

Bachelor's/Semester/Master's Thesis, Guided Research, Interdisciplinary Project (IDP)

Scenario Generation for Testing of Autonomous driving functions

Keywords: autonomous driving – simulation – testing

Background

As part of the research project CeCaS, a group has come up to build a new System Architecture for future vehicles with a focus on autonomous driving. The development of new autonomous vehicles requires a rethinking of the systems and software engineering to keep up with the growing complexity and the Implementation of the latest technologies such as AI-based functions in automotive engineering. For this purpose, our developed software is first integrated on an HPC system and then tested on real vehicles.

Description

A key challenge in this context lies in the testing of the Hardware- and Software components as well as the integrated system. A mechanical test bench was set up for these tests, which supports the development of new technologies and enables our algorithms to be tested in real vehicles. The testing of autonomous driving functions as well as the communication between the simulation and the real world involves many interesting research questions. These include, but are not limited to:

- Requirements-based scenario generation for testing autonomous driving functions.
- Automated generation of test scenarios
- **Your ideas:** If you have any other ideas for research in this area you are welcome to suggest your own topic.

Your Tasks

- Familiarization with testing algorithms
- Research the problem (study state-of-the-art testing algorithms)
- Development of a novel solution approach for the specific problem
- Evaluation of the solution in our simulation environment
- Support in setting up our test environment

Requirements

- You are currently studying Computer Science, Electrical Engineering, Robotics, Mechanical Engineering (or similar)
- High motivation and ability to work independently on your research topic as well as contributing to our teamwork.
- Interest in autonomous driving and simulation
- Basic understanding of driving simulators such as Carla
- Good knowledge in programming languages: Python, C++
- Experience with Linux

