UCAIR: A Personalized Search Toolbar

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The UCAIR search toolbar is a web browser plug-in that functions as a client-side personalized search agent [4]. A major advantage of UCAIR over many existing toolbars (e.g., Google toolbar) is that it can collect implicit feedback information from a user and exploit such information to improve retrieval accuracy for this user without requiring any additional effort from the user. While implicit feedback has been recognized as an effective technique for improving search accuracy [2, 1, 5, 6, 3], such functionality has not yet been delivered to users in assisting their web search. UCAIR is the first web search toolbar to support online implicit feedback effectively and efficiently. Specifically, it can (1) log a user's interaction history with a search engine; (2) identify query coherence and search session boundaries; (3) perform implicit user modeling based on the past queries and the user-viewed results in the same search session; (4) selectively modify user queries based on implicit user modeling; (5) immediately re-rank search results once the user model is updated.

As shown in Figure 1, the UCAIR toolbar has 3 major components: (1) The (implicit) user modeling module captures a user's search context and history information, including the submitted queries and any clicked search results and infers search session boundaries. (2) The query modification module selectively improves the query formulation according to the current user model. (3) The result re-ranking module re-ranks any unseen search results immediately whenever the user model is updated. For example, when the user clicks on a search result to view the corresponding web page, UCAIR would assume that the clicked result summary is appealing to the user and may reflect the user's information need. It would immediately re-rank the not-yet-viewed results based on the viewed summaries and attempt to pull up results that match the clicked summaries well while pushing down those results that are originally ranked high, but do not match the clicked summaries well. Thus when the user clicks on the "Back" button of the web browser or "Next" link of the search result page to view more results, the new results displayed would be different from the original results.

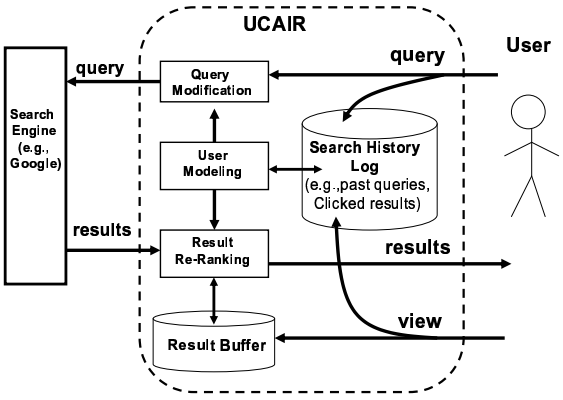

Figure 1: UCAIR toolbar architecture

With the implicit feedback from the user, the UCAIR toolbar can personalize web search results and improve search accuracy. Moreover, the UCAIR toolbar performs query modification and result re-ranking in a very efficient way; as we will demonstrate, a user does not usually feel any obvious delay in the response time.

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