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(57) Abstract :

[500] Road Transport is considered to be one of the most cost effective and preferred mode of transport. It is vital for economic development and social integration of the country. In India, at the first face, with huge population count, Road Transport Sector accounts for about 87% of passenger traffic due to its easy availability, adaptability, and minimum cost while on another hand day by day it is becoming risky due to heavy traffic intensities and increased frequency of accidents. Facts are dangerous if road accidents count is in concern and it is direct live loss. Driver fatigue is a major contributor to road accidents, resulting in significant injuries and fatalities globally. To resolve this serious issue, the present system provides an innovative and affordable wearable eye drowsiness detection facility through Infra-red sensor-based glasses designed for real-time detection of inattentiveness of driver's eyes which indirectly helps to avoid the chances of road accidents. These are Accident Prevention Glasses (APGs), intentionally designed to combat road accidents caused by driver fatigue. Unlike complex vehicle systems, these glasses offer real-time detection of drowsiness through eye movement monitoring. An IR sensor tracks blinks and prolonged eye closure, triggering immediate audible and tactile alerts via a buzzer and vibration motor when drowsiness is detected. The buzzer uses alternating frequencies to maximize wakefulness. An Arduino NANO microcontroller processes sensor data and manages alerts. The system is programmed using the Arduino IDE and includes predefined thresholds. A lithium-ion battery provides around 13 hours (factual testing result 13.7 hours) of operation. This hardware-based approach prioritises rapid alerts, unlike systems relying on facial recognition. The system resets after each alert, ensuring continuous monitoring. Testing confirms over 90% accuracy in detecting drowsiness under controlled conditions. This system can be also used in medical field, heavy digital screen operators, scientist, Multinational companies wherein consistent eye concentration is mandatory. It is also useful to monitor unconscious patients, detecting movement and triggering alerts and for old age people for their day-to-day activity support where in the person requires helps for his/her eye drowsiness.

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