



At the Chair of Logistics and Supply Chain Management of TUM School of Management, we are looking for interested and qualified students to conduct their

Project study

on the topic

Map-Based Vehicle Routing: Human Performance vs. Optimum

The Capacitated Vehicle Routing Problem (CVRP) concerns planning delivery tours from a central depot to many customers under vehicle capacity constraints Toth and Vigo (2014) Exact methods can find provably optimal solutions for small/medium instances, while human planners often rely on heuristics that trade optimality for speed or simplicity.

Building on Fontaine et al. (2020), who studied human routing behavior in a controlled setting, this project aims to investigate how people solve VRP-like tasks in a *survey-based*, remote environment using realistic, map-based scenarios (one depot, multiple customers, road-network distances). Participants complete an online survey with interactive vignettes (or high-fidelity screenshots) to construct or choose routes under varying conditions. Their solutions are compared to exact and heuristic benchmarks computed on the same instances.

Key project tasks

- Literature review on relevant fields of study
- Design an online survey instrument
- Implement a benchmark pipeline to generate instances from real road networks and compute exact/heuristic solutions for comparison
- Run the survey study remotely; collect demographics and experience covariates
- Analyze human performance (optimality gaps, feasibility) and compare to exact/heuristic baselines

Requirements

This project study is open to students at TUM School of Management with a focus on Operations and Supply Chain Management. Knowledge of one general-purpose programming language (e.g., Python, Julia) is required. Knowledge of mathematical programming and optimization is preferred.

Earliest begin: November 2025

Supervisor: Nicolas Kuttruff

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

References

- Fontaine, P., Taube, F., Minner, S., 2020. Human solution strategies for the vehicle routing problem: Experimental findings and a choice-based theory. *Computers & Operations Research* 120, 104962.
- Toth, P., Vigo, D., 2014. *Vehicle routing: problems, methods, and applications*. SIAM.