Institute of Automotive Technology
TUM School of Engineering and Design
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IDP

Optimization of a Fault-Injection Framework for Automated Driving Systems

Within this project, an already existing ROS2 Fault Injection Framework shall be optimized to meet usability, modularity, and generalization. Using the software stack of a teleoperation framework, the Fault-Injection Framework can be further developed and improved.

Background

Fault-Injection is a well-known method to test fault tolerance algorithms and mechanisms of different systems. Especially in Cyber-Physical Systems, like autonomous robots and vehicles, the structured injection of faults into the system is advantageous to validate and verifiy the system's robustness and resilience in the presence of faults. Even in the automotive functional safety standard (ISO26262), fault-injection is recommended to use.

In this project, you have the chance to work on an existing ROS2 (Robot Operating System) fault-injection framework. This fault-injection framework should be optimized in terms of its usability, modularity, and generalization. The main tasks will be getting comfortable and understanding the current version, identifying problems and discontinuities, and working on new features to handle those. Using a ROS2 software stack of a teleoperation system for automated driving, you can validate and test your work continuously.

Language

English/German

Your Role

- Onboarding: Get comfortable with the current fault-injection framework and its used mechanisms
- Critical Analysis: Analyse existing problems and impediments in terms of usability, modularity and generalization
- Implementation: propose solutions for the problem(s) and implement suitable solutions (according to literature or community)
- Documentation: Document your code and work continuously

What should you bring along?

- Strong interest & motivation for automated driving and
- Initiative & independent way of working
- Programming skills, e.g. C++

What are your benefits?

- Opportunity to work on a real-world teleoperation stack
- Option to write a master thesis afterwards

If you are interested, please send me a grade sheet with your CV!

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