First International Conference on Computer Engineering
International Journal of Scientific Research in Science and Technology
Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)
Volume 5 Issue 8, November-December-2020

Helmet Detection on Two Wheeler Riders using Machine Learning and Automatic Licence Plate Recognition for Identification

Vaibhav Kharade[1], Rachana Jaykumar[1], More Pratik[1] , Mahendra Mahaja[1], Jayashree Chaudhari[1]
[1]Department of Computer Engineering, Dr. D.Y.Patil School of Engineering, Lohegaon,Maharashtra India

ABSTRACT

To ensure safety measures on road, detection of traffic offenders is a highly desirable but a very challenging task due to various difficulties such as closure, lighting, low video surveillance, various weather conditions, etc. this violation is a challenge due to the population and the low level of access caused mainly by the lack of an automatic system for detecting violations and taking necessary action. The growing number of people and the increasing number of vehicles make it impossible for manual systems to prevent this problem. The latest developments in Deep Learning and Image Processing provide an opportunity to solve this problem. This manuscript introduces the implementation of the three-component system which is a car, the non-use of a helmet and the number of the vehicle being monitored using Tensorflow. In-depth learning using SSD MobileNet V2 is the main method used to use the system. In this paper, we present a framework for automatic detection of motorcycle riders who drive barefoot in surveillance videos.

Keywords: SSD MobileNet V2, video surveillance, Dataset, Tensorflow and Deep Learning

I. INTRODUCTION

As motorcycles have become more affordable and have become the main route for many Indians. However, it comes with a high risk of accidents. To reduce the risk involved, it is advisable for motorcyclists to use a helmet. In view of this, the government has made it a criminal offense to ride a motorcycle without a helmet. Currently video-based methods are being used. This is simply not possible and is not possible as people are involved. The automation of this process is very desirable in recognizing the reliable and firmness of these violations on college premises. By looking at the properties and challenges required, we propose the idea of automatic acquisition of motorcycle riders without a helmet, using inputs from existing surveillance cameras operating in real time. Therefore, the solution to finding offenders using existing equipment makes it cost effective.

In order to ensure the safety measure, the detection of traffic rule violators is a highly desirable but challenging task due to various difficulties such as occlusion, illumination , poor quality of surveillance videos , varying whether condition ,etc.

This project holds an agenda to propose a framework for automatic detection of motorcyclists driving without helmets in surveillance videos.

Along with it we present a framework for Number Plate recognition as well. This will be achieved by use of Image Processing .

II. METHODS AND MATERIAL

fig.1 shows the structure of the SSD MobileNet The proposed project used a two-stage method provided by google, namely, the SSD MobilNet Version 2. The image database is divided into two parts for training and testing respectively.

Our goals will be achieved in four stages:
- Database collection.
- Annotation.
- Testing.
- Training assessment.

In machine learning, data collection is of great importance as it is a highly dependent category. We should be able to define all views and variations from potential data. Here the data can be collected by placing the camera on the road at the right angles to capture traffic.

The information is collected in bulk in open source videos available on any social media platform. After collecting images from all the resources can be divided into two categories namely training and testing. There are blank images added to the database to have a better knowledge base.

Models can be trained with images that contain a variety of objects, as well as a label that describes the category of the object it represents, and data that specifies where each item appears in the image. Next time the image is presented as a model entry, it will also release a list of items we found, state the location of the binding boxes containing each item, and the score indicating the level of confidence that the item has been found.

As the SSD model is trained to detect the presence and location of multiple categories of objects it leads to the release of four members included in the indices 0-4. All of these four inputs describe all the items in the input image, with one item in each list corresponding to each item in the image.

III. SYSTEM ARCHITECTURE

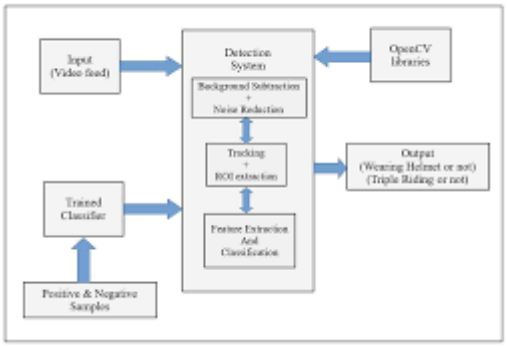

Fig 1

IV. RESULTS AND DISCUSSION

This is the complete flow diagram for our project starting from Giving video as an input to registering Number Plate Entry in the database.

The image (Fig.3) shows the Rectangle bounded objects and it can be clearly seen that the system is successfully able to detect all the desired objects while handling changes in conditions that are mentioned above. Model uses a matching phase while training, to match the appropriate anchor box with the bounding boxes of each ground truth object within an image. Basically, for the anchor box with the most significant level of cover with an article is responsible for foreseeing that item's class and its location.(Fig 3)

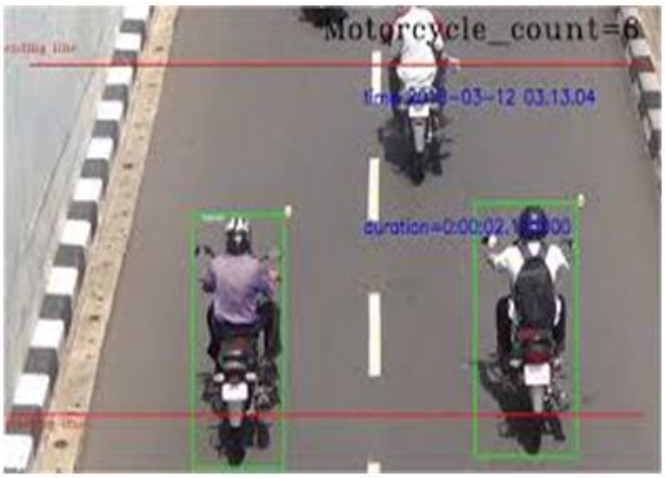

Fig 2

The model was prepared until the checkpoint for the 8,000 iterations were reached.. The final loss value at this checkpoint was 1.12. Table 1 represents the minimum, maximum, and average confidence score of the system under all the test conditions.

The variety in confidence is noted because of the adjustment in states of testing. This adjustment in the confidence factor under various conditions shows the versatility of the framework.The system performs well for all input cases.

The confidence can also be seen in the output images shown in Fig. 3. The images presented here are taken from the video processed using the system.

TABLE 1

Object name	Maximum, Average and Minimum Confidence scores seen in the video processed using the proposed system		
	Maximum confidence	Average confidence	Maximum confidence score.
BIKE	99%	87%	70%
NoHELMET	99%	81%	68%
NUMBER PLATE	99%	84%	71%

SSD MobileNet VS YOLO

Here we are contrasting two DNN object detection algorithms, a SSD (single shot detector) MobileNet and you-only-look-once (YOLO), through transfer learning.

The mobilenet-ssd model is a Single-Shot multibox Detection (SSD) network expected to perform object detection. This model is actualized utilizing the Caffe* framework.

You only look once (YOLO) is a state-of-the-art , real-time object detection system.

The recognition pace of the SSD MobileNet pith detector is better than that of the YOLO pith detector. It is equipped for making right pith detections 83.6% of the time.However, when the location error is thought of, the YOLO pith detector outperforms the SSD MobileNet pith detector since it has half the average location error. Both DNN pith detectors greatly outperform the non-DNN algorithm .

License Plate recognition

License plate recognition is one of the methods used for vehicle identification purposes. The sole purpose of this project is to find the most effective way to know the details of the License Plate from a digital photo (captured on camera). This process usually has three steps. The first step is License plate localization, regardless of the license-plate size and orientation. The next step is the segmentation of the characters and last step is the acknowledgment of the characters from the license plate. Thus, this project reveals the basic concept of the various algorithms required to achieve character recognition from a license plate during template simulation.

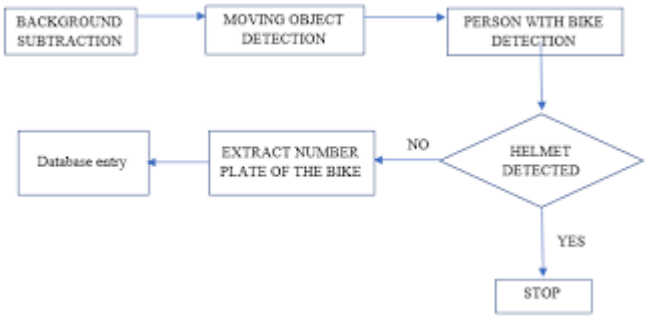

Fig 3

Steps followed:

Number plate recognition essentially comprises of three solid steps specifically:

1. Number Plate Extraction.

2. Character Segmentation.

3. Template Matching.

However, these steps are additionally divided into a progression of other steps whose working is as followed:

- Loading an RGB image
- Grayscale conversion
- Histogram equalization
- Binarization
- Dilation
- Edge detection
- Plate region extraction
- Character segmentation
- Template matching

All these steps can be carried out using the OpenCV.

And after successfully extracting the license plate we will put that entry in our database. Further necessary actions will be taken based on policies of authority.

V. CONCLUSION

The proposed program and project concludes by creating a solution that is able to identify features using transfer learning from custom databases. Therefore, the system demonstrates the possibility of achieving the goal of automating a traffic law enforcement process that enables additional functionality such as record keeping while completely eliminating manual input. The main focus of future additions is to increase the accuracy of the system by training it to suit a wide variety of vehicles and to add processing of individual number plates to create a database of recipients as compiled by the system. The whole system provides the need for a comprehensive monitoring and verification system to avoid positive false charges being added to the database.

VI. REFERENCES

[1]. Boonsirisumpun N, Puarungroj W and Wairotchanaphuttha P, Automatic Detector for Bikers with no Helmet using Deep Learning, Proc 22nd Int Comp Science & Eng Conf(IEEE)2018, 1–4.