Dynamics in Search User Interfaces

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Abstract

Searching the WWW has become an important task in today's information society. Nevertheless, users will mostly find static search user interfaces (SUIs) with results being only calculated and shown after the user triggers a button. This procedure is against the idea of flow and dynamic development of a natural search process. The main difficulty of good SUI design is to solve the conflict between good usability and presentation of relevant information. Serving a UI for every task and every user group is especially hard because of varying requirements. Dynamic search user interface elements allow the user to manage desired information fluently. They offer the possibility to add individual meta information, like tags, to the search process and enrich it thereby.

Motivation

• proficient tool to analyse the structure of the web and to provide guidance to specific sources of information is needed → search engines
• rising demand for search tools & quality of search terms has changed (**users tend to request complex answers trying to learn about topics in deep**)

→ **using dynamic elements in SUIs**, that focus on fluent work flow characteristics, a high grade of interactivity and an adequate answer-time-behaviour

Information Gathering

- users are not familiar with the domain & need to refine search queries, branch out into other queries to gain additional understanding and collect results to merge them into a single topic → **exploratory search** (tasks are fragmented, consisting of single queries and search requests)
- search requests may yield additional data or parts of the final information which in the end form the information requested by the user
- user **discovers new traces** leading to other sources
- **different traces span a map** in the end, representing the whole search and its processing
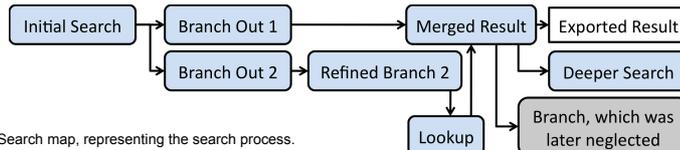
Search map, representing the search process.

- users may track back to a certain node and deepen the understanding about it by adding new queries, and therefore new branches
- the result is not a single object → it is a set of sources, **representing the learning process**
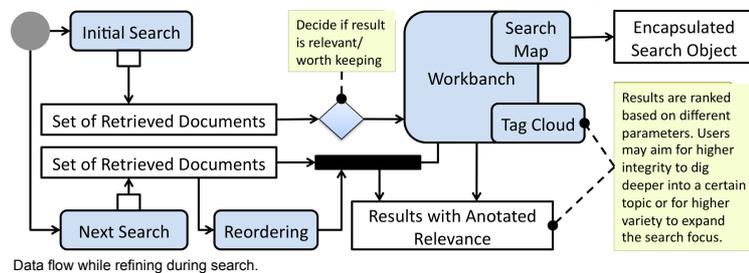
Data flow while refining during search.

Composing a dynamic SUI

• design enriched with dynamic UI elements, including principles to form web based learning applications focusing on completion of complex search tasks
• by adding dynamic elements internal states can be visualized for the user to give a better overview about the current position in the search process
• context of the whole search process will be persistent over multiple search queries and provide a method of accumulation parts of the search process
• modular UI, the user may move, hide and scale elements to fit his current need

Reordering (offer users the opportunity to reorder and therefore to rate a search result):
• results handled as single items, picked by the user & dropped in another place → other items reorder fluently, giving user feedback while user moves on
• SUI holds array of parameters to evaluate every result item (possible criteria are accuracy, clarity, currency and source novelty)
• search engine may use information provided by ranking to weight existing parameters → engine present results ranked according to user's preference

**Workbench** (targets the issue of loosing information while switching between different searches):
• adds a third place to the proposed search process, located outside of the search scope but still related
• user may drop queries to keep them throughout the whole search process
• workbench acts as a buffer between search queries, adding a broader context to every entry

Tag Cloud (tag cloud supported retrieval system can increase the find rate of adjacent data nodes by nearly 15%):
• most relevant tags from results are extracted and visualized in tag cloud
• when entering a new search query the tag cloud displays the relevant tags and reorders the cloud to revolve around the current tags
• by combining distance and size of the entered tag with their direct neighbours the user can directly spot how homogeneous its current query is

Search Map Support (as a representation of whole search process by storing every query & following up querying and visualize it in a chronological order):
• user may select single nodes in the map to get into the state of search process at this moment and refine it
• allows the user to cut off nodes and whole branches if they are not needed any more to fulfil the need for information
• user can save whole search tasks just like he saves favourite web pages
• the search map provides a visual representation to simulate parallelism
• scoping of the analysis by creating a horizontal or vertical bound; only tags and items inside this bound will be considered, the rest is greyed out → dig deep into a certain topic (small vertical bounds) or create a better understanding of a certain term and add more results to a certain query (horizontal boundary)
• helps the user to concentrate on smaller pieces of a big search process and to narrow down problems one by one
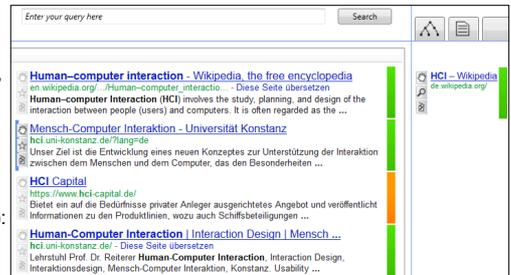
Mockup-Design using principles of dynamic SUI elements.

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