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Title : Situational awareness and applications to safety-oriented driver assistance systems

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This collaborative work between UC Berkeley and Inria addresses safety-oriented driver assistance systems, with a focus on combining high-level probabilistic reasoning and low-level vehicle dynamics and control. In this presentation I will describe our main two current projects.

The first project concerns the formulation of a probabilistic model of driver control strategies for highway driving. We use statistical machine learning methods to learn typical steering and acceleration behaviors exhibited by drivers on the highway in situations such as lane keeping, vehicle following, and lane changing. In the future the driver model will be used in combination with the MPC-based driver assistance framework developed by the MPC lab at Berkeley.

The second project tackles the decision making problem for collision avoidance systems. One challenge for decision making algorithms is that they have to decide whether the collision avoidance system should intervene or not (e.g. by warning the driver or braking autonomously) based on uncertain knowledge. We are working on decision making algorithms which adapt their decisions based on this uncertainty. Preliminary results show that we are able to reduce the rate of false alarms by incorporating the value of available sensor information in the cost of decisions.

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