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# Traffic Violation Proctoring System: Helmet and Triple Riding Detection

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**ABSTRACT:** Motorcycle accidents are growing throughout the years in all the countries, as there is difference in social, economic and the transport conditions differs from place to place. Motorcycle is one of the prominent means of transport used by middle class people. Wearing helmet is the main safety equipment of motorcyclists, which might not be followed by all drivers. Adult people don't take proper precaution safety riding take over speed, and triple riding. Accident of a motorcyclist is serious issue on society the structural support that a car does to keep drivers safe and protected. Even when a rider takes all possible precautions, accidents resulting in injury still occur. The primary objective of a helmet is to protect the driver's head in case of an accident or fall from a bike. Now a day's use of helmets is low and many people do not follow traffic rules like triple riding. The proposed project helps to identify whether motorcyclists wear safety harnesses that is helmets while driving or not and maintain proper rules on triple riding.

**KEYWORDS:** Motorcyclists, Safety, Helmet, Accidents, Triple riding.

## I. INTRODUCTION

All over the world around 1.35 million lives are lost each year, 50 million people are getting injured due to road accidents, according to a report titled "The Global status Revised Manuscript Received on December 05, 2021 report on road safety" released by world health organization. It is very hard to imagine that this burden is unevenly borne by motorcyclists, cyclists, and pedestrians. This report noted that a comprehensive action plan must be set up in order to save lives. Two-wheeler is a very popular mode of transportation in almost every country. However, there is a high risk involved because of less protection. When a two-wheeler meets with an accident, due of sudden deceleration, the rider is thrown away from the vehicle. If head strikes any object, motion of the head becomes zero, but with its own mass brain continues to be in motion until the object hits inner part of the skull. Sometimes this type of head injury may be fatal in nature. In such times helmet acts as life savior. Helmet reduces the chances of skull getting decelerated, hence sets the motion of the head to almost zero. Cushion inside the helmet absorbs the impact of collision and as time passes head comes to a halt. It also spreads the impact to a larger area, thus safeguarding the head from severe injuries. More importantly it acts as a mechanical barrier between head and object to which the rider came into contact. Injuries can be minimized if a good quality full helmet is used. Traffic rules are there to bring a sense of discipline, so that the risk of deaths and injuries can be minimized significantly. However strict adherence to these laws is absent. Hence efficient and feasible techniques must be created to overcome these problems. To reduce the involved risk, it is highly desirable



for bike-riders to use helmet. Worrying fact is that India ranks in top as far as road crash deaths are considered. Rapid urbanization, avoiding helmets, seat belts and other safety measures while driving are some of the reasons behind this trend according to analysis done by experts. In 2015 India signed Brasilia Declaration on Road Safety, where India committed to reduce road crash deaths to 50% by 2020. Observing the usefulness of helmet, Governments have made it a punishable offense to ride a bike without helmet and have adopted manual strategies to catch the violators. However, the existing video surveillance-based methods are passive and require significant human assistance. In general, such systems are infeasible due to involvement of humans, whose efficiency decreases over long duration.

Paper is organized as follows. Section II describes automatic detection of Traffic violations: Helmet and Triple Riding. The flow diagram represents the stages of detection of Traffic violations. YOLOv3 calculates an attempt to do an image grouping to investigate the info dataset about motorcyclists with a helmet or without a helmet and Triple riding given in Section III. Section IV presents experimental results showing results of images tested. Finally, Section V presents conclusion.

## **II. RELATED WORK**

Methods for object detection generally fall into either machine learning-based approaches or deep learning-based approaches. For Machine Learning approaches, it becomes necessary to first define features using one of the methods below, then using a technique such as support vector machine (SVM) to do the classification. On the other hand, deep learning techniques that can do end-to-end object detection without specifically defining features and are typically based on convolutional neural networks (CNN).

The proposed work mainly involves two main steps: i) We implemented another deep neural network in this which is implemented for motorcycle rider's helmet detection and ii) The deep neural network which is employed for identification of single and multiple riders on a motorcycle using the YOLOv3 model. For these two steps, traffic surveillance video is the main input to the YOLO3 model, and the individual video frames are obtained by cropping images and taking screenshots from input videos are utilized as the input to the CNN to detect motorcycle riders and pillion riders with or without a helmet.

## **III. METHODOLOGY**

In this project, YOLOv3 calculates an attempt to do an image grouping to investigate the info dataset about motorcyclists with a helmet or without a helmet.

This exploration has upheld the following procedure:

- image gathering
- image classification
- vehicle detection and grouping
- image detection examination
- Interpretation of Result

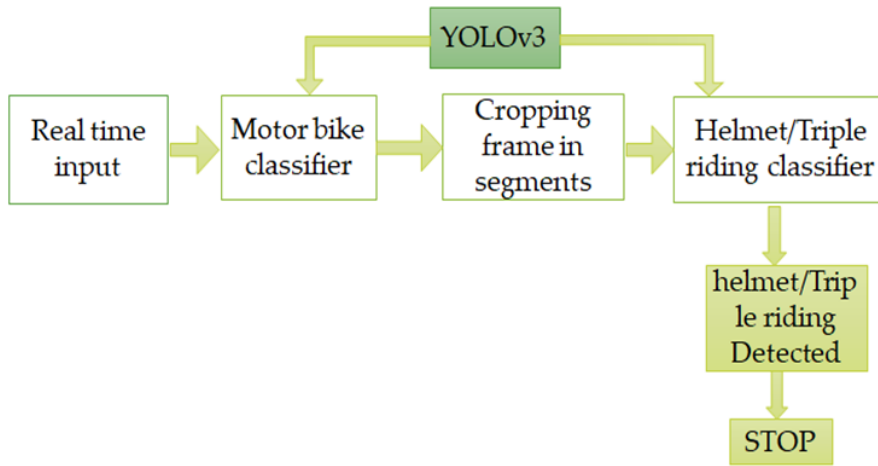


Fig 1: Dataflow diagram

#### IV. EXPERIMENTAL RESULTS

Figures show the results of Traffic Violation Proctoring System: Helmet and Triple Riding Detection. Fig (a) shows the interface of Training and Testing for input data. (b) Helmet detection as an object (c) Image given to riding test (d) Detection of Triple riding (e) Detection of No Triple riding.

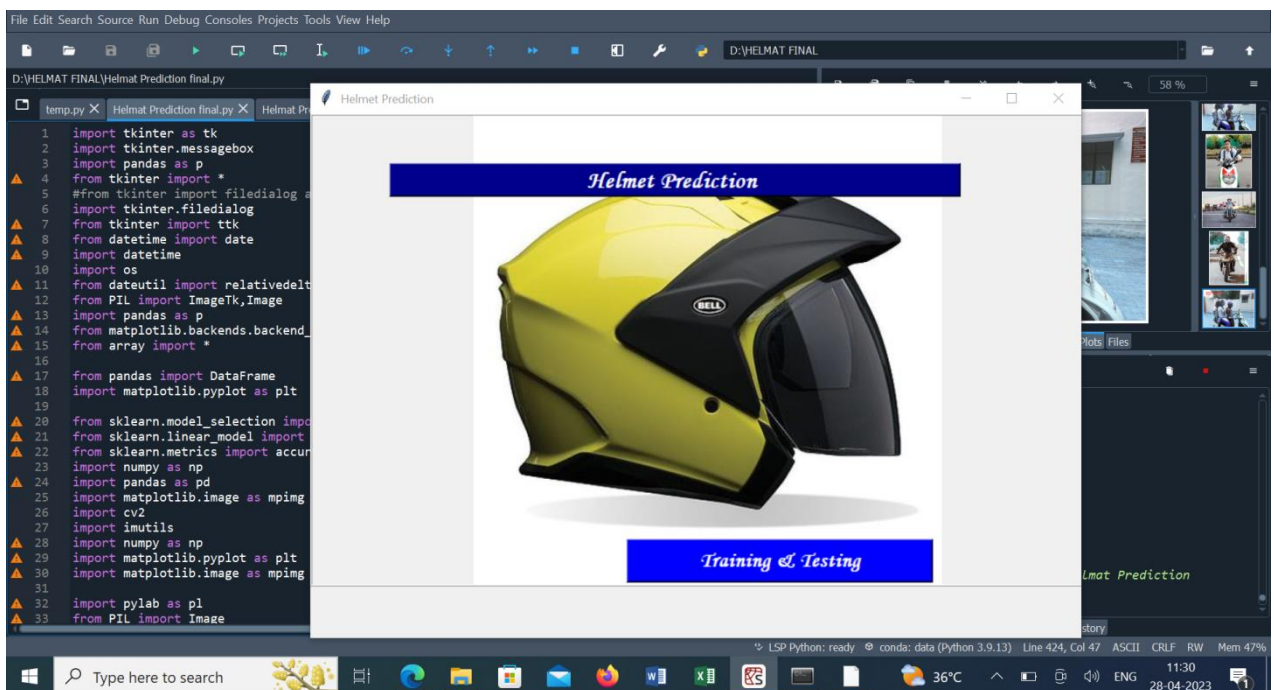


Fig (a) shows the interface of Training and Testing for input data



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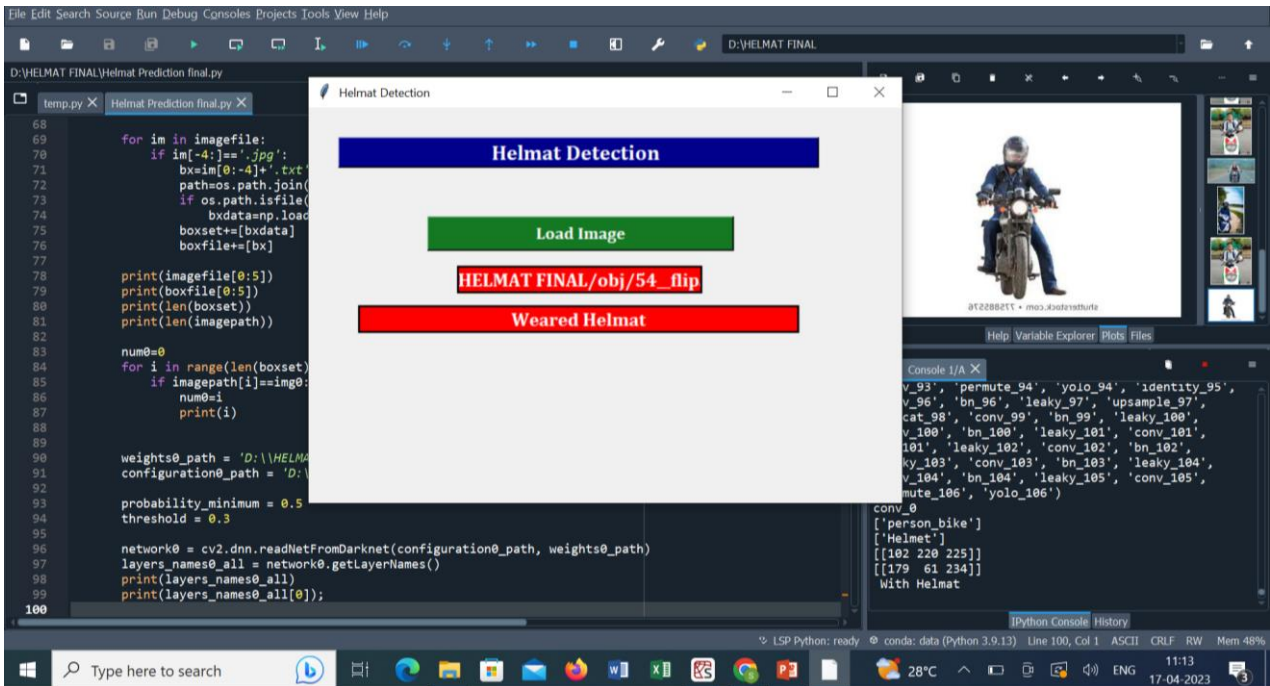


Fig b: Helmet detection as an object

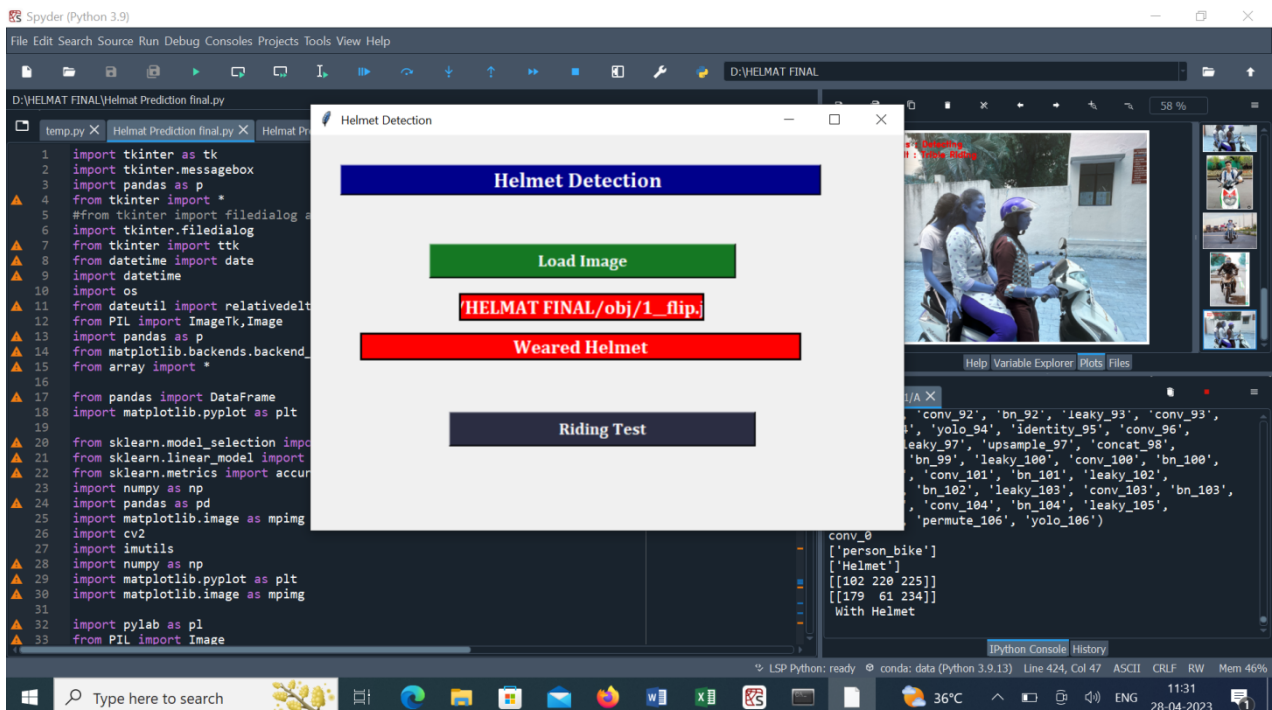


Fig c: Image given to riding test



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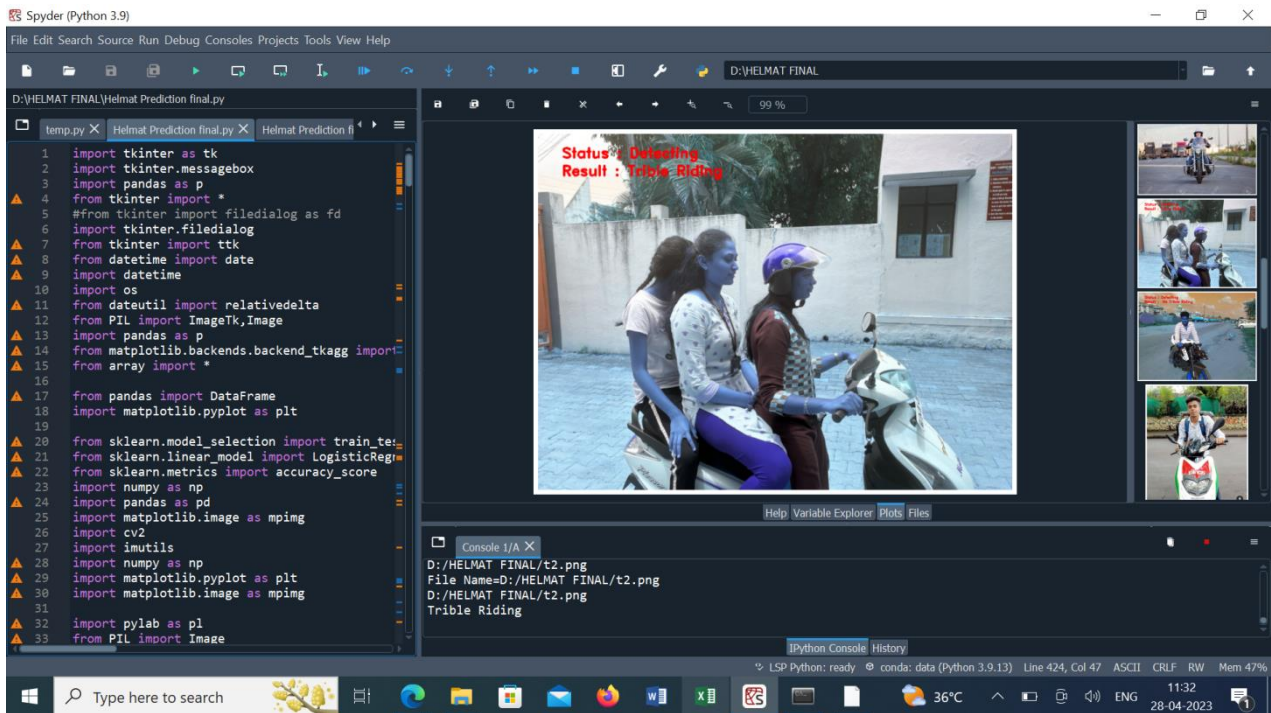


Fig d:Detection of Triple riding

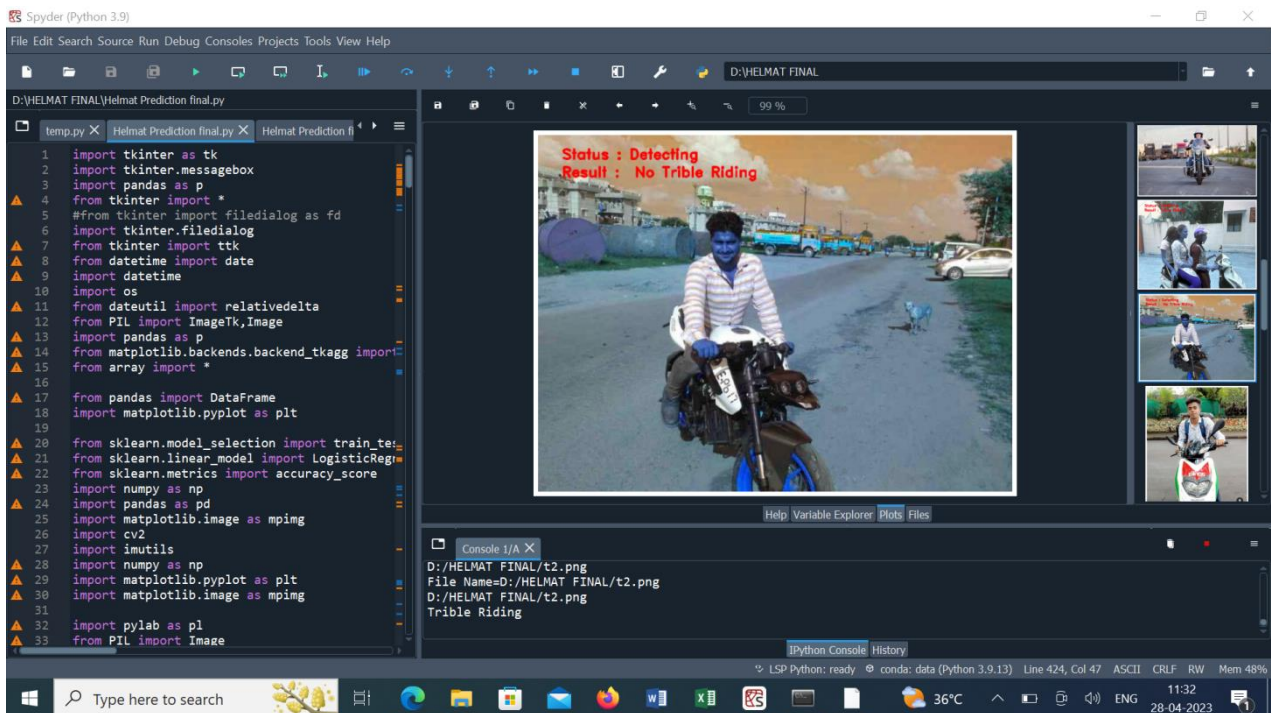


Fig e:Detection of No Triple riding



## V. CONCLUSION

In this project we implemented a model that could detect bike rider in images feeds. The dataset that was used in this project was made and annotated so that the model could differentiate between image having bike rider or not. Proposed bike rider detector has been successfully trained by using YOLOv3 learning method on the sample vehicle datasets and the vehicle detection process has been successfully performed by the trained vehicle detector being tested on the test data set. This model can be useful for project in which we detect a bike rider with or without helmet and tripleride.

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