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. A standard situation in software development is that in a test environment or deployment an error may occur, severely interrupting or affecting dependent services. Conducting a manual Root Cause Analysis (RCA) is a standard task that many software engineers face, which often includes (in a complex system) a lot of verbal communication and manual analysis.
In recent years, several frameworks and methods for automatically performing RCA have evolved. Many of these methods use causal graphs fitted to historic data or automatic processing of multiple logs requiring preparation steps before error event roots can be detected rapidly.

The aim of this mater thesis is to first identify RCA methods in literature. After providing an overview of existing methods, at least one method should be chosen that can be used to automatically detect root causes for different kinds of errors in the Torc behavior-in-the-loop simulation toolchain. The necessary data should be prepared, the chosen method implemented/modified and adapted to Torc's data, and the automatic RCA shall be demonstrated on actual error events.

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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