Case Study: Creating a better search experience with dynamic and personalized sponsored ads

Challenge:

Every ecommerce experience is constricted by digital device screens. Only so many products can appear on a screen at the same time – and scrolling through a long digital aisle is a waste of shoppers' time. We sought to change that.

When a customer searches for products using the Kroger app or website, the most relevant items appear alongside sponsored ads. The relevancy of the sponsored ads to the search terms varied, however. This presented an opportunity to better engage customers with sponsored ads that were relevant to the context of their search, personalized, and timely. The challenge was to develop a model to predict customer propensity to click on a sponsored ad and dynamically serve up the most applicable featured product in real time.

Solution:

The Kroger Onsite Ad Technology team engaged 84.51° Data Science and Research Labs teams to create a proprietary two-phased approach. In the offline first phase, a model that decouples the positional and item relevancy effects is learned using a combination of historical clickstream and search result data. For each ad position and its corresponding item, the model learns how likely it is to be clicked.

To ensure the model can handle uncommon search terms, historical searches are clustered based on similar clickthrough behavior for the most frequently clicked positions in the search results. This approach helps to make the model more robust and improve its performance in handling a wider range of search queries.

The online phase searches the set of positions of the sponsored ads returned from the auction. It uses the modeled relevancy and position effects and the clustering from the offline phase to search for the optimal position of the sponsored ads, all in under 20ms so that customers experience no latency effect.

Results:

The deployed solution, Dynamic Positioner (DP), improved the search experience on the Kroger app and website by presenting customers ads that they were more likely to find relevant and useful. The results broadly indicated that the search experience was not only improved, but customers were more willing to explore the sponsored ads.