

The Hong Kong University of Science and Technology
Dept of Information Systems, Business Statistics
and Operations Management
Frontiers in Operations Management Workshop



**Joint Assortment Optimization and Customization
under a Mixture of Multinomial Logit models:
On the Value of Personalized Assortments**
by
Professor Huseyin Topaloglu
School of Operations Research and Information Engineering
Cornell University

Date : 2 December 2021 (Thursday)
Time : 10:00 am - 12:00 noon
Zoom ID : 974 8479 7912 (passcode 196610)



Abstract: We consider a joint assortment optimization and customization problem under a mixture of multinomial logit models. In this problem, a firm faces customers of different types, each making a choice within an offered assortment according to the multinomial logit model with different parameters. The problem takes place in two stages. In the first stage, the firm picks an assortment of products to carry subject to a cardinality constraint. In the second stage, a customer of a certain type arrives into the system. Observing the type of the customer, the firm customizes the assortment that it carries by, possibly, dropping products from the assortment. The goal of the firm is to find an assortment to carry and a customized assortment for each customer type that can arrive in the second stage to maximize the expected revenue from a customer visit. The problem arises, for example, in online platforms, where retailers commit to a selection of products before the start of the selling season, but they can potentially customize the displayed assortments for each customer. We give an approximation algorithm that obtains $1/\log m$ fraction of the optimal expected revenue, where m is the number of customer types. Contrasting this problem with the variant where customization is not possible, it is NP-hard to approximate the latter variant within a factor better than $1/m$. Thus, from computational complexity perspective, the variant with customization is fundamentally different.

Bio: Huseyin Topaloglu is a Professor in the School of Operations Research and Information Engineering at Cornell University. He holds a B.Sc. in Industrial Engineering from Bogazici University in Turkey, and a Ph.D. in Operations Research and Financial Engineering from Princeton University. His recent research focuses on constructing tractable solution methods for large-scale network revenue management problems and building approximation strategies for retail assortment planning. Huseyin Topaloglu is currently serving as an area editor for Analytics in Operations area at *Manufacturing and Service Operations Management*.

All interested are welcome!
Enquiries: Dept of ISOM