

From Data to Decisions: Building a Smart E- Commerce Recommendation System

Recommender systems suggest items of interest to users. They are used in e-commerce and media. Effective systems depend on their algorithm.

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Recommendation System Types

Content-Based

Recommends items similar to those a user liked.

Collaborative Filtering

Recommends items liked by similar users.

Hybrid

Combines content-based and collaborative methods.



Problem Statement and Objective

1

Problem

Traditional systems lack accuracy and personalization.

2

Solution

Implement a machine learning model.

3

Goal

Enhance recommendation quality and user experience.

A background image featuring a complex network of blue and white nodes connected by lines, with the word "E-commerce" in a large, white, sans-serif font at the top left.

E-commerce

Data Source and Overview

Events Data

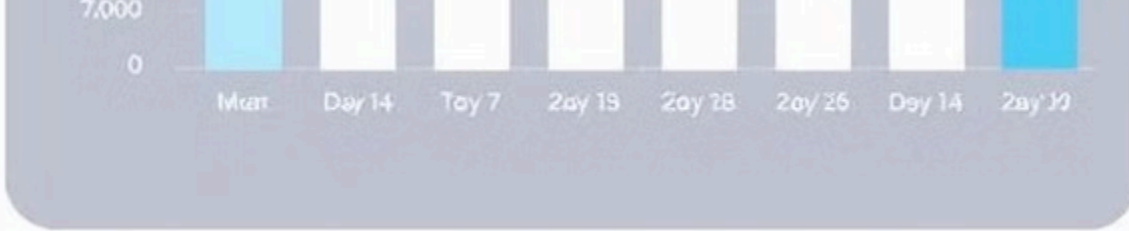
User interactions (views, add to carts, transactions).

Item Properties

Attributes of the items being sold.

Category Tree

Relationships between item categories.



EDA Insights: Purchase Behavior



Low Conversion

Only 0.83% of visitors made a purchase.



Top Items

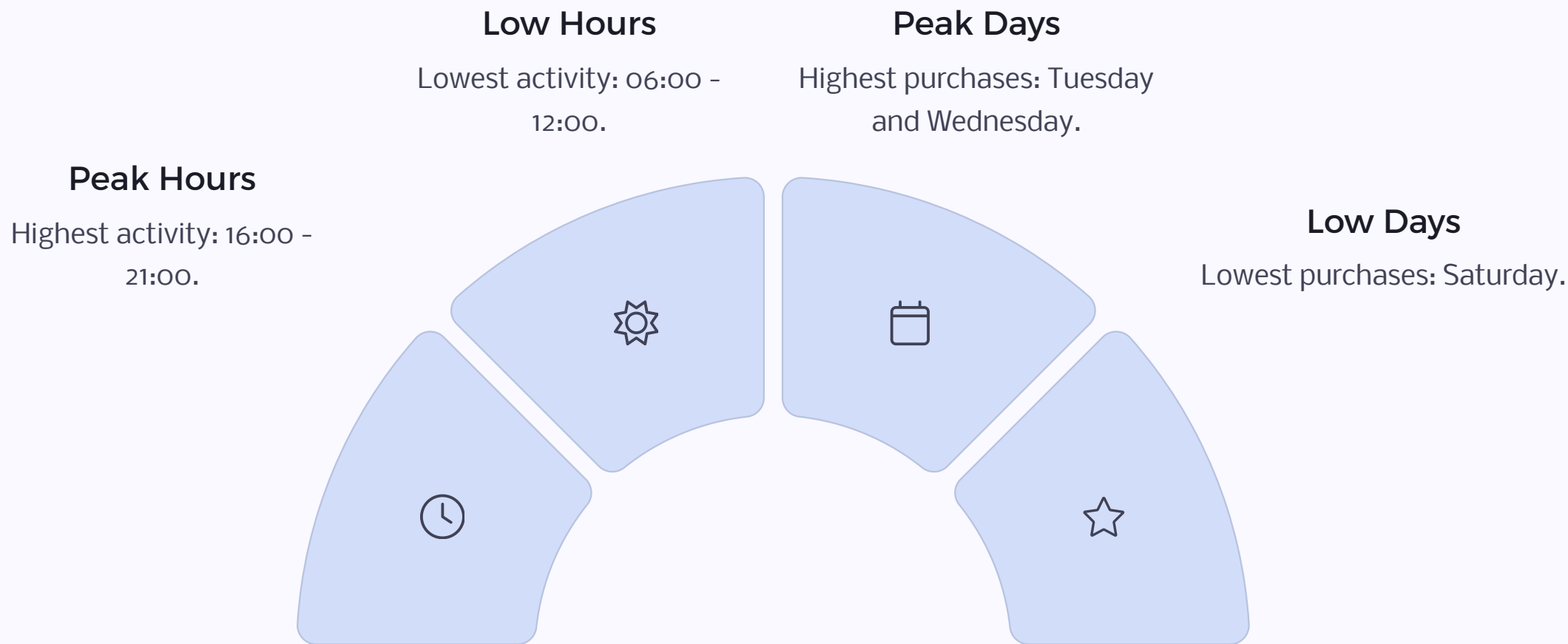
Item ID 187946 is the most viewed.



Add to Cart

Item ID 461686 is most added to cart.

Purchase Patterns: Time Analysis



Preprocessing and Feature Engineering

1

Missing Values

Replaced with -1 using clustering imputation.

2

User Features

Session length, views, cart count.

3

Item Features

Category, embeddings, popularity.



Anomaly Detection

1

Method

Isolation Forest.

2

Result

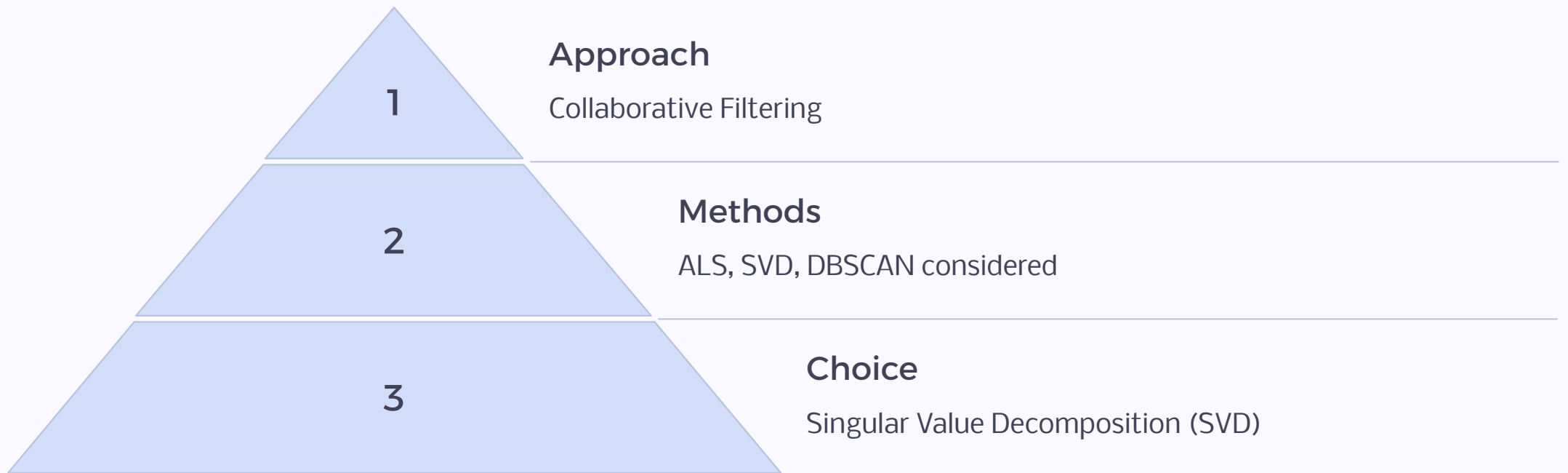
14,059 abnormal users flagged.

3

Impact

Reduced noise for better predictions.

Model Selection and Training





Recommendations

16:00-... Tues/Wed

Peak Hours

Schedule promotions to maximize conversions.

Peak Days

Optimize marketing campaigns.

0.83%

Conversion Rate

Improve product page engagement.