ISKODOR: Unified User Modeling for Integrated Searching

Melanie Gnasa
Inst. of Computer Science III
University of Bonn and
Fraunhofer Institute IAIS
Sankt Augustin, Germany
melanie.gnasa@
iais.fraunhofer.de

Armin B. Cremers
Inst. of Computer Science III
University of Bonn
Bonn, Germany
abc@iai.uni-bonn.de

Douglas W. Oard
Coll. of Info. Studies/UMIACS
University of Maryland
College Park, MD 20742 USA
oard@umd.edu

ABSTRACT

ISKODOR integrates personal collections, peer search, and centralized search services. User modeling in ISKODOR fills three roles: discovery of sites with suitable information stores, context-based query interpretation, and automatic profile-based filtering of new information. Explanation and control are achieved through graphical depiction of sources, explicit feedback regarding utility, and explicit control over peer association behavior and information sharing.

Categories and Subject Descriptors

H.3.3 [**Information Storage and Retrieval**]: Information Search and Retrieval

General Terms

Algorithms, Experimentation

Keywords

Web search, explicit relevance feedback, collaborative search

1. MOTIVATION

User modeling for information retrieval is an active research area to improve the effectiveness of information access. Two new research directions have been explored in different settings. Lu and Callan [3] demonstrated that user modeling in peer-to-peer networks significantly improves the efficiency of federated full-text search without degrading its accuracy. In the context of web search, the experiments of Agichtein et al. [1] demonstrate a significant improvement of the accuracy of competitive web search ranking algorithms in a realistic environment by incorporating user behavior information. Our goal is to integrate personal collections, peer search, and centralized search services in order to improve web search accuracy. Thus, a user can be made aware of information providers that have contributed to his or her search result, and he gets a personalized access to large information storage. We refer to this integration as *congenial web search* [2].

2. SYSTEM DESIGN

The architecture of the ISKODOR prototype integrates commercial web search engines in a virtual peer-to-peer network. All users are organized in the network as peers and maintain a personal collection. Figure 1 shows a flow diagram of an integrated search with ISKODOR. In general, the inte-
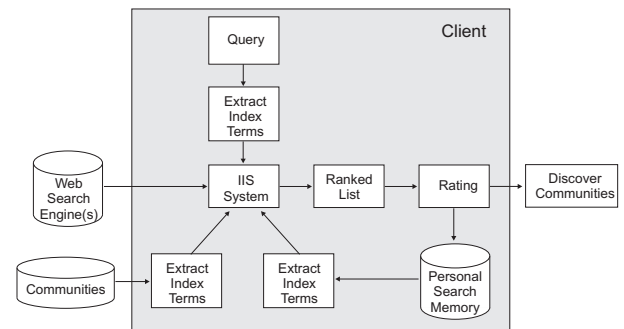
Figure 1: Integrated Searching with ISKODOR

grated search concept is similar to traditional information retrieval. The main difference arises from the unified user model which fills three roles:

- ISKODOR helps the user identify and select peers who share common interests. The client maintains a search history which can be used to indicate the utility of prior search results. Communities are nominated automatically based on the search histories that their users choose to share; nominations accepted by the local user can then guide future peer search.

- ISKODOR ranks results from local search, peer search, and web search based on context-dependent query interpretation. The context for a query draws on the client's search history and on shared search histories by community members.

- ISKODOR performs automatic profile-based filtering for new information. This process aims to provide awareness of documents which have been found by other community members.

All three roles of the unified user model are implemented in a working prototype in which a graphical user interface provides for explanation and control.

3. REFERENCES

[1] E. Agichtein, E. Bill, a. S. Dumais. Improving web search ranking by incorporating user behavior information. In *SIGIR*, 2006.

[2] M. Gnasa, M. Won, a. A. B. Cremers. Three pillars for congenial web searching—continuous evaluation for enhancing web search effectiveness. *Journal of Web Engineering*, 3:252–280, 2004.

[3] J. Lu a. J. Callan. User modeling for full-text federated search in peer-to-peer networks. In *SIGIR*, 2006.