TITLE: Checking the Completeness of Scenario Libraries

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ABSTRACT:

For highly complex systems like partially autonomous vehicles, trains, and aircrafts, conventional model-based testing is usually infeasible, since it would take too much effort to produce one comprehensive reference model reflecting all expected behaviours of the system under test. Scenario-based testing mitigates this problem by using a library of many less complex models or logical specifications, each library element describing the environmental conditions and the associated expected behaviour in a specific (usually parameterised) operational situation. The downside of the scenario-based approach is that for certification purposes, the completeness of the scenario library has to be verified, in addition to the usual test strength justification that is also required for "conventional" model-based of specification-based testing. In this presentation, we describe promising approaches to the verification of scenario completeness, such that the risk of unidentified scenarios can be statistically quantified. As an interesting additional insight, we explain the similarities between the verification of scenario completeness and the justification of training and verification data set completeness required for the certification of neural networks trained for safety-critical functions like obstacle detection.