

Bachelor's / Master's Thesis

Interactive Driving Simulator for Car2X Scenarios

This thesis is co-hosted at the research groups for Distributed Embedded Systems (CCS) and Control Engineering and Mechatronics (RtM).

Thanks to interactive 3D driving simulators, future advanced driver assistance systems (ADAS) can be tested before the technology is available on the market. The research group for Control Engineering and Mechatronics operates a variety of such simulators—with different degrees of complexities [1]. However, until now support for other (computer-controlled) vehicles has been limited.



To allow research on interconnected traffic systems and analyze driver's reaction to such systems, additional traffic composed of communicating vehicles shall be integrated into the simulation environment. At the research group for Distributed Embedded Systems (CCS), *Veins* [2], a simulation tool linking inter-vehicle communication and large-scale road traffic models, has been developed and validated. In this co-hosted thesis the two environments shall be coupled.

Goals of the thesis

The goal of the thesis is to develop an interconnection between the 3D driving simulator and *Veins*, including traffic scenario(s) to be experienced by the ego-vehicle. The combined simulation system is then to be evaluated using an advanced driver assistance system harnessing inter-vehicle communication. This could be used to, e.g., perform experiments with test drivers to analyze the driver's acceptance of the assistance system.

Requirements

The candidate should be accustomed to C++ and network programming. Experience with Unity3D is also beneficial.

References

- [1] Kareem Abdelgawad, Bassem Hassan, Jan Bessenbrügge, Jörg Stöcklein, and Michael Grafe. A modular architecture of an interactive simulation and training environment for advanced driver assistance systems. In *International Journal On Advances in Software*, volume 8, pages 247 – 261. IARIA, June 2015.
- [2] Christoph Sommer, Reinhard German, and Falko Dressler. Bidirectionally Coupled Network and Road Traffic Simulation for Improved IVC Analysis. *IEEE Transactions on Mobile Computing*, 10(1):3–15, January 2011.

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