Recommender Systems

ECS 189G (AI series)
Fall 2018
Prof. Norm Matloff

Units: 4

Days/Time: Lecture MWF, 3:10-4, Wellman 1; discussion M 12:10-1; Haring 2016; CRN 43540

Prerequisites: Course 132 or one of STA 32/STA 130A/STA 131A; MAT 22A; course 30. Machine learning methods used but no prior background assumed. Non-CS majors welcome!


Workload: Weekly or biweekly open-book quizzes (no midterm or final exam); group programming assignments (mainly analysis of real data); group term project. Probability content is light; STA 32 is enough.

The field of recommender systems (RS):

- A branch of machine learning.
- Prediction of how well a given “user” will like a given “product.”

- Companies like Amazon, Spotify, and OkCupid use RS to recommend merchandise, songs and potential dates to their users.

- Other sample apps:
  - University of Minnesota RS system aids students in selecting courses. Predicts how well a student would like a certain course, and even predicts his/her grade!
  - Predict whether a given patient will have an adverse reaction to a given prescription drug.
  - Suggest “friend” relations in social networks.

- Software: Various packages available in R and Python. We will use R (no prior R background assumed). My students and I have developed the rectools package; see github.com/matloff/rectools and a great Stanford presentation by Pooja Rajkumar, https://www.youtube.com/watch?v=G_z4sXiYGog.

Topic outline:

- Review of probability concepts and linear algebra (both using R).
- Collaborative filtering. Functional relations between users, items and ratings.
- Content-based systems. Text processing.
- Graphical methods, e.g. PageRank and Random Walk with Restart.