UNIVERSITY OF ALBERTA

CPA Speaker Series- Business Analytics

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Location: BUS 4-06

Designing Size -Inclusive Fashion Assortments

ABSTRACT

Fashion retailers adjust their product assortments frequently to enhance profitability and customer satisfaction. Advanced analytics-driven systems supporting this process focus primarily on revenue improvement and have led to significant reductions in markdowns and increases in sales. However, this revenue-focused approach often results in the under-representation of plus-sized options which raise fairness concerns and negatively affects brand perception. This paper is motivated by a collaboration with a major European online fashion retailer and aims to tackle this issue by adjusting option planning to balance revenue and size inclusivity. We consider a choice model that allows for size substitution and develop a measure of pairwise fairness among customer size groups. We then integrate this measure into the assortment optimization problem of an online fashion retailer. We transform the problem into a zero-sum game and develop exact and approximate algorithms to find its Nash equilibria. We interpret mixed strategy equilibria as the online retailer displaying multiple assortments randomly. These assortments may also conceal inventory, that is, not displaying all size SKUs of an option in the assortment. We estimate the size substitution coefficients and calibrate our model using a real dataset provided by our industrial partner. Simulation results show that our approximation algorithm can reduce unfairness by 30% with only 1.5% sacrifice in revenue. The results demonstrate the practicality of our algorithm as the retailer typically randomizes over a few assortments. Further, the optimality gap is relatively small, highlighting the algorithm's efficiency.