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DETECTION OF NON-HELMET RIDERS AND EXTRACTION OF LICENSE PLATE NUMBER USING YOLO V2 AND OCR METHOD

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ABSTRACT: Nowadays, we come across various problems in traffic regulations in India which can be solved with different ideas. Riding motorcycle without wearing helmet is a traffic violation which leads to Increase in number of accidents and deaths in India. In this research work, a Non-Helmet Rider detection system is built which attempts to satisfy the automation of detecting the traffic violation of not wearing helmet and extracting the vehicles license plate number. The main principle involved is Object Detection using Deep Learning at three levels. The objects detected are person, motorcycle at first level using YOLOv2, helmet at second level using YOLOv3, license plate number at the last level using Optical Character Recognition (OCR).

Key Word: YOLOv2, YOLOv3, OCR.

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I. INTRODUCTION

Two-Wheelers are the main reason for the most number of road accidents. Though careless and rash driving is the main cause of these accidents, head injuries are also the foremost reason for the road accidents deaths. The solution for these problems is wearing helmet. 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. It acts as a mechanical barrier between head and object to which the rider came into contact. If a good quality helmet is used then injuries can be minimized. 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 in reality. Hence efficient and feasible techniques have to be created to overcome these problems. So here we proposed a methodology for helmet detection and extraction of license plate number using YOLOv2, YOLOv3 and OCR.

II. METHODOLOGY

PROPOSED SYSTEM

In this project we are detecting whether two wheeler rider wearing helmet or not, if he is not wearing helmet then we are going to extract the license plate number of the motorbike. To extract number plate we have YOLO CNN model with some train and test images. The main principle involved is object detection using deep learning at 3 levels.

To implement above techniques we are following below steps:

1) First image will be uploaded to the application and using YOLOV2 we will check whether image contains person with motorbike or not, if YOLO model detect both person and motorbike then we will proceed to step2
2) In this module we will use YOLOV3 model to detect whether object wear helmet or not, if he wears helmet then application will stop here itself. If rider does not wear helmet then application proceed to step 3.
3) In this module we will extract number plate data using python tesseract OCR AI. OCR will take input image and then extract vehicle number from it.

MODULES

1. Upload Image: User will upload the image into the application.

2. Detect Motor Bike and Person: The frame chosen in given as input to YOLOv2 object detection model, where the classes to be detected are motorbike, person. At the output, image with required class detection along with confidence of detection through bounding box and probability value is obtained.

3. Detect Helmet: Once the person-motorcycle pair is obtained, the person images are given as input to helmet detection model. While testing the helmet detection model, some false detections were observed. So, the person image was cropped to get only top one-fourth portion of image. This ensure that false detection cases are eliminated as well as avoid cases leading to wrong results when the rider is holding helmet in hand or when the helmet is on motorcycle while riding instead of wearing.

4. Exit: User will exit the application.

III.RESULTS

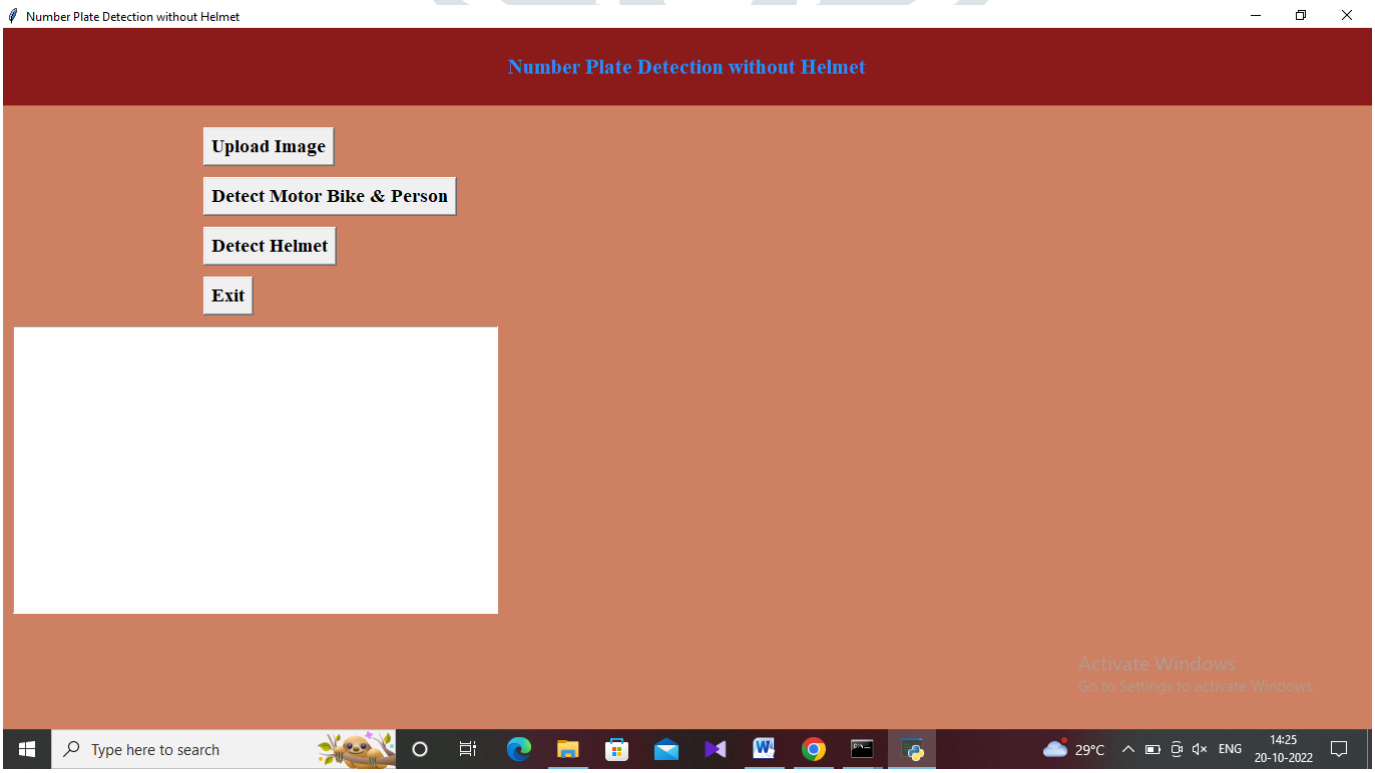

Figure 3.1 In above screen click on “Upload Image” and then you will get below screen.

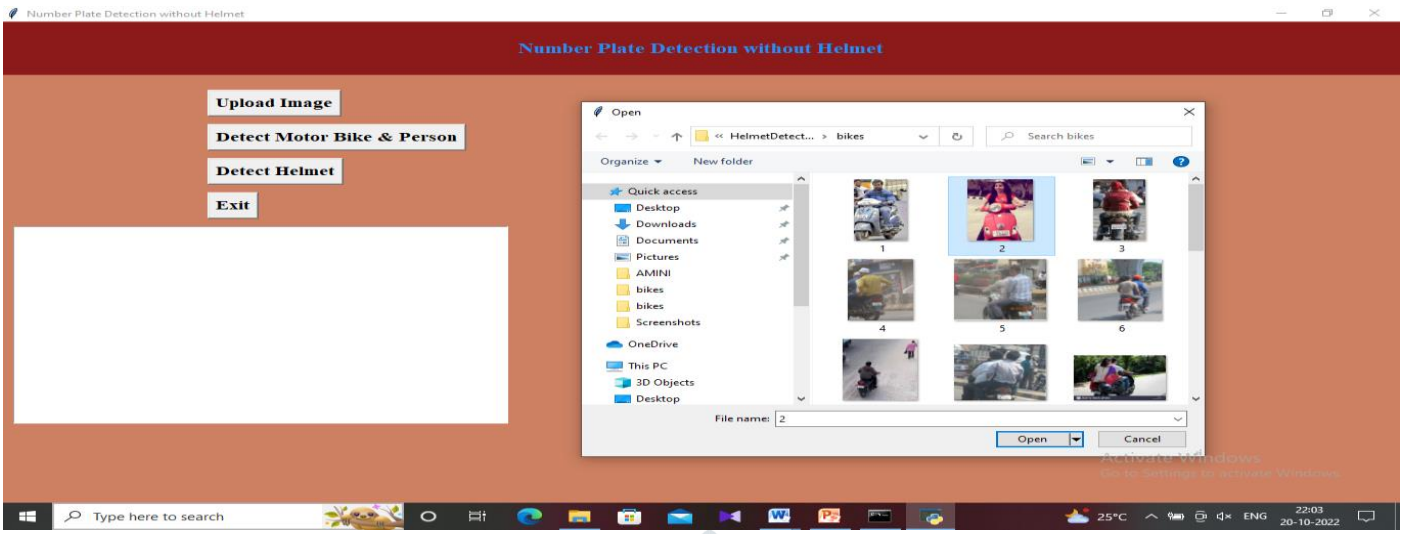

Figure 3.2 In the above screen select any one of the image .Let us select image ‘2.png’ and click on ‘Open’ button then the image will be uploaded successfully. Now click on ‘Detect Motor Bike & Person’ button to detect whether the image contains motorbike and Person or not.

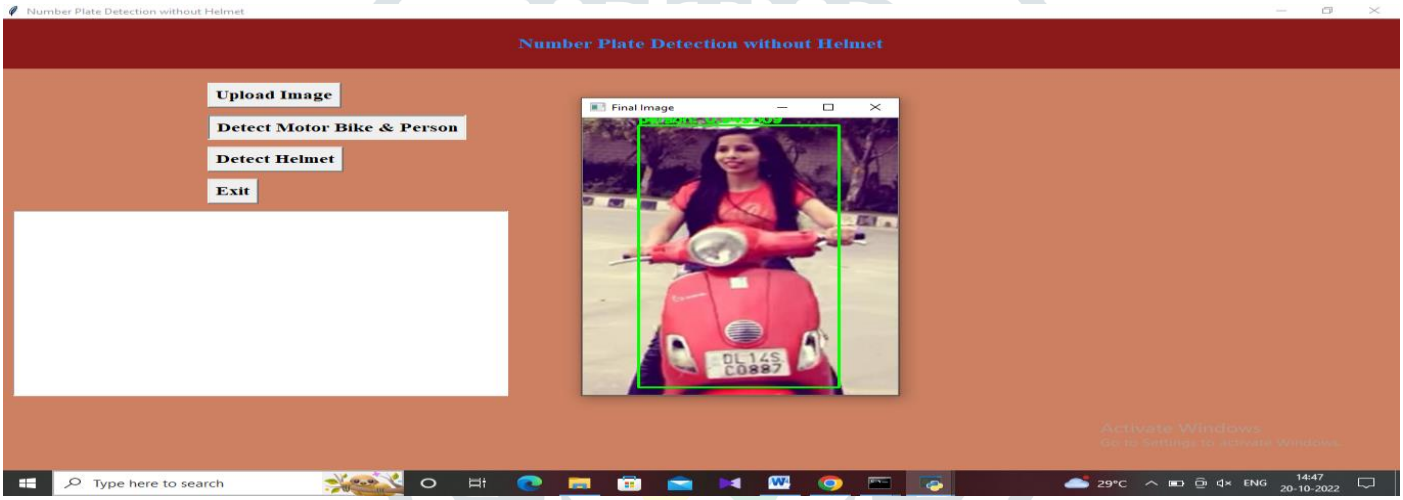

Figure 3.3 In above screen Yolo detected image which contains person and bike and now click on ‘Detect Helmet’ button to detect whether the motorcycle rider is wearing helmet or not.

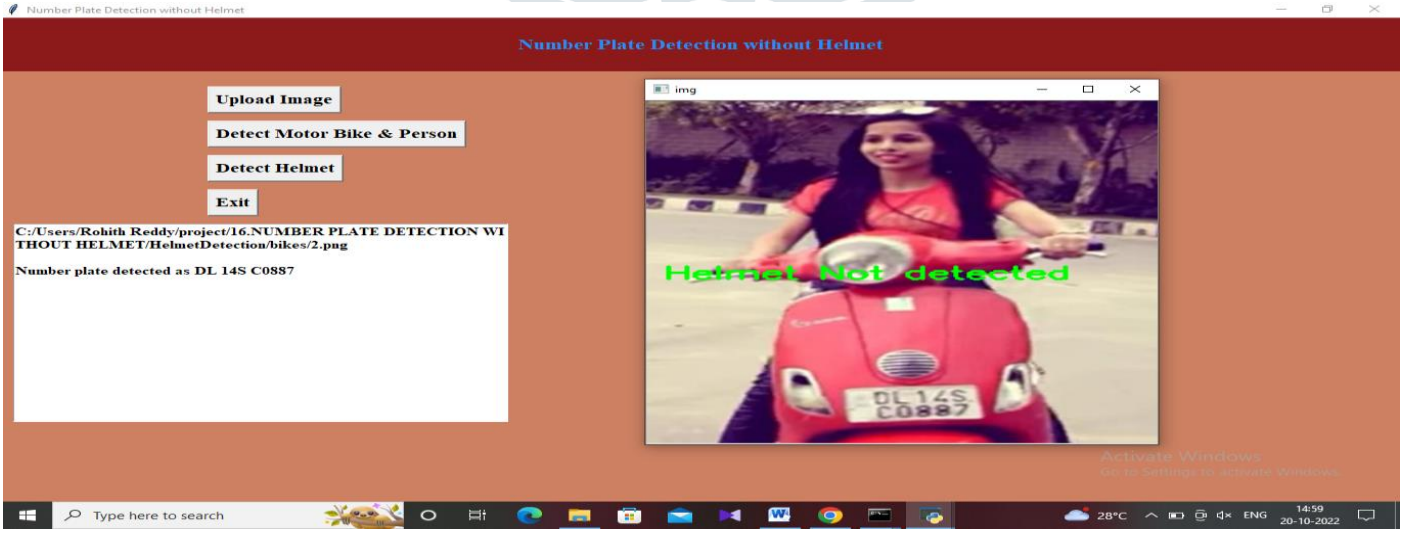

Figure 3.4 In above screen yolov2 detected that the person is not wearing helmet by displaying “Helmet Not detected” and then immediately it displays the extracted number plate of the motorcycle beside text area.

Now we will check the person with helmet image and its results are as follows:

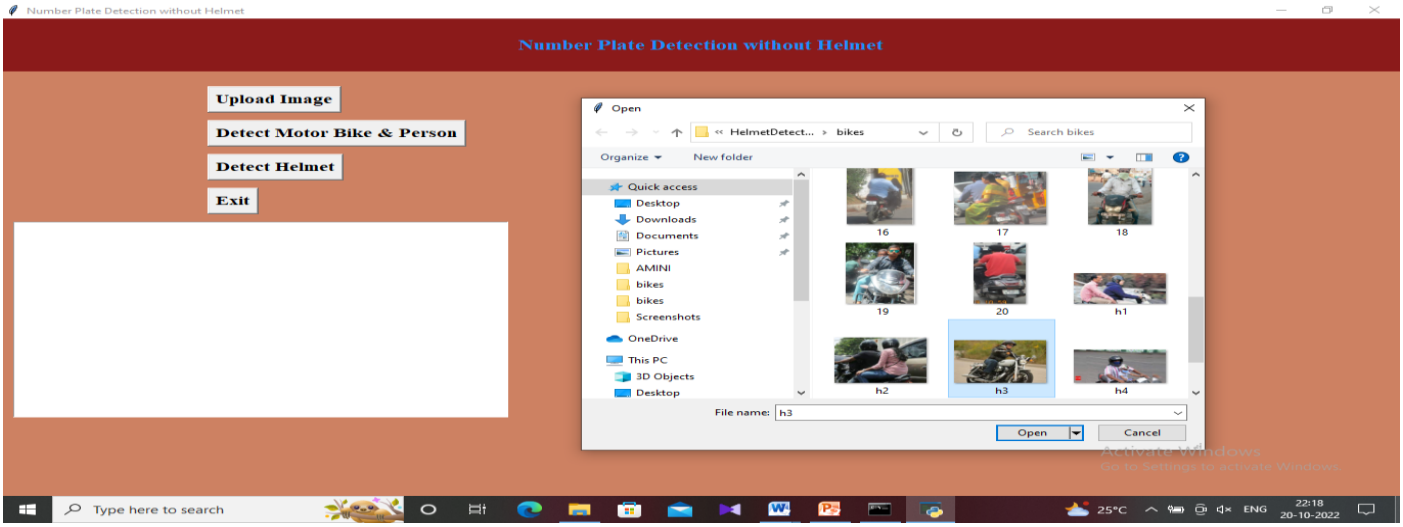

Figure 3.5 In above screen upload any one of the image in which the person is wearing helmet and then Click on 'Detect Motor Bike & Person' button to get the below result

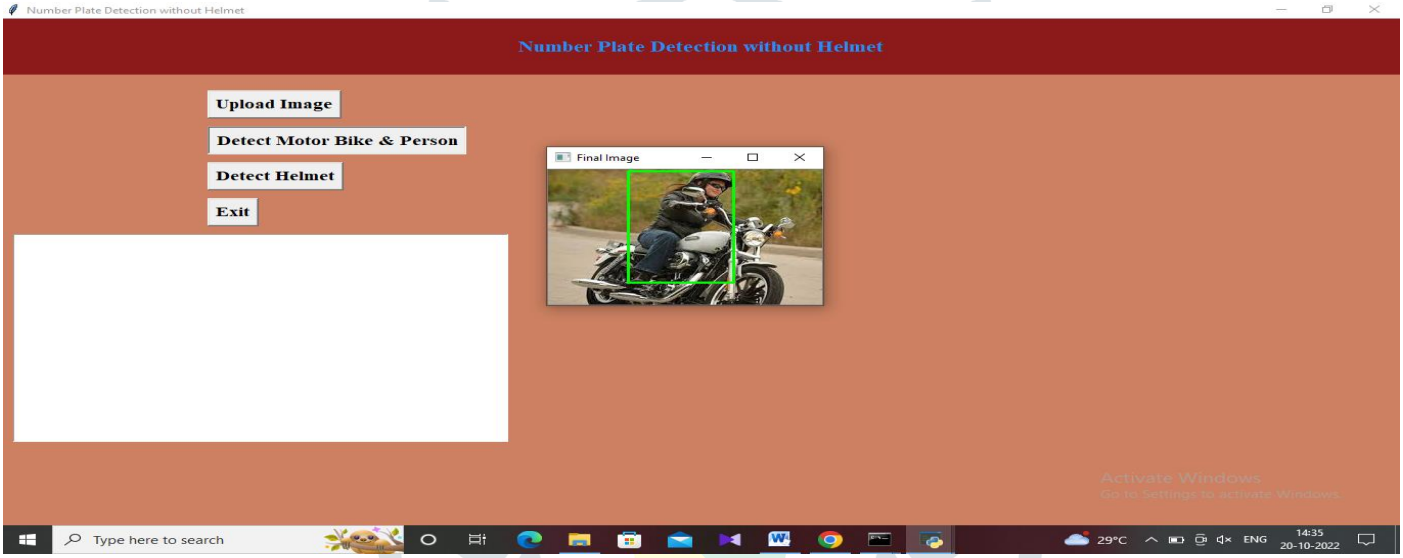

Figure 3.6 In above screen Yolo detected person with motorbike and now click on 'Detect Helmet' button to get below result

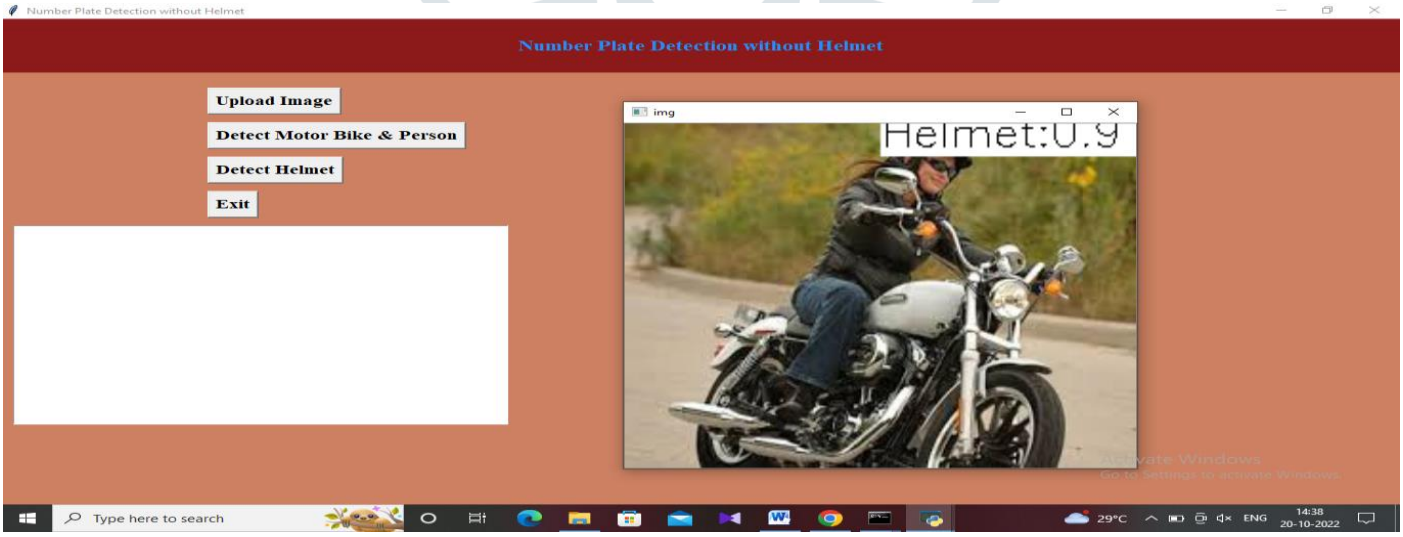

Figure 3.7 In above screen application detected that the person is wearing helmet and that label is shown around the person head and application stops there itself and not scanning number plate.

IV.DISUSSIONS

After studying different research articles, one can observe that the accuracy of each and every experiment is different because of methodologies used and average accuracy rate is 94% which is good. In this research work the methodology we used gives the maximum accuracy than HOG, Circular arc detection method based on Hough transform.

V.CONCLUSION

A non-helmet rider detection system is developed where it take input as image. If any of the motorcycle rider is not wearing helmet while riding the motorcycle, then extraction of number plate takes place. Object detection principle with YOLO architecture is used for person, motorcycle, helmet, license number plate detection. If the motorcycle rider is wearing helmet while riding then stop the application. We successfully implemented YOLOv2 to detect the objects like person and motorbike, YOLOv3 is to detect the helmet and OCR to extract the number plate. By implementing above techniques we reached to maximum accuracy and all the objectives of the project is achieved.

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