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Development of A Multi-Functional Driving Anti-Sleep Alarm System for Enhanced Road Safety

Thombare Aditya Premsangram[1], Wakchaure Sakshi Navanth[2], Nimase Vaishnavi Mahesh[3], Prof. Dighe Y. N[4]
Students, Department of Electronics & Telecommunication[1,2,3]
Assistant Professor, Department of Electronics & Telecommunication[4]
Amrutvahini Polytechnic, Sangamner, MH, India

Abstract: *Driver fatigue and drowsiness are major contributors to road accidents, leading to severe injuries and fatalities worldwide. To address this issue, a Multi-Functional Driving Anti-Sleep Alarm System has been developed to enhance road safety by monitoring the driver's alertness and providing real-time alerts. This system integrates multiple sensors, including an IR sensor and an eye blink sensor, to track eye movement and detect signs of drowsiness. Additionally, a DS18B20 temperature sensor helps maintain an optimal cabin environment, reducing fatigue caused by discomfort. A MQ-6 gas sensor is incorporated to detect flammable gases, ensuring an added layer of safety. The Arduino UNO microcontroller processes data from these sensors and triggers alerts through a buzzer, LCD display, and vibration motor when necessary. A relay module controls high-power devices to conserve energy while efficiently managing alert mechanisms. This proactive system minimizes accident risks by waking up drowsy drivers before critical situations arise. Designed to be cost-effective and easily integrated into commercial and personal vehicles, this device represents a significant advancement in automotive safety technology. By providing a comprehensive solution to drowsy driving, the system enhances driver awareness, reduces fatigue-related accidents, and ultimately saves lives.*

Keywords: Driver fatigue, Drowsiness detection, Road safety, Eye blink sensor, Arduino UNO