



Master Thesis (m/w/d) Simulation and Validation of Autonomous Vehicle Software

Daimler Trucks introduced the first truck 125 years ago and continued to pioneer Advanced Driver Assistance Systems technology in commercial vehicles. In June 2019, Daimler Trucks established an international division to bring autonomous driving technologies to series production. Together with our partners Daimler Trucks North America and Torc Robotics we focus on bringing highly automated trucks onto the roads.

We seek a highly motivated and technically adept Master's student (m/f/d) to contribute to the advancement of our simulation and validation toolchain for autonomous driving as part of a Master's thesis project. Correctly representing different traffic scenarios in simulation is a complex task: a traffic scene can include a different number of diverse actors. Also, a good representation does not just include a fixed point in time but represents the time progression of all relevant actors. For representing the actor progression over time, there are different embedding approaches, e.g. time series auto encoders or transformer-based encodings. For representing a different number of actors and their relationships, graphs are an effective method that is flexible for describing different situations and patterns.

The goal of the master thesis is to combine these 2 aspects: Representing the different actors of a traffic scene as nodes in a graph and modeling their relationships as edges. A graph can be parametrized with node and edge attributes and the created actor embeddings shall be used as node/edge attributes. This results in a graph on which many different graph methods may be applied with the aim to have quantitative descriptions/embeddings for the complete traffic scenario, allowing tasks like traffic scene comparison, outlier/anomaly detection, or clustering based on the graph embeddings.

What you will do

- Research on traffic scene representation using state of the art ML methods
- Cleaning and preparing high-dimensional datasets for machine learning
- Implement and reuse existing code for creating temporal actor representations
- Implement graph methods for traffic representations
- Try out different paths in computational optimization

Benefits

- Opportunity to work on a cutting-edge research project in the field of autonomous vehicles
- Gain hands-on experience with simulation tools and programming languages
- Collaborate with a team of experts in the field
- Flexible working hours and the ability to work remotely

Qualifications

- Pursuing a degree in Computer Science, Electrical Engineering, or a related field
- Strong programming skills, ideally in Python
- Strong attention to detail and problem-solving skills
- Ability to work effectively in a team environment
- Familiarity with autonomous vehicle technology and testing methodologies, including simulation and modeling, is a plus

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