

## Assignment 9: Recommendation System

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**Learning Outcome:** At the end of this assignment you will learn using Collaborative filtering on a rating matrix to perform recommendations

### 1 Problem description

Recommendation system is used to recommend items to user. We focus on collaborative filtering (user and item based) in this assignment.

- User based Collaborative Filtering
  1. In this technique the similarity between the target user and the other users are calculated.
  2. The top K similar users are considered
  3. The missing rating of the item is then calculated by taking a weighted average of the ratings given by the other users and weights are the similarity scores that we calculated earlier
- Item based Collaborative Filtering
  1. In this technique the similarity between the target item and other items are calculated
  2. The top K similar items are considered
  3. The missing rating of the item is then calculated by taking a weighted average of the ratings of the similar items and weights are the similarity scores that we calculated earlier

### 2 Implementation

#### 2.1 Dataset

- For this assignment we will make use of MovieLens 100K dataset. It consists of 100,000 ratings from 1000 users on 1700 movies.
- The dataset is directly downloaded by the Surprise API which has been shown in the references.

#### 2.2 Exercise

- We will be using Surprise API (<http://surpriselib.com/>) which has basic implementations of all memory based recommendation algorithms.
- Split the dataset in train and test (80:20 ratio).
- Use user based collaborative filtering and perform 5 fold cross validation to train your algorithm, Use RMSE for evaluating each fold.
- Now evaluate your algorithm on the test data. Evaluate using accuracy
- Use item based collaborative filtering and perform 5 fold cross validation to train your algorithm, Use RMSE for evaluating each fold.
- Now evaluate your algorithm on the test data. Evaluate using accuracy.

### 3 References

- <http://surpriselib.com/>
- [https://surprise.readthedocs.io/en/stable/knn\\_inspired.html#surprise.prediction\\_algorithms.knns.KNNBasic](https://surprise.readthedocs.io/en/stable/knn_inspired.html#surprise.prediction_algorithms.knns.KNNBasic)
- [https://surprise.readthedocs.io/en/stable/getting\\_started.html](https://surprise.readthedocs.io/en/stable/getting_started.html)

### 4 Submission

- You have to submit your assignment in notebook with proper comments and explanation of your approach.
- Show the scores for all the approaches clearly.
- The submission deadline for this assignment in **18th April 2021 at 11 PM**