**DRIVER FATIGUE DETECTION SYSTEM REPORT**

**Team 3**

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PROBLEM TO BE SOLVED

Lack of sleep or feeling fatigued can reduce attention and concentration, making it harder for drivers to see risks heading their way. Both the decision-making and reaction times are slowed. All of these factors can cause accidents or worsen existing ones. Our team decided to work on a **driver fatigue detection system** that would be used to detect whether a driver is sleepy or drowsy , using a webcam somewhere on the dashboard of the car facing the driver recording live feed , and give an alert to the driver if they are deemed to be drowsy by the model ,and for us to be able to do this we opted to use facial detection with eyes as the main landmark . There were a number of tasks that required to be done and a few tools that needed to be used to do this and those are as follows;

TOOLS AND TASKS

Facial recognition and feature extraction.

**MTCNN**(Multi-Task Cascaded Convolutional Neural Networks) as the facial recognition **tool**.This was used to identify faces and facial landmarks (eyes , nose and mouth )of different individuals with a few modifications to the key points of detecting the eyes nose and mouth.

Once this was working ,code for eye extraction was written .This was done mainly because the key facial feature that we had decided to use was the eyes . This was done by separately cropping the left and right eye then putting them together side by side.

Data Collection

This was done by taking videos of various people using a webcam connected to a laptop, while facing the camera , facing down,facing sideways(left and right) , while using their phones and while yawning. This data is relevant in training the model on detecting fatigue considering these are the markers for detecting fatigue .

Gui Creation

The Gui is basically a field that uses the camera to take live video of the person in front of it and uses the facial detection code to detect facial structures and give feedback on the level of fatigue of the person ahead of it(deally the driver ).

Libraries Used

Pytorch: This was used for developing and training the model

Tkinter :This framework was used in the creation of the graphical user interface.

Opencv :This was used for visualization of the images.

Matplot :This was used for data visualization and plotting of the accuracy and loss function trend.

Tensor flow :This was used for classification of the data.

DataSet

The dataset was in form of video frames with a resolution of 640\*480, were recorded and the eyes cropped separately (that is left eye and right eye) into an image of 32\*32, and then stitched together into an image of 32\*64.

