Autonomous Racing –

Simulation Environment for Object Detection Training

In the context of the Indy Autonomous Challenge, the software for an autonomous racing vehicle is developed at the Chair of Automotive Technology. The software manages the whole pipeline of autonomous driving: Perception, planning and control safely under racing conditions.

Autonomous vehicles use a wide range of environment perception sensors such as cameras, lidar and radar. The detection of objects is performed with machine learning techniques that require vast amounts of data. To facilitate the learning process, we generate training data from simulation. The simulation environment outputs the ground truth data. In this project, the current simulation in Unity shall be enhanced with further scenarios and the object detection algorithm shall be retrained and tested on the newly generated data.

In the first step of this project, environment and sensor modelling for autonomous vehicle simulation are reviewed. Based on the research, the current simulation suite is expanded by adding additional sensor models. The sensor models and overall integrity of the simulation is verified by the simulation of the full software stack on the simulator.

Work packages

- Literature search about sensor models and environment modelling in Unity
- Expanding of the lidar model or creation of the radar sensor model
- Extension of the simulation for racing scenarios
- Evaluation of the sensor data quality by running the full software stack on recorded data

Requirements

- Ideally experience in C# and Unity or another game engine
- Involved working attitude

Should you be interested in this project or in another project in the context of the Indy Autonomous Challenge, send a short motivation letter, transcript and CV to:

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