

Scenario-based validation of automated driving systems

Hardi Hungar, DLR, Institute of Transportation Systems

hardi.hungar@dlr.de

Abstract

To assess the safety of automated driving systems (ADS), all potentially critical situations have to be considered. One way to do so is to test the function performance in *scenarios* which lead to these situations. A scenario is a description of an evolution of traffic situations. It provides snapshots capturing important intermediate states and descriptions specifying what happens between these states. Semantically, a scenario can be mapped to a set of time series: All concrete instantiations of the dynamic behavior which is specified in the scenario. In this contribution, abstract scenarios are used for test specifications, while their concrete instantiations define test cases.

The number of relevant concrete scenarios is very large, even if a particular ADS is supposed to operate in a restricted traffic environment. Therefore, testing must rely heavily on a virtual, largely automatized exploration of scenario spaces. For that, the abstract scenarios have to be given in language with a formal notation, to enable the dynamic generation of concrete test cases covering the behavior space.

The presentation will delineate a general approach to safety assessment of ADS by virtual testing. It discusses in particular the nature and building blocks of a formal scenario language and the construction of test specifications. This approach is based on developments of the ongoing research project PEGASUS, where such a method is being defined and instantiated.

(end of file)