Master Thesis: Tool for fault injection testing in an automotive communication network

Background

Modern automotive vehicles are distributed systems that rely heavily on their communication networks for correct functionally. Many of these systems are safety critical and information on their communication networks are also safety critical. These kinds of systems require extensive verification and validation. Part of this concerns verifying correct behavior even in the case of faults on the communication network. To this end a testing tool that injects fault in an automatic way can be used.

Objective

Design a tool that can be used for automatic fault injection testing in a vehicle network. It shall be possible to use the tool both for CAN and Ethernet buses. It shall be possible to generate test cases for the tool using a semi-formal language, for instance by parsing requirements written in that language. The tool shall be able to generate test reports that makes it possible to trace a test result to a test case requirement. It shall be possible to integrate the tool in an existing test framework.

Scope and method

- Literature study of typical faults on CAN and Ethernet buses.
- Literature study of fault injection methods.
- Literature study of existing tools for fault injection.
- Proposal of HW to use for fault injection.
- Design and implementation of SW to use for fault injection, including test case generation, test report generation and integration in test framework.

Project can be adapted to 1-2 master students. Students should have a background in computer science, electrical engineering or similar.

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