

VORträge zum Operations Research

Kolloquium des Instituts für Operations Research

Zeit: Donnerstag, 22. Juni 2017, 17:30 Uhr

Ort: Raum 320, Gebäude 09.21

Es spricht: Prof. Dr. Cornelia Schön, Universität Mannheim

Zum Thema: **Competitive Service Network Design when Demand is Sensitive to Congestion**

Abstract: In this paper, we present a market-oriented service network design model in which the seller's problem is to determine the number of facilities, their locations, their service capacities, and their service levels such that overall profit is maximized. Our model explicitly considers the customers' facility choice as a function of typical choice determinants, such as travel distance and congestion delays (which are endogenously impacted by the seller's decisions) as well as other, exogenous factors such as price level and product variety. We relax the assumption adopted in many related works that the service provider has discretion regarding the assignment of customers to facilities; instead, we allow customers to self-select based on their preferences for facility attributes according to an attraction-based choice model. Furthermore, we capture not only the effect of congestion on demand but also the reciprocal impacts of demand on both congestion and service level by modeling each facility as an $M/G/1$ queue with service capacity as a decision variable.

The resulting model represents a non-linear mixed-integer problem; however, we show that this problem can be linearized introducing several new continuous variables and constraints. For solving the linearized MIP to proven optimality or approximately, an exact decomposition approach and heuristics were developed. We report the performance testing of our approach with regard to run times and solution quality in an extensive computational experiment. A case study of the selection of locations for new convenience stores in Heidelberg, Germany, illustrates the real-world applicability of the model using empirical market research data. An equivalent problem arises in a number of other applications, particularly in service shop industries such as restaurants and retailers, but surprisingly, profit maximization under customer-choice-driven behavior has rarely been considered as an objective in the related literature.

This research is joint work with Pratibha Saini.

Die Vorträge zum Operations Research wenden sich an alle Interessierten!

Ab 17:00 Uhr ist am Institut für Operations Research (Gebäude 09.21, Raum 119) Gelegenheit zu einem Gespräch mit der Referentin bei einer Tasse Kaffee gegeben.

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