

Introduction to Customer Churn Prediction

Definition:

A Next Best Offer (NBO) system predicts and recommends the most relevant product, service, or promotion to a customer based on their past behavior, preferences, and similarity to other users.

Objective:

To deliver personalized recommendations that enhance cross-selling, upselling, and retention by anticipating customer needs.

Why It Matters in Marketing:

- Boosts conversion rates by showing contextually relevant offers.
- Increases average order value (AOV) and lifetime value (CLV).
- Enhances customer engagement through personalization.

Example:

Amazon recommends “Customers who bought this also bought...”, while Netflix suggests “Because you watched...” — both based on collaborative filtering.

Concept of Collaborative Filtering

Definition:

Collaborative Filtering (CF) is a machine learning technique that predicts a user's interest by analyzing user-item interactions and finding similar users or items.

Core Principle:

“Users who behaved similarly in the past will likely behave similarly in the future.”

Types of Collaborative Filtering:

User-Based CF:

- Finds users with similar preferences.
- Example: If User A and User B both liked Product X, and User A also liked Product Y → recommend Y to User B.

Item-Based CF:

- Finds items that are similar based on user behavior.
- Example: If many users who bought Phone A also bought Case B → recommend Case B to others buying Phone A.

Model-Based CF:

- Uses machine learning models (e.g., Matrix Factorization, SVD, Neural Networks) to learn latent relationships.
- Scalable and effective for large datasets.

Data Requirement:

User IDs, Item IDs, and interaction data (ratings, clicks, purchases, views).

Workflow of Collaborative Filtering for NBO

Step 1: Data Collection

- Capture user interactions: clicks, views, ratings, purchases, add-to-cart, and time spent.
- Source: CRM, e-commerce logs, website analytics, or app events.

Step 2: Data Preprocessing

- Build a user-item matrix (rows = users, columns = items).
- Handle missing values (most users haven't interacted with most items).
- Apply normalization or implicit feedback conversion (e.g., purchase = 1, view = 0.5).

Step 3: Similarity Calculation

- Cosine Similarity: Measures angle between user vectors.
- Pearson Correlation: Measures linear relationship between users/items.
- Euclidean Distance: Measures difference in preference patterns.

Step 4: Prediction & Ranking

- Predict user interest score for each item not yet interacted with.
- Rank items based on predicted scores.
- Recommend the top-N offers as "Next Best Offers."

Step 5: Continuous Learning

- Update the model as new interaction data flows in.
- Measure success using metrics like CTR, conversion rate, and engagement time.

Evaluation Metrics and Model Performance

Key Evaluation Metrics:

- Precision@K: Fraction of recommended items that are relevant.
- Recall@K: Fraction of relevant items that are recommended.
- Mean Average Precision (MAP): Overall precision across users.
- RMSE (Root Mean Square Error): For rating-based predictions.
- Hit Rate: Percentage of users who engage with at least one recommended item.

A/B Testing for Effectiveness:

- Compare conversion or click-through rates between NBO-enabled group vs. control group.
- Evaluate lift in sales or engagement post-recommendation.

Example:

A retail app uses collaborative filtering and observes a 15% lift in upsell conversions and a 20% increase in user session time.

Benefits, Challenges & Strategic implication

Applications:

- E-commerce: Recommend accessories, similar products, or bundles.
- Banking: Suggest next best financial product (credit card, loan, insurance).
- Telecom: Recommend higher data plans or add-ons.
- Streaming Services: Suggest content based on user watch history.
- Retail Loyalty Programs: Personalized offers based on purchase frequency.

Benefits:

- Enhances customer experience through personalization.
- Drives revenue growth via targeted cross-sell and upsell.
- Reduces offer fatigue by presenting relevant content only.
- Enables data-driven marketing automation.

Strategic Implications:

- Integrates with CRM and marketing automation for real-time offer delivery.
- Supports AI-driven personalization at scale.
- Strengthens brand loyalty through individualized customer journeys.
- Provides competitive advantage by predicting what customers will want next.

Example:

Starbucks uses collaborative filtering in its app to recommend drinks and combos, increasing both average transaction size and repeat purchases.