# ABSTRACT

*Driver drowsiness is a significant cause of traffic crashes, necessitating effective and computerized monitoring systems to enhance road safety. Drowsiness reduces response time, decreases alertness, and significantly increases accident rates after prolonged driving. This study introduces a vision-based driver drowsiness detection system using computer vision and real-time facial analysis. The system integrates YOLOv8 for object detection and Dlib for facial landmark extraction, identifying key indicators such as Eye Aspect Ratio (EAR), Mouth Aspect Ratio (MAR), and head tilting patterns to assess driver alertness. The system's novelty lies in its concurrent multi-feature analysis and real-time alarm function, enhancing detection accuracy without additional sensors. It continuously monitors eye closure, yawning frequency, and head posture to promptly detect drowsiness signs. Trained and tested on a dataset of 3,474 driver images under various lighting conditions and accessory usage (e.g., glasses, masks) from Roboflow, the system achieved a mean Average Precision (mAP) of 91.5%, 25 FPS real-time processing, and 4 ms inference latency per frame, proving its practical efficiency. Moreover, its ability to operate with a standard camera makes it highly accessible and cost-effective. With its stability and versatility in diverse situations, the proposed system holds great potential for use in commercial and private vehicles, providing timely warnings and actively reducing drowsiness-related accidents.*

*Keywords: Computer Vision, Drowsiness Detection, Eye Aspect Ratio, Mouth Aspect Ratio, YOLOv8.*