Abstract / Synopsis

Driver gaze plays a crucial role in several gaze-based applications, such as visual distraction detection, driver attentiveness detection, gaze behaviour understanding, and building driver assistance system. Advanced Driver-Assistance Systems (ADAS) enhance vehicular safety by reducing human error, with accurate gaze estimation playing a key role in assessing driver attentiveness. This study focuses on non-intrusive, camera-based gaze zone estimation using multiple cameras and employs computer vision and machine learning approaches for gaze estimation. It examines the impact of different camera positions on gaze estimation accuracy and explores the fusion of multiple cameras to enhance performance. In data collection equipment involves instrumented vehicle, with eye-tracking glasses and high-definition webcams providing comprehensive visual data. The study employs early and late fusion techniques to combine multiple camera angle gaze estimation models, improving the robustness and accuracy. Results highlight the influence of camera angles on eye detection and head pose estimation. The proposed model's innovative approach to combining eye and head features sets the base for reliable driver gaze monitoring systems, contributing to the broader goal of enhancing gaze estimation by fusion. The fusion techniques used in this study have shown an improvement in overall accuracy by 7% in gaze estimation compared to the single camera-based models.