1. Challenge

What products should we put into a store to make the most money while accounting for demand substitution?

2. Scope and Timeline

We worked with the U.S. business and focused on making assortment recommendations for retail accounts in Texas. These accounts are where we have the most data and can have the most immediate impact given that ABI representatives help chains design assortments every 6 months.

3. Data

Our dataset is a combination of internal and third party data. The main data source we used is the data provider JDA’s sales data. In particular, we used data provider IRI’s SKU level by store for around 3000 chain accounts in Texas. We supplemented the sales data with information on both stores and products. In particular, we used data provider IRI’s sales data to impute price information for all products in our data.

For computation reasons, we aggregated all products to product groups, providing the highest level of visibility for the largest and fastest growing brands.

4. Methodology

Our methodology consists of two pieces. First, we estimate a consumer preference model to capture substitution patterns between products. Second, we use the consumer preference model as an input to a constrained optimization that searches over all the possible assortments and picks the one that gives the most expected revenue while respecting business constraints.

5. Results

The model outputs recommendations for what to swap into and out of a chain store’s current assortment. Below, we show the recommendations made for different numbers of swaps for a convenience store and highlight how demand substitution affects our recommendations. After letting the model make as many changes as it wants, we also observe that relatively few assortment changes can realize most of the overall benefit.

6. Next Steps

There are four areas in which the model can be extended:
1. Adding information on the market segment served by each chain
2. Using unit movement in the objective function
3. Using more refined space constraints
4. Accounting for inventory requirements

After refining the model further, we recommending running a field experiment with a partner chain in Texas.