

# Week 12 - Lab Session Results

March 19, 2025

## Explainable Recommender Systems

Exercises in this lab focus on explanations that are **integrated into the model**, both collaborative filtering and content-based recommender systems. Please refer to explainable recommender systems lecture slides by Christina Lioma, pages 159-169.

Please refer to this supplementary resources for an example of template-based approach for generating textual explanations: <https://explainablerecsys.github.io/recsys2022/>

### Exercise 1: Explanations based on user-based collaborative filtering

In this exercise, we are going to explain the prediction from a neighborhood-based collaborative filtering recommender system.

The explanation is in the form of ratings of similar users.

#### 1.1

Refer back to Lab Week 6, Collaborative Filtering, Exercise 1.1-1.2, where you computed the cosine similarities (based on ratings) between the user with reviewerID `A25C2M3QF9G70Q` and all users that have rated the item with asin `B00EYZY6LQ`.

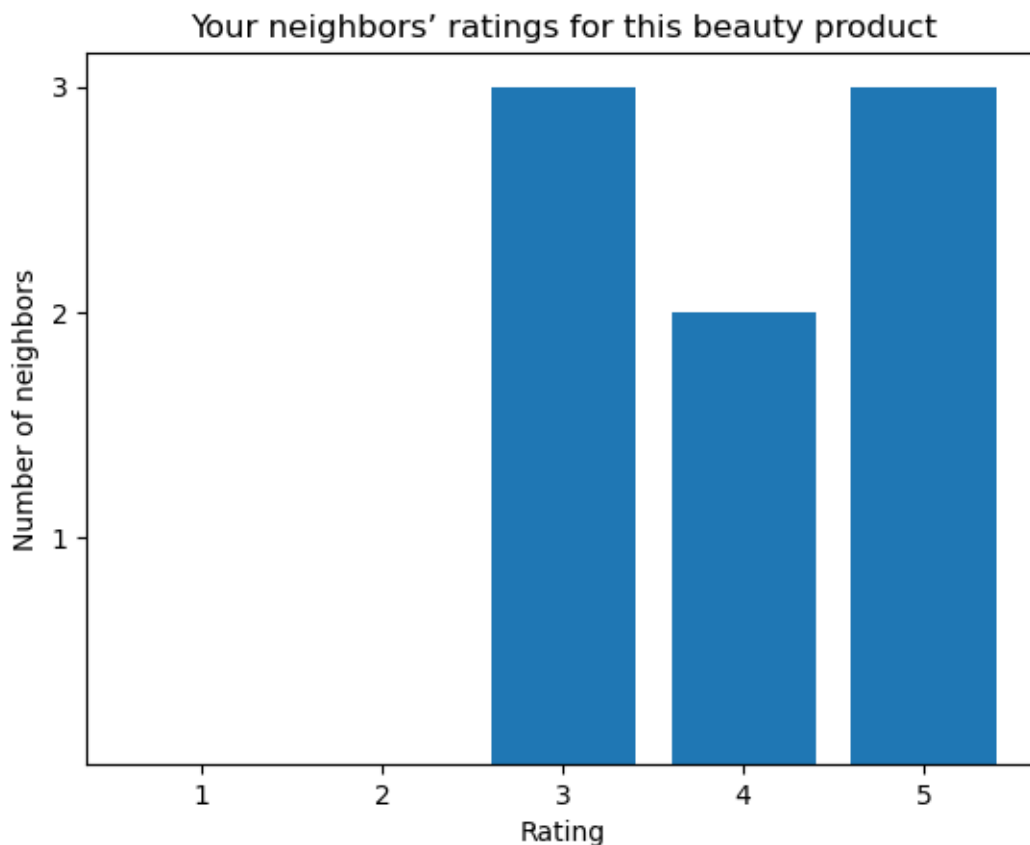
Now, predict the rating for user `A25C2M3QF9G70Q` on item `B00EYZY6LQ` based on the ratings from the 8 most similar users (previously it was 3), using a weighted (by similarity) average. What is the predicted rating (rounded to 3 decimal places)?

Predicted rating for user `A25C2M3QF9G70Q` on item `B00EYZY6LQ`: 3.908

#### 1.2

Visualize an explanation of the prediction for the user by plotting a bar plot of the 8 neighbors' ratings of this beauty product.

The x-axis should be the rating (1-5) and the y-axis should be the number of neighbours with that rating of the beauty product.



## Exercise 2: Explanations based on content-based recommender system

In this exercise, we are going to explain the prediction from a content-based recommender system.

The explanation is in the form of the item features that are similar to the items that have been rated by a user.

### 2.1

Print **all** the items rated by the user with reviewerID `A39WWMBA0299ZF` (in `train_df`) and look at all the `title` given in the metadata.

*Hint:* there should be 3 items.

Items rated by user 'A39WWMBA0299ZF': B0010ZBORW, B001LNODUS, B00EYZY6LQ

```
[7]:      asin      title
2381  B0010ZBORW  Urban Spa Moisturizing Booties to Keep your Fe...
3423  B001LNODUS  Pre de Provence Maison French Dried Lavender B...
10257 B00EYZY6LQ  Fekkai Full Blown Aerosol Foam Cond Us 6.6 Oz,...
```

## 2.2

Recall that in Lab Week 10, Exercise 1, we used a content-based recommender system based on TF-IDF to get the top-5 recommended items for user `A39WWBA0299ZF`. The recommended items are in this order: `'B019FWRG3C'`, `'B00W259T7G'`, `'B00IJHY54S'`, `'B0006O10P4'`, `'B00006L9LC'`

Print the item titles given in the metadata. What do these titles have in common with the titles of the items rated by the user?

Check if one of the recommended items is in the test set (`test_df`).

These are the titles of the recommended items:

```
[9]:
```

	asin	title
	B019FWRG3C	Pre De Provence Maison French Lavender Bath &a...
	B00W259T7G	Pre de Provence Artisanal French Soap Bar Enri...
	B00IJHY54S	Spongelle Wild Flower 14+ Uses Body Wash Buffe...
	B0006O10P4	ZUM Zum Bar Anise Lavender, 3 Ounce
	B00006L9LC	Citre Shine Moisture Burst Shampoo - 16 fl oz

Item `B019FWRG3C` is rated by the user in the test set.

Note that the recommender system nailed it in this case! The top recommended item is actually the item we had in our test split and was positively rated by this user. One possible explanation for this: the user rated item `B001LNODUS` in the train split. The item title contains the phrase “Pre de Provence Maison French” and “Lavender”. The same phrase exists in item `B019FWRG3C`’s title.

The second recommended item also has some words that intersect with the words in the item titles that have been rated by the user.

In addition, you should pay a closer look at other features to see commonalities between the user’s history and the recommendations given.