

Integrated Target Tracking and Control for Automated Car-Following of Truck Platforms

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Abstract : This article proposes a perception model for enhancing the accuracy and stability of car-following control of a longitudinally automated truck. We applied a fusion-based tracking algorithm on measurements of a single preceding vehicle needed for car-following control. This algorithm fuses two types of data, radar and LiDAR data, to obtain more accurate and robust longitudinal perception of the subject vehicle in various weather conditions. The filter's resulting signals are fed to the gap control algorithm at every tracking loop composed by a high-level gap control and lower acceleration tracking system. Several highway tests have been performed with two trucks. The tests show accurate and fast tracking of the target, which impacts on the gap control loop positively. The experiments also show the fulfilment of control design requirements, such as fast speed variations tracking and robust time gap following.

Keywords : object tracking, perception, sensor fusion, adaptive cruise control, cooperative adaptive cruise control

Conference Title : ICITT 2021 : International Conference on Innovative Transportation Technologies

Conference Location : Lisbon, Portugal

Conference Dates : September 20-21, 2021