

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

Integrated learning and optimization for inventory decision support

The newsvendor problem is a classic inventory control problem with stochastic demand. Traditional methods derive the optimal order quantity based on the assumption of a known demand probability distribution. However, the approach is not applicable in reality. An alternative is an integrated learning and optimization approach, wherein order quantities are determined directly from historical demand data and exogenous feature data that may influence the demand. This approach offers the advantage of not relying on assumptions about demand distribution, instead adapting decisions based on the stochastic environment. To achieve this goal, this study will use integrated machine learning and mathematical optimization to solve the inventory control problem. A practical data set will be provided.

Key project tasks:

- Literature review on relevant fields of study.
- Mathematical modeling addressing the research question.
- Implementing the integrated learning and optimization method by the Gurobi ML solver.
- Analysis of results and implications.

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. Experience with commercial solvers (e.g., Gurobi) 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