Netflix Recommendations for Groups

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ABSTRACT
In this era of overabundant information and content, people increasingly rely on recommender systems to identify those information items that best meet their needs and interests. Movie recommender systems, like the one used by Netflix, attempt to predict which films a given person will enjoy watching. While these systems help single individuals make decisions, they provide limited support for groups of people. This work explores how to create recommender systems for groups that can combine multiple user profiles and predict which movies a group of users will collectively enjoy the most. We built a prototype using Netflix REST API based on the results of a formative study of the watching habits of 60 actual Netflix users and examined their views of how a group recommendation system would fit in with their current habits. We conducted a preliminary evaluation with a focus group which validated our approach to group recommendations, revealing that this type of system could facilitate social interactions by sparking discussion about movies, directors, and actors among viewers. This prototype provides a valuable platform for further exploring group decision making in this context.

Keywords
Digital Television, Program Recommendation, Joint Recommendations, Collaborative Filtering, User Profile.

INTRODUCTION
The goal of the recommender system has traditionally been to make helpful suggestions to an individual. Recently, more attention has been placed on systems that provide recommendations to groups of users. The addition of the group dynamic complicates these systems considerably.

RELATED WORK
Jameson and Smyth (2007) provide a comprehensive description of the unique challenges faced by recommender systems for groups. They specifically focus on the how the group recommender workflow differs from a traditional recommender's. Goren-Bar & Glinansky (2004) outline a Family Interactive TV system (FIT), which filters TV programs according to user preferences, and considers how preferences might change in the presence of other family members. Yu et al. (2006) propose a system that creates a common "group profile" by combining individual profiles. The system generates a common program recommendation list for the group as determined by the merged user profile.

SURVEY
In order to better design Netflix functionality, we surveyed a group of 60 users, focusing on their viewing behaviors and demographic information. Surprisingly, our results indicate that power-users (as determined by frequency of use) are actually less likely to take advantage of Netflix's recommendation features. We also found that the power-users tend to stream Netflix content as opposed to the 'rental-by-mail' option. We hypothesize that power users are less likely to use recommender features because the interface on Netflix streaming devices is difficult to use or lacking in features.

PROTOTYPE CREATION
Engaging media systems collaboratively requires new tools (Irish & Trigg, 1989). We set out to create a prototype application based on real data that enables multi-person recommendations in the context of the Netflix streaming service that would enable both group recommendations and a way to interact with those recommendations in a collaborative manner. Our use case involves two or more people, each with their own Netflix queue, body of ratings, and individual recommendations, interacting with Netflix streaming services to select and view movies collaboratively.

Our prototype was implemented as a Web interface that utilizes the Netflix REST API to access real rental history and predicted ratings as the basis of the system. Our approach was to build a body of recommendations among a group by retrieving each individual’s recommendations from Netflix, combining them and sorting them to display what movies all viewers would most enjoy.

The system authenticates users against the API and adds them to our system, storing connection credentials until explicitly deleted. The initial screen of the app lists all of these stored, authenticated users and allows selection of two or more participants from this list to generate a recommendation view.

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Recommendation View

Our Recommendation view has two primary sections: Merged Queues and Merged Recommendations. The fact that a user has added a movie to his or her queue is significant in that the user has explicitly indicated that this is a film they would like to see. We decided to separate merged queues from merged recommendations because they differ semantically and create separate game plans for evaluating what to watch.

The Merged Queue list is generated using the API by retrieving what movies are in each participant’s queue. We combine these queues and have the API generate a predicted rating for each viewer for every movie in this combined set. For any given movie, we created a “joint predicted rating” which was an average of the predicted ratings of all participating users for that movie. In addition to the average of the two ratings, we calculated the standard deviation amongst the ratings values as our “least misery index” – a larger standard deviation value suggests a larger difference in predicted ratings and more potential disagreement on the suitability of the selection for the group. Any movies that appeared in the intersection of queues are displayed first, followed by all remaining movies sorted by joint predicted rating descending, joint standard deviation ascending. The Merged Recommender list was produced in much the same way but without attributing special significance to the intersection of recommendations across users. These two blocks were then rendered as two simple, horizontally scrolling lists of movie titles with the box art from the film and the joint predicted rating (Figure 1).

We then added relevant information regarding how these recommendations were generated to provide a visible “game plan” on how the recommendations were found and created. Just showing the joint predicted rating was opaque, and we believed that exposing the information and strategy used to promote any given recommendation could be helpful in selecting which movie to watch and also add to the collaborative nature of the experience. Finally, we added weighted normalization functions to offset the inevitable variability of rating tendencies among users and also to balance the “New User” problem for users with a small or nonexistent corpus of ratings.

CONCLUSIONS AND FUTURE WORK

Our survey provided us with a general view of the watching habits of Netflix users, and the possibility of our proposed group recommendation system fitting in with their current habits. Armed with the results gathered in this survey, we were able to determine how our prototype might be integrated with their current behavior. After researching the possibility of extending the Netflix recommendation system to include the option of providing group recommendations, we developed our prototype application.

Additionally, we conducted a focus group with three Netflix users who have multiple viewers in their households to evaluate the prototype’s usefulness. While the users we interviewed felt that Netflix’s recommendations were not always accurate or useful, they all expressed great interest in the group recommendation prototype that we presented. The participants found the idea of group recommendations and the social contexts in which they could be used to be fascinating. The focus group also revealed the possibility for our interface to spark discussion about movies, directors, and actors among viewers.

While the sample sizes of our survey and focus group were relatively small, we believe that the results indicate that this is an important area for further study, both for improvements and revisions of our prototype and for applications of group recommendations in other contexts. Specific changes to our interface include the ability to search for a specific movie and to sort by genre, MPAA rating, and other factors. We are currently planning additional user studies to investigate factors such as user privacy, queue sharing, viewer involvement, and group decision making in the context of movie watching.

REFERENCES
