

Key Characteristics: Improve current ADAS technologies to work in complex scenarios (intersections, roundabouts, entry lanes...) • Supervised driving paradigm: drivers remain in charge of their own safety • Detect and seamlessly correct human error when it would provably lead to an accident •

Supervised driving for safer intersections

To improve the safety and driving comfort of their occupants, modern vehicles are equipped with more and more advanced driver assistance systems (ADAS), effectively rendering them semi-autonomous.

Among other capacities, these systems can accelerate (e.g., Adaptive Cruise Control) or brake the vehicle in case of emergency (e.g., Emergency Brake Assist), steer the vehicle to avoid departing the current driving lane (e.g., Lane Keeping Assist) or even be used to detect bicycles or pedestrians. Despite all of these innovations, current ADAS technologies are unable to handle complex traffic situations, notably when dealing with vehicles arriving from the side, either at intersections or when merging on highways. However, the high rate of accidents in these settings prove that they constitute difficult driving situations, and are often the source of important traffic congestion.

Therefore, it would be extremely desirable to provide drivers with assistance in these situations. From these observations, we propose a cooperation technique based on vehicle communication to safely coordinate semi-autonomous vehicles in intersections, roundabouts or merging lanes, which removes the risk of collision or deadlocks while remaining compatible with human driving.

More specifically, we suggest a supervised coordination scheme which uses existing ADAS technologies to override control inputs from human drivers when they would result in an unsafe or blocked situation.

To avoid unnecessary intervention and remain compatible with human driving, overriding should only occur when collisions or deadlocks are imminent. In this case, safe overriding controls should deviate as little as possible from those originally requested by the drivers •

