

Depth – and Breadth –First Processing of Search Result Lists



Kerstin Klöckner, Nadine Wirschum, and Anthony Jameson

DFKI, German Research Center for Artificial Intelligence Evaluation Center for Language Technology Systems (www..lt-eval.org)

Introduction

Overall research issue

How can the design of search result lists best support users' search strategies?

Fundamental question about search strategies

In what order do users tend to look at the entries in a search result list?

Strictly depth-first strategy

The user examines each entry in the list in turn, starting from the top

She decides whether to open the document in question before looking at the next entry

(Partly) breadth-first strategy

The user looks ahead ...

- ... to the end of the whole list
- ... or perhaps just a couple of entries

She then revisits the most promising entries to open the documents

Required methodology

Eye tracking of users processing search result lists

Experiment 1

Subjects

41 largely experienced web users

Task

Process a page of 25 search results returned by Google for the query assessment center "building blocks" (in German)

Goal: Acquire information to prepare for a visit to an assessment center

Time limit: 10 minutes

Behavior recorded

Mouse clicks and scrolling

Eye movements

Equipment

ASL 504 remote eye tracker

GazeTracker software

Coding

Based on video recordings with superimposed cross indicating point of gaze and on fixation plots (cf. the examples for Experiment 2)

Three types of strategy distinguished

Cf. graph for Experiment 1

Evaluation notes were added to the output document. To get rid of these notes, please order your copy of ePrint IV now.

Experiment 2

Subjects

27 largely experienced web users, not including any subjects from Experiment 1

Task

As in Experiment 1, except:

Only 5 minutes per query

Extra motivation for selective opening of documents:

Only 10 in all could be opened

For each relevant document opened, an extra reward of 10 Euro cents was paid

For each query, 12 or 13 documents were in fact relevant

Coding

More detailed coding method applied than in Experiment 1 (cf. graph for Experiment 2)

Frequencies of Breadth- and Depth-First Strategies

Each time a subject opened document *M* after having looked as far ahead as document *N*,

Documents opened after the subject had reached the bottom of the search result list in a

depth-first manner were not taken into account in the computation of this index

Overall, a similar distribution of strategies

Experiment 1

Looking Ahead Looking Ahead

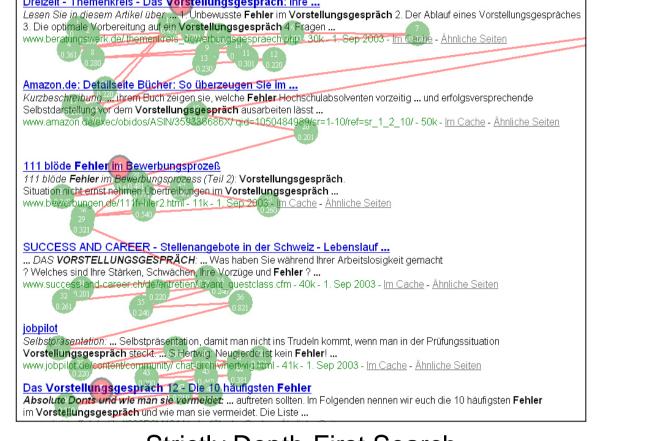
Over Part of List Over Entire List

(N - M) was added to her look-ahead index for the task in question

Explanation of look-ahead index (Experiment 2)

nova.com - Übersicht weiben - Praysperspele inhalt Job intendaw Inhalt Jobs & Internet Inhalt E-Mail-Bewerbu

Example Fixation Plots for Three Search Strategies

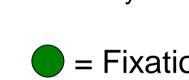








Partly Breadth-First Search





Experiment 2

0 1 2 3 4 5 6 ... 25

Average Look-Ahead Index

Overall lesson

Implications

The design of search result lists should take into account the fact that a minority of users may process the list in a partly or entirely breadth-first manner

This strategy can be more effective than depth-first search where resource limitations encourage selective opening of documents

E.g., long download times; monetary cost for each document

Design issues raised

How can search result pages be designed to facilitate ...

- ... remembering entries that have been looked at and (at least superficially) evaluated?
- ... switching attention quickly between entries?

Solutions currently being investigated

1. Optional provision of check boxes (or radio buttons ...)

Cf. the screen shot on the right

Well received by some subjects, especially those who applied a breadth-first strategy

2. Design elements that make list entries more distinctive in short-term memory

E.g., colors, icons

✓ Inhalt und Optik der Bewerbungsmappe Die Bewerbungsmappe: Inhalt und Optik: Wenn die Anlage

in einer Mappe zusammengeheftet sind, hilft dies ... 62.157.178.39/Bewerbung/Bewerbmappe.html - 2k - Im Cach

□ jova-nova.com - Übersicht

... Bewerben: Praxisbeispiele Inhalt Job-Interview: Inhalt Job Layoutvorlage Anschreiben Bewerbungsmappe Bewerbung www.jova-nova.com/auswahl/inhalt.htm - 64k - 31. Aug 2003

Blattsalat mit Deckblatt - [Bewerbungsmappe] Leser lassen sich nicht blenden: ... zu individuell und un www.jova-nova.com/bewerb/Deckblatt.html - 49k - Im Ca [Weitere Ergebnisse von www.jova-nova.com]

21