Project Proposal: Recommendation Engine & Feedback Analysis

Abstract:

Recommendation engines, as in Netflix’s movie recommendations, prompt the user to provide ratings on the recommended movies, which then feeds back into the engine for future predictions. When a person watches and rates a recommended movie, the data available to the engine changes, and the next recommendation is based on that new data. In this way, recommendation engines create their own feedback, which could plausibly change their own recommendations over time. We would like to test if 1) the model will recommend a more similar set of movies over time, and 2) recommended movies across users will converge to only a few (highest globally-rated) movies. We would also like to check if 3) if anyone’s recommendations wildly changed from start to finish.

As a prerequisite, a significant part of this project will be creating a sufficiently strong ML recommendation engine and evaluating its performance.

Procedure

Part 1 - Recommendation Engine: We plan to deploy a memory based collaborative filtering technique that takes into account either a user-item or an item-item filtering approach to recommend the movies. We plan to deploy a model based collaborative filtering technique that is based on either KNN or Matrix factorization based algorithm. We will evaluate each model from the standpoint of prediction accuracy and computational complexity to determine the meat model to deploy in the simulation.

Part 2 – Simulation: A simulation will run using the recommendation engine. Individuals will ‘watch’ and ‘rate’ sequence of movies recommended by the algorithm. At each step, the last rating will be incorporated into the recommendation engine to make the subsequent recommendations. The list of recommended movies per person will be recorded at each step.

Part 3 – Analysis:  Analysis of simulation data will look for changes in the patterns of recommended movies between the 1st and the last iteration. Intended areas of focus are changes in genres and patterns appearing across all users. Analysis will include formal statistical tests and plots.