LANE DEPARTURE AVOIDANCE SYSTEM

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Abstract:

Traffic accidents cause millions of injuries and tens of thousands of fatalities per year worldwide. This thesis briefly reviews different types of active safety systems designed to reduce the number of accidents. Focusing on lane departure, a leading cause of crashes involving fatalities, we examine a lane-keeping system proposed by Minoiu Enache et al.They proposed a switched linear feedback (LMI) controller and provided two switching laws, which limit driver torque and displacement of the front wheels from the center of the lane. In this thesis, a state feedback (LQR) controller has been designed. Also, a new switching logic has been proposed which is based on driver's torque, lateral offset of the vehicle from the center of the lane and relative yaw angle. The controller activates assistance torque when the driver is deemed inattentive. It is deactivated when the driver regains control. Matlab/Simulink modeling and simulation environment is used to verify the results of the controller. In comparison to the earlier switching strategies, the maximum values of the state variables lie very close to the set of bounds for normal driving zone. Also, analysis of the controller' s root locus shows an improvement in the damping factor, implying better system response.

Description:

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