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Recommender system

A **recommender system**, or a **recommendation system** (sometimes replacing "system" with terms such as "platform", "engine", or "algorithm"), is a subclass of information filtering system that provides suggestions for items that are most pertinent to a particular user.[1][2] Recommender systems are particularly useful when an individual needs to choose an item from a potentially overwhelming number of items that a service may offer.[1][3]

Typically, the suggestions refer to various decision-making processes, such as what product to purchase, what music to listen to, or what online news to read.[1] Recommender systems are used in a variety of areas, with commonly recognised examples taking the form of playlist generators for video and music services, product recommenders for online stores, or content recommenders for social media platforms and open web content recommenders.[4][5] These systems can operate using a single type of input, like music, or multiple inputs within and across platforms like news, books and search queries. There are also popular recommender systems for specific topics like restaurants and online dating. Recommender systems have also been developed to explore research articles and experts,[6] collaborators,[7] and financial services.[8]

Overview

Recommender systems usually make use of either or both collaborative filtering and content-based filtering (also known as the personality-based approach), as well as other systems such as knowledge-based systems. Collaborative filtering approaches build a model from a user's past behavior (items previously purchased or selected and/or numerical ratings given to those items) as well as similar decisions made by other users. This model is then used to predict items (or ratings for items) that the user may have an interest in.[9] Content-based filtering approaches utilize a series of discrete, pre-tagged characteristics of an item in order to recommend additional items with similar properties.[10]

We can demonstrate the differences between collaborative and content-based filtering by comparing two early music recommender systems – Last.fm and Pandora Radio.

- Last.fm creates a "station" of recommended songs by observing what bands and individual tracks the user has listened to on a regular basis and comparing those against the listening behavior of other users. Last.fm will play tracks that do not appear in the user's library, but are often played by other users with similar interests. As this approach leverages the behavior of users, it is an example of a collaborative filtering technique.[11]
- Pandora uses the properties of a song or artist (a subset of the 400 attributes provided by the Music Genome Project) to seed a "station" that plays music with similar properties. User feedback is used to refine the station's results, deemphasizing certain attributes when a user "dislikes" a particular song and emphasizing other attributes when a user "likes" a song. This is an example of a content-based approach.

Each type of system has its strengths and weaknesses. In the above example, Last.fm requires a large amount of information about a user to make accurate recommendations. This is an example of the cold start problem, and is common in collaborative filtering systems.[12][13][14][15][16][17] Whereas Pandora needs very little information to start, it is far more limited in scope (for example, it can only make recommendations that are similar to the original seed).