STAT 542 Project 5

Recommender System: MovieLens

Array3

Hongfei Li, Meng Du, Yiqin Wu

Preprocessing

In MovieLens dataset, we do not need to do anything about missing values since it means that a user does not rate a movie.

We are going to use the R package *recommenderlab*, which requires a *realRatingMatrix* object as input. So we first transform the train dataset into *realRatingMatrix*, which includes the ratings of every user versus every movie.

Model

Collaborative filtering is a technique that is widely used in recommender systems. It is the process of filtering for information or patterns. In our project, we use two different collaborative filtering models to predict the ratings.

I. User Based Collaborative Filtering

According to this approach, given a new user, its similar users are first identified. Then, the top-rated items rated by similar users are recommended.

For each new user, these are the steps:

1. Measure how similar each user is to the new one. Like IBCF, popular similarity measures are correlation and cosine.
2. Identify the most similar users.
3. Rate the movies rated by the most similar users.
4. Pick the top-rated movies.

Our parameters in User Based Collaborative Filtering model are as below:

normalize	method	nn
Z-score	cosine	25

II. Item Based Collaborative Filtering

Similar to User Based Collaborative Filtering, Item Based Collaborative Filtering starts from a rating matrix in which rows correspond to users and columns correspond to items. The core algorithm is based on these steps:

1. For each two items, measure how similar they are in terms of having received similar ratings by similar users
2. For each item, identify the k most similar items
3. For each user, identify the items that are most similar to the user's purchases

Our parameters in Item Based Collaborative Filtering model are as below:

k	method	normalize
5	cosine	center

Evaluation

The runtime for our mymain.r is 20 minutes. The prediction error is given below:

	User Based Collaborative Filtering	Item Based Collaborative Filtering
RMSE	1.04	1.15

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