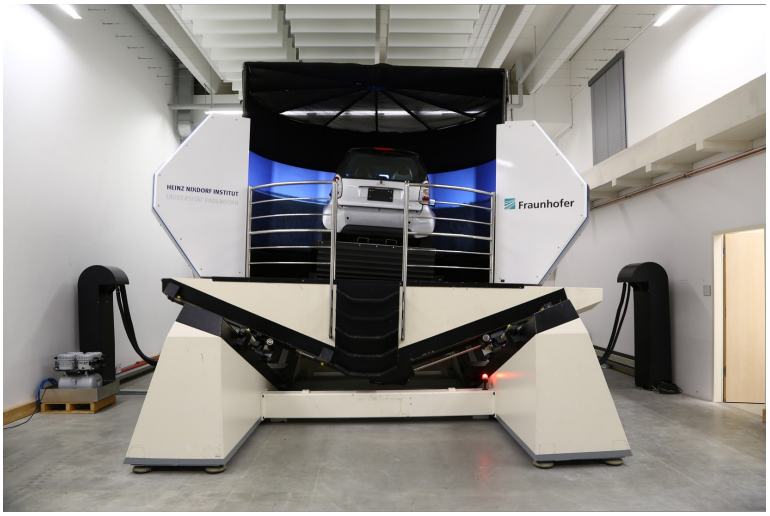
PADERBORN UNIVERSITY

CEM Group

CCS

Bachelor Thesis

Realistic driving behavior in vehicular network simulations



Today's road traffic simulators are often assuming idealistic car-following models like Krauss or IDM. Such a model determines how vehicles follow each other on a road, that is, how they accelerate and brake in different scenarios. However, these models are idealistic in the sense that they abstract away from peculiarities of human driving behavior.

An example for this is a construction site on a German motorway, where the speed limit is usually reduced to a maximum of 80 km/h. Many common car-following models would model the car as going 130 km/h up until the speed limit sign, then have it decelerate to 80 km/h. Reality, however, shows that: first, such limits are often not taken too strictly. Second, the point at which a vehicle starts to brake might change based on the individual driver's decision to shift to a neutral or lower gear to brake slowly. Third, how the driver is informed about the speed limit (visually, by road signs, by an indication on their dashboard only, ...) and when they are informed about it (in terms of distance or time before the limit) might have an influence on both of the aforementioned factors. All of this is likely to differ even more depending on the experience of the driver, age, time of the day, weather and many more parameters. Previous work on this topic has, so far, ignored the possibilities introduced by wireless communication between cars (both in terms of information quality and speed of reporting).

Goals of the thesis

In the scope of this thesis we want to use the ATMOS Driving Simulator[1] from the Control Engineering and Mechatronic group. The simulator will be used to measure real driver behavior from test subjects. The collected data will be integrated into the road traffic simulator SUMO in a next step. This modified road traffic simulator will then be used to identify the impact of wireless communication on driving patterns.

In-cooperation

This thesis is being offered (and will be conducted) in cooperation with the Control Engineering and Mechatronic group (Prof. Trächter).

Keywords

C++, Unity, C#, Driving Simulators, Network Simulation, Vehicular Networking

[1] https://www.hni.uni-paderborn.de/en/control-engineering-and-mechatronics/forschung/fahrerassistenzsysteme/fahrsimulatoren-und-versuchsfahrzeug/

Contact:
Tobias Hardes <hardes@ccs-labs.org>

In cooperation with the
Control Engineering and Mechatronic group