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Domain: Transportation

Title: "A Real-Time Drowsiness Detection and Alarm System for Driver Fatigue Prevention Using Computer Vision and Machine Learning"

Description: This system is a real-time safety mechanism for preventing vehicular accidents because of driver fatigue. This is done by using the camera mounted on the dashboard that continuously monitors the facial features during travel. With the use of Computer Vision techniques, this system performs precise detection and mapping of facial landmarks by which the region of interest, namely, the driver's eye, is extracted. The underlying logic depends on the EAR algorithm, a mathematical formula calculating the openness of the eyes in each frame of the video. If this system finds that the driver's eyes remain closed beyond a safe threshold-one that indicates the driver has been in microsleep, the classifier from Machine Learning will fire a response. It triggers an immediate loud auditory alarm and a visible warning to startle the driver awake. The idea behind this is to reduce road casualties with an automated alert co-driver that never sleeps.

Problem: Drivers falling asleep cause fatal accidents because they cannot react in time.

Users: Truck Drivers, Bus Drivers, Taxi Drivers, Family Drivers

AI: Computer vision (Face Detection), Machine Learning (Takes data from your eyes state)

Outcome: A system that successfully detects when a driver's eyes are closed for too long and wakes them up to prevent accidents.

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Domain: Education

Title: "An Automated Online Proctoring System for Academic Integrity Monitoring Using Computer Vision"

Description: This is a web system that acts as an online proctoring tool for ensuring academic integrity is maintained during online exams. This system works as a background viewer where it makes use of a normal webcam to track the behavior of the test-taking individual throughout the entire testing period. The system makes use of Computer Vision technology where it first identifies the identity of the individual taking the test to ensure that the student is alone in the room. Simultaneously, it makes use of gaze tracking and head pose estimation algorithms that track where the individual is fixing his/her eyes in relation to where the computer screen is directed. In the event that the computer algorithm identifies any form of malpractice, it instantly generates flags for such malpractices in a file marked 'Suspicion Report' for later assessment by the concerned tutor. This technology enables educational institutions to ensure that each student has a tutor for assessment security without the need for a corresponding number of human tutors due to cost effectiveness.

Problem: Teachers cannot manually watch every student's webcam during online exams, making it easy for students to cheat by looking at notes or having others help them.

Users: Educational Institutions

AI: Computer Vision(Detects the presence of the students face)

Outcome: It ensures fair grading in online classes by automatically identifying potential cheaters.