ITI

Graz University of Technology
Institute of Technical Informatics
Cognitive Products

Pro²Future

TU Graz

Exploring the Learning Factory for Automation and Process Optimizations (Bachelor/Master)

The rapid advancement of Industry 4.0 technologies necessitates continuous adaptation and innovation within manufacturing processes. Testing and implementing new technologies and approaches in real industrial environments can be challenging due to the complexities of production sites and unwillingness of the owners to play with their infrastructure. To address this, learning factories – scaled realistic manufacturing environment - provide controlled environments for experimentation and validation. They serve as valuable platforms for testing and refin-

The Learning Factory @ ITI

ing novel solutions before their deployment in actual production lines. In this thesis, students will first analyze the "old" existing learning factory then start with retrofitting it with modern systems (including sensors and actuators) and in the end introduce new services for an existing factory layout to optimize manufacturing process and its configuration.
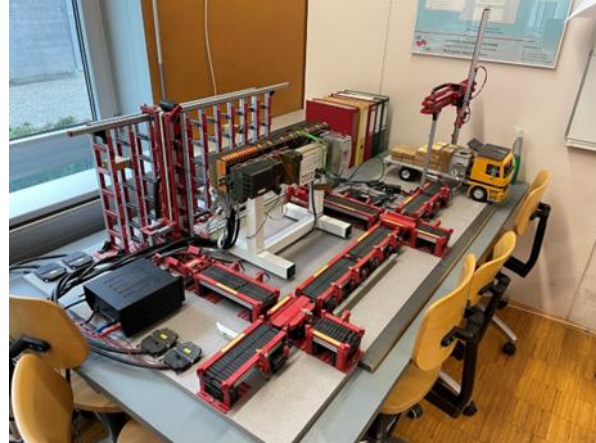
Goal and Tasks:

- Getting familiar with the Learning Factory and its capabilities - Analyzing the performance of existing sensors, actuators, and control algorithms.
- Retrofitting: Replacing outdated sensors and algorithms with state-of-the-art systems.
- Adding additional sensors and actuators to simulate advanced automation and optimization techniques.
- Improving data collection, analysis, and control mechanisms.
- Exploring the integration of emerging technologies such as edge computing, machine learning, and predictive maintenance.
- Exploring possibilities for implementing safety concepts for the Learning Factory.

Recommended Prior Knowledge:

- Experience or a high interest in learning concepts of Industry 4.0, Industrial Automation and Cyber Physical Systems.
- Experience or a high interest in working with automation technology, particularly PLCs, sensors, and actuators.
- Interest in working with simulation models of smart factories.

Start: a.s.a.p.

Duration: 6-12 months

Contact: Amer Kajmakovic (amer.kajmakovic@pro2future.at)