

Integrating tactical driver decision models in high-fidelity vehicle simulation

Context

High-fidelity vehicle simulation tools are widely used for the development of automotive software. Such tools provide models for the vehicle with several sub-components, the static and dynamic environment and the driver. The driver model focusses on operational driver behavior such as realistic actuation of throttle and brake pedals. However, in the context of assisted and automated driving, the simulated scenarios get more and more complex and the driver model has to be capable of making tactical choices, such as lane changes. Lane change models are a basic functionality of traffic simulators and could be integrated for the use in vehicle simulators.



Figure: Vehicle under test in a virtual rural environment with surrounding traffic

Tasks

- integrate existing lane change models (C++-coded) in a Simulink model by creating C++-coded Level-2 S-Functions
- evaluation of the performance of the integrated lane change models in the vehicle and environment simulation DYNA4 regarding computing performance and realistic driving behavior

Requirements

- Good programming skills, preferably familiar with C/C++ and Matlab
- Knowledge of vehicle dynamics simulation software is recommended but not required

The student will be provided test data sets for scenarios as well as the required license for the simulation tool. The developing company of the simulation tool (Vector Informatik) will be involved in the IDP and can give the student guidance to get familiar with the tool.

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