

# Knowledge Engineering for Failure Knowledge for System-level Testing in the Automotive Domain

Bachelor's Thesis, Master's Thesis

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**Starting date:** Any time



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## Application:

Please apply via email to [claudius.jordan@tum.de](mailto:claudius.jordan@tum.de). Your email should explain your interest in the topic and contain your current transcript of records. The most promising candidates will be invited for an informal interview. Upon mutual agreement, the thesis will be performed in cooperation with TraceTronic GmbH.

## Context

Sophisticated test infrastructure is required to test modern vehicles. However, if a test fails, it is not clear whether the failure is due to the tested vehicle being faulty, or a broken test setup. Practitioners investigate the causes for the failures and, most importantly, they determine whether the test results are trustworthy. In other words, they decide whether a test case failure is *valid*, i.e. a flaw in the system-under-test (SUT) has been discovered, or *invalid*, i.e. the test case fails due to the inherent unreliability of the test bench. This investigation is associated with significant amount of time and, thus, is an important cost factor for validation & verification (V&V) projects.

In the literature various approaches to model-based diagnosis ([1, 2, 3]) can be found. Their problem is of course the requirement of a model. That is where *knowledge engineering* [4, 5] comes into play.

## Goal

In the course of this thesis you will acquire and formalize failure related knowledge in (at least) one running project at our industry partner. Hence, it is advantageous if you have already (practical) experience with knowledge engineering.

## Working Plan

1. Familiarize yourself with knowledge representation and related concepts (e.g. semantic web, ontology, ...)
2. Familiarize yourself with model-base diagnosis
3. Find appropriate tools for working on and with formal knowledge bases
4. Write the exposé incl. a first literature review
5. Setup a knowledge base and formalize the knowledge regarding failures in the context of system-level testing at our industry partner
6. Carve out the open challenges regarding knowledge engineering in the given setting.
7. Write the thesis report

## Deliverables

- Exposé (about 6 weeks after kick-off)
- Source code of the implementation.
- Technical report with comprehensive documentation of the implementation, i.e. design decision, architecture description, API description and usage instructions.
- Final thesis report written in English and in conformance with TUM guidelines
- Presentation of the work at the chair (2-3 weeks after submission)

## References

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