Modeling and Optimization of Uncertainty in Manufacturing Systems (BA/MA/SA)

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

Task Description:

Process quality is a key performance indicator for modern manufacturing systems. However, due to the high complexity of the system, the causes that hinder such quality are often diverse and difficult to determine, such as episodic events, subsystem failures, response delays, etc. The sources and classification of inherent uncertainties in systems components, as well as the handling of such intra-system uncertainties, are currently hot research topics.

There are a variety of existing methods with different limitations of use. In this task methods that are generic to modern manufacturing systems need to be selected and their applicability should be verified using a demonstrator. For this purpose, it is necessary to identify the sources of uncertainty in the demonstrator system and collect operational data first. After the uncertainty modeling is completed, optimization directions need to be provided, using the selected methods.

Preliminaries:

- Understanding of manufacturing system structure and manufacturing processes
- Basic knowledge in probability and statistics is an advantage
- Programming knowledge in Python or Matlab, ideally with experience in data analysis
- Independent, conscientious working style and high willingness to learn

Mingxi Zhang M. Sc.

Tel.: +49 (0) 89 / 289 164 38
E-Mail: mingxi.zhang@tum.de