EQUATION
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Recommender system sequence model for a Top Technology Company

Background

Our client is a top MNC technology company that designs, develops, sells desktops, mobiles, workstations, servers, etc. and all related products and services for engaging with Business customers. The current Collaborative Recommender faced a big challenge in getting effective recommendations for advanced technology niche products that had new users or items with limited interactions history and users with unique or unconventional preferences.

Desired State

Build and leverage a more sophisticated Hybrid recommender method covering sequences and multiple interactions that provides meaningful and accurate product recommendations for the coming quarters thereby allowing client to increase user engagement, increase sales, and continuously adapt offerings to user's preferences.

Challenge

The new model recommender had to be future-proof and give highly accurate recommendations. The deployed model must overcome current issues like cold-start problem, inclusion of meta-features, and customizable loss functions.

Solution Framework

01 Analysis

Evaluated shortcomings of collaborative and content approaches (regression or classification) for handling requirements such as, limited history of interactions of users and/or items, unique users or unconventional preferences, very few users, high number of interactions, so on. Hybrid models method was a preferred solution for above cases and having both diversity and explainability properties.
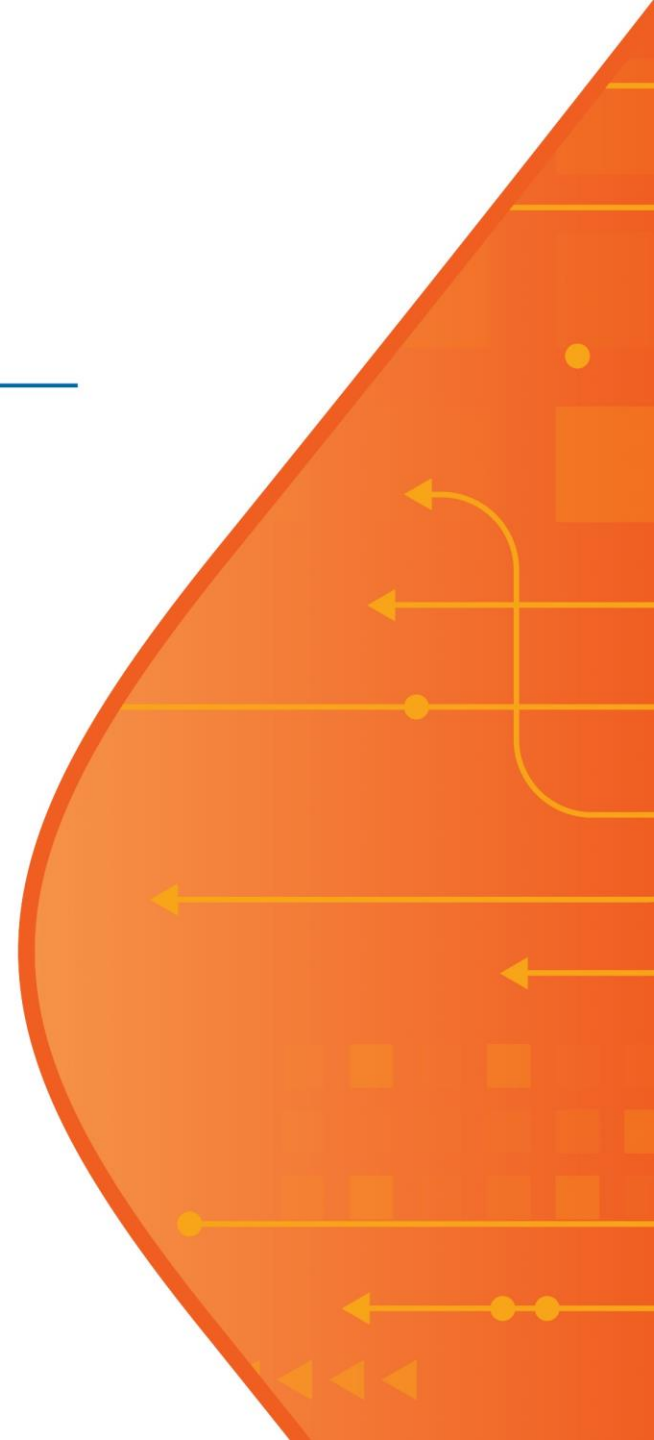
03 Benefits

A significant increment in revenue indicates the hybrid model's effectiveness and its potential for significantly enhancing business outcomes.

02 Methodology

This entire system started with a data pipeline that had a feedback loop. Data preparation involved data collection, cleaning of the data, handling sparsity of data, data storage, and access. The model-ready data was split into train and test sets and the recommender model training step was done.

Next, a hybridization strategy was applied using a weighted average technique which assigns weightings by combining scores of different recommender systems and making a final prediction. These weightings remained static and did not change across the train and test set. Scalability was ensured by optimizing both algorithms and hardware.

Thus, content-based and collaborative filtering were combined to develop a special Hybrid recommender that overcomes shortcomings like multi-interactions, sequencing, cold-start problems, inclusion of meta-features, and customizable loss functions.

Impact

Outcome

The new tuned hybrid model gave superior performance with an accuracy **(95%)** and recall **(97%)** that was a **10%** increase, indicating accurate identification of relevant items. An **8%** increase in unique buyers generated a **5%** increase in revenue, equating to an extra **$20** million.

Long Term Benefit

The Hybrid Recommender approach takes input of sales conversations to serve Site-Finder recommendations that are enhanced with multiple interactions and sequencing. The accuracy and recall metrics showed model performance as very good.

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