

Integrating CommonRoad Lanelets into Real-time 3D Traffic Simulation Platforms

Context

The development of autonomous driving vehicles requires that the autonomous driving function is tested with extensive data. Virtual testing environments and digital twins for operational domain modeling are common methods in the development of autonomous driving vehicles. CogniBIT is a startup which provides cognitive agents based on neuroscientific knowledge, which are used to simulate naturalistic behavior of car drivers, pedestrians and bike riders for testing, validation and modeling of real-world traffic situations. Crucial for such simulations are high-quality map data of roads and the surrounding environment, usually provided in the ASAM OpenDRIVE format.

CommonRoad is a simulation environment for the evaluation of motion planning on roads. Additionally to benchmarks, vehicle models and traffic scenarios, it provides the lanelet format for the representation of high-quality road data. The lanelet format is especially suitable for simulations.

Objective

The use cases employed at cogniBIT differ from the original motion planning use case of the CommonRoad framework. The integration into real-time 3D simulation environments such as Virtual Test Drive, IPG CarMaker and rFpro poses some additional requirements, such as

the movement in three dimensions. The objective is to extend the CommonRoad Scenario designer, a toolbox which offers OpenDRIVE to lanelet conversion, in order to support the additional use cases.

Work Packages

- Extension of the CommonRoad lanelet road format with elevation profiles and z-Coordinates.
- Adaptation of the CommonRoad Scenario Designer GUI.
- Integration of the CommonRoad-converter into the cogniBIT-toolchain.
- Optimization of the lanelet conversion for real-time traffic simulations.

This is an applied project designed for students who want to work at a research-oriented startup at the frontier of the application of neuroscientific research in the industry. If you are interested in this project, please send a short email with your CV, previous projects, etc., to supervisor Dr. Johannes Drever, cogniBIT GmbH Email: johannes.drever@cogniBIT.de

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