Predictive Modeling of Preference Ranking Data

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Thursday, April 9, 2015  
3:30pm  
Electrical Engineering  
Seacat Room 217

Ranking data arise in myriad scenarios including voters ranking top candidates, search engines returning top-k web pages, and customer preferences over different products in online systems such as Amazon, Netflix, and Pandora. Analyzing large scale ranking data is very important for both business analytics and system engineering, which, however, has not yet been fully studied due to computational difficulties.

In this talk, I focus on efficient modeling to predict user preferences, to improve the algorithm design of online systems, and to gain insights from ranking patterns. In particular, I introduce an efficient non-parametric model to estimate distributions from partial incomplete rankings, which is naturally suited for tasks such as rank prediction and association rule discovery. I further present a framework to explore user-system interactions and improve prediction accuracy when little information is known about the preferences of new users. In addition, I demonstrate how to visualize ranked preference data in a low-dimensional space via multi-dimensional scaling for effective summarization.