

Chapter VII

From PageRank to Social Rank: Authority-Based Retrieval in Social Information Spaces

Sebastian Marius Kirsch

University of Bonn, Germany

Melanie Gnasa

University of Bonn, Germany

Markus Won

University of Bonn, Germany

Armin B. Cremers

University of Bonn, Germany

ABSTRACT

Social information spaces are characterized by the presence of a social network between participants. In this chapter we present methods for utilizing social networks for information retrieval by applying graph authority measures to the social network. We show how to integrate authority measures in an information retrieval algorithm. In order to determine the suitability of the described algorithms, we examine the structure and statistical properties of social networks, and present examples of social networks as well as evaluation results.

INTRODUCTION

While the core concepts of information retrieval have been traced back as far as 4,000 years by some authors (Manber, 1992), the field itself is

comparatively recent. The development of automated information retrieval systems has always been closely tied to available computing power. As increasing amounts of data and processing power become available, new methods are be-

ing developed which utilize these resources for information retrieval—often drawing on ideas or concepts that are much older. For example, the field of Web retrieval, one of the largest applications of information retrieval at the moment, did not exist until the Web itself (Berners-Lee, Cailliau, Luotonen, Nielsen, & Secret, 1994) was invented. At the same time, the most prominent methods for Web retrieval (Page, Brin, Motwani, & Winograd, 1999) draw upon ideas developed in related fields decades earlier (Pinski & Narin, 1976).

On the other hand, the idea of finding information using social relations and social networks is an ancient one. Indeed, before the advent and ubiquitous availability of modern communication media, it was the only method of finding information: If one wanted to know something, one had to ask someone—an acquaintance, a friend, or the reference desk librarian. Being well connected in the social network of one's peers was of paramount importance to ensure that one stayed well informed about current events. Scores of letters exchanged between scientists in the last centuries are testimony of the importance of communication and social relations for scientific work.

Closely connected is the idea of social rank and of authority. It is not only important how many people one knows, but also to know the right people—in order to be able to ask the right questions to the right people, and in order to get the right answers. Well-connected people are also crucial for disseminating information and spreading new ideas.

When communication networks—precursors of the Internet such as the ARPANET or Usenet—were invented, one of their first purposes was communication not between machines, but between users: electronic mail, newsgroups, and real-time communication. The cost of interacting with many people sank dramatically, and this made e-mail one of the “killer applications” for the budding computer networks.

Social Networks, Social Information Spaces, and Social Information Retrieval

Social networks become increasingly interesting with the shift of computer systems away from devices for computation towards communication media. Although social networks exist without any computer support, in recent years many different networks were formed, using the Internet as their main platform.

Besides a shared interest, the formation of social networks in real life is often determined by external factors—age, sex, geography, or a crucial experience (e.g., relocation or war.) Since virtual networks or communities are unconstrained by such external factors, the shared interest becomes a predominant determinant. The participants' identification with the group and the group's self-made norms also play an important role (see Dholakia, Bagozzi, & Klein Pearo, 2004).

The earliest applications of computer networks were electronic mail, mailing lists, and discussion boards. Especially in recent years, the World Wide Web shifted from content provision towards an interactive information space. Content (information) is not only provided by the providers of Web sites. Technologies like Wikis (Fuchs-Kittowski & Köhler, 2005), blogs (e.g., BlogSpot), or community support systems provide mechanisms that allow every user to add or change the content of this information space, with respect to access rights and correct authorization. We collectively refer to those interaction-enabling technologies as “Web 2.0” or the “social Web.”

Technology serves as a new basis for a much older concept: social networks. People who share the same interests form a group. They know people within the group and share information with each other.

The glue that keeps them together is trustworthiness. Information given by a known person is trusted more than the one given by unknown people. In particular, those feelings of trust can be

19 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/chapter/pagerank-social-rank/29163

Related Content

The Current State and Future Potential of Virtual Worlds

John M. Artz (2009). *International Journal of Virtual Communities and Social Networking* (pp. 14-22).
www.irma-international.org/article/current-state-future-potential-virtual/2950

Feeling (Dis)Connected: Diasporic LGBTQs and Digital Media

Alexander Dhoest (2016). *International Journal of E-Politics* (pp. 35-48).
www.irma-international.org/article/feeling-disconnected/163144

Using Social Media to Advocate LGBT Rights in Black Africa: A Study of Nigerian and Cameroonian Gay Bloggers and "Facebookers"

Floribert Patrick C. Endong (2018). *Exploring the Role of Social Media in Transnational Advocacy* (pp. 203-227).
www.irma-international.org/chapter/using-social-media-to-advocate-lgbt-rights-in-black-africa/202310

Web 2.0 and Collaborative Learning in Higher Education

Anna Escofetand Marta Marimon (2010). *Educational Social Software for Context-Aware Learning: Collaborative Methods and Human Interaction* (pp. 206-221).
www.irma-international.org/chapter/web-collaborative-learning-higher-education/38167

The Evolution and Influence of Social Presence Theory on Online Learning

Patrick R. Lowenthal (2010). *Social Computing: Concepts, Methodologies, Tools, and Applications* (pp. 113-128).
www.irma-international.org/chapter/evolution-influence-social-presence-theory/39716