Title of the Contribution:
Model-Based Analysis of Sensor-Noise in Predictive Passive Safety Algorithms

Abstract:
The introduction of environment perception sensors into the automotive world enables further improvement of the already highly optimized passive safety systems. Such sensors facilitate the development of safety applications that can act in a context sensitive manner concerning the protection of vehicle occupants. Hereby the quality of the provided information is decisive for the usability and effective range of such sensors within integrated safety systems. In this paper noise effects in sensors and their implications on the prediction of collision parameters are analyzed. The focus lies on sensors that can measure distances but not velocities or accelerations of the objects surrounding the car. For such sensors a noise model is presented as well as a tracking algorithm aiming to estimate the velocities and to compensate the effects of noise. This information is used by a trajectory-based algorithm to predict relevant collision parameters like time-to-collision, relative velocity at collision time etc. Monte Carlo simulations show the influence of noise on the accuracy of the predicted collision parameters. The described model-based study allows the systematic deduction of sensor requirements and represents a new way for the evaluation of the robustness of predictive passive safety systems.

Keywords:
simulation, predictive passive safety, pre-collision-phase, collision parameters, automotive

Conference / Book Title:
Proceedings of the 22nd Enhanced Safety of Vehicles Conference

Year:
2011

Occurrences: