

Attribute-based demand estimation and Price Elasticity and Demand Estimation for Markdown Price Optimization

In fashion retailing, a key input in markdown price optimization is the estimation of price elasticity and forecasting of demand for products with a short demand history. We observe empirically that products with distinctively different product characteristics or inventory distribution patterns yield significantly different reactions to price changes. Retailers have historically relied on managers' experience to differentiate between products with different characteristics. We develop a methodology to identify key product attributes that explain the variation in historical item-response to price changes. We then embed an attribute-based price elasticity estimation technique in item-level demand forecasting. Finally, we demonstrate the benefits of an online learning layer in demand forecasting. We find that this methods result in significantly more accurate price elasticity estimation and demand forecasts, which in turn lead to more profitable markdown decisions. We describe the implementation results and gross margin impact at a fashion retailer.