

# Department of Applied and Computational Mathematics and Statistics Colloquium



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## *A group-specific recommender system*

In recent years, there has been a growing demand to develop efficient recommender systems which track users' preferences and recommend potential items of interest to users. We propose a group-specific method to use dependency information from users and items which share similar characteristics under the singular value decomposition framework. The new approach is effective for the "cold-start" problem, where, in the testing set, majority responses are obtained from new users or for new items, and their preference information is not available from the training set. One advantage of the proposed model is that we are able to incorporate information from the missing mechanism and group-specific features through clustering based on the numbers of ratings from each user and other variables associated with missing patterns. In addition, since this type of data involves large-scale customer records, traditional algorithms are not computationally scalable. To implement the proposed method, we propose a new algorithm that embeds a back-fitting algorithm into alternating least squares, which avoids large matrices operation and big memory storage, and therefore makes it feasible to achieve scalable computing. Our simulation studies and MovieLens data analysis both indicate that the proposed group-specific method improves prediction accuracy significantly compared to existing competitive recommender system approaches.

**Monday, December 18, 2017**  
**4:30 PM – 5:30 PM**  
**127 Hayes-Healy Center**

Colloquium Tea 4:00 PM to 4:30 PM 154 Hurley Hall