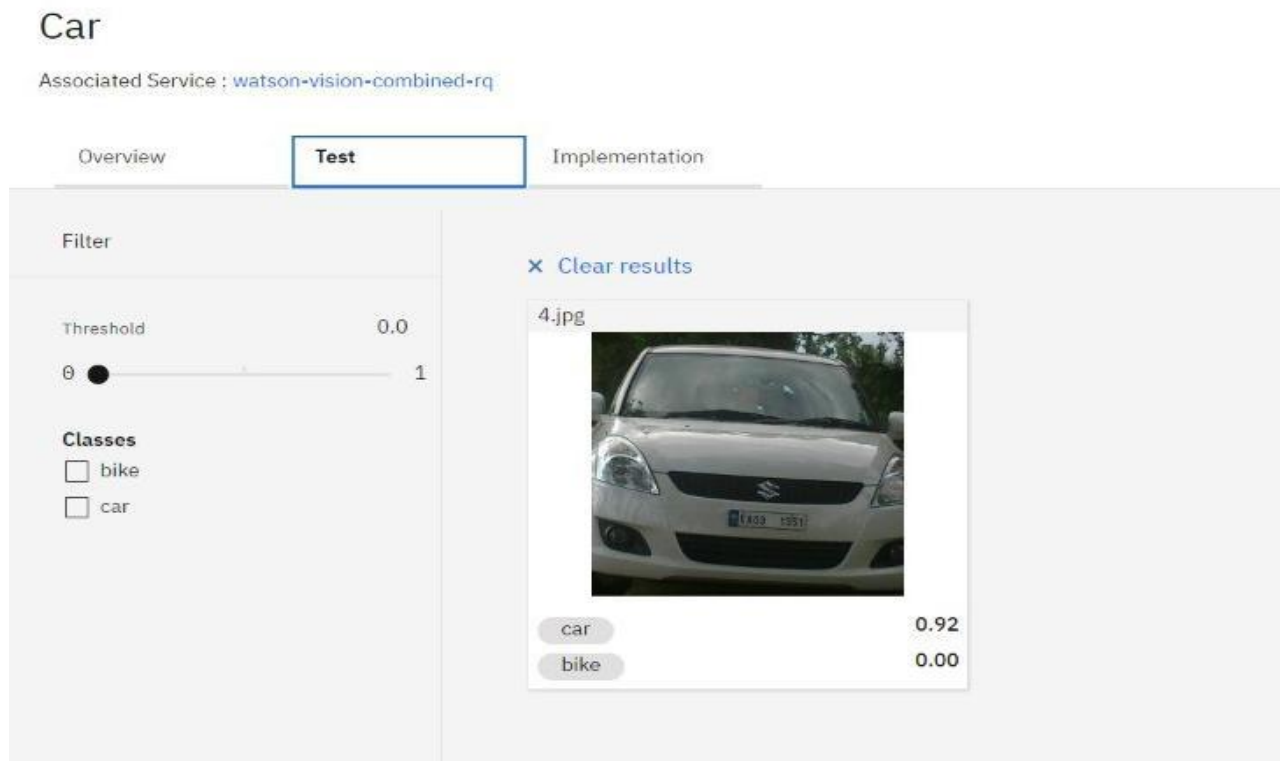
Here the object is being classified as car. Take a look at this picture the accuracy of predicting the car is 0.92 which is nearly equal the exact prediction. In this when 2 classes are provided the prediction is almost accurate. But when applying the algorithm YOLOv3 says if the class exceeds more than 2 the accuracy of prediction will be decreased accordingly. The differences are shown by comparing the figure 2 and figure 3.

VIII.CONCLUSION

1. https://github.com/sdevkota007/vehicles-nepal- dataset/blob/master/VehiclesNepal5.zip

Violating the traffic rules and accidents are the most crucial things while we see traveling on road ways.People also travel fast and they don't abide the traffic rules.So, this system will be very effective to solve this problem. Object detection places an important role for detecting the crimes uses cameras and it has drastically improved.By placing the cameras in the signals, It could find the objects(number plate of the vehicles that violating the traffic rules).

IX.REFERENCE

1. https://appsilon.com/object-detection-yolo-algorithm/

2. https://www.analyticsvidhya.com/blog/2018/12/practical-guide-object-detection-yolo-framework-python/

3. https://www.kaggle.com/ankitbarai507/indian-vehicle-license-plates

ABOUT AUTHOR(S)

CHITRALEKA.G. V, II Year MSc Software Systems, Coimbatore Institute of Technology, email - chitraleka892@gmail.com

BOOBALARAGAVAN. P, II Year MSc Software Systems, Coimbatore Institute of Technology, email - boobal520@gmail.com

KOWREESH.G, II Year MSc Software Systems, Coimbatore Institute of Technology, email - kowreesh3801@gmail.com

SANTHIYA.S, II Year MSc Software Systems, Coimbatore Institute of Technology, email - santhiyasundarraj05@gmail.com