Detection of non helmet riders and extraction of register number plate using yolo V2 and ocr methods

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ABSTRACT_ India faces significant traffic regulation challenges, particularly concerning motorcycle riders not wearing helmets, which contributes to a rise in traffic accidents. Existing methods for monitoring traffic infractions are often limited in effectiveness, accuracy, and speed. This research aims to develop a Non-Helmet Motorbike Tracking system to address these issues by automatically detecting traffic violations such as failure to wear a helmet and retrieving the motorcycle's number plate. The proposed system utilizes deep learning techniques across three layers for detection, with YOLOv2 and YOLOv2 employed to identify persons, motorcycles, helmets, and license plates. Optical Character Recognition (OCR) is then used to extract the license plate registration number. The system is designed with predetermined limitations, with a particular focus on the speed of license plate extraction due to the use of video input. A comprehensive approach for helmet detection and license plate extraction is developed, aiming to improve traffic regulation and safety on Indian roads.

Keywords: Protective cap Detection, Convolutional Neural Network, Tesseract OCR, License Plate Extraction

1.INTRODUCTION

According to a World Health Organization report titled "The Global status report on road safety 2018," approximately 1.35 million people die annually and 50 million are injured in road accidents. It is hard to imagine that motorcyclists, cyclists, and pedestrians each shoulder this responsibility differently. In order to save lives, a comprehensive action plan must be developed, according to this report. India is at the top of the list when it comes to deaths from car accidents. Experts' analysis indicates that this trend is caused by a number of factors, including a lack of helmets, seat belts, and other safety measures while driving. In 2015, India signed the Brasilia Declaration on Road Safety, in which it pledged to cut the

number of people killed in traffic accidents by half by 2020. Before halving the number of people killed in car crashes, policymakers in India must first acknowledge the issues that remain. The rider is thrown out of a two-wheeler during an accident caused by a sudden acceleration. If the head hits anything, it stops moving, but the brain, which is its own mass, keeps moving until the object hits the inside of the skull. This kind of head injury can sometimes result in death. When this occurs, the helmet saves the day. Because a helmet prevents the skull from decelerating, head motion is virtually eliminated. The head comes to a halt over time as the cushion inside the helmet absorbs the impact of the collision. Additionally, it disperses the impact over a larger area, protecting the head from severe injuries. In addition, it serves as a mechanical barrier between the rider's head and the object with which they came into contact. Using a high-quality full helmet can reduce injuries. The purpose of traffic laws is to enforce discipline and significantly reduce the likelihood of fatalities and injuries. Anyway severe adherence to these regulations is missing in all actuality. As a result, effective and practical solutions to these issues must be developed. A method for manually monitoring traffic using CCTV is already in place. However, in this case, numerous iterations are required to achieve the goal, requiring a significant amount of human resources. As a result, cities with such a large population and a large number of parked vehicles cannot afford this ineffective manual method of helmet detection. Therefore, using YOLOv2, YOLOv2, and OCR, we propose a method for full helmet detection and license plate extraction...

2. LITERATURE SURVEY

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

Head protectors are essential for a bike rider's wellbeing, yet upholding cap use is a tedious and work serious assignment. Accordingly, a framework for consequently characterizing and following bike riders wearing and not A wearing protective caps is portrayed and tried. The framework utilizes support vector machines that have been prepared on histograms created from head locale picture information of cruiser riders, just as individual picture outlines from video film. The learned classifier is utilized in a global positioning framework that

utilizations foundation subtraction to automatically segment motorcycle riders from video data. The riders' heads are segregated, and the trained classifier is used to classify them. Each motorbike rider creates a track, which is a series of areas in neighbouring time frames. The individual classifier outputs are then averaged to classify the tracks as a whole. The classifier can accurately distinguish whether riders are wearing helmets or not on static pictures, according to tests. The categorization approach's validity and utility are also demonstrated by tests on the tracking system.

2.2 Dharma Raj KC, Aphinya Chairat, Vasant among, Matthew N. Dailey, Mongkol Ekpanyapong, "Head protector Violation Processing Using Deep Learning", 2018 International Workshop on Advanced Image Technology (IWAIT), IEEE, 2018

In the United States, traffic accidents are one of the top causes of death. Motorcycle accidents are one of the most prevalent types of traffic collisions, and they often result in significant injuries. The rider's primary method of protection is a motorbike helmet. Motorcycle riders are required to wear helmets in most nations, although many people do not comply for a variety of reasons. We discuss the development of a system that uses photo handling and deep CNNs to detect motorcyclists who are not wearing safety hats. The framework requires cruiser identification, a protective cap vs no-head protection arrangement, and cruiser tag recognition. We give the system a score based on its precision and quickness. The system has been placed in a number of locations in Bangkok and Phuket, Thailand, since 2016. According to preliminary data, motorcycle helmet laws are being followed more closely.

3. PROPOSED SYSTEM

The authors suggested a function extraction method based on LBP-based hybrid descriptors, HOG, and Hough seriously change descriptors. On the other hand, Xinhua Jiang et al. extracted facets using a grey stage co-occurrence matrix and LBP. Using the YOLOv2 and COCO datasets, various objects can be identified and categorised. The alleged targets are employees, pedestrians, motorcyclists, and motorcycles. There are a variety of colours that can be used to identify a motorcycle's helmet and tyres. using an accelerometer and a microcontroller to detect two-wheeler accidents Pedestrians are frequently the true victims of accidents involving site visitors., It is essential that they are safe. the friends of Jie Li A method for identifying pedestrians using SVM that is

entirely based on histograms of oriented attitude highlights has previously been proposed. (HOG). The highest level of development is cap discovering. Hough adjustments based on shading, circle Hough adjustments, and HOG descriptors are employed to distinguish caps. The alternative is to detect highlights in shading. The cap was located using shading spotlight segregation and shade spacing variation. to make it simpler to implement head protection.

In this project, we are determining whether or not a two-wheeler rider is wearing a helmet. If he is no longer doing so, we are retrieving the two-wheeler's licence plate. If you would like to add additional images, please send them to us so we can also combine them in the YOLO model with annotation to extract the wide variety plate of these new photographs. We have the YOLO CNN model with some teach and check images to extract the variety plate.

3.1 IMPLEMENTATION

In order to implement the aforementioned strategy, we are employing or imposing the following modules.

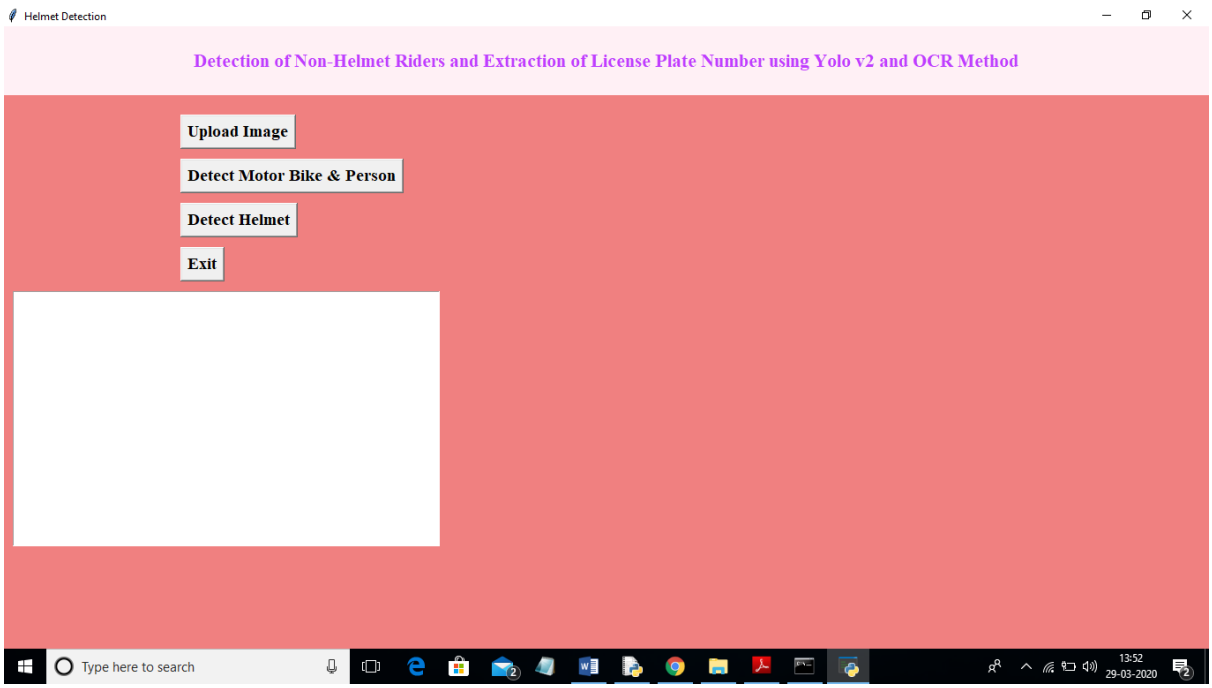
1) The first image will be uploaded to the application and using YOLOV2 we will check whether the image contains a person with a motorbike or not if the YOLO model detects both person and motorbike then we will proceed to step 2.
2) In this module, we will use the YOLOV2 model to detect whether the object wear helmet or not, if he wears a helmet then the application will stop hearing itself. If the rider does not wear a helmet then the application proceeds to step 3.

   In this module, we will extract number plate data using python Tesseract OCR API. OCR will take the input image and then extract the vehicle number from it.

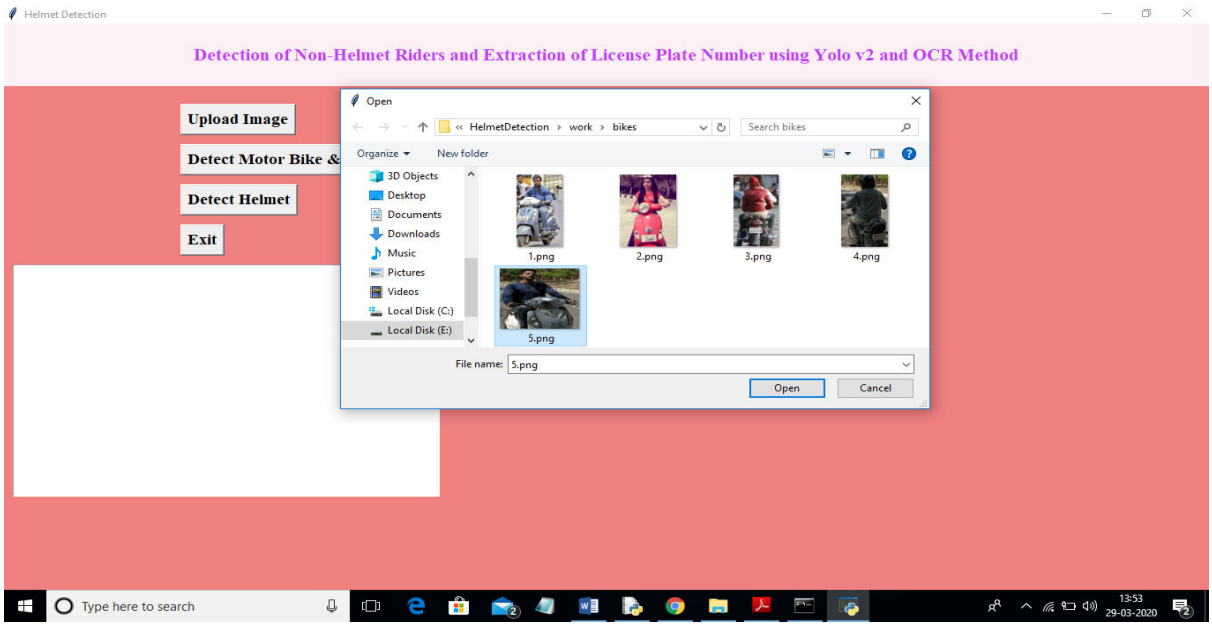
4. RESULTS AND DISCUSSION

In this project we have built CNN model to detect HELMETS and number plates from 25 different images and we can detect more images but we don't have sufficient dataset to train CNN model so our application can detect presence of helmet from 25 different images and if helmet not present then it will identify number plate and if helmet detected then it will not identify number plate.

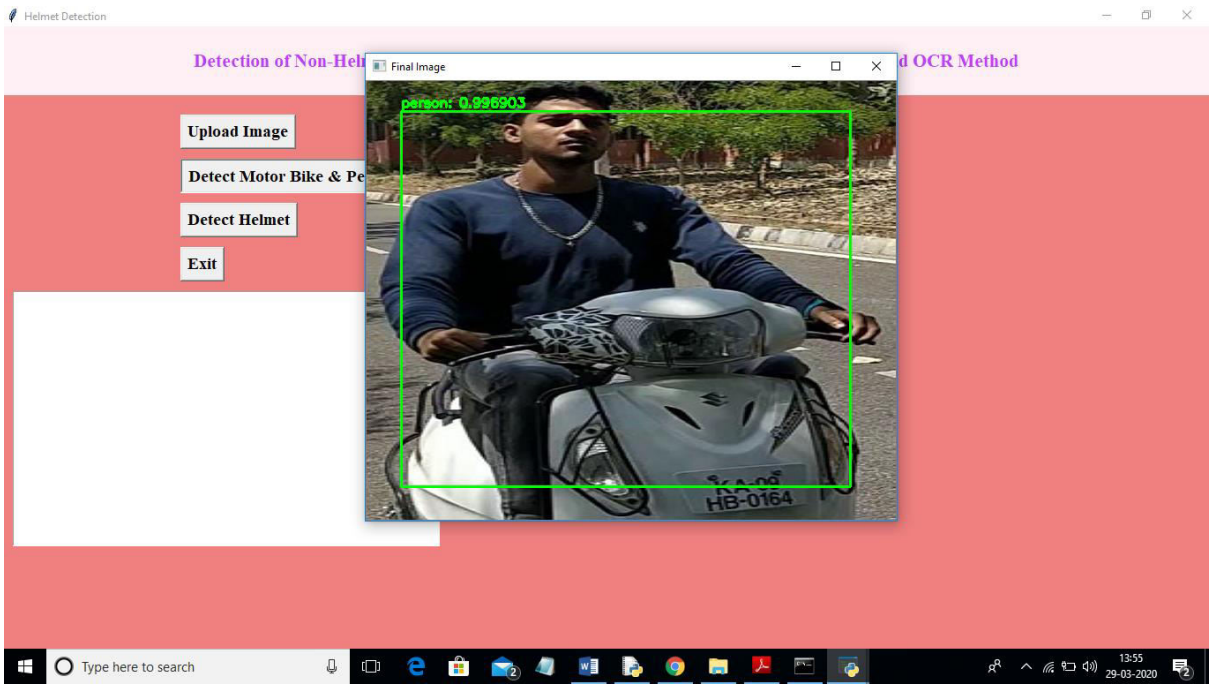
To run project double click on 'run.bat' file to get below screen



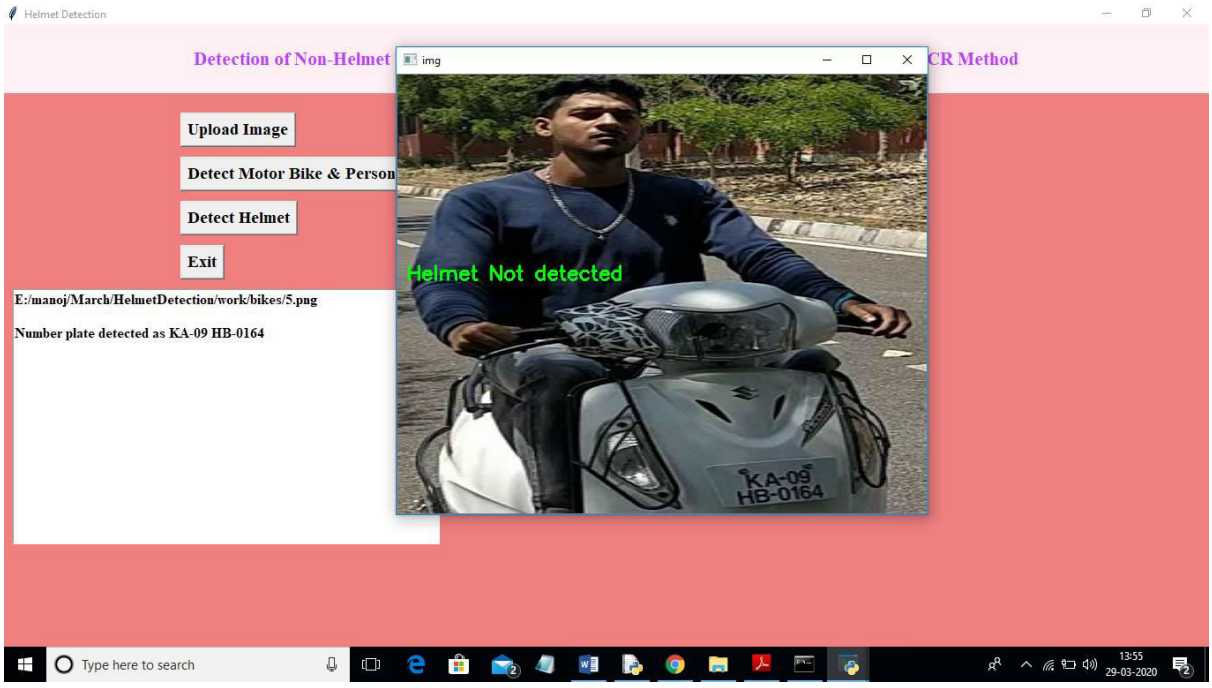
In above screen click on 'Upload Image' button and upload image



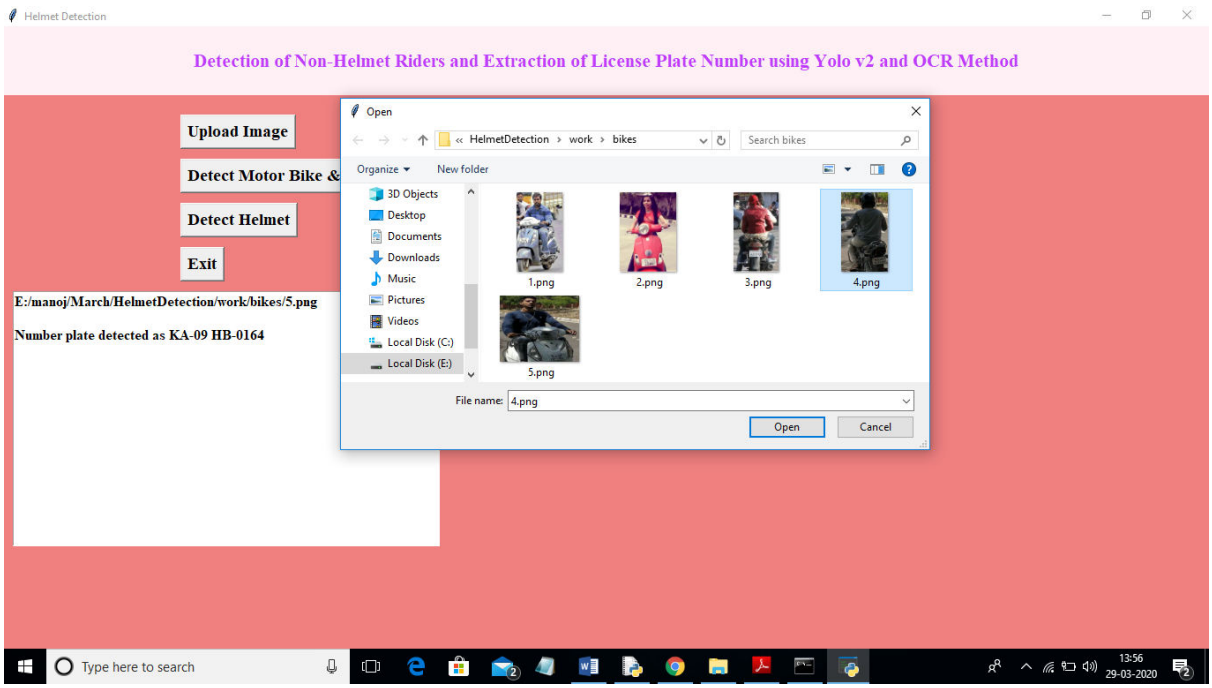
In above screen I selected one image as '5.png' and click on 'Open' button to load image. Now click on 'Detect Motor Bike & Person' button to detect whether image contains person with motor bike or not



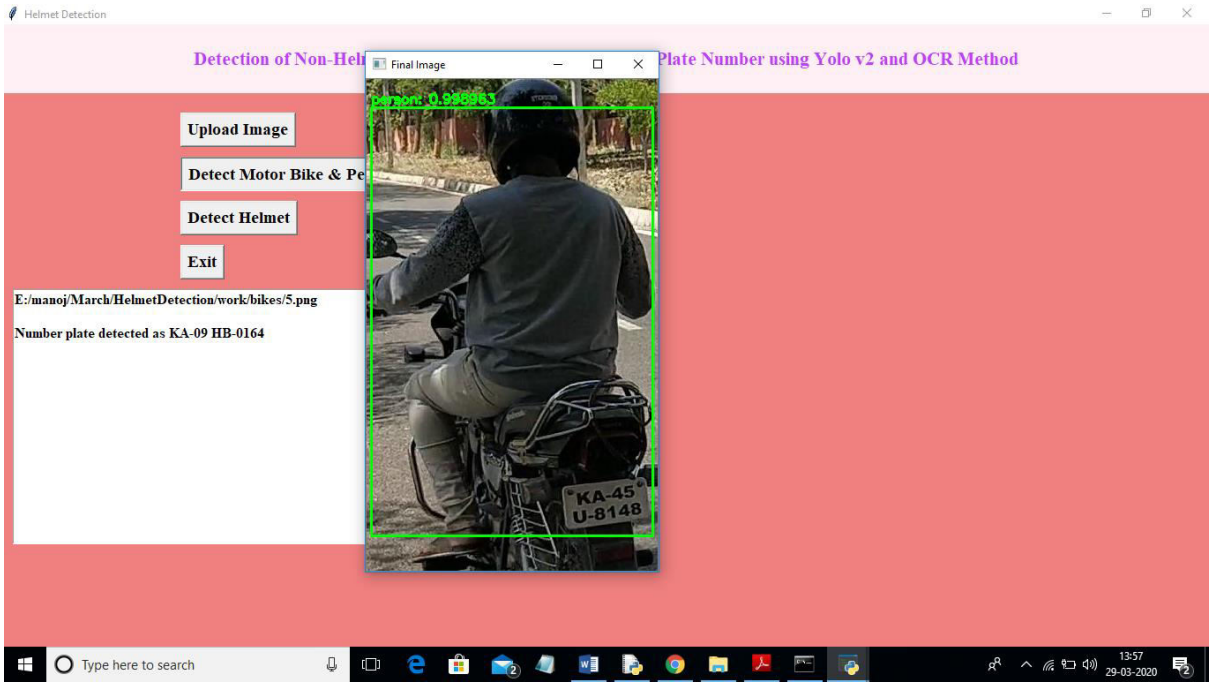
In above screen yolo detected image contains person and bike and now click on 'Detect Helmet' button to detect whether he is wearing helmet or not



In above screen application detected that person is not wearing helmet and its extracted number from vehicle and display in beside text area. Now we will check with helmet image



In above screen I am uploading 4.png which is wearing helmet and now click on 'Detect Motor Bike & Person' button to get below result



In above screen yolo detected person with motor bike and now click on 'Detect Helmet' button to get below result

5.CONCLUSION

A video file is the only source of data for a Non-Helmet Bike Detection system. If the motorcycle rider in the video cameras is not wearing a helmet when driving the motorcycle, the motorcycle's licence number plate is retrieved and shown.The object recognition idea with YOLO architecture is used to recognise motorbikes, people, helmets, and licence plates.If the cyclist is not wearing a helmet, OCR is utilised to extract the licence plate number. Not only are the characters taken, but the frames from which they are extracted as well, so that they could be used for various reasons. The project's objectives have all been met satisfactorily.

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