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Detection of Triple Riding and Helmet

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ABSTRACT:

Motorcycle accident is growing throughout the year 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. People does not 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 precaution, accidents resulting in injury still occur.

Keywords- **Raspberry pi, Image processing, Raspberry Pi.**

1. INTRODUCTION:

The helmet detection project is a computer vision-based system that uses deep learning techniques to detect if a person wearing a helmet while riding a vehicle. The system utilizes a Raspberry Pi, a webcam, and the YOLOv3 model for detecting helmets. The project aims to promote the use of helmets among riders and enforce helmet usage policies.

If you are a law enforcement officer or a concerned citizen who suspects that triple riding is occurring. You can look for the following signs:

A motorcycle Carrying three people, with the third person sitting one the fuel tank or the rear fender.

The motorcycle appearing overloaded, with the rear suspension compressed and the front wheel lifting off the ground.

The motorcycle swaying or weaving from side to side. Indicating that it is difficult to control.

The rider appearing uncomfortable or unstable, with the third rider holding onto the driver or the passenger for support.

If you suspect that triple riding is occurring, it is important on report it to the appropriate authorities, such as the police or the transporting department. This can help to prevent accidents and save lives.

- **Hardware Setup:**

To start with the project, we set up the hardware by connecting the webcam to the Raspberry Pi and ensured that Raspberry Pi was connected to the internet. We installed the necessary libraries including OpenCV and YOLOv3 on the Raspberry Pi.

- **Data set Preparation:**

We collected data of labelled images containing people wearing and not wearing helmet. The data was used to train the YOLOv3 model to accurately detect helmet in real-time video footage. We used OpenCV to annotate and label the images and create bounding boxes around the helmet and heads.

- **Model Training**:

We used the annotated dataset to train the YOLOv3 model. The training process involved adjusting the weights of the model to optimize its performance. We used transfer learning to finetune the model on the new dataset. The model was minimizing false positives.

- **Real-time Helmet detection:**

Once the model was trained, we captured video footage using the webcam and processed each frame using OpenCV to isolate people in the frame. The YOLOv3 model used to detect helmet on each person.

If a person was detected without a helmet, the system flagged the frame.

- **Email Notification System:**

If the system flagged a frame where a person was not wearing a helmet, an email notification was sent to the person. we set up an email account and used the SMTP

Protocol to send the email. The email contained a message informing the person of the fine for not wearing a helmet.

- **Automation:**

To automate the process, we created a script that continuously captured and processed video footage, and sent mail notification if necessary. The script ran in the background of the Raspberry Pi, ensuring that the system was always active.

2. LITERATURE SURVEY

- **Article_18405_5c82f527d7755bd076le19fac63a0ab.**

An efficient method for recognition of Indian vehicle number plates has been devised. We are able to deal with noisy. low illuminate, cross angled, non-standard font number plates. This work employs several image processing techniques such as, morphological transformation, gaussian smoothing, gaussian thresholding and Sobel edge detection method in the pre-processing stage, after which number plate segmentation, contours are applied by border following and contours are filtered based on character dimensions and spatial localization.

- **Traffic Violation proctoring system Document:**

Violations in traffic laws are very common in a highly populated country like India, the accidents associated with these violations cause a huge loss to life and property. Since utilization of bikes is high, mishaps associated with bikes are additionally high contrasted with different vehicles. One of the main causes of these is not using motorcycle helmets.

Machine Learning Based Surveillance System for Detection of Bike Rider Without Helmet.

As the number of bikes in India is increasing daily compared to that of the human population. The danger of demise has increased 2.5 times among the rider without using a helmet contrasted with person wearing a helmet.

Helmet Detection Based on Improved YPLOv3 Deep Model.

Helmet Detection Based on Improved YOLOv3 Deep Model.

Helmet Detection under the Power Construction Scene Based on Image Analysis.

Motorcycle Traffic rule Violation Detection and Licence Plate Recognition using YOLO.

3.Working:

Helmet Detection-In this research, YOLOv3 computes an attempt to do image grouping to analyse the information dataset regarding motorcyclists wearing helmets or not. Furthermore, a deep learning strategy for picture identification to attempt to find a rider by not having helmet detection from the video picture

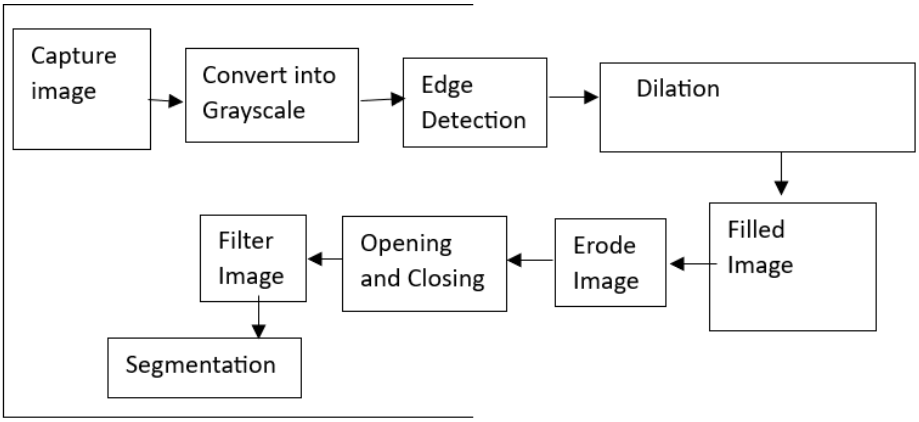


Fig a) Helmet Detection

Helmet detection and number plate detection are two separate computer vision tasks that require different techniques and algorithms.

Helmet detection can be done using object detection algorithms, which involve training a machine learning model to recognize the specific shape and features of a helmet. One popular object detection algorithm is called YOLO (You Only Look Once), which is capable of real-time object detection on embedded systems.

Raspberry Pi. The YOLO algorithm involves dividing the image into a grid and predicting the probability of a helmet being present in each cell, followed by refining the bounding box around the helmet. Once the helmet is detected, the system can sound an alarm or take other actions to alert the wearer or others.

- **Number Plate detection:**

Number plate detection, on the other hand, involves first detecting the license plate region in the image and then performing optical character recognition (OCR) to extract the text from the plate. There are many different algorithmb0

- **Triple Detection:**

Triple riding detection and number plate detection using Raspberry Pi typically involves using computer vision algorithms and image processing techniques to analyse the video feed captured by a camera. The general steps involved in the process are:

Capturing video:

A camera connected to the Raspberry Pi captures the video feed of the area being monitored.

Using computer vision algorithms such as Har Cascades or YOLO (You Only Look Once), objects such as vehicles and people can be detected in the video feed.

Triple riding detection:

Once people are detected, a triple riding detection algorithm can be applied to determine if there are more than two people on **a** motorcycle. This can involve techniques such as detecting the location and orientation of the people on the bike and comparing it to a threshold value.

4. Number plate detection:

Using image processing techniques such as edge detection, the number plate on the motorcycle can be located in the video feed. Once the location of the number plate is determined, optical character recognition (OCR) can be applied to extract the text on the number plate.

- **Database lookup:**

The extracted number plate text can then be compared against a database of registered vehicles to determine if a violation detected, such as triple riding or an unauthorized vehicle, an alert can be generated to notify the authorities.

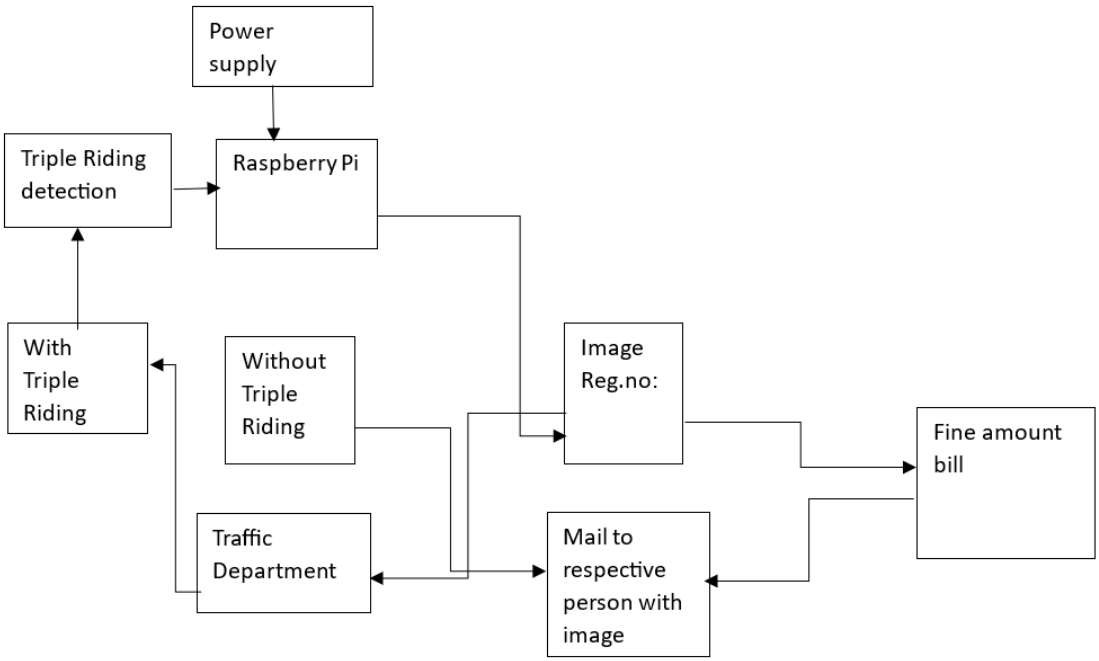
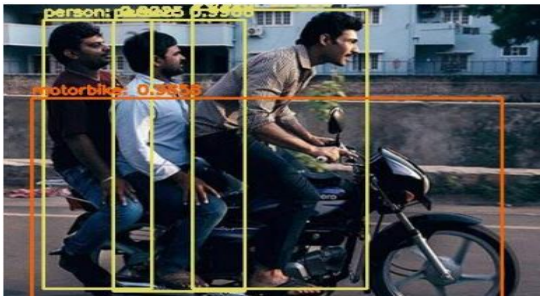


Fig b) Triple Riding Detection.

5.Output Window:

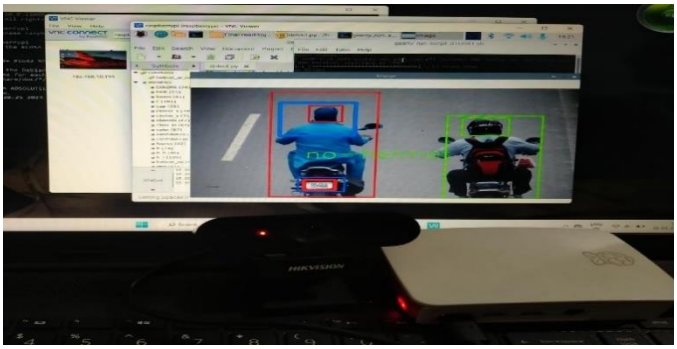
Step 1: Extraction of motorbikes from surveillance video using YoloV3 Algorithm.

Step 2: Detection of helmet and triple riders using CNN-YoloV3



Step 3: Extraction of corresponding images with applied bounding boxes which is shown in Fig .

Step 4: Recognition of number plate for respective motorcycles



Step 5: Final Output shown in fig.

6.CONCLUSION:

In conclusion, the helmet detection project is an effective system that combines computers vision techniques with deep learning to detect helmet usage in real-time video footage. The mail notification system severs to incentivize people to wear helmet and helps enforce helmet usage polices. With the increasing number of road accidents, the helmet detection project has the potential to save lives by promoting the use of helmet among riders.

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