

InFrame-Browsing - Enhancing Standard Web Search

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ABSTRACT

While adhoc-search is well supported by current web search engines like Google, more complex information seeking processes like exploratory searches often lack in support for integrated browsing, easy change of perspective on the same information and a support for Personal Information Management (PIM). However, these aspects are crucial when working with retrieved results in order to put them into context. In this paper we present a concept that enhances classic web search by different user interface elements and personalization components in order to improve user experience (UX) while users conduct complex search tasks. The concept has been prototypically implemented as a rich internet application to demonstrate its advantages towards ordinary web search user interfaces and has been evaluated by conducting an expert design review.

Author Keywords

Web Search, Search User Interface, Information Retrieval.

ACM Classification Keywords

H.3.3 Information Storage and Retrieval: Information Search and Retrieval.; H.5.2 Information Interfaces and Presentation: User Interfaces.

General Terms

Design, Human Factors, Management.

INTRODUCTION

When a user searches the web for information, he usually uses a standard web search engine. This works quite good in adhoc-search scenarios [12]. But if user's information need is or becomes (during the search process) more complex, he often needs to use additional, even external tools in order to manage his research on a certain topic [11, 5, 1]. In this work we present a promising search user interface (SUI) for a web search engine that is integrated in a Context Aware Retrieval System Architecture (CARSA, [2]). Furthermore the proposed user interface concept prevents users from unintended context and use mode switches that usually strain user's working memory capacities or increases his workload



Figure 1. Keep it simple & clean: CARSA start screen (enlarged).

since it supports different views and integrated PIM functionality.

PROPOSED DESIGN FEATURES

Since users are often forced to use a number of different tools to be adequately supported in complex information retrieval tasks like exploratory searches [12], we designed an SUI that integrates basic features like website previews and bookmark management. In contrast to other proposed solutions, which uses static web page thumbnails or document previews (like PDF- & PS-previews in [6, 7]), we decided to use iFrames to support users in browsing a single search result as this helps users to evaluate the relevance of a certain web document towards their actual information need.

To create a better image of the proposed idea, we created an interactive prototype using Adobe Flex¹. The referenced screen shots were taken from this running rich internet application. To satisfy user's expectations we lend the entry design from a standard web engine, like e.g. Google². Therefore the system starts with a simple, clean and common known user interface (Fig. 1). The entry field supports auto-complete functionality and query suggestions, provided by Google's search API³. We added some additional features that addresses the needs of users with enhanced information needs and research ambitions.

Next to the expected standard functionality of a search engine (entering queries, providing a list of results and giving users the opportunity to click single results to further explore them), we liked to offer users to decide easier and quicker whether a result is relevant or not. Therefore, users can select from different algorithms to configure searches in advance and users

¹<http://www.adobe.com/products/flex.html> (03.08.2012)

²<http://www.google.com> (03.08.2012)

³<https://developers.google.com/web-search> (03.08.2012)

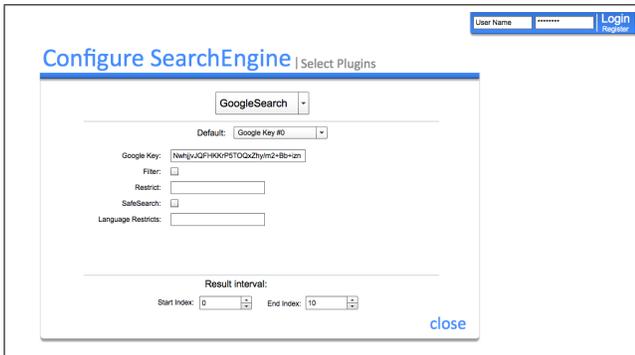


Figure 2. Configuring selected plugins.

can switch between different views to preview results before actually clicking them. Furthermore we added simple PIM features to manage search results and personal bookmarks after conducted searches.

In the following, the different key features will be presented in more detail:

Easy Setup and Configuration. Since the CARSA system is not only a web search engine, but an information retrieval framework, the interface also supports complex plugin configuration options to use different classifiers and clustering methods like k-means clustering (see, e.g. [4]).

To provide users with a simple way to set a personal plugin configuration for result preparation, such as re-ranking functionality, the user configures (see Fig. 2) his plugins by adding plugins in a kind of shopping cart (see Fig. 3). This metaphor mapping is supposed to reduce the complexity of such configurations.

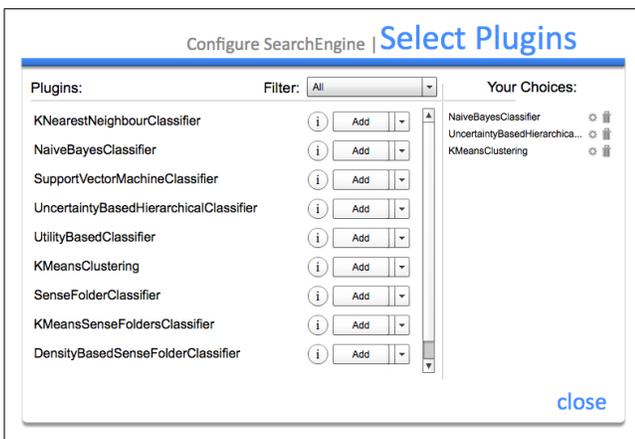


Figure 3. Shopping algorithms: plugin configuration (detail).

First tests with users reveal a high acceptance of this metaphor as it is also common practice in e-shopping portals and therefore quite familiar to them.

Supporting Different Views. Besides a list view of retrieved web documents (see Fig. 4), which meets user expectations, the system also provides further views.

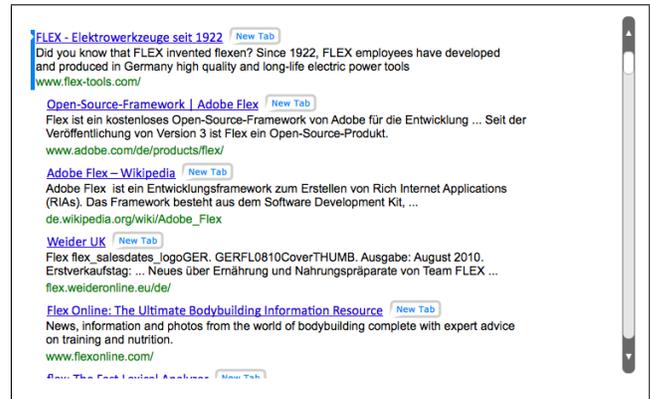


Figure 4. Fulfilling user's expectations: classic list view support with marking functionality.

Switching between these views is easy since single results can also be marked in the list view in order to ensure seeing the same results marked in other views. Since this provides users with a reliable change of perspective to support them in conducting sub-researches (browsing for evaluating the relevance of single results). Other search engines, like google.com, do not keep last viewed result's view positions while switching between views (e.g. switching between textual result lists, maps and images does not freeze the different view positions of the user). By clicking on the *select view* symbols in the left upper corner of the UI, users can select from *L* (list view, set as standard view), *CF* (CoverFlow visualization) and *S* (two step screen filling).

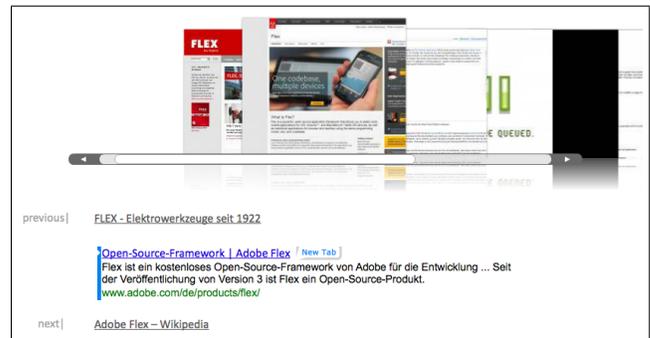


Figure 5. Reducing user's work load: coverflow view (detail).

The CoverFlow visualization (Fig. 5) supports a smaller list view at the bottom in order keep users on track by providing more detailed information on certain results. By horizontal scrolling through results the cognitive work load is lowered and this saves user's mental resources to concentrate on their current task.

InFrame Browsing. In contrast to other SUIs, like e.g. SearchMe⁴, our proposed concept offers an integrated browsing experiences that does not expect users to leave the search engine environment. While the CoverFlow visualization is realized using a thumbnailing tool that captures the initial screens of a certain web document, users might be interested in directly interacting with search results.

⁴<http://www.searchme.com> (no longer available)

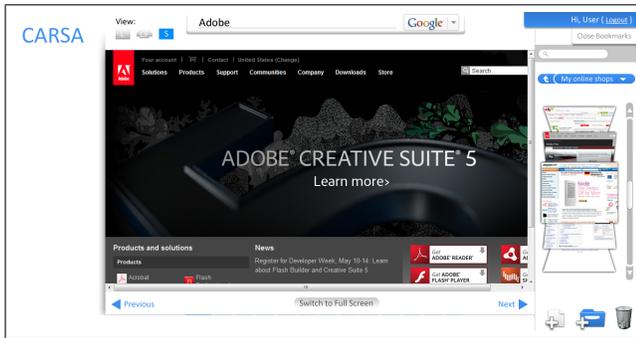


Figure 6. Keeping user's workload: the InFrameBrowsing feature.

Therefore we are using iFrames to enable *InFrameBrowsing*. The user does not need to open a new window, tab or even another browser instance. He can browse single results to evaluate the relevance to his current information need. Thereby users are prevented of mode switches that might lower their attention and increases cognitive workload [8]. In a first step users will be provided by a half-sized InFrameBrowsing window, integrated in the IR system, see Fig. 6. But they can also click on *Switch to Full Screen* to maximize their work space. Also in this case users do not need to leave the search engine which allows to log user's interaction to provide them with personalized and optimised results. To use this personalization feature users are asked to set up an account to manage their individual user profile.

Once a user has an account for CARSA, he can also manage his bookmarks using the integrated bookmark manager (see Fig. 7) which allows users to personalize future search results based on their current interests [3]. This is supposed to support user's management of personal links and therefore can be seen as a kind of Personal Information Management [10] feature.

Methods & Expert Review. We developed the search user interface considering the ISO-13407 [9] standard for usability engineering. Furthermore we took Nielsen's recommendations [13] into account to ensure the development of an ergonomic interactive system.

After developing this first interactive prototype we consulted three experts of the domains HCI, IR and HCIR to ask for their opinion. There was no special task given since the test users were supposed to check out the new features by their own, without limiting it to a certain test scenario. After a short phase of orientation our test users liked the proposed concept. They went different cognitive walk throughs since they were from different domains and tested the UI from their personal perspectives. Especially the possibility of switching between views was often used and characterized to be a "very good idea". Critics were mentioned towards the concept of the shop basket since the experts mentioned that some of the offered algorithms might affect themselves mutually. They suggested to explain the algorithms in more detail, especially for novice users or non-professionals.



Figure 7. Supporting PIM: the bookmark manager (detail).

DISCUSSION & OUTLOOK

To extend standard web search engines by providing different views on retrieved web documents, allowing users for direct browsing single results and support them with basic PIM features, we propose a variety of additional UI features that aim to lower user's cognitive work load while searching. Focussing on integrated views, users do no longer need to leave the search engine environment to visit single web documents to evaluate their usefulness. Since users are still in the environment of the information retrieval framework, this allows system providers to offer personalized content preparation to improve usability and user experience. However, especially users benefit from the possibility of *InFrameBrowsing* since this concept prevents them from unintended mode switches. This in return saves user's concentration on the actual (search) task.

In further usability studies we like to evaluate the proposed concept using real search scenarios in a more advanced testing setup. In addition we will compare the results with standard web search engines like Google to evaluate the usability and user experience.

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