E-Commerce Recommendation Engine:

Leveraging SQL for Personalized Shopping Experiences

Problem Statement:

- An e-commerce platform wants to enhance its user experience and optimize product recommendations based on user interactions and past purchase history.

- The platform seeks to identify patterns in user behavior, such as popular products, frequently interacted categories, and purchasing habits, to provide personalized recommendations and improve customer engagement.

Solution Overview **-** SQL Implementation for E-commerce Recommendation Engine:

Data Modeling and Database Design:

- Design and create tables to store user interactions, product details, and past purchases.
- Define appropriate data types, primary keys, and foreign key constraints to ensure data integrity.
- Normalize the database schema to minimize redundancy and optimize query performance.

Data Analysis and Exploration:

- Utilize SQL queries to perform exploratory data analysis (EDA) on the database tables.
- Analyze user interactions by counting views, clicks, and purchases for each product.
- Identify popular products, frequently interacted categories, and user preferences through SQL aggregation functions and group by clauses.

User Segmentation and Profiling:

- Segment users based on their interaction history and purchasing behavior using SQL queries.
- Group users into clusters using techniques such as k-means clustering or hierarchical clustering.
- Create user profiles by aggregating user data, including demographics, preferences, and purchase history.

Databases Schema

Product Table:

Columns:

- **product_id:** Unique identifier for each product.
- **product_name:** Name of the product.
- **category:** Category to which the product belongs.
- **price:** Price of the product.
- **brand:** Brand of the product.

Interactions Table:

Columns:

- **interaction_id:** Unique identifier for each interaction.
- **user_id**: Unique identifier for each user.
- **product_id:** Unique identifier for each product.
- **interaction_type:** Type of interaction (e.g., view, add to cart, purchase).
- **timestamp:** Timestamp when the interaction occurred.

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Past Purchases Table:

Columns:

- **purchase_id:** Unique identifier for each purchase.
- **user_id:** Unique identifier for each user.
- **product_id:** Unique identifier for each product that was purchased.
- **purchase_date:** Date when the purchase occurred.