Lehrstuhl für Fahrzeugtechnik
School of Engineering and Design
Technische Universität München

Interdisciplinary Project

Automatic 3D Scenario Generation for Autonomous Driving

Situation:

The development of autonomous vehicles is advancing rapidly. At the same time, autonomous vehicles are still absent from public roads. One of the reasons is the inability to ensure the safety of autonomous vehicles. The scenario-based approach is a promising method, in which individual traffic situations are typically tested by means of virtual simulation. Simulative testing involves creating virtual simulations of various driving scenarios and running the autonomous driving software through those scenarios to see how it responds. By simulating different scenarios, developers can identify potential hazards and ensure that the system can handle them safely. At present, there is no catalog of numerous scenarios publicly accessible for testing the complete autonomous driving software.
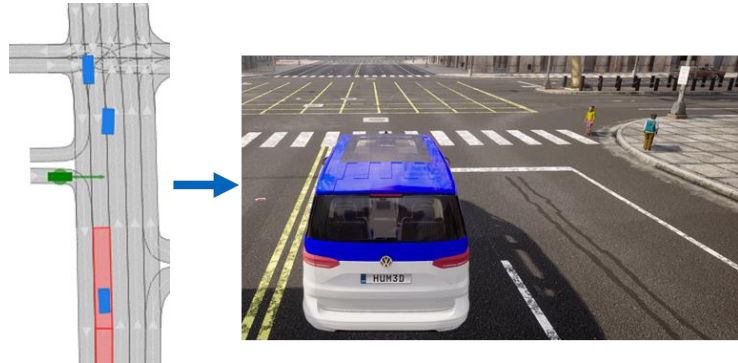
Project:

The objective of this project is to develop and implement a method that automatically generates three-dimensional scenarios from two-dimensional scenarios. The CommonRoad scenario collection is used as a basis for this project. The developed approach should be able to generate the necessary 3D information automatically and add challenging objects, surfaces, and other challenging elements for the vehicle software. Once the scenarios have been generated, they will be tested using the CARLA Simulator. The developed approach should be able to run the created scenarios seamlessly in the simulator, allowing for accurate and efficient testing.

The following work packages comprise the student research project:

- Literature research on automatic test scenario generation
- Familiarization with CommonRoad and the Carla Simulator
- Design of a concept for the automatic 3D Scenario generation and the testing strategy
- Implementation of the concept and integration into Carla
- Validation on Carla

Prerequisites:

- Advanced analytical, programming and debugging skills
- Knowledge in C/C++ or Python
- Ability to thrive in a collaborative environment
- Ideally experience with Carla and CommonRoad

Contact:

Should you be interested in this project or any other project in the context of autonomous driving, send a CV to:

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