TU Clausthal

Abschlussvortrag Research Track Ayman Amyan

„Automating Fault Test Cases Generation and Execution for Automotive Safety Validation via NLP and HIL Simulation“

The complexity and the criticality of automotive electronic implanted systems are steadily advancing and that is especially the case for automotive software development. ISO 26262 describes requirements for the development process to confirm the safety of such complex systems. Among these requirements, fault injection is a reliable technique to assess the effectiveness of safety mechanisms and verify the correct implementation of the safety requirements. However, the method of injecting the fault in the system under test in many cases is still manual and depends on an expert, requiring a high level of knowledge of the system. In complex systems, it consumes time, is difficult to execute, and takes effort, because the testers limit the fault injection experiments and inject the minimum number of possible test cases. Fault injection enables testers to identify and address potential issues with a system under test before they become actual problems. In the automotive industry, failures can have serious hazards. In these systems, it is essential to ensure that the system can operate safely even in the presence of faults. We propose an approach using natural language processing (NLP) technologies to automatically derive the fault test cases from the functional safety requirements (FSRs) and execute them automatically by hardware-in-the-loop (HIL) in real time according to the black-box concept and the ISO 26262 standard. The approach demonstrates effectiveness in automatically identifying fault injection locations and conditions, simplifying the testing process, and providing a scalable solution for various safety-critical systems.

Betreuer der Arbeit:	Prof. Dr. Andreas Rausch, PD Dr. Christoph Knieke
Datum:	Mittwoch, 29. Mai 2024, 8:30 Uhr
Ort:	Online-Meeting über BBB
	Link: https://webconf.tu-clausthal.de/rooms/sim-uc9-rvy/join