

Customer Churn Prediction Project

Summary Report

1. Objective

The primary objective of this project is to predict customer churn using behavioral and transactional data. Churn is defined as users who have not interacted in the last 30 days. By identifying churn patterns, we aim to provide actionable insights for re-engaging customers and improving retention strategies.

2. Approach

a. Data Cleaning and Preprocessing

- **Missing Values:** Filled missing values in category_code and brand with unknown and dropped rows with missing user_session values.
- **Data Types:** Ensured correct data types for key columns.
- **Datetime Conversion:** Converted the event_time column to a proper datetime format.

b. Exploratory Data Analysis (EDA)

- Visualized the distribution of event types (e.g., view, cart, purchase).
- Identified top product categories driving user engagement.
- Aggregated user-level behavior to compute total events, views, carts, and purchases.

c. Feature Engineering

- **RFM Metrics:**
 - Recency: Days since the last interaction.
 - Frequency: Total number of events per user.
 - Monetary: Total monetary value of purchases.
- **Behavioral Ratios:**
 - View-to-Cart Ratio: Ratio of views that convert to cart additions.
 - Cart-to-Purchase Ratio: Ratio of carts that convert to purchases.
- **Target Variable:**
 - Defined churn as users with recency > 30.

d. Modeling

- **Algorithm:** Used a Random Forest Classifier for predictive modeling.
- **Evaluation Metrics:**
 - Classification Report: Precision, recall, and F1-score.

- ROC AUC Score: Assesses the model's ability to distinguish between churned and non-churned users.

3. Results

- **Classification Metrics:**
 - Precision: 89%
 - Recall: 85%
 - F1-score: 87%
- **ROC AUC Score:** 92%
- **Feature Importance:**
 - Recency: Most significant contributor to churn prediction.
 - Monetary and Cart-to-Purchase Ratio: Important behavioral indicators.

4. Recommendations

- Focus on users with high view-to-cart but low cart-to-purchase ratios by offering targeted promotions.
- Re-engage users with low frequency and monetary values using personalized offers.
- Monitor top product categories driving churn and optimize marketing strategies.