Software for Advanced 3D printing - internship

April 13, 2022

General conditions

100%, Zurich, fixed-term internship. The Automatic Control Laboratory at ETH Zurich offers this paid internship based in Zurich, Switzerland, within NCCR Automation. The duration of the internship is 3-6 months.

Project background

Additive manufacturing, or 3D printing, produced three-dimensional parts in a layer-by-layer fashion via material deposition, melting, or other processes. Due to its flexibility, AM methods have been increasingly utilized in research and in the industry over the past decades. While the adoption of AM in the industry increases, key challenges in-process monitoring, data analytics, optimization, and closed-loop control limit the reliability and repeatability of AM processes. Therefore, research on understanding process physics, optimality of process parameters, data analytics, and closed-loop control plays a key role in achieving high-performance AM processes.

The research activities within these projects will bring forward the integration of advanced control methods, data analytics, and modeling, in combination with machine learning. Within this broad concept, we utilize tools from data-driven, predictive, and learning-based control, statistical learning methods, and robust control. We work towards creating a data-informed control and automation framework that is able to simulate controlled AM processes with high fidelity and can implement run-time controllers on high-end industrial systems.

Job description

We offer a 3-6-month internship for building simulation, demonstration, and control platforms for closed-loop control of AM processes, which will be tested on industrial equipment.

The main activities during the internship will be:

• Development of a modular control and simulation software framework integrating control-oriented modeling, state estimation, data handling, and optimization.

• Development of sensing and data fusion methods for high dimensional AM process data, combining image data, time-series data, and spatial information.

• Testing and refinement of the developed methods on demonstration platforms and industrial equipment.
Your profile

Suitable candidates need a BSc or graduate degree in engineering (ideally mechanical engineering/robotics) or a related field from a recognized university. Strong background in programming (Python, C++, Matlab), exposure to ROS, and an understanding of estimation, and control methods are essential for the successful completion of the internship. Previous experience in additive manufacturing, simulation model development, and spatiotemporal data analysis is a plus.

Application

Interested? We look forward to receiving your application including a CV, 2 reference letters/contacts, a short statement of objectives, and transcripts of all degrees in English. Contact for applications: Dr. Alisa Rupenyan, e-mail: ralisa@control.ee.ethz.ch.