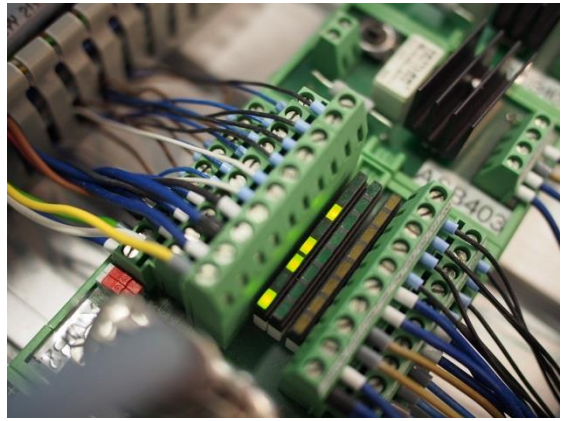
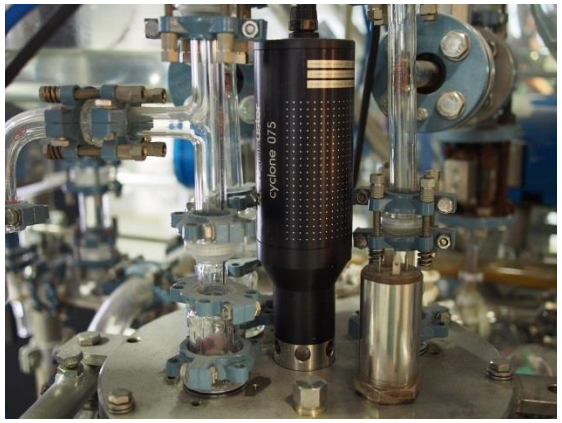


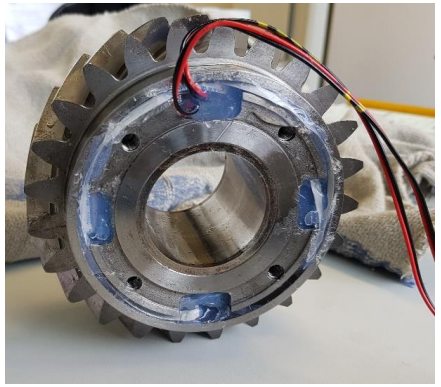


Variant-management of IIoT Hardware for Sensor-integrating Gears and Its Integration with a Modular Building Kit (BA/SA/MA)

Lehrstuhl für Automatisierung und Informationssysteme
Technische Universität München
Prof. Dr.-Ing. Birgit Vogel-Heuser

Motivation:

The integration of sensors into gears enables condition monitoring and digital twins in industrial applications. On the one hand, the hardware and firmware require changes as features and requirements evolve. On the other hand, multiple variants are often needed to suit different gear dimensions and operating conditions. This growing complexity demands a structured approach to variant-management of IIoT-enabled systems.



Goal & Methodology:

A variant-management strategy will be developed that supports both the evolution of IIoT hardware/software over time and the coexistence of parallel variants. The focus lies on modeling variant relationships across hardware generations, firmware revisions, and mechanical constraints, ensuring version compatibility and systematic reuse. Finally, the integration of the developed approach for gears into an existing modular building kit for sensor-integrating machine elements is evaluated.

Requirements:

- Knowledge in embedded systems, firmware/software development, or configuration management
- Familiarity with variant modeling techniques and systems engineering or modeling languages (e.g. UML)
- Strong analytical skills, structured thinking, and the ability to work independently

In case of interest, please send your CV and current grade transcripts to the contact below.

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