



# **E-COMMERCE RECOMMENDATION SYSTEMS**

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# **DOMAIN AND RESEARCH TITLE**

DOMAIN: E-COMMERCE AND RECOMMENDER SYSTEMS  
RESEARCH TITLE: ITEM-TO-ITEM COLLABORATIVE FILTERING FOR E-COMMERCE RECOMMENDATION SYSTEMS

# PROBLEM STATEMENT

As e-commerce platforms continue to grow, providing personalized recommendations becomes a critical component of improving customer engagement and sales. Traditional recommendation algorithms, such as collaborative filtering, can struggle with issues like scalability, real-time performance, and handling new users with minimal data. This research aims to enhance e-commerce recommendation systems by utilizing item-to-item collaborative filtering, a method that overcomes the scalability and real-time data challenges inherent in traditional collaborative filtering systems.

# RESEARCH QUESTION

How can item-to-item collaborative filtering be optimized for scalability and real-time performance to provide high-quality personalized recommendations for e-commerce platforms?

# AIM & OBJECTIVES

## AIM:

TO IMPLEMENT AN ITEM-TO-ITEM COLLABORATIVE FILTERING RECOMMENDATION SYSTEM FOR E-COMMERCE PLATFORMS, OPTIMIZED FOR SCALABILITY AND REAL-TIME PERFORMANCE.

## OBJECTIVES:

- TO ANALYZE AND PREPROCESS THE AMAZON PRODUCT DATASET FOR RECOMMENDATION TASKS.
- TO IMPLEMENT THE ITEM-TO-ITEM COLLABORATIVE FILTERING ALGORITHM FOR PRODUCT RECOMMENDATIONS.
- TO EVALUATE THE SYSTEM'S SCALABILITY, PARTICULARLY IN HANDLING LARGE-SCALE DATA AND GENERATING RECOMMENDATIONS IN REAL-TIME.
- TO COMPARE ITEM-TO-ITEM COLLABORATIVE FILTERING WITH TRADITIONAL COLLABORATIVE FILTERING ALGORITHMS

# DATASET & SOURCE

- Dataset Name: Amazon Product Dataset
- Size & Shape: (1,426,337 rows, 11 columns)
- Features: ASIN, Title, Image URL, Product URL, Stars, Reviews, Price, List Price, Category ID, Bestseller Status, Bought in Last Month
- Source: Kaggle

# BASE PAPER & COMPARISON

- Base Paper Title: Item-to-Item Collaborative Filtering
- Authors: Greg Linden, Brent Smith, Jeremy York
- Dataset Used in Base Paper: Not specified (likely internal Amazon data)
- link: <https://ieeexplore.ieee.org/abstract/document/1167344>

## **Comparison:**

- The base paper introduces the item-to-item collaborative filtering algorithm, which focuses on finding similar items rather than similar customers. This is particularly useful in a large catalog setting like e-commerce.
- Our research aims to apply the item-to-item collaborative filtering technique to large-scale real-world datasets like the Amazon product catalog and compare it with traditional collaborative filtering methods.
- We will also explore hybrid models that integrate item-to-item collaborative filtering with other techniques, such as content-based filtering and clustering.

# TOOLS

Python

Pandas

NumPy

SciPy

PostgreSQL/MySQL/MongoDB (Database for storing user interactions, products, and ratings)

Scikit-learn

Surprise

Algorithms: Item-to-Item Collaborative Filtering:

Cosine Similarity

Pearson Correlation

Jaccard Similarity

Adjusted Cosine Similarity Matrix Factorization:

SVD (Singular Value Decomposition)

ALS (Alternating Least Squares

) Content-Based Filtering





**THANK YOU**