Recommender Systems

Agenda

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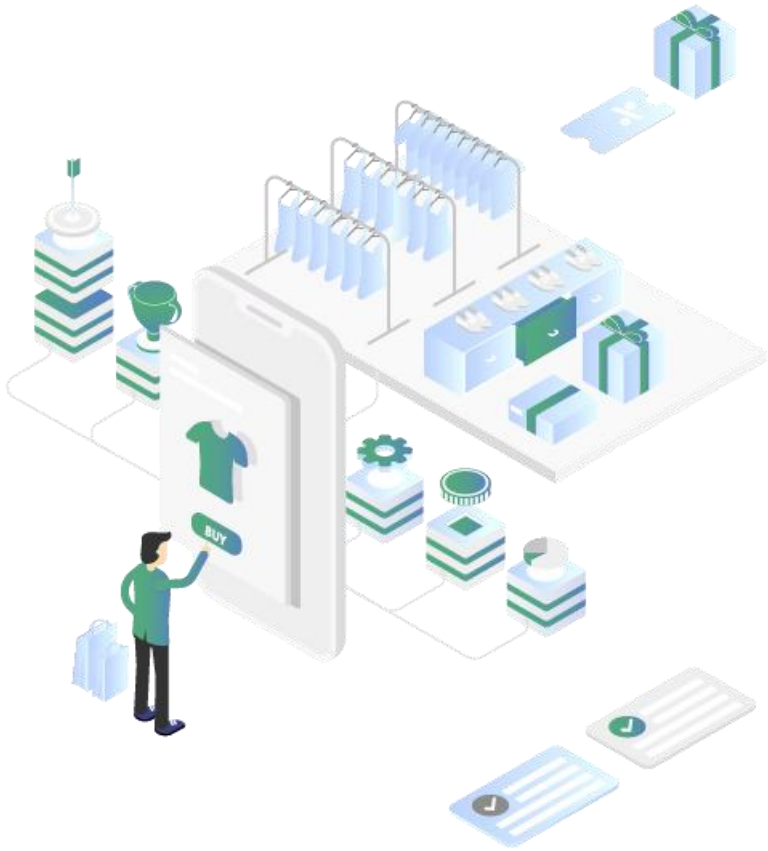
- How it works ?
- Purpose and Benefits of Recomm. System
- Recommender system around us.
- Types of Recommender systems.
- Content based vs Collaborative filtering
- Case study of Feedly
- Power and Potential of recommender system.



Understanding the recommender systems

A *recommender system* is a type of machine learning model that predicts and suggests items that a user may be interested in based on their preferences, behavior, or similarity to other users.

80%

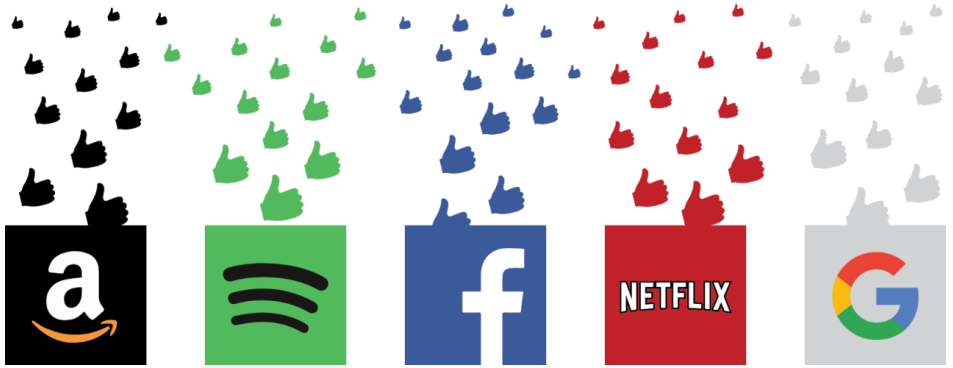
of content consumed on Netflix is due to recommendations.

60%

of video clicks on Youtube's homepage are attributed to recommendations

35%

of its revenue is generated by its recommendation engine



How recommender system generally works ?

Mainly, a recommendation system processes data through four phases as follows :-

- **Collection**

Data collected can be explicit (ratings and comments on products) or implicit (page views, order history, etc.).

- **Storing**

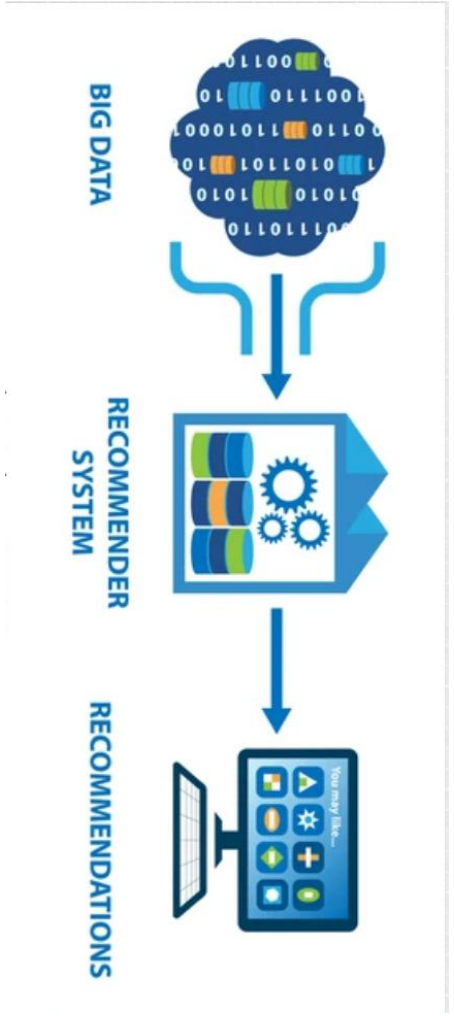
The type of data used to create recommendations can help you decide the kind of storage you should use- NoSQL database, object storage, or standard SQL database.

- **Analyzing**

The recommender system finds items with similar user engagement data after analysis.

- **Filtering**

This is the last step where data gets filtered to access the relevant information required to provide recommendations to the user. To enable this, you will need to choose an algorithm suiting the recommendation system.



Purpose and Benefits of recommender systems

- **Purpose**:
  - To enhance user experience by simplifying content discovery.
  - To improve engagement and satisfaction by suggesting relevant content or products.

- **Benefits**:
  - **For Users**: Saves time and offers a personalized experience.
  - **For Businesses**: Increases retention, boosts engagement, and drives sales.

- **Example**:
  Personalized shopping suggestions on Amazon or content recommendations on Netflix.

Recommender systems around us

- **E-commerce** : Product recommendations on platforms like Amazon and eBay.
- **Streaming Services** : Personalized movie or song suggestions on Netflix, Spotify, and YouTube.
- **Social Media** : Content suggestions on Facebook, Instagram, and Twitter.
- **Job Portals** : Tailored job recommendations on LinkedIn.
- **News Platforms** : Custom article feeds on Medium and Google News.

Types of recommender systems

1. **Content-Based Filtering**
   - **Definition**: Recommends items by analyzing item features and comparing them to user preferences or previously liked content.
   - **Example**: If a user reads many tech articles on Medium, the system recommends other tech-related articles.
   - **Analogy**: Imagine a bookstore staff who remembers the genres you usually browse. If you often look at science fiction, they direct you to new sci-fi arrivals, based on your known interest.

2. **Collaborative Filtering**
   - **Definition**: Recommends items based on the preferences and interactions of similar users, without focusing solely on item content.
   - **Example**: Netflix suggests shows that people with similar watch histories have enjoyed.
   - **Analogy**: Think of it as a movie club where members recommend movies to each other based on common tastes. If someone with similar preferences enjoyed a new movie, it's likely you'll enjoy it too.

3. **Hybrid Systems**
   - **Definition**: Combines both content-based and collaborative filtering to improve recommendation accuracy and variety.
   - **Example**: Amazon suggests products by combining information on what you've previously purchased (content-based) with items that other users bought alongside those products (collaborative).
   - **Analogy**: Imagine a friend who not only remembers what you like but also knows what other friends with similar tastes recommend. They combine both insights to suggest the perfect new item.

4. **Knowledge-Based Filtering**
   - **Definition**: Recommends items based on specific needs or attributes directly provided by the user.
   - **Example**: Travel platforms recommend destinations or hotels based on user criteria (budget, location preference).
   - **Analogy**: It's like a travel agent who considers your exact vacation requirements and budget before making suggestions that align precisely with your needs.

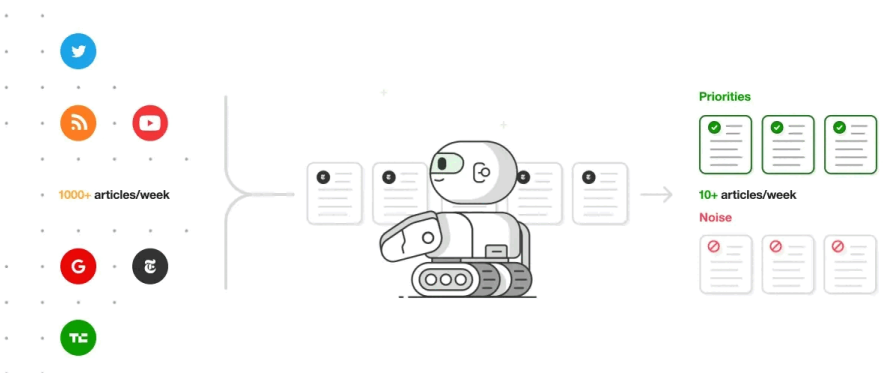
5. **Demographic-Based Filtering**
   - **Definition**: Suggests content based on demographic information like age, location, or gender.
   - **Example**: Social media ads targeted by location or age groups.
   - **Analogy**: Picture a local newspaper offering event suggestions relevant to your city; they tailor their recommendations based on local interest data rather than personal preferences.

Aspects	Content based Filtering	Collaborative Filtering
Definition	Uses item features to recommend similar items based on what the user has liked before.	Recommends items based on preferences of similar users.
Example	Suggesting articles based on a user's past reads on Medium.	Netflix suggesting shows watched by similar users.
Advantages	- Works well with little user data - Doesn't rely on other users' preferences.	- Broadens recommendations beyond individual preferences - Leverages preferences of similar users.
Dis-advantages	- Can lead to repetitive recommendations. - Limited by known features.	- Requires substantial user data for accuracy. - Struggles with new users (cold start).
Use case	E-commerce product suggestions, music, article suggestions.	Social media feeds, streaming services, online shopping.
Analogy	Content-based is like a bookstore employee remembering your favorite genre and recommending within that genre.	Collaborative filtering is like joining a movie club where people with similar tastes recommend movies you might also enjoy.

Case Study of Feedly

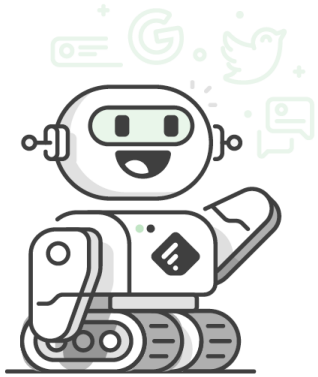
What is Feedly?

Feedly is an **AI-powered news aggregator** and content curation tool that allows users to **gather, organize, and read articles and updates from their favorite sources in one place**. Users can subscribe to topics, websites, and news sources across various fields, such as technology, science, business, and more, making it a highly customizable platform for staying informed.



Objective of Feedly:

Feedly's main goal is to **help users stay updated on topics they care about**, providing a personalized feed of content that is continuously refreshed based on user preferences and industry trends.



Approach:

Feedly leverages AI-driven recommendation algorithms, using both **topic modeling and machine learning**, to curate content based on user-selected sources and reading patterns. Additionally, it offers tools like **Leo**, an AI assistant that filters, prioritizes, and highlights relevant articles, creating a highly tailored reading experience.

How Feedly' recommender system work and its effectiveness

Aspect	Description
User Profile Creation	Builds a profile based on user-selected topics, followed sources, reading behavior, and time spent on articles.
Content Analysis	Uses user-generated data and naming patterns to create a hierarchical topic taxonomy, classifying articles into over 2,500 specific topics. This helps organize content and ensures accurate recommendations.
Filtering Mechanism	1. **Content-Based**: Matches users with new articles related to the topics or sources they follow. 2. **Collaborative**: Uses patterns from similar users to recommend relevant articles and sources based on shared interests.
User Controls for Recommendations	- Users can refine topic preferences by adjusting the categories, topics, or sources they follow. - **Follow/Unfollow:** Users can follow/unfollow topics and sources to curate a highly customized feed.
Personalization Tools	- **Discover Page:** Displays featured topics and subtopics, allowing users to explore in-depth hierarchies and discover related topics. - **Mute Topics/Sources:** Users can mute specific sources to refine feed relevance. - **'You Might Also Like' Suggestions**: Recommends sources similar to the ones users follow.
Feedback Loop	Tracks interactions (such as votes in the "Battle of the Sources" experiment, reading duration, and saves) to continuously refine and improve recommendations.

Why Feedly's Recommender System Is Effective:

- **Enhanced Engagement** : Feedly's personalized feeds keep users engaged with content tailored to their interests, driving frequent visits.
- **Discovery of Niche Content** : Feedly's AI helps users uncover high-quality, niche sources they might otherwise miss.
- **Continuous Adaptation** : Feedly's system learns from user behavior, adapting recommendations to stay relevant as interests change.

Power and potential of recommender systems

- **User Value** : Recommender systems provide a **streamlined experience**, helping users find valuable and relevant content with ease.

- **Future Enhancements** :
  - **Improved Contextual Understanding**: **Enhanced algorithms** can incorporate real-world context like time of day, user mood, or seasonal trends.
  - **Advances in NLP** : **Deeper natural language processing (NLP)** capabilities help understand **content more accurately, refining personalization.**

- **Long-Term Impact** : As recommendation systems advance, platforms like Feedly will become even more adept at aligning content with user interests, enhancing loyalty and satisfaction.

Thank You