

# Online Learning for Constrained Assortment Optimization under Markov Chain Choice Model

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**Talk will take place from 1:00PM - 2:00PM through Zoom.**

**Abstract:** We study a dynamic assortment selection problem where arriving customers make purchase decisions among offered products from a universe of  $N$  products under a Markov-chain-based choice (MCBC) model. The retailer observes only the assortment and the customer's single choice per period. Given limited display capacity, resource constraints, and no a priori knowledge of problem parameters, the retailer's objective is to sequentially learn the choice model and optimize cumulative revenues over a selling horizon of length  $T$ . We develop an explore-then-exploit learning algorithm that balances the trade-off between exploration and exploitation. The algorithm can simultaneously estimate the arrival and transition probabilities in the MCBC model by solving linear equations and determining the near-optimal assortment based on these estimates. Furthermore, compared to existing heuristic estimation methods that suffer from inconsistency and a large computational burden, our consistent estimators enjoy superior computational times.