

Learning From Mistakes in Testing Automotive Software

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Abstract text In the context of the AUTO-CAAS project [1] that deals with model-based testing techniques applied in the automotive domain, we present the preliminary results of building generalised failure models for non-conformant software components. A failure model is a description of the behaviour of the system that takes into account erroneous behaviour and describes several (possibly all) execution traces leading to a component failure state. This is opposed to the common scenario where only a small selection of failing execution traces is known resulting from classical unit testing. These failure models are a building block for our efforts to detect and analyse failure causes in automotive software built with AUTOSAR components [2].

Concretely, we discuss how to build the failure models using automata learning techniques [3, 4] applied to a guided model-based testing procedure of a failing component. The knowledge about the failure model is built based on the collection of failed execution traces, which are provided by the underlying model-based testing framework, in our case QuickCheck developed by QuviQ AB, one of our project partners. We illustrate our findings and experiments on a simple queue data-structure implemented in the C programming language. In the next step we apply our method to the more realistic examples based on the open source implementation of AUTOSAR components provided by our second project partner ArcCore AB.