Abstract

A recommendation system is an information retrieval system that employs user, product, and other related information to infer relationships among data to offer product recommendations. The basic assumption is that friends or users with similar behavior will have similar interests. The large number of products available today makes it impossible for any user to explore all of them and increases the importance of recommendation systems. However, a recommendation system normally requires comprehensive data relating users and products. Insufficiently comprehensive data creates difficulties for creating good recommendations. Recommendation systems for incomplete data have become an active research area. One approach to solve this problem is to use random walk with restart (RWR), which significantly reduces the quantity of data required and has been shown to outperform collaborative filtering, the currently popular approach. This study explores how to increase the efficiency of the RWR approach by replace transition matrices that use information regarding relationships between user, usage, and tags with transition matrices that use Bayesian probabilities, and compare the efficiency of the two approaches using mean average precision. An experiment was conducted using music information data from last.fm. The result shows that the proposed approach provides better recommendations.
Random Walk-based Recommendation with Restart using Social Information and Bayesian Transition Matrices

References

- E. -H. S. Han and G. Karypis, "Feature-based recommendation system," in
Random Walk-based Recommendation with Restart using Social Information and Bayesian Transition Matrices

- P. Heymann, G. Koutrika, and H. Garcia-Molina, "Can social bookmarking improve web search?" in Proceedings of the 2008 International Conference on Web
Random Walk-based Recommendation with Restart using Social Information and Bayesian Transition Matrices


- D. Aldous and J. Fill, &quot;Reversible markov chains and random walks on graphs,&quot; 2002.
- M. Clements, A. P. de Vries, and M. J. Reinders, &quot;Optimizing single term queries using a personalized markov random walk over the social graph,&quot; in Workshop on Exploiting Semantic Annotations in Information Retrieval (ESAIR), 2008.
- M. Brand, &quot;A random walks perspective on maximizing satisfaction and profit,&quot; in SIAM International Conference on Data Mining, pp. 12–19, 2005.
- F. Fouss, A. Pirotte, J. -M. Renders, and M. Saerens, &quot;Random-walk computation of similarities between nodes of a graph with application to collaborative


- M. Bayes and M. Price, "An essay towards solving a problem in the doctrine of chances. by the late rev. mr. bayes, f. r. s. communicated by mr. price, in a letter to john canton, a. m. f. r. s." Philosophical Transactions, vol. 53, pp. 370–418, 1763.

Index Terms

Computer Science

Information Sciences
Keywords
Recommendation system  random walk with restart  mean average precision