

Title: *Revenue Management in Face of Choice Heterogeneity*

Abstract:

Modern-day applications in e-commerce and brick-and-mortar retailing involve complex customer choice behaviors. Modeling this choice heterogeneity strikes a delicate balance between explaining large-scale data and prescribing efficient operational policies. At the strategic level, for the assortment selection problem, we propose a "consider-then-choose" modeling approach, borne out by the marketing literature. Experiments on a large purchase panel dataset demonstrate the strong predictive power of our models against common benchmarks. We develop a dynamic programming framework and show that many empirically vetted assumptions on how customers consider and then choose lead to tractable optimization models. Our algorithm dominates state-of-the-art commercial solvers in several regimes. Further, at the operational level, we study joint assortment and inventory management where customers show a dynamic substitution behavior. We derive the first provably good policies by revealing hidden submodular-like structure. Our approach is an order of magnitude faster than existing heuristics and increases revenue by 6% to 12% in experiments.

This work is based on several papers jointly with Profs. Vivek Farias, Retsef Levi and Danny Segev.

Bio:

Ali Aouad is a PhD candidate in the Operations Research Center at MIT, co-advised by Profs. Vivek Farias and Retsef Levi. Before joining MIT, he earned a BS and an MS degree in Applied Mathematics from the Ecole Polytechnique (Paris) in 2013. His research focuses on the design and performance analysis of algorithms for contemporary problems in operations management. His work was awarded the 2015 MIT ORC Best Student Paper prize and selected as finalist in the 2016 George Nicholson Prize Competition. Previous industry experiences include investment banking, strategic consulting and entrepreneurship.