TU Clausthal

Abschlussvortrag Masterarbeit Muhammad Sami Khan

„Detection and Identification of Simultaneous Known and Unknown Faults in
the Automotive Software Systems Based on HIL Simulation Tests and Deep
Learning Techniques"

At the system integration test level of automotive software systems, the test results of the hardware-in-the-loop simulation are traditionally inspected manually by a system expert to detect deviations in system behavior. However, as the complexity of the target system increases and the huge amount of data is recorded, the traditional approach is becoming impractical. Therefore, the development of advanced algorithms is required to analyze the HIL test recordings in an efficient fashion, thereby saving time, effort and cost.

ML-based fault detection and diagnosis outperforms other approaches in terms of accuracy, development speed and effort. However, most of the current methods rely on the quality and labeled data set as predefined known fault classes. Consequently, the developed models are not able to identify new classes beyond the trained labels. Moreover, in case of simultaneous occurrence of faults, it is impossible to generate a large number of combination classes to cover all fault types.

To overcome this challenge, an ensemble DL classifier is proposed in this study to detect and classify single and concurrent faults using single fault features. Moreover, an unsupervised DL technique is used so that unknown new faults can be detected. As a case study, a virtual test drive with a dynamic vehicle system model is used to validate the proposed work.

Betreuer der Arbeit:	PD Dr. Christoph Knieke, Prof. Dr. Andreas Rausch
Datum:	Dienstag, 10. September 2024, 8:30 Uhr
Ort:	Online-Meeting über BBB
	Link: https://webconf.tu-clausthal.de/rooms/sim-uc9-rvy/join