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DROWSY DRIVER DETECTION

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Abstract:

Driver drowsiness/fatigue is an important cause of combination-unit truck crashes. Drowsy driver detection methods can form the basis of a system to potentially reduce accidents related to drowsy driving. Commercial motor vehicle truck drivers were studied in actual fleet operations.

Keywords- Driver drowsiness; eye detection; Yawn detection; blink pattern; fatigue.

Introduction:

Driver safety in the car is one of the most wanted system now a days, to avoid accidents. According to human psychology it has always invented machine and devised technique to protect their lives with the advancement in technology modes of transportation is going on
increasing and our technology dependency it started increasing exponentially. Now

we are travelling to places at a place with our family friends etc. in modern time, almost everyone in this world using some sort of transportation every day. There are some rules and

regulation for those who drive vehicle irrespectively. One of them is staying alert and active while driving.

Neglecting our duties towards safer travel has enabled hundreds of thousands of tragedies. One kind of carelessness is not admitting when we are too tired to drive. In order to monitor and prevent and destructive outcome from such negligence. Drowsiness means feeling sleepy or tired or unable to keep your eyes open. It can be accompanied by weakness, lack of mental agility, especially at inappropriate times.

***Facts*:** our current statistics reveal that just in 2015 in India alone, 148707 people died due to car related accidents. Of those 21% died due to fatigue causing drivers to make mistakes.

- **The major objective:**

The driver drowsiness detection system provides the similar functionality but with better results and additional benefits. Also, it alerts the user on

reaching a certain saturation point of the drowsiness measure.

Literature survey:

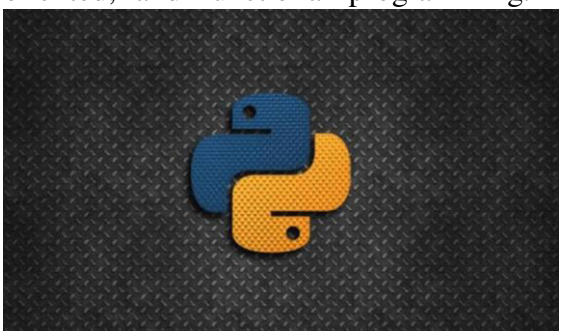
Driver drowsiness detection is a car safety technology which prevents accidents when the driver is getting drowsy. Various studies have suggested that around 20% of all road accidents are fatigue-related, up to 50% on certain roads. Driver fatigue is a significant factor in a large number of vehicle accidents. Recent statistics estimate that annually 1,200 deaths and 76,000 injuries can be attributed to fatigue related crashes. The development of technologies for detecting or preventing drowsiness at the wheel is a major challenge in the field of accidents avoidance systems. Because of the hazard that drowsiness presents on the road, methods need to be developed for counteracting its affects. Driver inattention might be the result of a lack of alertness when driving due to driver drowsiness and distraction. Driver distraction occurs when an object or event draws a person's attention away from the driving task. Unlike driver distraction, driver drowsiness involves no triggering event but, instead, is characterized by a progressive withdrawal of attention from the road and traffic demands. Both driver drowsiness and distraction, however, might have the same effects, i.e., decreased driving performance, longer reaction time, and an increased risk of crash involvement. shows the block diagram of overall system. Based on Acquisition of video from the camera that is in front of driver perform real-time processing of an incoming video stream in order to infer the driver's level of fatigue if the drowsiness is Estimated then it will give the alert by sensing the eyes.

Face and Eye Detection by Machine Learning (ML) and Deep Learning (DL) Algorithms

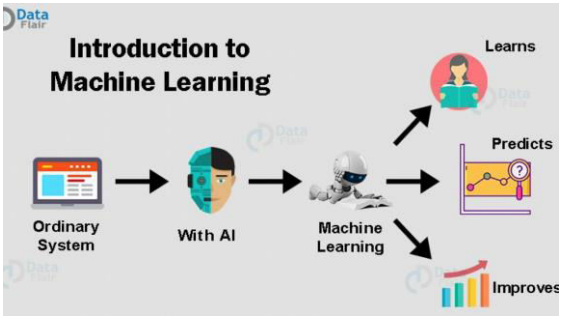
Jabbar et al. [2] proposed Convolutional Neural Network (CNN) technique of the ML algorithm to detect microsleep and drowsiness. In this paper, detection of driver's facial landmarks can be achieved through a camera that is then passed to this CNN algorithm to properly identify drowsiness. Here, the experimental classification of eye detection is performed through various data sets like without glasses and with glasses in day or night vision. So, it works for effective drowsiness detection with high precision with android modules. The algorithm of Deep CNN was used to detect eye blink and its state recognition as provided by Sanyal and Chakrabarty [12]. Saleh et al. [13] developed an algorithm of LSTM and Recurrent Neural Networks (RNN) to classify driver's behaviours through sensors. Ed-Doughmi et al. [14] analyzed the driver's behaviours through the RNN algorithm. It specially focuses on construction of real-time fatigue detection to prevent roadside accidents. This system formulates a number of drivers' faces, which works on multilayerd3D CNN models to identify drowsy drivers and provide 92 percentage acceptance rate.

Technology used:

- **Python:**
  Python is an interpreted, high level, general purpose programming language. Python design philosophy emphasizes code readability with its notable use of significant whitespace. Its language constructs and object-oriented approach aim to help programmers write clear, logical code for small and large-scale projects. Python is dynamically typed and supports multiple programming paradigms, including procedural, object-oriented, and functional programming.



- **Image processing:**
  In computer science, digital image processing is the use of computer algorithms to perform image processing on digital images.
- **Machine learning:**
  Machine learning is the scientific study of algorithms and statistical models that computer systems use in order to perform a specific task effectively without using explicit instructions, relying on patterns and inference instead. It is seen as a subset of artificial intelligence. Machine learning algorithms build a mathematical model based on sample data, known as "training data", in order to make predictions or decisions without being explicitly told.



Problem Statement :

The system is designed to avoid countless mishaps due to drowsy drivers behavioural and psychological changes by focusing on driver's eye movements. In addition to monitoring the intensity of the collisions impacts during road accidents, it is also required to keep records of the location for taking supportive action.

- **Driver Drowsiness Detection Dataset**

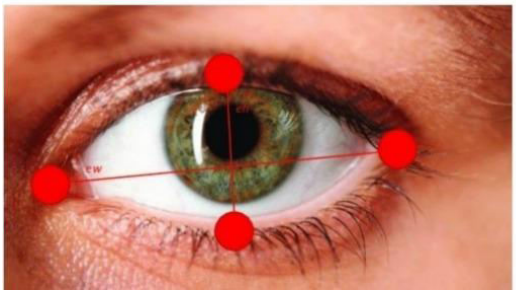
The dataset used for this model is created by us. To create the dataset, we wrote a script that captures eyes from a camera and stores in our local disk. We separated them into their respective labels 'Open' or 'Closed'. The data was manually cleaned by removing the unwanted images which were not necessary for building the model. The data comprises around 7000 images of people's eyes under different lighting conditions. After training the model on our dataset, we have attached the final weights and model architecture file. The dataset consists of 2900 images which include both normal and yawning images. Dataset is divided into training and testing, which is used in the project for training and testing respectively.

Modules:

Step 1 – Take image as input from a camera.

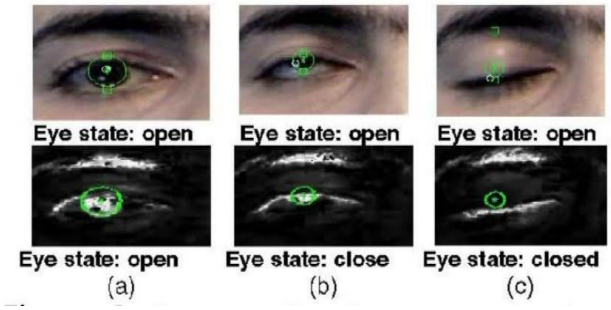
Step 2 – Detect the face in the image and create a Region of Interest (ROI).

Step 3 – Detect the eyes from ROI and feed it to the classifier.



Step 4 – Classifier will categorize whether eyes are open or closed.

Step 5 – Calculate score to check whether the person is drowsy.



These is a image were it shows the region of interest (ROI). It is a process in which it detects the portion of an image that we want to operate. In our project eyes are relevant to us, only eyes can detect the person is sleepy or not.

The platforms we are using are:

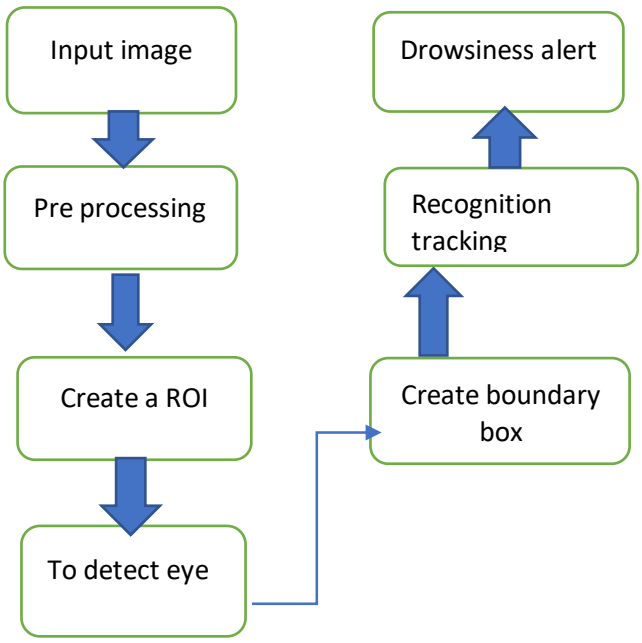
- **OpenCV**

- **Keras**

- **Tensorflow**

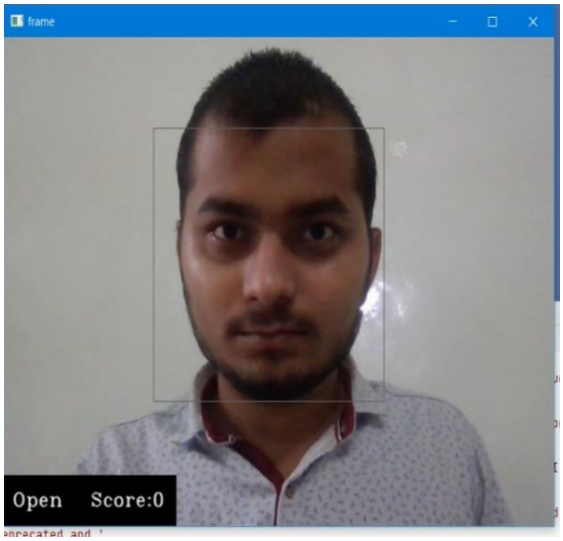
- **Pygame**

Block diagram:

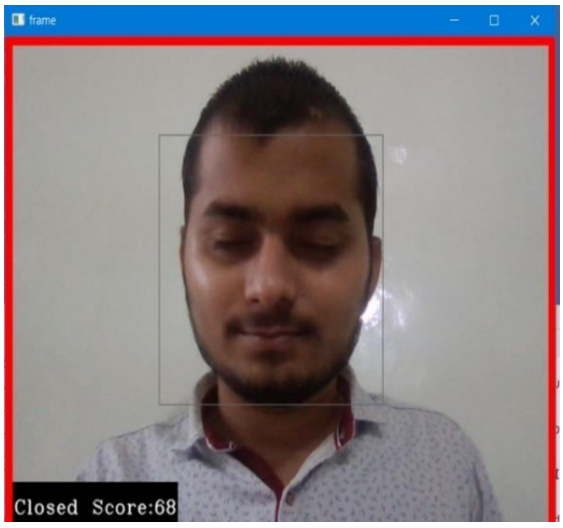


Result:

The image will show some scores to check person is drowsy or not. The score is basically a value a threshold value.



As, here is showing the score '0'that means that eye is open.



Here, the 2nd image shows the eyes are closed for long time. A certain threshold value is defined if the score is more than 15 eyes are closed for long time. If the eyes get close it will beep an alarm and driver get alert form getting accidents.

Conclusion:

It completely meets the objectives and requirements of the system. We have developed a detection system with the help of CNN. The fact that it takes care of the issue of stressing out for individuals having fatigue-related issues to inform them about the drowsiness level while driving. The system will work even in the case of driver wearing spectacles and under low light conditions also. The system is able to decide if the eyes are opened or closed. when the eyes have been closed for 5 sec – 10sec it will beep an alarm to alert the driver and speed of vehicle is reduced.

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