

Module 5

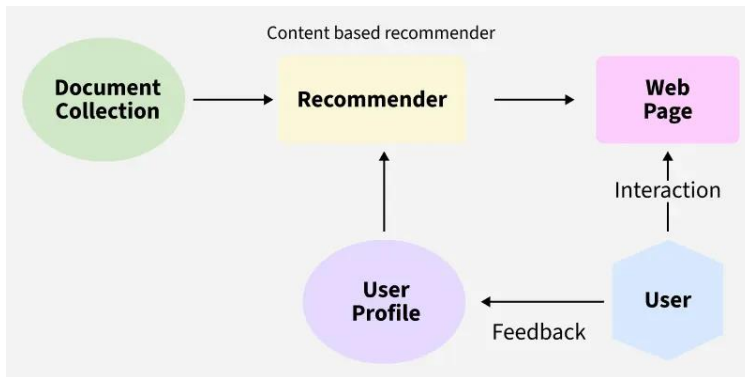
Q. Recommendation system

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1. Recommendation systems are intelligent information filtering systems designed to predict and suggest items that users might be interested in.
2. They have become an integral part of modern digital platforms, helping users discover relevant content while addressing the information overload problem.
3. These systems analyze user behavior, preferences, and patterns to provide personalized suggestions.
4. Working
 - i. Recommender systems operate by filtering and predicting user preferences using sophisticated algorithms and extensive data analysis.
 - ii. The basic mechanics of recommender systems includes several critical elements:
 - 1) User profiles are built using both explicit data, such as ratings and reviews, and implicit data, including browsing history and click habits.
 - 2) Item profiles provide information about the objects, such as genre, actors, and movie keywords.
 - iii. The recommendation algorithms study these profiles using techniques like matrix factorization, which breaks user-item interactions into hidden factors, or deep learning models, which find complex patterns in large datasets.
 - iv. These algorithms estimate what things a user would favor and rank them appropriately.
5. Types of Recommendation Systems
 - i. **Collaborative filtering** (https://youtu.be/xUJs_tpcCw0?si=aSEdg4NC43cpjlwx)
 - a. Collaborative filtering makes recommendations based on the preferences of similar users or items.
 - b. It operates on the principle that users who agreed in the past will likely agree in the future.
 - c. For example, if User A and User B like the same movies, User A may love other movies that User B enjoys.
 - d. **User-Based Collaborative Filtering**
 1. This approach finds users similar to the target user and recommends items that those similar users have liked.
 2. For example, if User A and User B have similar movie preferences, movies liked by User B can be recommended to User A.
 - e. **Item-Based Collaborative Filtering**
 1. This method identifies items similar to those the user has previously liked.
 2. It calculates similarity between items based on user ratings and recommends similar items.

3. This approach is often more stable than user-based filtering as item relationships change less frequently than user preferences.

ii. **Content-Based Filtering** (<https://youtu.be/yxGRawv4zWM?si=6-cBjbVJgbnZJa52>)



- a. Content-based filtering recommends items similar to those a user has liked in the past by analyzing item features and user profiles.
- b. It creates a profile for each user and item based on their characteristics.
- c. The system analyzes item attributes such as genre, keywords, descriptions, or metadata.
- d. For a movie recommendation system, features might include director, cast, genre, and plot keywords.
- e. The system then matches these features with user preferences learned from their historical interactions.

iii. **Hybrid Recommendation Systems**

- a. Hybrid systems combine multiple recommendation techniques to leverage their strengths and mitigate individual weaknesses.
- b. Common hybridization strategies include weighted approaches where results from different methods are combined with
 - assigned weights
 - switching between techniques based on context
 - using one method to augment another
 - building a unified model incorporating multiple techniques
- c. Popular platforms like Netflix and Amazon employ hybrid approaches to provide more accurate and diverse recommendations.

Understand the following by watching the videos first :

Girvan Newman : https://youtu.be/JxFf_oLRq9o?si=DkFc-LXvUkPtKDJ1

Clique Percolation Method (CPM) : https://youtu.be/kZ9pd59_ToU?si=Gco-Vs7v2e6-ZNkZ