Real-time Coordination of Merging Vehicles

Relative vehicle trajectories using V2V communication

A new vehicle merge assist technology uses Dedicated Short Range Communication (DSRC) to coordinate merging between vehicles. DSRC, a short-range wireless communication protocol developed specifically for vehicle-to-vehicle (V2V) or vehicle-to-infrastructure (V2I) communication, allows vehicles to communicate with other nearby vehicles and with various infrastructures (e.g. road signs). The new merge assist system uses standard GPS receivers and DSRC-based wireless V2V communication to acquire accurate relative trajectories of surrounding vehicles. The trajectory information provides drivers with real-time guidance on how best to merge and may even facilitate automated merging in the future. Field tests using lane-level position resolution could distinguish two vehicles on separate or adjacent lanes of a multiple-lane freeway. The system can work with Cellular V2V (C-V2V), which is the new approach for vehicle-to-vehicle communication.

Uses simple, less expensive GPS sensors

Current merge assist systems use an individual vehicle’s sensors and may require additional vehicle-based sensors or infrastructure-based sensors to detect approaching vehicle trajectories. Common GPS-based devices can guide drivers by showing an image of the junction on a map, but they do not have lane-level resolution and cannot show other approaching vehicles. High-accuracy differential GPS receivers with vision- or sensor-based systems and high-resolution maps can provide lane-level resolution and precise absolute positions of other vehicles.

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vehicles, but their use is limited by very high cost and complexity. This new technology achieves relative lane level resolution using less expensive, commonly available GPS receivers deployed with emerging V2V communications technology. It requires less computation and lower cost sensors. It can be especially valuable for blind intersections and obstructed views.

Phase of Development

• Prototyped in commercial DRSC units.

Benefits

• Provides real-time guidance on how best to merge
• Less costly and simpler than other methods
• Can be used for blind intersections and obstructed views
• May facilitate automated merging in the future

Features

• Uses Dedicated Short Range Communication (DSRC) vehicle-to-vehicle (V2V) communication
• Uses standard GPS receivers
• Requires lower cost sensors and less computation
• Acquires accurate relative trajectories of surrounding vehicles
• Lane-level position resolution; accuracy of less than half a lane width
• Distinguishes two vehicles on separate or adjacent lanes of a multiple-lane freeway

Applications

• Driver assistance devices
• Vehicle safety systems
• Semi-autonomous vehicles
• Autonomous vehicles

Interested in Licensing?

The University relies on industry partners to further develop and ultimately commercialize this technology. The license is for the sale, manufacture or use of products claimed by the patents. Please contact Andrew Morrow to

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share your business needs and licensing and technical interests in this technology.

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