Project Design Phase-I
Solution Architecture

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Team ID	NM2023TMID14164
Project Name	Drowsiness Detection and alerting system

Solution Architecture:

This phase uses Haar face detection algorithm that takes captured frames of image as input and then the detected face as output. Next, Haar is also used to extract the eyes image from the detected face which will be used as an input for the machine learning phase. The main role of the machine learning is to classify either the eyes of the driver are closed or opened using Support Vector Machine (SVM). If the result of the classification indicates that the driver's eyes is closed for a predefined period of time, the eyes of the driver will be considered closed and hence an alarm will be started to alert the driver. The proposed methodology has been tested on available benchmark data. The result demonstrates the accuracy and robustness of the hybridized of image processing technique with machine learning technique. Thus, it can be concluded that the proposed approach is an effective solution method for a real-time of driver drowsiness detection.
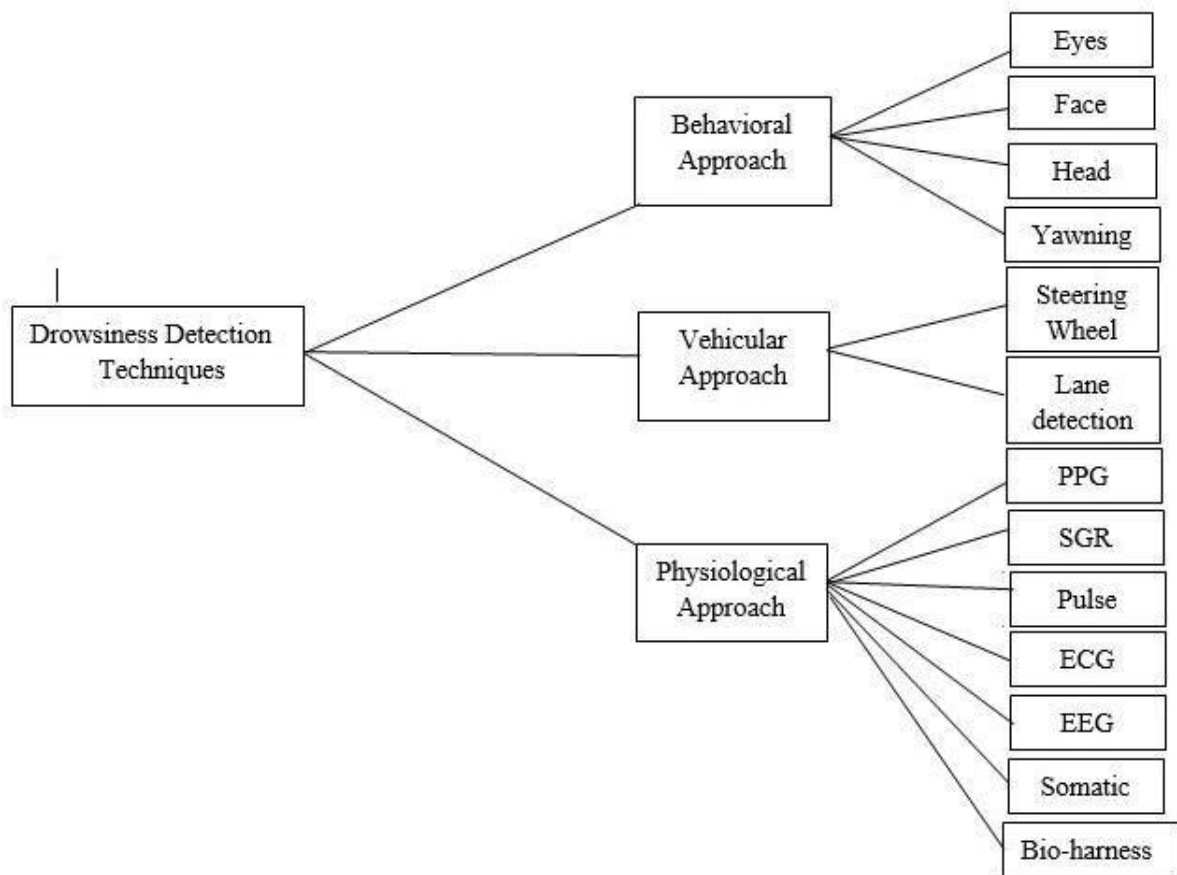
Driver drowsiness detection systems can use cameras, eye tracking sensors and other hardware to monitor visual cues, where drowsiness can be detected through yawning frequency, eye-blinking frequency, eye-gaze movement, head movement and facial expressions.

In an intrusive approach, sensors are used to detect driver drowsiness by placing them on the driver's body, whereas in a non-intrusive approach, a camera is used for drowsiness detection by identifying yawning patterns, eyelid movement and head inclination

The most popular algorithm for detecting drowsiness is PERCLOS. This algorithm is developed by Wierwille et al. [7]. PERCLOS measures percentage of time that eyes are closed over a window.

Popular algorithms used to perform object detection include convolutional neural networks (R-CNN, Region-Based Convolutional Neural Networks), Fast R-CNN, and YOLO (You Only Look Once).

EXAMPLE :