Karlsruher Institut für Technologie

INSTITUTE FOR OPERATIONS RESEARCH

VORträge zum Operations Research

Kolloquium des Instituts für Operations Research

Zeit:	Donnerstag, 04. Mai 2023, 16:00 – 18:00 Uhr
Ort:	**FZI Forschungszentrum Informatik** Haid-und-Neu-Straße 10-14, 76131 Karlsruhe Raum New York (1.0.36)
Es spricht:	Univ.-Prof. Dr. Jan Fabian Ehmke
Zum Thema:	Predicting Pareto Fronts for Smart Sampling of Multimodal Itineraries

In recent years, the importance of decision support for the planning of multimodal itineraries has increased. Integrated mobility platforms such as GoogleMaps, omio, and Rome2rio promise travelers to create door-to-door itineraries considering their individual preferences based on the comprehensive breadth and quantity of mobility services. While finding optimal paths has been investigated thoroughly in the context of Multi-Criteria Decision Making, finding the full Pareto-optimal set of itineraries with multiple traveler preferences in a multimodal setting remains a significant challenge. To achieve a scalable algorithm, approximating the Pareto-optimal set of itineraries has been proposed by several authors.
In this work, we follow this idea and present a smart sampling framework that takes advantage of relationships between traveler preferences. The core idea is to learn and predict the characteristics of multidimensional Pareto fronts from historical search data collected by integrated mobility platforms. To this end, we propose and compare different approaches to predicting relationships between traveler preferences for a new traveler request. The predicted relationships are integrated into the sampling framework to enhance the approximation of Pareto-optimal itineraries by focusing on more relevant areas of the multimodal search space. In particular, the Pareto front prediction is then embedded into a multimodal network search algorithm. The integration of predicted relationships into the sampling framework is evaluated in a proof-of-concept study using a large amount of real-world data of multiple mobility services for long-distance trips between major cities in Germany, taking up to five preferences into account.

Die Vorträge zum Operations Research wenden sich an alle Interessierten!

Bei Rückfragen wenden Sie sich bitte an:
Prof. Dr. Stefan Nickel, Institut für Operations Research