

At the Chair of Logistics and Supply Chain Management of TUM School of Management, we are looking for an interested and qualified student to conduct his/her

Master thesis

on the topic

Buffer level and bottleneck prediction in flow lines

Flow lines are production systems consisting of machines and buffers that hold a finite number of parts (i.e., buffer level). Machines face random failures and need repairs from time to time, which adds uncertainty to the flow line. To improve the efficiency and robustness of the production processes, it is necessary to predict the buffer levels and detect the bottleneck ahead of time. This study will evaluate the use of state-of-the-art Machine Learning algorithms (e.g., XGBoost, LSTM) for buffer level prediction. Based on the prediction result, a mathematical model will be built for bottleneck analysis.

Key project tasks:

- Literature review on Machine Learning prediction models and bottleneck analysis.
- Implementation of ML-based algorithms to predict buffer level.
- Mathematical formulation for bottleneck analysis.
- Evaluation and comparison of different prediction algorithms.

Requirements:

The thesis is suitable for Master in Management and Technology students with a major in operations and supply chain management. The ability to work independently as well as analytical skills are required. Knowledge of Machine Learning and optimization is required. Experience with Machine Learning libraries (e.g., PyTorch, Tensorflow) is highly recommended. Knowledge of a general-purpose programming language (e.g., Python, C++) is required. The thesis should be written in English.

Earliest begin: as soon as possible

Supervisor: Yihua Wang

Application: Email with curriculum vitae and transcript of records to logtheses.log@mgt.tum.de