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Driver Drowsiness Detection and Accident Alert System

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The issue of driving when drowsy remains a global concern in road safety, often leading to accidents due to delayed driver responses. Additionally, the limited awareness of emergency units exacerbates the consequences of such accidents. To address these challenges, we have developed an integrated system aimed at enhancing road safety by mitigating the occurrence of accidents due to drowsy driving and ensuring a swift emergency response when accidents occur. The drowsiness detection system utilizes an IR sensor embedded in a glass frame, focusing on detecting prolonged eye closures, a key indicator of drowsiness. Upon detection, the system triggers a buzzer and vibrator to alert the driver. The accident alert system integrates a GPS and accelerometer module to detect sudden vehicle movements indicative of an accident, automatically sending location-based alerts to specified emergency units via GSM. The methodology involved rigorous testing under various driving conditions to evaluate the system's accuracy and response time, resulting in a drowsiness detection accuracy of 95.7% during daytime and 91.1% at night, with an average end-to-end latency of 3.5 to 6.5 seconds for the accident alert system. This study demonstrates that the proposed system provides an effective solution for enhancing driver safety, with potential for large-scale implementation.

Keywords: *drowsiness detection, accident alerts, emergency response, driver safety*