Dynamic Assortment Optimization

Abstract

In this talk, we consider dynamic assortment optimization problems, where a firm has limited inventories for a number of products and the customers choose among the offered products according to a certain choice model. The goal of the firm is to find a policy to decide which set of products to offer to its customers over time to maximize its total expected revenue. One approach for tackling such a problem is based on solving a fluid approximation to estimate the value of a unit of inventory for each product, called the bid-price. In this case, one decides which set of products to offer by solving a myopic problem that maximizes the expected revenue extracted from each customer after adjusting the revenue from each product by its bid-price. We give a performance guarantee for a policy of this form. In particular, we show that a policy of this form is guaranteed to obtain at least half of the optimal total expected revenue. Furthermore, we demonstrate that we can use the standard rollout idea on this policy to further improve its performance.