WEEKLY REPORT - 3

Project Id :19	**Semester: 6**
From Date: 29/12/2025	**To Date: 02/01/2026**
Student ID: 23DCE091, 23DCE092, 23DCE093	

Work done in last week (Attach supporting Documents):

1. Yawning Detection using Mouth Aspect Ratio (MAR)

- Extracted mouth landmarks using MediaPipe Face Mesh
- Calculated Mouth Aspect Ratio (MAR) using vertical and horizontal mouth distances
- Fixed threshold values to detect yawning
- Identified yawning when MAR exceeded the threshold for a specific duration

2. Sideways Face (Head Pose) Detection

- Implemented head pose estimation using facial landmarks
- Calculated yaw and pitch angles using the solvePnP method
- Detected sideways and downward head movement
- Classified prolonged head turn as driver distraction

3. Integration with Existing System

- Integrated MAR-based yawning detection with EAR-based drowsiness detection
- Combined head pose detection with the existing alert logic
- Ensured real-time processing using webcam input

4. Machine Learning Model Training (CNN)

- Implemented CNN training code in train_eye_cnn.py
- Used a public Kaggle dataset for eye state classification
- Trained the CNN model to classify:
- Eyes Open
- Eyes Closed
- Saved the trained model as eye_cnn_model.h5 for real-time use

5. Real-Time Testing

- Tested the system under multiple conditions:
- Normal (alert) state
- Yawning detection
- Sideways face detection
- CNN-based eye state detection

Results

The system was able to:

- Successfully detect yawning using MAR
- Detect sideways face movement as distraction
- Display real-time values on screen:
- MAR value
- Head pose status
- Eye state (CNN output)
- Run smoothly on a live webcam feed

However, during real-time testing:

- It was observed that the CNN model sometimes classifies open eyes as closed
- This leads to false detection of the drowsy state
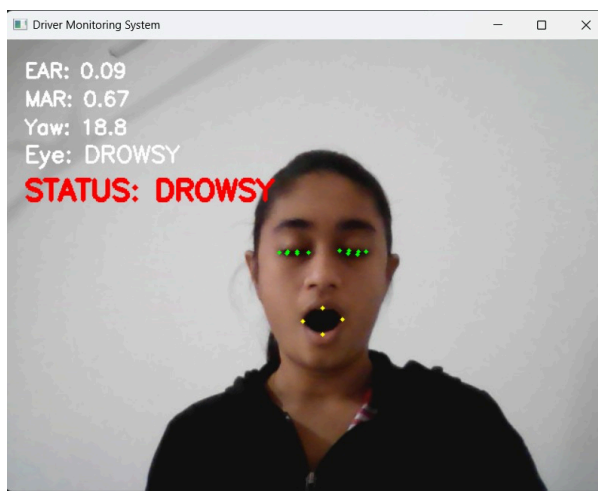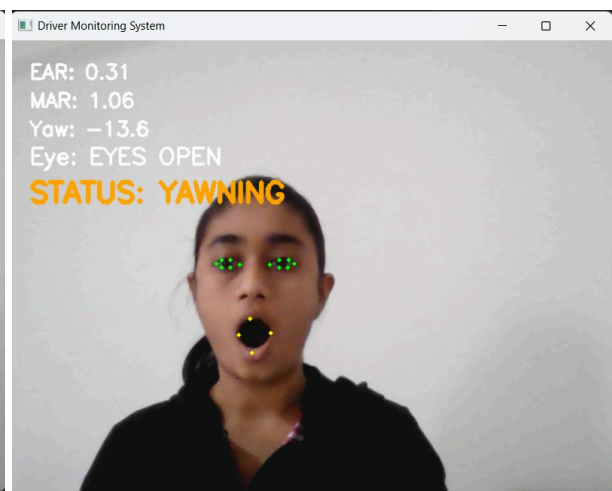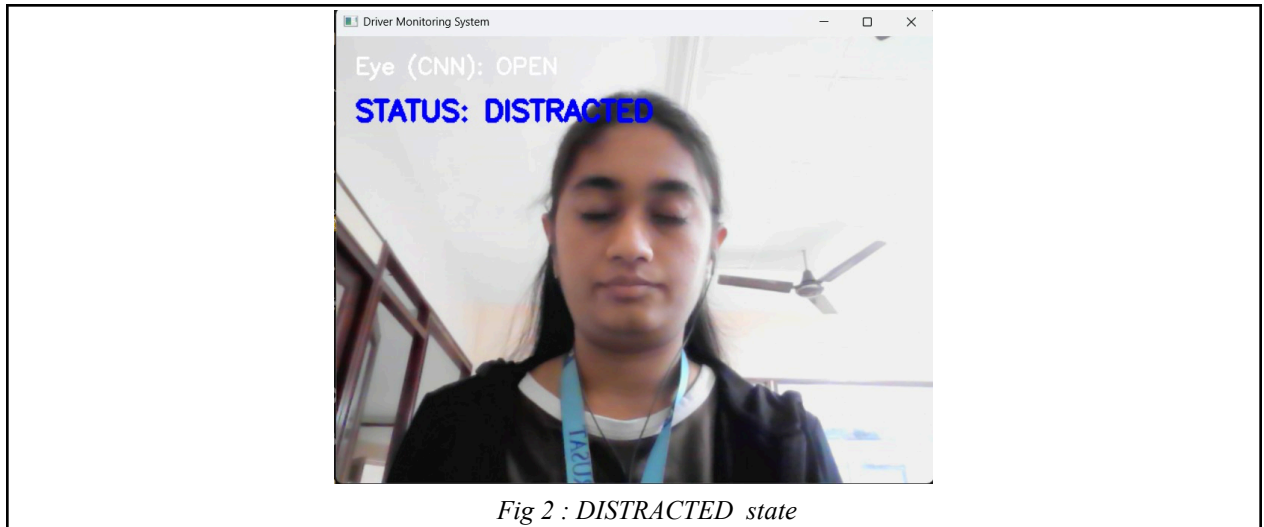- This issue is currently under analysis and debugging

Fig 1: DROWSY state   Fig 2 : YAWNING state

Fig 2 : DISTRACTED state

Plans for next week:

In the next week, the following tasks will be performed:

- Fix CNN misclassification where open eyes are detected as closed
- Improve eye state decision logic to reduce false drowsiness detection
- Refine integration between CNN output and geometric features
- Perform extensive real-time testing and validation
- Document observations and improvements

References:

https://www.kaggle.com/datasets/serenaraju/yawn-eye-dataset-new

1. Kumar, S. and Tomar, C.S., 2025, March. Driver Drowsiness Detection and Alert System Using Computer Vision. In *2025 3rd International Conference on Disruptive Technologies (ICDT)* (pp. 548-553). IEEE.

2. Karthigavani, N., Christober, S., Dhanesh, S. and Dhanush, P.S.R., 2025, July. A hybrid accident prevention framework towards Driver Fatigue and Distraction Detection using YoloV10 architecture. In *2025 2nd International Conference on New Frontiers in Communication, Automation, Management and Security (ICCAMS)* (pp. 1-6). IEEE.

3. Karthigavani, N., Christober, S., Dhanesh, S. and Dhanush, P.S.R., 2025, July. A hybrid accident prevention framework towards Driver Fatigue and Distraction Detection using YoloV10 architecture. In *2025 2nd International Conference on New Frontiers in Communication, Automation, Management and Security (ICCAMS)* (pp. 1-6). IEEE.

4. Kurian, A.T. and Soori, P.K., 2023, March. AI-Based Driver Drowsiness and Distraction Detection in Real-Time. In *2023 International Conference on Computational Intelligence and Knowledge Economy (ICCIKE)* (pp. 13-18). IEEE.

Signature of Student   **Signature of Mentor**