

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

Project Study

on the topic

Scaling Gen-AI for Supply Chain Optimization: From Toy Problems to Real-World Applications

The use of Generative AI (Gen-AI) tools, particularly large language models (LLMs), has shown promising capabilities in solving basic optimization tasks. However, their effectiveness and scalability in real-world supply chain optimization problems remain largely unexplored. While LLMs can often solve or assist with small, toy-like problems, their performance in larger and more complex contexts—such as multi-echelon inventory management, facility location, or transportation planning—needs systematic evaluation.

This study aims to critically assess the scalability of Gen-AI in optimization-based supply chain scenarios. The project will benchmark LLM-based solutions against classical optimization solvers, examining solution quality, interpretability, computational efficiency, and practical limits. Insights from this study will inform both the academic community and practitioners about the potential and limitations of deploying Gen-AI tools in supply chain decision-making.

Key project tasks:

- Conduct a comprehensive literature review on Gen-AI applications in optimization and existing benchmarks of LLM performance.
- Define a set of representative supply chain optimization problems (e.g., transportation, production planning, facility location) with varying complexity and size.
- Implement experiments using Gen-AI agents (e.g., ChatGPT, Claude, Gemini) and benchmark results against standard OR solvers (e.g., Gurobi, CPLEX, CBC).
- Evaluate performance in terms of solution quality, runtime, scalability, and explainability across problem scales.
- Summarize findings and derive implications for the future adoption of Gen-AI in supply chain optimization practice.

Requirements:

This project study is open to students at TUM School of Management with a focus on Operations and Supply Chain Management, Management & Technology, or related fields. Basic knowledge of operations research and optimization methods and proficiency in one general-purpose programming language (e.g., Python) are required. Familiarity with optimization solvers (e.g., Gurobi, PuLP, OR-Tools) and interest in AI/ML methods is highly recommended.

Earliest begin: As soon as possible

Supervisor: Yuxuan Zhu

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