

The Value of Visual Elements in Web Search

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ABSTRACT

We used eye-tracking equipment to observe 36 participants as they performed three search tasks using three graphically-enhanced web search interfaces (Kartoo, SearchMe and Viewzi). In this poster we describe findings of the study focusing on how the presentation of SERP results influences how the user scans and attends to the results, and the user satisfaction with these search engines.

Categories and Subject Descriptors

H.3.3 [Information Search and Retrieval]: Search process

H.5.2 [Information interfaces and presentation]: User Interfaces. - *Graphical user interfaces.*

General Terms

Design, Human Factors.

Keywords

Search Engine Results Page Display (SERP), Eye-tracking study, Search Engine Evaluation, User Study

1. INTRODUCTION

The results of a web search are generally presented as a collection of web-page surrogates. Each surrogate conveys information that

can be used to support the decision ‘should I follow this link?’ These surrogates, along with other information on the page may also support the decision to reformulate the search query – either because the results don’t seem relevant, or because they trigger ideas that alter the searcher’s target or conceptualization of the information need [4].

Our study investigates how searchers interact with graphical, non-textual search engine results page user interfaces (SERP UIs) to reveal the potential value of these alternative display strategies. We study whether the unique characteristics of these displays facilitate the work of scanning the page for the clues that support the decision to follow a link or reformulate a query.

2. REVIEW OF RESEARCH

Others have also used eye-tracking to gain an understanding of what happens during search. A major finding of this work is that, when results are presented as a ranked list, users direct most of their attention to results near the top of the list [2,5]. This is true even if the list is manipulated so that more relevant results appear lower on the list [5], and even if the eye-tracking data shows that the viewer looked at those more relevant results [2]. Cutrell & Guan [1] found that this bias toward earlier results can also be affected by the content of the surrogates – in this case, by the length of the text snippet.



Figure 1: Screenshots of ViewZi, SearchMe, and KartOO

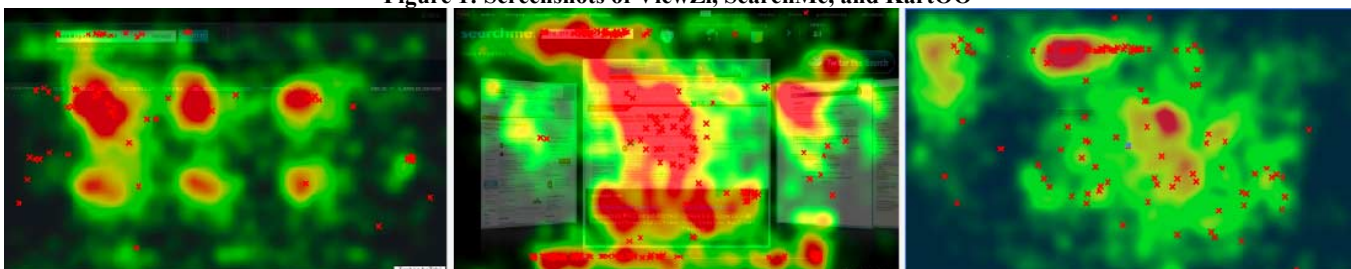


Figure 2: Hot spots for ViewZi, SearchMe, and KartOO

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Some other observations revealed by eye-tracking that are relevant to our work are that placement and proximity of image search results affects a viewers gaze path [6], and that an organized display with an explicit hierarchy reinforced with

headings and indentations facilitates a more efficient visual search [3].

3. METHODOLOGY

To gather evidence for how graphical qualities of a SERP support or hinder a user, we collected and analyzed two sources of data: 1. self-report (both audio recordings of verbalizations during search and responses to a questionnaire), and 2. observation (cursor and gaze behavior). We collected this data while users completed a series of search tasks using three graphically-enhanced search interfaces. The interfaces were Kartoo (kartoo.com), SearchMe (searchme.com) and Viewzi (viewzi.com). We chose these three because they display the results using graphical representation rather than the typical text-based ranked list. They also have enough similarities to each other to allow for meaningful comparisons.

3.1 Participants

We recruited 36 participants, all undergraduate students at a major research university. They were divided into two groups: 18 were trained to search the three SE, 18 were untrained.

3.2 Search Tasks

We chose search tasks which require different types of cognitive processing and navigation to elicit a range of search behaviors. Task 1 asked the user to find the schedule of events at a local performance theater. Task 2 asked to find two sites where a specific camera model could be purchased. Task 3 asked the user to find two credible sites describing the side-effects of aspirin.

3.3 Data Collection

Data was collected using questionnaires, the think-aloud process, eye-tracking, transaction logging, and participant observation. We used the Tobii eye-tracking system and ClearView 2.7.1 software to record and analyze the eye-tracking data. After each search, we asked the users to reflect upon how the interface affected their searching. After the entire set of searches, we asked them to compare the interfaces with each other.

4. DISCUSSION

Each of these three SERP interfaces uses an arrangement of page surrogates which differs from the usual top-to-bottom linear display. Viewzi (upper left in Figure) uses a grid. SearchMe (central image in Figure) uses a horizontal display in which only one surrogate (the central one) is clearly displayed at a time, while the previous and subsequent surrogates are smaller and displayed as if in a stack set at an angle to the central surrogate. Kartoo (right in Figure) spreads the surrogates across the page organized by major topic area and resembles a map.

The three displays also differ in the content of each surrogate. All three include a thumbnail image of the site though they vary substantially in size (Figure). All three include some text – a partial URL and keywords in Kartoo, a slightly-abbreviated Google-derived snippet in Viewzi, and a snippet plus access to the full page (using a magnifying window) in SearchMe.

We can easily see differences in scanning behavior across the three interfaces. This is evident in the heat-map images in Figure which show the combined gaze data from 18 participants. Our analysis indicates that the Kartoo display elicited the most scanning. Participants generally spent time looking at all 10 surrogates before clicking to go to a page. The SearchMe Display elicited careful analysis of individual surrogates, but inhibited scanning beyond the first few results. Though it is possible to

scan sequentially through the entire result set using the slider control that is located at the bottom of the screen, none of our participants took advantage of this feature choosing instead to analyze each carefully in sequence. The Viewzi display facilitates scanning in a way that is similar to the typical ranked list. The results are displayed from left to right and continue in rows from top to bottom. The most attention is given to the surrogate in the upper-left hand corner with correspondingly less attention to the surrogates to the right and bottom. However we did find that this strong preference for the surrogates near the beginning of the sequence is less pronounced than that reported by Guan & Cutrell with the typical ranked list display [2]. The question remains how much of this scanning behavior was influenced by the arrangement of the surrogates and how much was influenced by the content of the surrogates. The fact that users viewed more surrogates using the Kartoo display appears to be mostly because the surrogates provide fewer textual cues as to the content of the target website. The results of our questionnaires indicate that Kartoo was the least popular interface while SearchMe, which heavily favored the first site in the list and elicited very little browsing, was the most popular. In terms of ease of interaction on a scale of 1-9, where 1 is most difficult, 5 is average, and 9 is least difficult, 30% found Kartoo most difficult (1-2), 70% found SearchMe least difficult (7-9), and 42% found Viewzi average.

5. CONCLUDING REMARKS

The major insight from our initial analysis is that the visual, non-linear qualities of these SERP displays strongly influence the user interaction, in particular, the number and sequence in which the surrogates are explored. Satisfaction with the SERP displays is correlated more closely with the textual content of the surrogates. Our more detailed analysis will look at what elements of the surrogate were examined (e.g. the URL, the text snippet, the screenshot) and compare these results with a similar data for a standard text-based search result display.

Familiarity to SE and knowledge about the functionality of the SE affected user satisfaction. Training how to search using the visual search engines enhanced the user's search effectiveness, e.g., less number of query reformulations, more efficient search by using search features, and better user satisfaction. When asked if they intend to use the visual search engine again, more trained users answered positively than non-trained users. The most popular search engine that people want to use again was SearchMe (72%), followed by Viewzi (36%), and then Kartoo (33%).

6. REFERENCES

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