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(57) Abstract :
The present invention relates to an AI-driven multimodal drowsiness detection system designed for real-time monitoring of individuals' alertness levels. The system utilizes facial recognition, behavioral analytics, and physiological sensors (such as heart rate, skin temperature, and electrooculography) to detect early signs of fatigue or drowsiness. Through deep learning algorithms and Convolutional Neural Networks (CNNs), the system analyzes facial expressions, blink rate, yawning frequency, and head movement to determine an individual's state. The system incorporates a multimodal alert mechanism, including visual, auditory, and haptic feedback, to intervene when drowsiness is detected, ensuring safety across various domains such as automotive driving, industrial work environments, and healthcare settings. The invention adapts to individual user behaviors, offering a non-invasive, scalable, and highly accurate solution for proactive fatigue management, reducing the risk of accidents and enhancing overall safety and productivity. Accompanied Drawings [Fig. 1]

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