STATS 507 Project Proposal:

MovieLens datasets—Predicting and analyzing user ratings of movies

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1. The MovieLens dataset

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The MovieLens datasets (Harper and Konstan, 2015) contains user ratings of a variety of movies continuously collected starting from 1998. In addition to the user-movie-rating pairings, the datasets contains information about movie genres, word tagging of movies provided by users and user demographic information.

We will consider the MovieLens 100K Dataset[1], which is one of the multiple datasets provided by GroupLens[2]. We will be interested in this particular dataset because it contains additional demographic information about the users in the dataset. To include

[1] Available at https://grouplens.org/datasets/movielens/100k/
[2] Organization website: https://grouplens.org/

tagging information, we also consider the `MovieLens Tag Genome Dataset`[3]. Here is a summary of the contents of the datasets that will be used[4]:

`MovieLens 100K Dataset` The dataset was collected from the `MovieLens` website (`movielens.umn.edu`) between September 19th, 1997 through April 22nd, 1998. It has been pre-processed and cleaned to include only examples where the users have made at least 20 ratings during the collection period and where demographic information are complete. In the `u.data` file, there are 100,000 ratings on the scale of 1 to 5, taking only integer values. It contains the following entries: `user id`, `item id`, `rating`, `timestamp`. In the `u.item` file, there are 1682 movies with the following information: `movie id`, `movie title`, `release date`, `IMDb URL` and 19 columns indicating movie genre with 0-1 encoding where 1 denotes that the movie is of the corresponding genre. In the `u.user` file, there are 943 users with the following information: `user id`, `age`, `gender`, `occupation` (see `u.occupation` file for details) and `zip code`.

`MovieLens Tag Genome Dataset` This dataset contains tagging information of 9734 movies and 1128 tags. In particular, the `tag_relevance` file contains the relevance of all tags for all movies reported on a continuous scale from 0 to 1, where 1 indicates strong relevance.

2. Research questions

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2.1. Prediction modeling

Our first research question is to construct a predictive model for the user ratings using the available information. In particular, we wish to produce a model that is able to accurately predict the movie rating (for some movie already in the dataset) by a given user (also in the dataset). This model could then be part of a *recommendation system* where the predicted rating could be used as input to produce the recommendations.

2.2. Analysis

A secondary research question we are interested in is to analyze the effect of the available information on the user ratings. For example, we could look for genres and tags that are related to movies with better ratings. Then, we can perform more granular analyses using the demographic data: this could allow to extract correlations between population groups and movie interests. The insights recovered from such analyses could be relevant for decision-making such as identifying which movies to produce and which population groups to target with advertisement.

[3] Available at `https://grouplens.org/datasets/movielens/tag-genome/`

[4] From the `README.txt` file attached to the datasets (`http://files.grouplens.org/datasets/movielens/ml-100k-README.txt`, `http://files.grouplens.org/datasets/tag-genome/README.html`)

3. Methodology

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4. Preliminary repot

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References

Harper, F. M. and Konstan, J. A. (2015). The MovieLens Datasets: History and Context. *ACM Transactions on Interactive Intelligent Systems* **5** 1–19.