

Adaptive IR for Exploratory Search Support

Daniel T. J. Backhausen
University of Hagen
58084 Hagen
Germany
daniel.backhausen@fernuni-hagen.de

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ABSTRACT

Most Information Retrieval (IR) software is designed to fit a general user where users are submitting queries and the retrieval system returns a ranked list of results. Regardless of the user, the query always returns the same list of results. Individual aspects like age, gender, profession or experience are often not taken into account, for example the difference in searching between children and adults. Although long challenged by works such as Bates' berrypicking model [1], common systems still assume that the user has a static information need which remains unchanged during the seeking process. Moreover many systems are strongly optimized for lookup searches, expecting that the user is only interested in facts and not in complex problem solving.

But in many everyday situations people search for information to gain knowledge which allows them to fulfill a specific work task (e.g., [3]), like answering research questions, investigating for a publication or thesis, comparing different products or learning a language. Such complex tasks can be divided into sub-tasks and generally include multiple exploratory search sessions, in which the user strongly interacts with the system. This is a longitudinal process where the searcher necessarily gathers, collects, aggregates, interprets, processes, and evaluates information objects from one or more sources. In such complex search scenarios all three activities lookup, learn, and investigate are used in conjunction with one another to bridge the users knowledge gap [2]. In each step of this process, the user faces a new situation in which knowledge and information need changes. This influences the relevance of information objects and may direct the user to different topics, domains, or also tasks.

The goal of this research is to effectively assist at fulfilling complex (work) tasks consisting of multi-session exploratory search activities. To achieve this, information retrieval needs

personalization and has to close the gaps between the different search sessions. This can be done by enabling the user to collect information objects into a personal reference library and visualizing past search activities in a kind of breadcrumb or time line.

Thinking one step further, a personalized IR system (PIR) has to adapt to relevant factors and commit itself to the specific user and the personal search behavior. This means the system needs to guide the user through the searching process, suggesting useful search actions like effective search strategies or query formulations and has to recommend information objects relevant to the work task and the users current situation. Thereby the system has to be aware of the user and specific contextual circumstances. General information about the user like gender or age can be fetched explicitly, allowing to adapt in a more coarse grained way (i.e. decide the way of presenting results based on the user group). Moreover integrating used applications or providing other ways to let the user explicitly manage tasks will help to understand the goal of the users search activities and will provide much better ways of user assistance.

To close the gap between user and system, both behavioral and contextual information are necessary. Information about the search behavior and indirectly the users knowledge and expertise can be conveyed by logging (e.g. query logs) and examining system interactions. The fetched data should be made transparent to the user, showing what kind of information has been gathered so far. The implicit information has to be refined with other contextual information collected implicitly from different interfaces or sensors (e.g. time, location) and explicitly by direct user input from e.g. relevance feedback interactions. This will allow a more fine grained way of system adaption and offers new options in assisting the user during the long-term search activities showing personalized search strategies and possible next steps appropriate to the information need and level of experience.

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