Week 06 - Lab Session

February 9, 2023

Familiarize Yourself with the Dataset

In the lab sessions, we will work with the “All Beauty” category of the Amazon Review Data, and we will use the 5-core subset. You can download the dataset and find information about it here: https://nijianmo.github.io/amazon/index.html

Exercise 1

Download and import the 5-core dataset.

Exercise 2

2.1

Sort the dataset entries by the user id (`reviewerID`), product id (`asin`) and rating timestamp (`unixReviewTime`). Then, clean the dataset from missing ratings and duplicates (cases where the same user has rated the same item multiple times) if any. Keep the last entry only. How many observations does the cleaned dataset have?

```
Obervations in the cleaned dataset: 4092
```

2.2

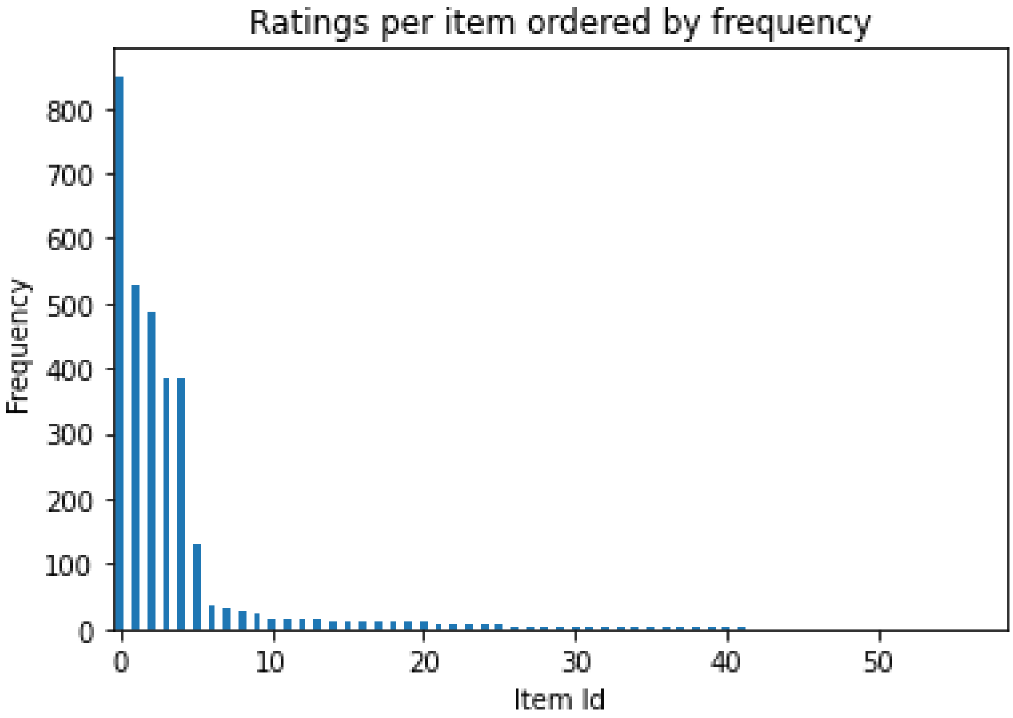
Create a test set by extracting the latest positively rated item (rating ≥ 4) by each user. Remove users that do not appear in the training set. How many observations does the training and test set have?

```
Observations in training set: 3133
Observations in test set: 949
```

Exercise 3

Compute the number of ratings per item in the training set. How does a barplot of the number of ratings ordered by decreasing frequency look like?

Reflect on how it will affect the prediction process of a recommender system if only a small fraction of the items are rated frequently.



Collaborative Filtering Recommender System

Exercise 1

In this exercise, we are going to predict the rating of a single user-item pair using a neighborhood-based method.

1.1

- Represent the ratings from the training set in a user-item matrix where the rows represent users and the columns represent items.
- Fill unobserved ratings with 0.
- Compute the cosine similarities between the user with `reviewerID`=‘A25C2M3QF9G7OQ’ and all users that have rated the item with `asin`=‘B00EYZY6LQ’.

- What are the similarities and what are the ratings given by these users on item ‘B00EYZY6LQ’?

```
                cosine similarity  overall
reviewerID
A1F7YU6O5RU432           0.079243      5.0
A1R1BFJCMWX0Y3           0.245145      3.0
A1UQBFCERIP7VJ           0.058634      5.0
A22CW0ZHY3NJH8           0.207883      3.0
```

```
A2LW5AL0KQ9P1M          0.275810      4.0
A2PD27UKAD3Q00          0.000000      5.0
A2WW57XX2UVLM6          0.000000      4.0
A2ZY49IDE6TY5I          0.682835      4.0
A39WWMBA0299ZF          0.000000      5.0
A3M6TSEV71537G          0.000000      5.0
A3S3R88HA0HZG3          0.000000      4.0
A914TQVHI872U           0.245145      5.0
AOEUN9718KVRD           0.105670      3.0
```

1.2

- Predict the rating for user ‘A25C2M3QF9G7OQ’ on item ‘B00EYZY6LQ’ based on the ratings from the 3 most similar users, using a weighted (by similarity) average. What is the prediction?

```
Predicted rating: 3.7963554954121093
```