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Using a Third Rider, Donning a Helmet, or Applying Deep Learning for Detection

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Abstract As social, economic, and transportation factors vary from place to place, the number of motorcycle accidents has increased with time in every country. One of the popular forms of transportation for persons in the middle class is the motorcycle. The primary piece of safety gear for motorcycle riders is a helmet, however not all drivers use them. Adults ride at excessive speeds and triples because they don't follow the required safety precautions. The support that an automobile provides to keep the drivers to be safe and are protected to make a motorcycle accident a severe problem for society. Even when a motorcyclist takes every precaution, incidents with injuries still happen.The key purpose forusing a helmet is towards safeguard wearer's head which consist of brain in tooccurrence ofcoincidence of accident or the occurrence of bike fall. Today, fewer individuals wear helmets, and many disregard traffic laws like those against triple riding. The suggested project assists in upholding proper triple riding regulations and determining whether motorcycle riders are wearing safety harnesses, or helmets, while operating their vehicles.

Keywords— Motorcyclists – Accidents– Helmet - Triple Riding –MultiBox - Safety.

I. INTRODUCTION

It's equivalent to risking one's life to triple-ride while driving without a helmet. A motorcycle does not have the similar structural protection that a car ensures to keep its motorists secure and protected in the case of an accident [1]. Accidents that result in injury still happen, even when a rider takes every precaution. The key purpose of the helmet is mainly to safeguard wearer's head in the occurrence of both an accident and bike fall [3]. The use of helmets is currently low [4]. The suggested idea assists in determining whether or not motorcycle riders are wearing safety harnesses or helmets while operating their vehicles [5]. This suggested tactic makes advantage of Mobile net-SSD, which uses live surveillance cameras to spontaneously identify motorcyclistswithout helmets and triple riders [6].

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II. RELATEDWORKS

An effective technique for identifying Indian license plates for vehicles has been developed [7]. We can manage number plates with a loud text, low illumination, a cross-angle, and low contrast [8]. In the pre-processing stage of this, several image processing methods are used, including morphological transformation [9] method, Gaussian smoothing [10] method, Gaussian thresholding [11] method, and the Sobel edge detection [12]method. Next, number plate segmentation [13] method, contours [14] method, and filtering based on the character dimensions and other spatial localization tools are applied to the contours. The collected characters are then recognized using Optical Character Recognition (OCR) [15]. The database contains the discovered texts, which have also been categorized and made searchable [16]. In general, the accuracy of those number plates are detectedwhich are based on image processing is relatively low because of the usage ofR-CNN model [17].

Disadvantages:

I. Classifying 2000 area proposals per image during network training requires a significant amount of time.

II. At least 47 seconds of normal time is needed for testing the image, thus by this we can say it could not be implemented in day to day analysis.

III.A fixed algorithm named as selective search is used in this due to this reason, no information would be gathered at that time thus poor candidate analysis have been produced in this region ideas could result due to this.

PROPOSED SYSTEM ARCHITECTURE

As main aim of this project is to prevent accidents by identifying automatically the drivers are wearing and not wearing helmet and triple riders. In order, RCNN descriptor which is fastest then all is used for the feature extraction. Real time images are captured through cameras and using the Faster R-CNN algorithm and Haar Cascade Classier algorithm features are extracted from those images. Results which were obtained from this classification were the best compared to other and it has an accuracy of 0.996, and the results which were obtained for helmet detection are the best with an accuracy of 0.966, and results which were obtained for triple riding detection are the best with an accuracy of 0.995. HereCNN (Convolution Neural Networks)algorithm used in this project which is shown in Fig. i.

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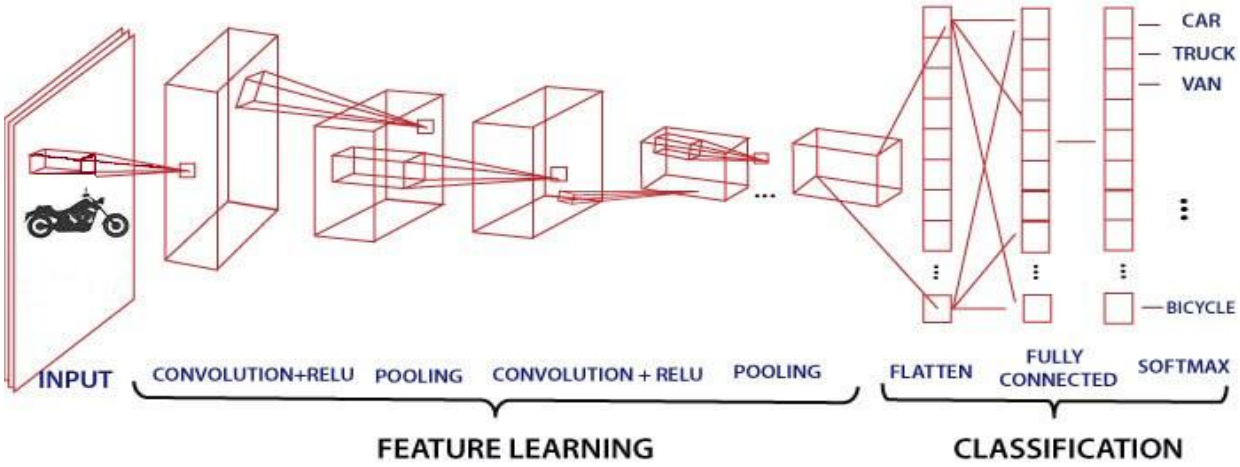

Fig. ito show the CNN (Convolution Neural Networks Architecture

Computational process used formerging any two of the functions to create a new function i.e. third function is known as convolution. Convolution is said to be carried out on the data which is input in CNN using a filter or kernel to build a feature map. To make the output non-linear, we employ the activation function. For non-linear operations, use a rectified linear unit. F(x)=max is applied to hidden layers (x, 0). Layer with full connectivity. In this layer I refer to as the Fully Connected layer, Icompressed matrix into a vector and sent it into a FC layer that resembles a neural network. To categorize the outputs as cat, dog, automobile, truck, etc., I have used an activation function like softmaxor sigmoid for this.

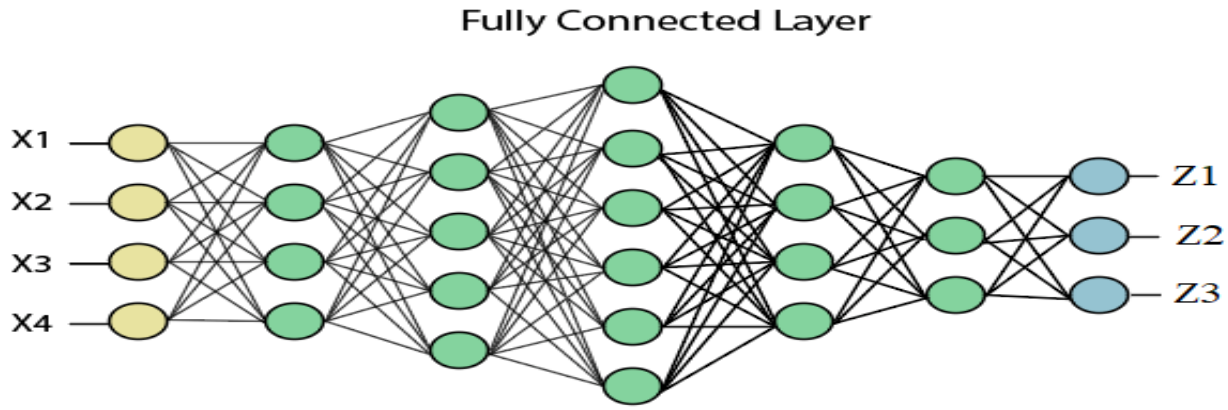

Fig. iiArchitecture of Fully Connected Layer

The steps of an algorithm are:

Step 1: Using the YoloV3 Algorithm, remove motorcycles from the surveillance video.
Step 2: CNN-YoloV3 helmet and triple rider detection
Step 3: Extraction of related pictures with bounding boxes applied
Step 4: Recognition of respective motorbike number plates
Step 5: the result being seen in a CSV folder.

III. RESULTS AND DISCUSSION

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Step 1: Using the YoloV3 Algorithm, remove motorcycles from the surveillance video.

The most recent version of the well-known object which detected the system YOLO—which stands for You Only Look Once is called YOLOv3. This disclosed model is extremely quick and almost as accurate as Single Shot MultiBox, and it can identify 80 different items in photos and videos (SSD). Besides, YOLO is known as the best method for the detection of dissimilar objects. Here YOLOsimply sends at a time the entire image through the network. Another deep learning network-forwarding object identification approach is SSD, but YOLOv3 is considerably very fastest and attains the perfect accuracy that is fairly similar to SSD.TitanX, M40, or 1080 Ti GPU, YOLOv3 provides accurate results that are faster than realtime. For a specific video frame, classes with a number of 80 are found, by this we can extract motorbikes for our project (see Fig. iii). Here, we solely considered motorcycles by comparing their weights to those found in the yolov3.weights file, which is depicted in Fig.iv.

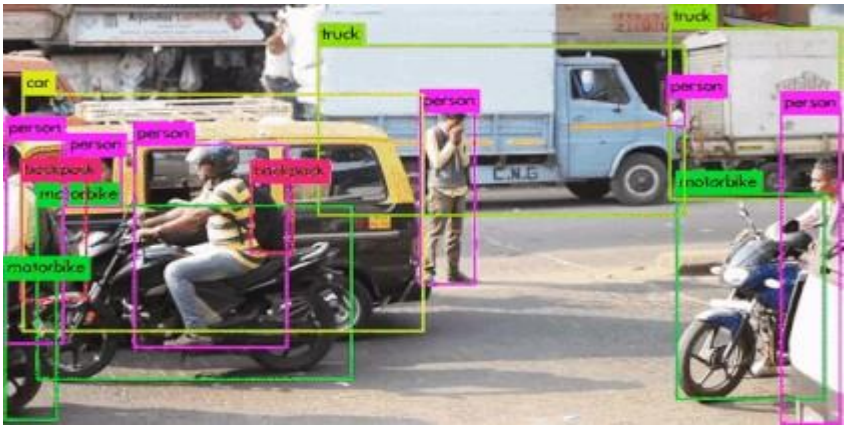

Fig.iiiUsing the YoloV3 Algorithm, remove motorcycles from the surveillance video.

<u>Step 2</u>: CNN-YoloV3 helmet and triple rider detection

Helmets and individual weights are included in YoloV3's yolov3.weights file. Once the motorbike photos have been cropped, these weights can be used to separate the triple riders and helmet violators from those who are wearing them, as illustrated in Fig. v.

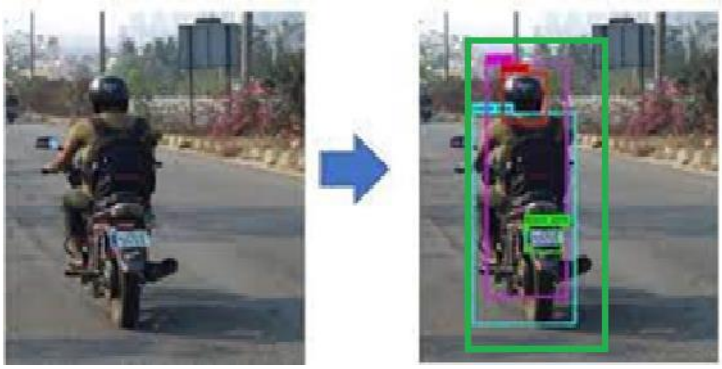

Fig. ivHelmet detection by applying CNN-YoloV3

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Fig. v Triple ridingdetection by applying CNN-YoloV3

Step 3: Extraction of related pictures with bounding boxes applied

Fig.vi Extraction of related pictures which were applied with bounding boxes

Step 4:Recognition of respective motorbike number plates:

Grayscale image created by converting an RGB image, as seen in Fig. vii. Using clever, findContours, locate the edges of the grayscale image. Make a copy of the original image and use the drawContours tool to draw all of the contours, as illustrated in Fig. viii.

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Fig. vii RGB image conversion into gray scale image

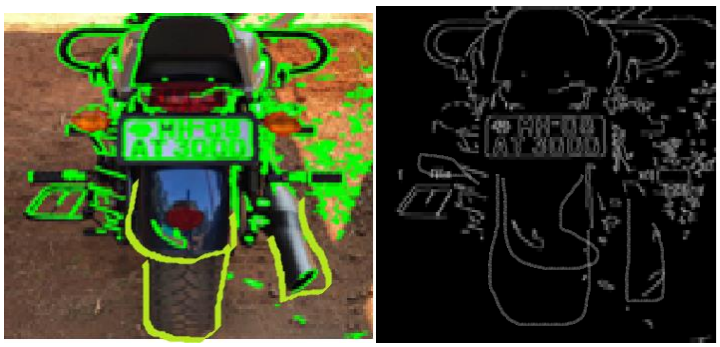

Fig. viii to show the finding edges of the grayscale image

To get the closest approximate number plate contour feasible, loop over our contours. Crop these contours, and put them in the cropped picture folder shown in Fig. ix. Fig. x displays the final result.

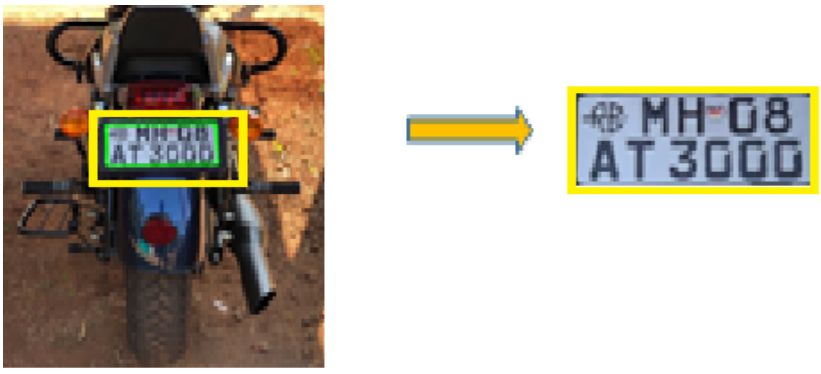

Fig.ixto show the loop over my contours in order to find the best possible for approximate contour of number plate

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Fig. x Final Result

IV. CONCLUSION AND FUTURE SCOPE

I want to develop a model which can recognize motorcycle riders in video or image feed. Datasets which were used in this study had created and annotated in order to enable the model which distinguish between images with and without a bike rider. By the usage of the Faster R-CNN techniques on sample vehicle datasets for learning, which was the proposed motorcycle rider detector have been successfully trained. Here this process for vehicle detection have also been successfully carried out by the trained vehicle detector which were when tested on the test data set. Future projects that involve detecting a motorcycle rider without a proper helmet or a triple rider and identifying the bike's license plate in order to issue an e-challan may find application for this approach.

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