

**Recommendation as Link Prediction: A Graph Kernel-based Machine Learning Approach**

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**ABSTRACT**

Recommender systems have demonstrated commercial success in multiple industries. Among the major recommendation algorithms, the successful collaborative filtering (CF) methods explore the use of user-item interactions to infer user interests. Based on the finding that transitive user-item associations can alleviate the data sparsity problem in CF, multiple heuristic algorithms were designed to take advantage of the user-item interaction networks with both direct and indirect interactions. However, the use of such graph representation was still limited in learning-based algorithms. In this paper, we propose a graph kernel-based recommendation framework. For each user-item pair, we inspect its associative interaction graph (AIG) that contains the users, items, and interactions  $n$  steps away from the pair. We design a novel graph kernel to capture the AIG structures and use them to predict possible user-item interactions. The framework demonstrates improved performance on three real-world datasets, especially when a large number of suggestions are needed.

**BIOGRAPHY**

Xin Li is an assistant professor in the Department of Information Systems at the City University of Hong Kong. He received his Ph.D. in Management Information Systems from the University of Arizona in 2009. Before that, he received his Master's and Bachelor's degrees from the Department of Automation at Tsinghua University, Beijing, in

2003 and 2000, respectively. He had worked for Oracle as an assistant consultant for one year in 2003. Xin's research interests include business intelligence, social network analysis, knowledge discovery and data mining, knowledge management, and patent analysis. His work has appeared in JMIS, IEEE TITB, Nature Nanotechnology, Journal of Biomedical Informatics, JASIST, Bioinformatics, and so forth.

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***All are welcome!***