Exploiting Implicit User Activity for Media Recommendation

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Abstract

This thesis explores in depth how to exploit the user browsing behavior, and in particular the referrer URL, to understand the interest of the users. The aim is, first, to understand the preferences of the users from their navigation patterns, *i.e.*, from the implicit actions of the users. Then, to exploit this information to personalize the content offered by the service provider. The key findings from our studies allowed us to propose innovative solutions to perform recommendation and ranking of media content. We show how the browsing logs are extremely meaningful also for cold-start problem – estimating the preferences of newcomers.

Summary of Contributions

- **Referrer URL.** We propose an analysis of the user browsing behavior, exploiting the external referrer URL, namely the last URL visited by the user before entering in the current website. We show the rich informativeness of the referrer URL, and how to exploit it in order to identify the behavior of the users.

- **ReferrerGraph.** We introduce the concept of the ReferrerGraph, namely a browsing graph built on sessions with the same referrer URL. We show how different referrer URLs often reflect different behaviors. A study in time of the evolution of the BrowseGraphs is performed in conjunction with the computation of random walk like algorithms and their performance. In addition a well-known problem, called Local Ranking Problem is tackled, and two different applications are proposed.

- **Cold-Start Recommendation.** In a news portal like Yahoo News with a vast collection of news articles with thousands of new articles posted every day, it is very easy for the user to get lost in the amount of data without reaching all the highly interesting articles. We face the problem of newcomers when the user is completely unknown, and therefore where we do not know the users tastes. Our approach use the ReferrerGraphs to retrieve the articles that are most likely to be consumed by the user.

- **Image Ranking.** Finally, we compare different approaches based on explicit actions, *i.e.*, favorites on Flickr, and on the vast implicit actions such as clicks, views and ReferrerGraphs. Results show how the rankings computed by different methods vary. Finally, thanks to the various evaluation metrics we used, the peculiarity and specific characteristics of each approach are highlighted and discussed.

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The thesis is available at the following link: `http://hdl.handle.net/10803/283657`