Institut für Mechatronische Systeme
Leibniz Universität Hannover
imes

Representation of Industrial Devices with Gaussian Processes

Task and background:

Model-based algorithms for estimation and control in mechatronic systems have proven their performance and are readily available. However, they depend crucially on accurate system models, whose derivation is a laborious and requires expert knowledge.

Recently, data-based system representations with Gaussian Processes (GP) have gained a lot of interest in research. Therefore, the dynamic and energetic behavior of industrial devices of the model assembly line (MPS, see picture) should be learned by means of GP in the study thesis.
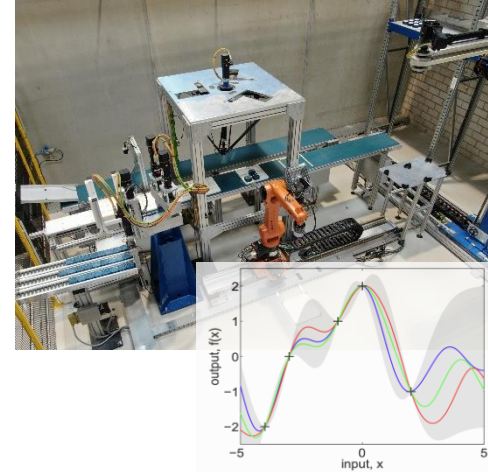
Work plan:

- Literature research regarding GP-types, its computational complexity and implementation.
- Implementation of at least two GP-types for representation of an industrial device in MPS.
- Learning of GP representations with real-world data from MPS.
- Comparison of GP representations with (available) system model.

Prerequisites:

- Highly motivated and interested in machine learning and practical experiments.
- Independent way of working, high level of initiative.
- Good written and spoken German or English skills.
- Advanced knowledge in Python.

Contact person:

Jan-Hendrik Ewering
Room 8142.001.A101
jan-hendrik.ewering
@imes.uni-hannover.de
+49 511-762-4036

Date:

Start possible from May/June 2023

*Image Source: Gaussian Processes for Machine Learning, C. E. Rasmussen & C. K. I. Williams