TU Clausthal

Abschlussvortrag Masterarbeit Shaoqing Guo

„A machine learning-based framework for effectively analyzing execution results of the back-to-back test method during real-time validation of automotive software systems“

The functional safety standard ISO 26262 strongly recommends the implementation of back-to-back testing (B2B) as a method of ensuring the safety of automotive systems. However, the traditional approach to analyzing the results of B2B tests based on variable thresholds is not effective. Moreover, the application of this method is constrained to non-real-time simulation, failing to account for the full range of environmental variations. In this study a novel machine learning-based framework for intelligent analysis of B2B test results considering the system behavior in the target machine is proposed. The approach offers a sophisticated and enhanced analysis of B2B test outcomes, thus facilitating adherence to ISO 26262 test requirements. The objective of the proposed framework is to utilize machine learning techniques for the automatic detection and clustering of faults, considering real-time behavior. For this purpose, B2B tests are carried out at two different levels, i.e., simulation level using a Simulink tool and real-time simulation level using a hardware-in-the-loop system (HIL). To illustrate the feasibility of the proposed framework, a high-fidelity vehicle system with a gasoline engine model is employed as a case study.

Betreuer der Arbeit:	Prof. Dr. Andreas Rausch, apl. Prof. Dr. Christoph Knieke
Datum:	Montag, 31. März 2025, 18:30 Uhr
Ort:	Online-Meeting über BBB
	Link: https://webconf.tu-clausthal.de/rooms/sim-uc9-rvy/join