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Helmet Detection

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A B S T R A C T

Motor icycle I accidents ihave ibeen irapidly igrowing ithroughout ithe iyears iin imany icountries. iThe ihelmet iis ithe imain isafety iequipment iof imotorcyclists, ithe imain igoal iof ihelmet iis ito iprotect ithe idrivers ihead iin icase iof iaccident. iThis iproject iaims ito ipropose ia isystem ifor idetection iof imotorcyclist iwithout ihelmet.In this project we are detecting whether two wheeler rider wearing helmet o not, if he is not wearing helmet then we are extracting number plate of that two wheeler. To extract number plate we are using YOLO CNN model with some train and test images .

Keywords: Helmet Detection, Extracting License Plate,Yolov2

1. Introduction

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/moped at first level using YOLOv2, helmet at second level using YOLOv3, License plate at the last level using YOLOv2. Then the license plate registration number is extracted using OCR (Optical Character Recognition). All these techniques are subjected to predefined conditions and constraints, especially the license plate number extraction part. Since, this work takes video as its input, the speed of execution is crucial. We have used above said methodologies to build a holistic system for both helmet detection and license plate number extraction.

2. Literature Survey

1. J.Chiverton, "Helmet Presence Classification with Motorcycle Detection And Tracking",IET Intelligent Transport Systems,Vol. 6, Issue 3, pp. 259–269, March 2012.

2. Rattapoom Waranusast, Nannaphat Bundon, Vasan Timtong and Chainarong Tangnoi, "Machine Vision techniques for Motorcycle Safety Helmet Detection", 28th International Conference on Image and Vision Computing New Zealand, pp 35-40, IVCNZ 2013.

3. Romuere Silva, Kelson Aires , Thiago Santos , Kalyf Abdala , Rodrigo Veras , Andr ́e Soares , "Automatic Detection Of Motorcyclists without Helmet", 2013 XXXIX Latin America Computing Conference (CLEI).IEEE,2013.

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3. Proposed Model

This model proposes methodology for feature extraction using LBP based   hybrid descriptor, HOG and Hough transform descriptors. Whereas Xinhua Jiang et al. incorporated grey level co-occurrence matrix along with LBP for feature extraction. YOLOv2 and COCO dataset can be employed to detect different types of objects and classify them accordingly The intended object are motorcycle, motorcyclists, pedestrians and workers. Helmet and tyre colour exhibits different characteristics, this can be exploited to detect motorbikes . proposed a method to identify two wheeler accidents using a microcontroller and accelerometer. Most of the time pedestrians are the real victims for road accidents, their safety is essential. Jie Li et al. The proposed a method to classify pedestrians using SVM based on histogram of oriented gradient features (HOG). The last step involves helmet detection. Colour based and circle Hough transform is used to detect helmet and HOG descriptors can also be used for helmet detection . Colour feature recognition is another option.deployed colour space transformation and colour feature discrimination for detecting the helmet. GLCM statistical features and Back-Propagation artificial neural network is used to detect helmet more effectively . helmet detection system involves following steps

Such as collection of dataset, moving object detection, background   subtraction, object classification using neural networks and extraction of licence plate number if the rider is not wearing helmet. Rattapoom Waranusast et al. used KNN classifier for moving object extraction and classification. Here the head is classified as wearing helmet or not based on various features obtained from the segmented head region Moving objects can be detected using adaptive background subtraction . ViBe background modelling algorithm can also be applied to detect motion objects . Canny edge detection algorithm is used to get segmented moving objects

4. Software Requirements

CODING LANGUAGE : Python 3.7
 MODULES   : Tensorflow,Numpy,Pandas,Matplotlib,
OPERATING SYSTEM   : Windows

5. Block Diagram
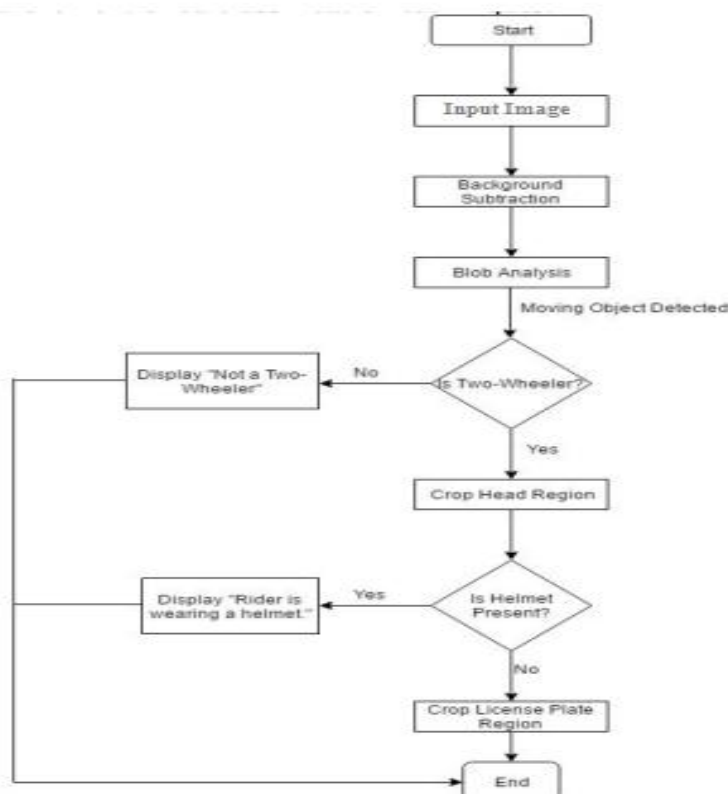
6. Result and Implementation

Whenever the program is ready to run,it will ask for input,the input will be either a image or video of motorcyclist.If the person is wearing helmet,then it displays output as helmet is detected.If the person is not wearing helmet,it shows output as helmet not detected and extracts the liense plate.
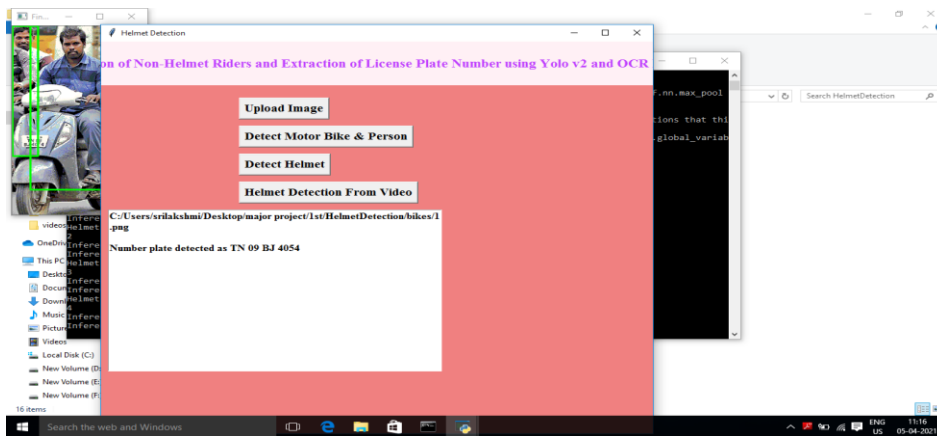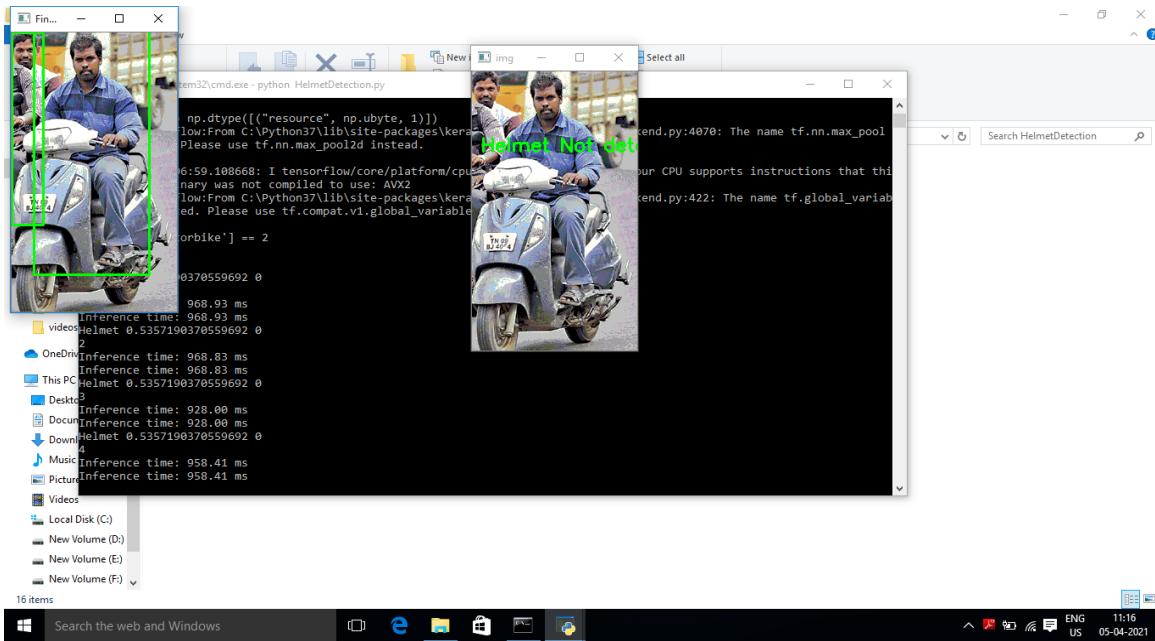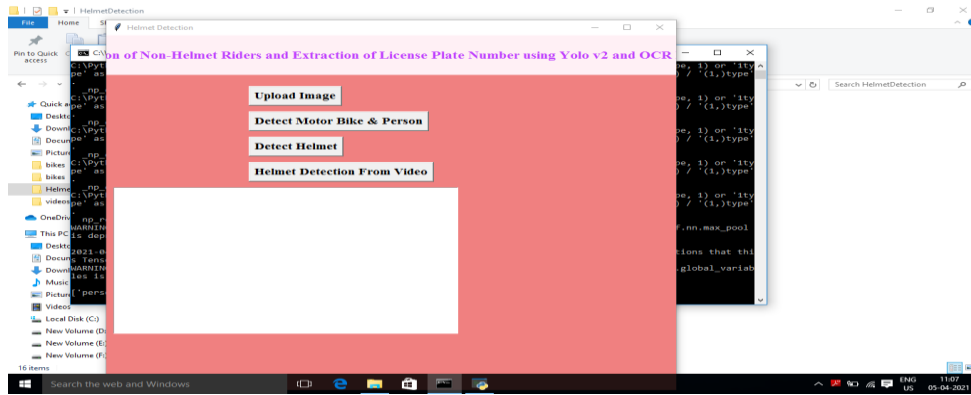
7. Advantages

- Injuries can be minimized if a good quality full helmet is used.
- For accuracy improvement of helmet detection PCA technique is used
- For detecting license plate and extracting the characters several methods have been used such as OCR, MobileNets and Inception-v3, Open ALPR..

8. Conclusion

A Non-Helmet Rider Detection system is developed where a video file is taken as input. If the motorcycle rider in the video footage is not wearing helmet while riding the motorcycle, then the license plate number of that motorcycle is extracted and displayed. Object detection principle with YOLO architecture is used for motorcycle, person, helmet and license plate detection. OCR is used for license plate number extraction if rider is not wearing helmet. Not only the characters are extracted, but also the frame from which it is also extracted so that it can be used for other purposes. All the objectives of the project is achieved satisfactorily.

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