

Real-Time Driver Drowsiness Detection System Using Eye Blink Analysis and WhatsApp Alert Integration

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Abstract

Driver drowsiness is a common yet under-reported contributing factor to road traffic accidents, since diminished alertness reduces attention to primary tasks, in turn affecting response time and the decision making process. This paper proposes a computer vision and artificial intelligence-based smart real-time model to detect driver drowsiness. The use of a webcam captures a view of the driver, and OpenCV's implementation of HaarCascade Classifier detects and tracks eye movement. Early fatigue can be detected with the blink count and duration. When the driver has their eyes closed for more than 2 seconds, an automated alert is sent to the driver, vehicle owner, and emergency contacts using the Twilio WhatsApp API. While solutions such as Drowsy Driving Detection already exist, the proposed technique is vision-based, low-cost, and could be deployed in any vehicle. It also continuously records blink activity for behavioural experiments, and it shows effectiveness and consistency in a variety of light and face orientations. This shows how AI-driven computer vision combined with real-time communication can directly make road safety-improving interventions, particularly to reduce accident risk due to fatigue.

Keywords

Driver Drowsiness Detection, Eye Blink Analysis, Computer Vision, OpenCV, HaarCascade Classifier, Real-Time Monitoring, WhatsApp Alert System, Artificial Intelligence, Deep Learning, Road Safety.