Elicitation of a Mode Model for AUTOSAR

Context
(Automotive) Software Engineering

Background
AUTOSAR (AUTomotive Open System ARchitecture) is a partnership between Automotive OEMs and suppliers with the goal to facilitate the exchange and collective development of software. To do so, AUTOSAR, for example, defines standardized interfaces (signals) for software of different application domains within a vehicle (e.g., driver safety functions, chassis, or powertrain)[1]. From recent work conducted at our chair [2] we know that, besides the description of input and output signals, also the description of operational system states plays an important role. We call these operational system states “modes”. A standardized list of modes does not yet exist for AUTOSAR.

Task
The goal of this thesis is to extract a model of modes of a vehicle based on the standardized AUTOSAR reference architecture(s). The model shall be represented by a state machine (Statechart) that structures all vehicle modes and transitions between them. Such a model is a first step towards a standardized description of operational states within a vehicle.

Approach
To fulfil the task, we propose the following steps:
1. Familiarize with the AUTOSAR reference architecture(s) and recent work of our chair w.r.t. mode models.
2. Develop an approach for extraction of vehicle modes from the AUTOSAR reference architecture(s)
3. Apply the approach to the reference architectures of all AUTOSAR application domains.
4. Structure and represent all vehicle modes by a hierarchical state machine.
5. Evaluate the resulting mode model w.r.t. completeness, consistency, and usefulness.

Prerequisites
- All formal prerequisites for a final thesis.
- The thesis must be written in German or English.

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