E-commerce Recommendation System

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Abstract

In this project, we developed a Recommendation System leveraging machine learning techniques to enhance user shopping experiences. The system predicts and recommends relevant products based on past purchase behavior and user preferences. We utilized data preprocessing, feature engineering, and advanced recommendation algorithms to achieve high recommendation accuracy.

1 Introduction

Ecommerce platforms or large-scale retailer like walmart, requires an efficient recommendation system to personalize user experiences. Our approach involves data-driven insights to improve customer engagement and sales.

2 Dataset

The dataset consists of user purchase history, product details, and transaction records. Preprocessing steps included:

- Handling missing values
- Data normalization and encoding
- Feature selection

3 Methodology

We implemented multiple recommendation techniques:

- **Collaborative Filtering:** Uses user-item interactions to predict preferences.
- **Content-Based Filtering:** Analyzes product features to suggest similar items.
- **Hybrid Model:** Combines collaborative and content-based approaches for better accuracy.

4 Model Training and Evaluation

We trained various models and evaluated their performance using:

- Precision, Recall, and F1-score
- Mean Absolute Error (MAE) and Root Mean Squared Error (RMSE)
- A/B testing to compare model effectiveness

5 Results and Discussion

Our recommendation system achieved promising results with an optimized hybrid model. We observed:

- Improved customer engagement
- Higher recommendation accuracy
- Faster response time due to optimized algorithms