



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

Exploring LLM Decision-Making in Inventory Settings

This thesis investigates whether large language models (LLMs) exhibit systematic behavior when making inventory decisions under uncertainty. Using a controlled experimental setup, it analyzes how LLM choices evolve across prompts, contexts, and parameter settings, and compares outcomes across different models to assess robustness. The study also evaluates targeted interventions to see if decision quality can be improved without extensive fine-tuning. By clarifying when LLM outputs are consistent and when they deviate, the work contributes to a more nuanced understanding of reliability in LLM-supported decision-making for operations management. It offers practical guidance on deploying LLMs as decision aids by highlighting conditions that support stable performance and flagging scenarios where additional safe-guards are warranted.

Key project tasks

- Conduct a literature review on the newsvendor problem as well as recent advances LLM decision-making.
- Set up an experiment with LLMs ensuring strict comparability.
- Evaluate the decision quality of multiple LLM models in inventory settings.
- Perform a benchmark analysis across LLM models and against a baseline.
- Develop debiasing prompts based on first findings and test them for their effectiveness.
- Interpret results and derive operational guidance on LLM decision support.

Requirements

This thesis is suitable for Master students in Management and Technology with a focus on operations and supply chain management. The ability to work independently, as well as strong analytical skills (e.g., Python, R) are required. Knowledge or strong interest in inventory management and AI/LLM are advantageous but not mandatory.

Earliest begin: As soon as possible

Supervisor: Ben Mischeck

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