

Car accidents remain one of the leading causes of injury and death, with most caused by human error. This research addresses one of the most pressing challenges in modern transportation: reducing driving accidents by combining human-centred assistance with intelligent automation. A comprehensive framework is developed for real-time driving risk assessment and reduction through sensor fusion, machine learning, optimal planning, and shared control. Key contributions include multi-modal driver behaviour classification, data-driven risk quantification, a novel accident-averse trajectory planner, and learning-based assist controllers such as emotional and imitation learning. A Shared Control System of Driving is also proposed to dynamically balance authority between human drivers and automation, enhancing both safety and trust. Experimental validation in simulation and real-world scenarios demonstrates significant improvements over conventional ADAS, paving the way toward safer, more reliable, and more human-centric intelligent vehicles.

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