

Smart Road Assistance System using Computer Vision

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Abstract: *The Smart Road Assistance System (SRAS) is a vision-based, real-time driver assistance framework designed to enhance road safety and minimize human error using Computer Vision and Deep Learning techniques. The system captures live video from a camera and processes each frame to detect and classify key road elements such as vehicles, traffic signs, traffic lights, lanes, and potholes. By integrating advanced models like YOLOv8 for object detection and Convolutional Neural Networks (CNNs) for traffic sign and light recognition, the system provides accurate, fast, and reliable detection under diverse environmental conditions.*

A fusion layer combines the outputs from multiple detection modules to make context-aware decisions, which are then displayed on a Graphical User Interface (GUI) with real-time visual overlays and alert messages. The proposed system achieves high accuracy while maintaining real-time performance, making it suitable for deployment in vehicles and smart transportation systems.

Keywords: Advanced Driver Assistance Systems (ADAS), YOLO Object Detection, Traffic Sign Recognition, Road Damage Detection

