

Forschungspraxis, Assistant (Student)

Integration of PRRT in NCSbench

Networked Control Systems, i. e. the interconnection of a control system over a communication network, are a fundamental building block of future industrial automation systems. To study NCS, the NCSbench platform [1,2] was developed allowing performance measurements of a real NCS. The platform is built using Lego, is developed in python, communicates over standard IP network interfaces and is fully open-source.

The analysis of NCSbench with wireless communication highlighted the problem of packet loss and delays on the NCS. In this project, the novel PRRT transport protocol [3,4] will be deployed on NCSbench to improve the communication performances with wireless communication.

[1] <https://github.com/tum-lkn/NCSbench/wiki>

[2] S. Zoppi, O. Ayan, F. Molinari; Z. Music, S. Gallenmüller, G. Carle, W. Kellerer, NCSbench: Reproducible Benchmarking Platform for Networked Control Systems. IEEE Consumer Communications & Networking Conference, 2020

[3] <https://www.nt.uni-saarland.de/project/latency-and-resilience-aware-networking-larn/>

[4] Schmidt, A., Reif, S., Gil Pereira, P., Hönig, T., Herfet, T., & Schröder-Preikschat, W. (2019). Cross-layer pacing for predictably low latency. Proc. 6th Intl. Worksh. on Ultra-Low Latency in Wireless Networks (Infocom ULLWN). IEEE, 184.

Prerequisites

This work will consist of a significant amount of programming for embedded devices, and for a large part also of processing the measurement data.

Requirements:

- Strong C and Python programming skills.
- Good knowledge of wireless systems and protocols (WLAN).
- Basic knowledge of LTI control systems.
- Experience with python data processing tools is beneficial.
- Experience with Linux systems is recommended.

Advisors

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