Driver Drowsiness Detection - Project Abstract

This project implements a real-time Driver Drowsiness Detection system using a standard webcam, OpenCV, and dlib facial landmarks. The system continuously detects the driver's face and extracts eye and mouth landmarks to compute Eye Aspect Ratio (EAR) and Mouth Aspect Ratio (MAR). A smoothed, time-based EAR criterion determines drowsiness: if EAR remains below a calibrated threshold for a configurable duration (e.g., 7-10 seconds), the system flags 'Drowsy' and triggers an audible alarm.

Robustness is improved via largest-face selection, optional auto-calibration of the EAR threshold, minimum face size filtering, FPS-aware overlays, detector interval reuse and best-face selection for efficiency, and Windows-friendly camera backend fallback. Audio behavior includes an immediate-stop mechanism with a release margin to prevent lingering alarms and an optional brief 'awake' chime when recovery is detected. The application is configurable via CLI and provides visual feedback (status, EAR/MAR, FPS).

This implementation is intended for demonstration, prototyping, and educational use, and is not a medical or safety-certified system.

Keywords:

Driver monitoring; drowsiness detection; EAR; MAR; OpenCV; dlib; real-time; webcam