Workshop title
Probabilistic Prediction and Comprehensible Motion Planning for Automated Vehicles – Approaches and Benchmarking

Workshop proposer(s)
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Abstract
The research field of Automated Vehicles has experienced vast progress over the last decades and today, first prototypes are sufficiently safe to drive on selected roads in public traffic. Nevertheless, safety comes at the price of overly conservative behavior, leading to inconvenient situations, for example, at unprotected left turns or merging scenarios.

Presumably, the main reasons for this behavior include (a) errors in the prediction of other traffic participants, especially in interactive scenarios and (b) the lack of probabilistic considerations in motion planning.

While safety should of course never be put at risk (which is the focus of the ITSC2020 Workshop on Automated Vehicle Safety: Verification, Validation and Transparency), worst case behavior of others should not be considered the basis for the motion plan of an automated vehicle. Rather, it must be ensured that a safe reaction to such worst case behavior remains feasible, allowing uncomfortable trajectories in these guarantees, while the intended trajectory as a reaction to the expected behavior of others is comfortable and thus less conservative. The proposal and exchange of these kind of approaches are the first aim of the workshop.

As a basis for such behavior, and thus closely related, sophisticated behavior prediction approaches for other traffic participants are necessary, which go far beyond constant velocity assumptions. The predictions provided must be of probabilistic nature and potentially based on or classified in maneuver options for other vehicles. In many scenarios, there is not "the right prediction", but many maneuvers are possible. The actual choice is influenced by the destinations of the other traffic participants, their individual driving behaviors and maybe even the drivers' mood. Thus, a simple evaluation against a ground truth is not possible for such approaches.

Prediction approaches, including but not limited to machine learning based approaches, as well as proposals for their evaluation, are the second main goal of this workshop.

Keywords
- Automated Vehicle Operation, Motion Planning, Navigation
- Cooperative Techniques and Systems

Topics of interest
- Cooperative and comprehensible motion planning

- Probabilistic decision making and motion planning (including MDPs, POMDPs, MMDPs)
- Probabilistic behavior prediction (with help of semantic high definition maps)
- Evaluation and benchmarking for probabilistic prediction
- Evaluation and benchmarking for comprehensible motion planning