

Master's thesis project

Comparison of models of driver behavior from different datasets

Project details
<i>Research project title</i> Comparison of models of driver behavior from different datasets
Examiner: Giulio Bianchi Piccinini (Chalmers): giulio.piccinini@chalmers.se Supervisor: Ron Schindler (Chalmers): ron.schindler@chalmers.se
<i>Workplace</i> This research project is performed at Chalmers University of Technology (Crash Analysis and Prevention group, division of Vehicle Safety). The workplace will be on campus Lindholmen.

Background

During a previously conducted test-track experiment, data was collected for truck drivers performing right-turn maneuvers at an intersection, with and without the presence of a cyclist and pedestrian dummy. The collected data was used to analyze and model driver behavior in those situations, identifying different behavioral patterns between them. Since the data was collected in a controlled experiment, it is beneficial to compare the results and the models with those that are based on data collected in different settings, such as naturalistic driving data.

Objective

This thesis aims at creating models of driver behavior from data collected within the [Udrive project](#) and compare these models to the ones already available from the test-track experiment. The goal is to analyze a list of candidate events in the Udrive data, where truck drivers performed right turn maneuvers that are similar to the ones collected during the test-track experiment.

First, the students will need to extract, check and annotate the data from Udrive for the considered scenarios. The work includes adapting an annotation tool, preferably in Matlab, and performing the annotations on a given set of candidate events. Then, the students will analyze the annotated data and the signals (e.g. speed) extracted from the naturalistic data, to create models of driver behavior. Finally, these models will be compared to the ones available from the test-track experiment, to draw conclusions on how drivers behave in the different environments.

The detailed learning objectives for the thesis project are the following:

- Extract, analyze and interpret kinematic and behavioral data collected during Naturalistic Driving Studies (NDS).
- Model driver behavior, using naturalistic data.
- Compare models of driver behavior obtained using different data sources, namely test-track experiments and NDS.
- Evaluate the impact of the work on the design of future data collection strategies.

Research project work

In this thesis project, the students will use the knowledge acquired in previous work to: a) analyze driver behavior from Naturalistic Driving Data; b) and compare the results of their analysis to previous work. The detailed plan of the research project includes the following steps:

1. Review the literature about test-track and NDS data collections and their comparison as well as driver behavior modelling.

2. Conduct annotations of the events, to retrieve relevant variables.
3. Create models of driver behavior and identify differences in the models, due to the different data collection methods.
4. Write the final thesis report and present the results.

Prerequisites

- Good programming skills (preferably in Matlab)
- Ability to work independently
- Physically located in Göteborg (data access is only possible in person at Lindholmen)