Applicability of Traffic Simulation as Contribution to the Development of Driver Assistance Systems

Master‘s Thesis of Sabine Krause

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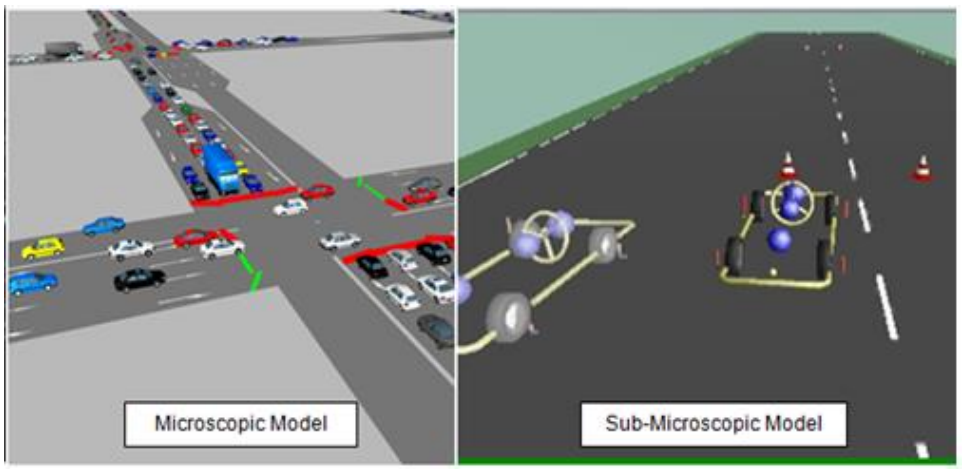
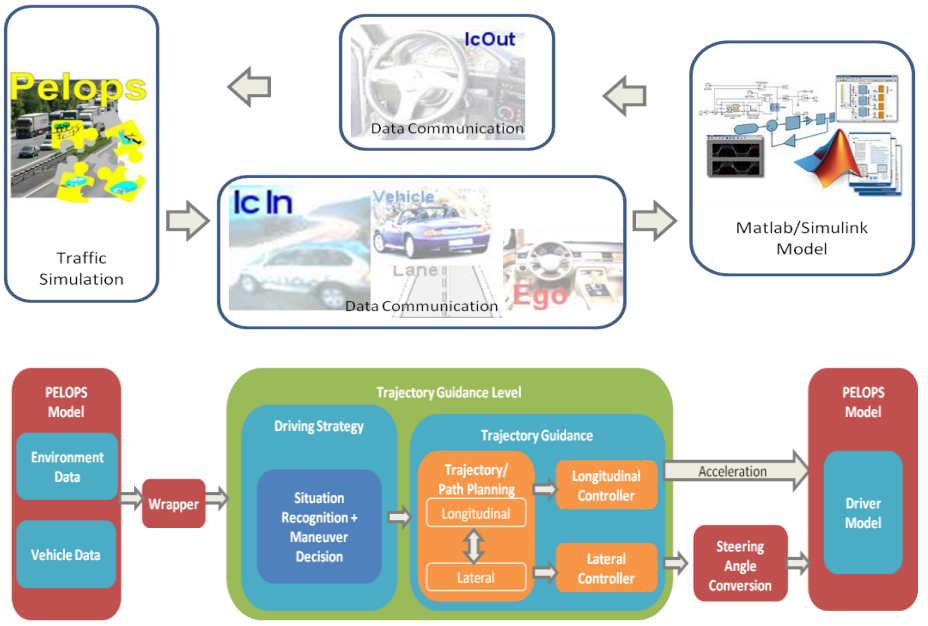
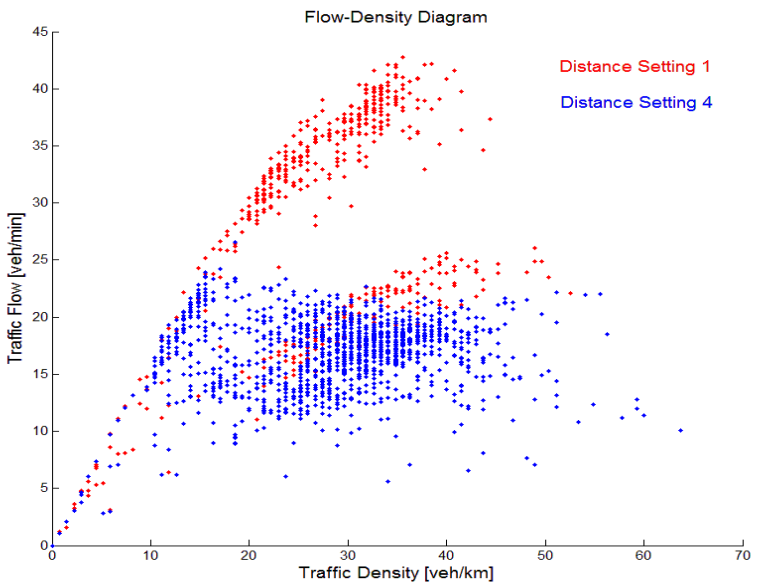


The thesis raises the question to what extend traffic simulation is applicable as contribution to the development of driver assistant systems. Within the development phase of partially and highly automated driver assistant systems, various test methods are used. Mainly driving tests and vehicle simulations are used so far. Traffic simulation has the advantage to be able to represent more vehicles, more complex traffic situations and realistic interactions between all traffic participants.

Pelops is presented as an appropriate tool for the integration of driver assistant controls into traffic simulation. An integrated simulation environment was developed within this work. Two control models are integrated into the simulation environment. One of the models is currently in the development phase where various aspects still need to be tested. The other model is a fully developed ACC function, which is in a development phase shortly before integration into the vehicle. Through software-in-the-loop simulations, it was possible to represent the controller-equipped vehicles in the simulation with the same behavior as this a real vehicle would have. Various simulations were carried out for the evaluation of the systems.





It was found that traffic simulation is an applicable tool within the development of driver assistant systems. It is possible to simulate single use cases, as well as complex traffic scenarios. The developed system can thus be tested within various realistic conditions, which gives a useful input for the further development of the systems. It is possible to evaluate the systems in a way which had not been possible before. As examples, within this thesis, the stability of the two controls is compared. Additionally, the effects of the system in different configurations on safety and traffic efficiency are evaluated.