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Online Book Recommendation using Collaborative Filtering

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Introduction

A recommender system is an information filtering system which recommends the products or items to the user. Recommender systems are used to recommend a variety of products such as movies, music, news, books, research articles, restaurants, historic places, grocery stores, shopping malls, Twitter pages and many more. We have already seen the applications of recommender systems in Amazon, Flipkart, Twitter, Netflix and Youtube.

In Collaborative filtering various number of users are selected which are similar to the active user ie. the user who wants recommendation. A prediction for the active user is done by calculating the weighted average of all ratings of similar users. The types of collaborative filtering are user based collaborative filtering and item-based collaborative filtering

Theory

Recommender systems apply data analysis techniques to the problem of helping users find the items they would like to purchase at E-Commerce sites by producing a predicted likeliness score or a list of top N recommended items for a given user.

Item recommendations can be made using different methods. Recommendations can be based on demographics of the users, overall top selling items, or past buying habit of users as a predictor of future items. Collaborative Filtering is the most successful recommendation technique to date.

Objective

To recommend books using collaborative filtering approach where the books would be recommended based on what other users like a particular user purchased after viewing the item which the current user is viewing.

Methodology

Two types of methodology are as follows:
1. Memory Based: It includes algorithms that are memory based, in which statistical techniques are applied to the entire dataset to calculate the predictions

2. Model Based: It involves a further step to reduce or compress the large but sparse user-item matrix.

Algorithm

1.Select the number K of the neighbors

2.Calculate the Euclidean distance of K number of neighbors

3.Take the K nearest neighbors as per the calculated Euclidean distance.

4.Among these k neighbors, count the number of the data points in each category.

5.Assign the new data points to that category for which the number of the neighbor is maximum.

6.The model is ready.

Detail explaination

Collaborative filtering relies on how other users responded to these same items. It doesn't rely of features of the item, but the preferences from other users. Similar users survey needs to be done.

- Users will have a table with different rated items of what they choose or liked
- Based on the similarities, prediction can be make of what the user might like, based on what similar users did.
- The list will be filtered and matched to users who used the same items for comparison and recommendations
- Everything will be summed up and highest score will be recommended
- Code will be created based on an algorithm, by given a user x, recommend an item that x might like
- Item with the highest score will be recommended

Results

The user is succesfully recommended Books based on calculations of the weighted average of all ratings of similar users.i.e the user is recommended books based on the ratings of similar users who kept same preferences as that user.

Advantages

- The content of the items does not necessarily tell the whole story, such as book type/category, and so on.
- Even when no information on an item is available, we still can predict the item rating without waiting for a user to purchase it.

Limitations

- Focusing solely on content does not provide any flexibility on the user's perspective and their preferences.
- Hard to include side features for query/item

Conclusion

Recommender Systems are quite a stable and old technology now. They have become an important tool of many ecommerce websites like Amazon, Flipkart, Netflix, YouTube. They have a variety of applications such as recommending movies, music, restaurants, grocery stores etc.

Recommendation system makes the job of the online user very easy by presenting a series of products which could be of interest to a user. A huge number of data mining algorithms are developed by researchers in this area.

References

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