Interdisciplinary Project

Development and Integration of an Autonomous Vehicle Software Stack in a Simulation Environment

Situation:
After participating in the Indy Autonomous Challenge and testing software for autonomous vehicles in the racing domain, the Chair of Automotive Technology is tackling the next big challenge – autonomous driving in urban areas. Due to the differences to autonomous racing, this requires a new AV software stack and also a new driving simulation environment. The AV software stack manages the entire pipeline of autonomous driving: Starting with the data acquisition, perception, planning, and finally controlling the vehicle. The simulation environment is used for extended testing of these algorithms before deploying them on the real vehicle.

Project:
In this project, an existing open-source simulation environment for autonomous driving should be set up and extended with the interfaces needed for the AV algorithms. Additionally, an open-source AV software stack should be integrated and tested in the previously built simulation environment.

The following work packages comprise the student research project:

- Literature research on the AV software stack, interfaces, and simulation environment
- Initial setup of the simulation environment including interfaces
- Selection of the AV software stack components and integration in the simulation environment
- Extensive testing of the AV software stack in simulation

Lecture recommendation:

- Autonomous Driving Software Engineering, MW2472, summer and winter term, available online

Prerequisites:
- Experience in working with C++, python, ROS2, git

Should you be interested in this project or in similar projects in the context of autonomous driving, send a short motivation letter, transcript and CV to:

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