Praxis der Forschung

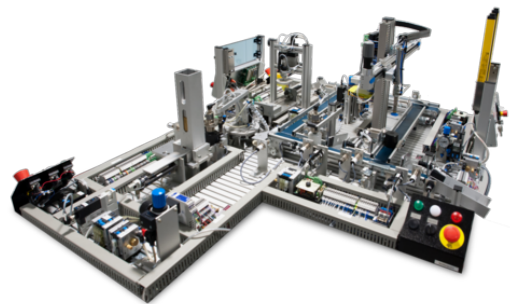# Specification Mining of Contract Automata

Background. Embedded systems are ubiquitous. For example, they appear as *Programmable Logic Controllers* (PLCs) controlling automated production systems, medical devices, or as controllers (motor, breaks, assisted driving, . . .) in cars. These systems are specially tailored to control system which operate in a mission- and safety-critical real-time environments. A malfunction may cause severe damage to the system itself or to the payload, or even harm persons within the reach of the system. They are worthy goal for formal verification.

Generalised Test Tables are a table-based specification developed at the chair of Prof. Beckert. They arise from the concrete test table and preserve their comprehensibility although extended expressiveness. They are powered by Contract Automata. A Contract Automaton is a finite automaton describing the possible contracts (pre- and post-condition) at every step of the reactive system.

Writing specification is still a labor-intensive and complex task. Something, which we want try to automatize by building an approach for learning for mining (or learning) a Contract Automaton from observed traces of a system. This research joins the field of specification mining together with the field of automata learning.

Goal & Task. In this work, we want to develop a method for mining specification in form of Contract Automata from observed traces. The first idea to established such approach is the extension of automata learning (L* algorithm, Library AALpy, . . .) together with pattern-based formula testing.

Your Profile. Programming skills are required. Furthermore, you should be interested in Model Checking, Temporal Logics and Automata Theory. You should have completed the Formal Methods (Formale Systeme) Course at KIT or equivalent.

Kontakt

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