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Recommendation systems have been implemented widely in various fields like e-commerce sites (i.e. Amazon, eBay, etc.), entertainments (i.e.movie, games, blogs), and so on to help users quickly find out the products that they may be interested in based on their personal profiles, behaviors, purchased history, and so on. In order to meet the needs of different types of users, the recommendation systems nowadays have become more adaptable and dynamic.

The most commonly used recommendations are Content-based filtering and Collaborative filtering. Content-based filtering will promote similar products based on the information the user/product provided or previous behaviors data that was collected (like leaving reviews, giving a rank, or clicks on links). Collaborative filtering, in addition, displays similar users and products based on the other similar user's explicit and implicit feedback data.

This review will summarize the basic information about collaborative filtering to lay out the advantages and shortages, especially in real-world practice, and propose future optimization direction based on the result.

Collaborative Filtering nowadays is widely used in a lot of websites. Compared with content-based filtering, it won't use the features from the products/users for

prediction. Collaborative methods only consider if users have a similar reaction to the same products, and predict that they may have the same option for the others.
Today, collaborative filtering can be implemented in two forms: user-based and item-based. One of the famous examples that use user-based collaborative filtering is on the social networking service websites like douban.com. When users interact with one of the products (i.e movie, book), the website will promote other products that peer users also like because the system will assume that you will have the same taste as the others. Another famous example is Amazon.com. It uses item-based collaborative filtering as its recommendation “customers who bought X will also be bought Y”.

Advantages

The collaborative filtering does have some benefits:

- It doesn’t require domain knowledge since the prediction is only based on users’ historical behaviors
- Compared to content-based filtering, it gives users a chance to explore new contents and products that may not directly match the searching query and requirements. For the vendor’s side, it does give a chance to show additional options and products that may not be the first choice for their customers but still attract them.

Disadvantages:

In real-world practice, even the collaborative is one of the most popular methods on recommendation systems, it does have a couple of shortages:

- Since the analysis is evaluated based on the historical data, it will have a cold start, which means there's not enough data to support the recommendation result for the new launch products/users.
- Today, we are in the big data century. There's a large number of products listed on the websites and it is hard to ensure the products get hits and reviews by active users.
- Not all the users are active users and users' preferences can be changed, and not all the products have an unlimited life cycle. Therefore, The result can be inaccurate if either the products no longer exist or the user activity is not active.
- Since recommendation systems aim to target users individually, due to the number of data a website obtained, it can be a large amount of computation needed as well.

There are a couple of opportunities that developers can focus on for future optimizations. Because of cold start problems, it is important to get as much information as possible to jump start a new user or product. Services can allow users or owners of products to answer questions such as their interests, to allow the system to grasp knowledge of what the user wants, and build the filtering off a much better start than nothing at all. Also, to tackle the issue of inactive user or products, services should be able to determine priority of filtering based on last update or how stale product sales are, to be able to provide the most up to date experience for each user.

Overall, collaborative and content-based filtering are great state of the art systems to give users a great experience. In the current age of big data, the possibility is endless for services to continue development of these filtering systems, to allow artificial intelligence to provide the best experience that is tailored to each user.

Reference

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