

Testing Google Interfaces Modified for the Blind

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aim of the study

Improving the usability of web search tools for blind users who interact via screen reader and voice synthesizer:

- proposing eight specific guidelines for simplifying interaction of the blind with search engines
- re-implementing the simple search and the result page
- preparing the environment for a remote testing with 12 totally blind users

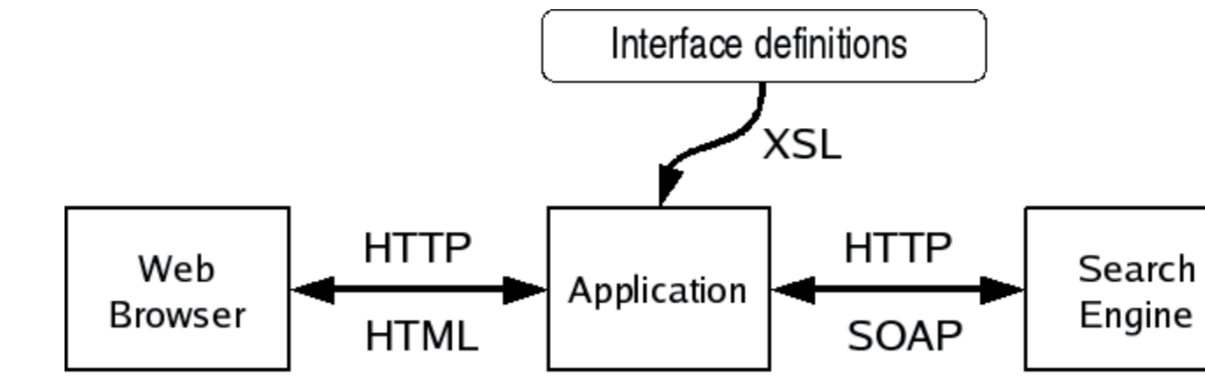
proposed Guidelines

General considerations:

- Easy location and labeling of edit field and search options:** immediately reach edit field and search options
 - Navigating more quickly:** more important elements should appear first
 - Alerting by sound:** adding different sounds to provide useful information for blind users
 - CSS2 aural style sheets:** try to use aural style sheets provided by CSS2 specification
- Navigation in the result page:**
- Highlighting the search result:** put an heading level at the beginning of the result list
 - Arranging the results:** put the list of the result links with their summary, just after the search result notification
 - Recognizing sponsored links:** separate them from the other results
 - Adding navigation and help links:** place the links pointing to result pages at the end of the results list

implementation

We redesigned Google UIs (i.e. simple search and result pages), building code with XSLT, Google APIs and PERL. The Figure shows the architecture of our implementation. The "interface definitions" in our case are both the modified interface, as well as the original ones.



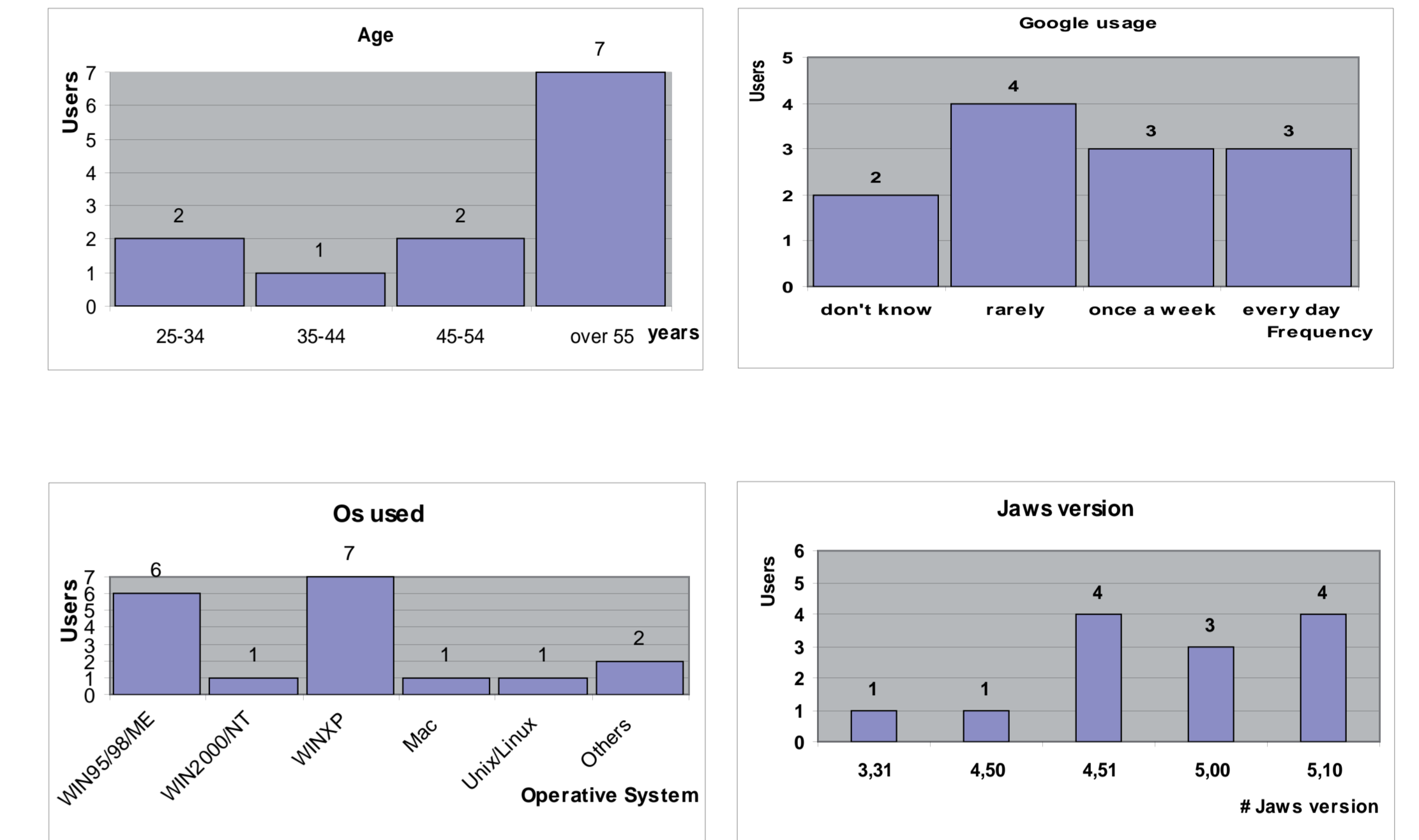
Interface design:

- structuring the page content in logical sections (XHTML and CSS);
- modifying the order of the functional block of elements on the page (e.g., navigation bar, search fields, search options, result list, etc.)
- building a different navigation order when interacting through tab index or access key;
- specifying information useful for the screen reader only (i.e., hidden labels, link to help page, etc.);
- adding aural feedback (i.e., specific sounds for different events).

Programmatic access to the search results by Google is provided by the "Google APIs". When using this APIs, messages are exchanged between the application and Google's server using SOAP (Simple Object Access Protocol), an XML-based messaging that uses HTTP for communication. Using XSLT, we wrote a small program (a "stylesheet") describing how to format each of the elements on the response (title, URL, and text snippet) to display it according to the guidelines stated above. Basically the XSL Transformation takes in input a XML document and based on the rules defined in the template returns an HTML or XHTML file. We defined two templates one in order to recreate the original HTML UIs of Google and the other for generating the new UIs conform to our design criterias.

preliminary questionnaire

Data from the preliminary questionnaire provided us with a characterization of our sample of a total of 12 blind subjects (2 women and 10 men) with an age ranging from 25 to more than 55 years. The education level of all participants was high: eight had a secondary school degree and four had a university education.



remote testing

The participants accessed to a web page with two links: one to the original Google interface (i.e. the output of an xsl transformation with one template that reproduce exactly the Google UIs) and one to the modified Google UIs.

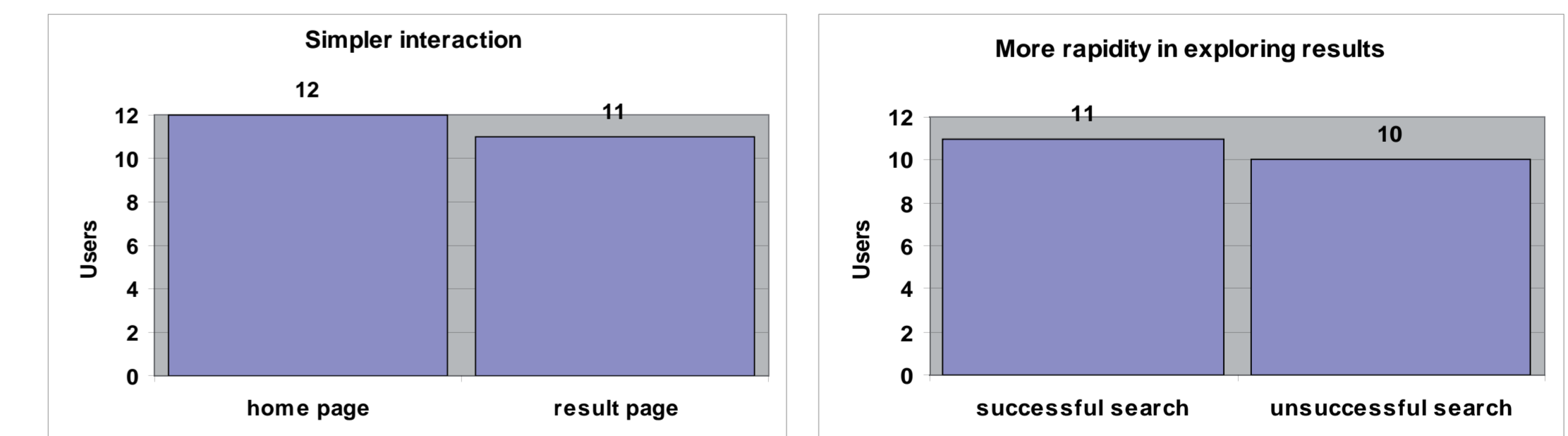
Exploration tasks

- Sequential reading (using arrow keys);
- Use of specific Jaws command (Insert+F6);
- Reading of the help page (only available in the modified interface) for a summary of shortcuts and Jaws commands;
- One free search and exploration of results in order to familiarise with the new interfaces;

Search tasks

- A settled search (cinema movies April) and the exploration for looking for a specific result;
- Looking for dates and places of Francesco Renga (an Italian singer) 2005 concert;
- One search with produce no result (FoscolPascoli instead of Foscoli Pascoli).

post-test questionnaire



All participants declared that the modified home page interface simplified the assigned search tasks, 11 of 12 participants acknowledged they felt that the simplified interaction and the greater clarity in result exploration reduced the time needed to carry out the search

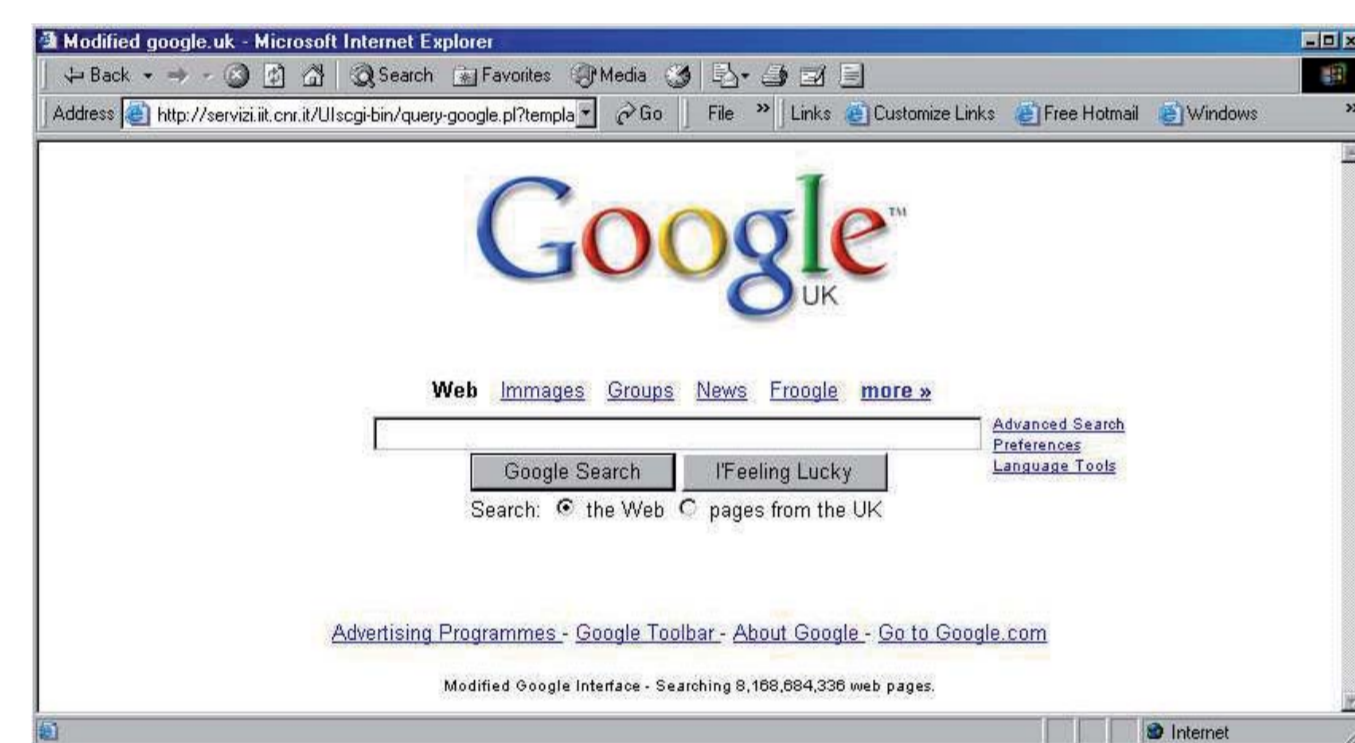
Concerning the speed of accomplishing the assigned search tasks, 11 of 12 participants acknowledged they felt that the simplified interaction and the greater clarity in result exploration reduced the time needed to carry out the search

10 users found the sounds useful and 6 of them gave some additional suggestions for their usage. The sound associated with the unsuccessful search (no result) was appreciated by 10 users.

Participants judged to be important not only sounds, access keys, and tab keys, but also hidden labels and numbering of results which assured greater clarity and aided orientation in result exploration.

All users found differences between the original and the modified interfaces and suggested that Google adopt all (9 users) or some (2 users) of the proposed changes. Other spontaneous comments by the users expressed great interest in applying the same solutions to other services offered both by Google (Froogle, News, and Scholar) and other Web sites, in particular to e-commerce sites.

original Google HomePage



Google Original home page read by Jaws

Google
Graphic Google

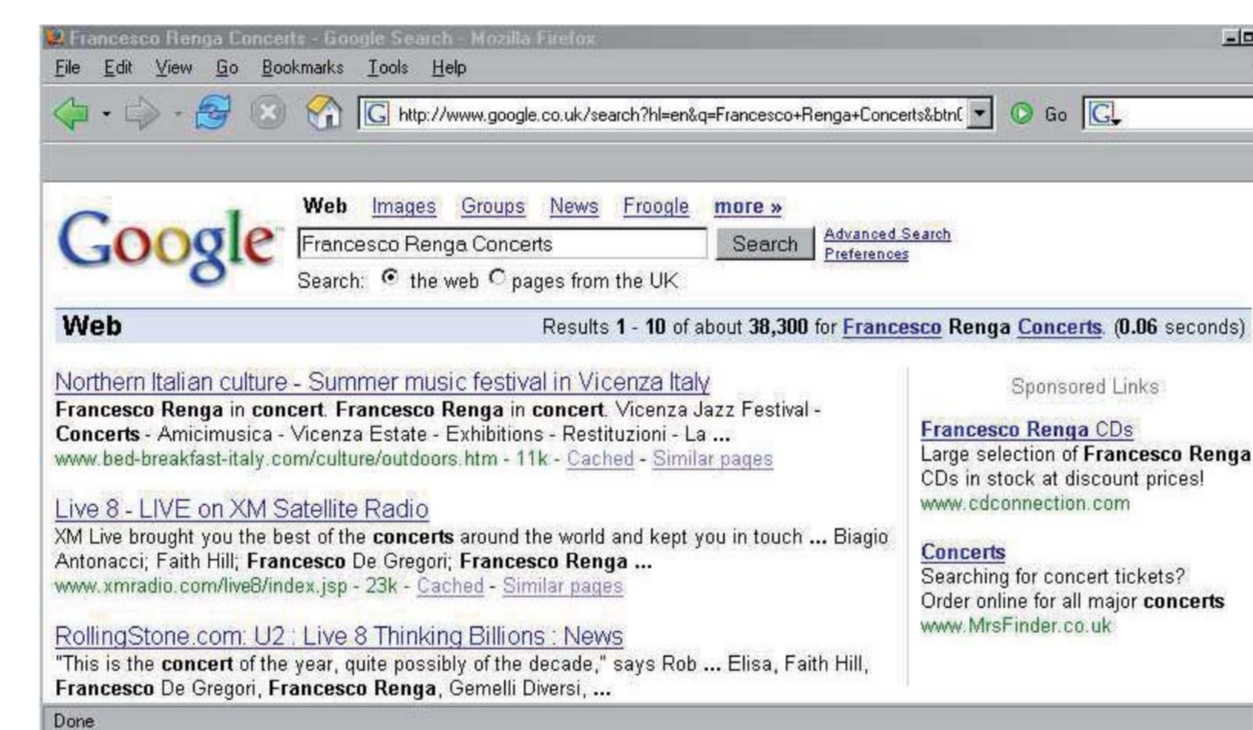
Web
Link Images
Link Groups
Link News
Link More >

Edit
Google Search Button
I'm Feeling Lucky Button

Link Advanced Search
Link Preferences
Link Language Tools

Search:
The web Radio button checked 1 of 2 pages from the UK Radio button not checked 2 of 2 ...

original Google results page



Google Search: airport rome

Link Graphic Go to Google Home
Web
Link Images
Link Groups
Link News
Link More >

Edit airport rome
Google Search Button
I'm Feeling Lucky Button

Link Advanced Search
Link Preferences

Search:
The web Radio button checked 1 of 2 pages from the UK Radio button not checked 2 of 2

Web
Results 1 - 10 of about 1,080,000 for airport rome. (0.12 seconds)

Table with 4 columns and 6 rows
Sponsored Links
Link Rome Airport
[... other 7 links and extracted texts of sponsored links...]
table end

Link ADR - Sito ufficiale Aeroporti di Roma - Homepage -
[Link Translate this page]
Sito ufficiale della Società Aeroporti di Roma. Informazioni, notizie e rubriche su azienda, aeroporti di Fiumicino e Roma Ciampino, orario voli, compagnie aeree ...
http://www.adr.it/ - 43k -
Link Cached -
Link Similar pages

Link ADR - Aeroporti di Roma Official Site - Homep-

age-
[Link Translate this page]
... Airports Eight new commercial activities have been recently opened at the two Roman airports with the aim to diversify the commercial offer to the passengers.
...www.adr.it/default.asp?l=3 - 41k
Link Cached -
Link Similar pages

Link Rome Fiumicino Airport
[Link Translate this page]
...HubPage: Airport Guide: Rome Fiumicino Airport: Rome Fiumicino Airport. Airwise - The Airport and Air Travel Guide... Rome Fiumicino Airport News. Rome Hotels...
http://www.airwise.com/airports/europe/FCO/FCO_01.html - 14k
Link Cached -
Link Similar pages
[... other result links...]

Result Page:
1
Link 2
Link 3
...
Link Next
...

modified Google HomePage



Google Modified home page read by Jaws

New google.co.uk
Graphic Google logo

Heading level 2 Navigation bar:
Link Navigation help alt+h

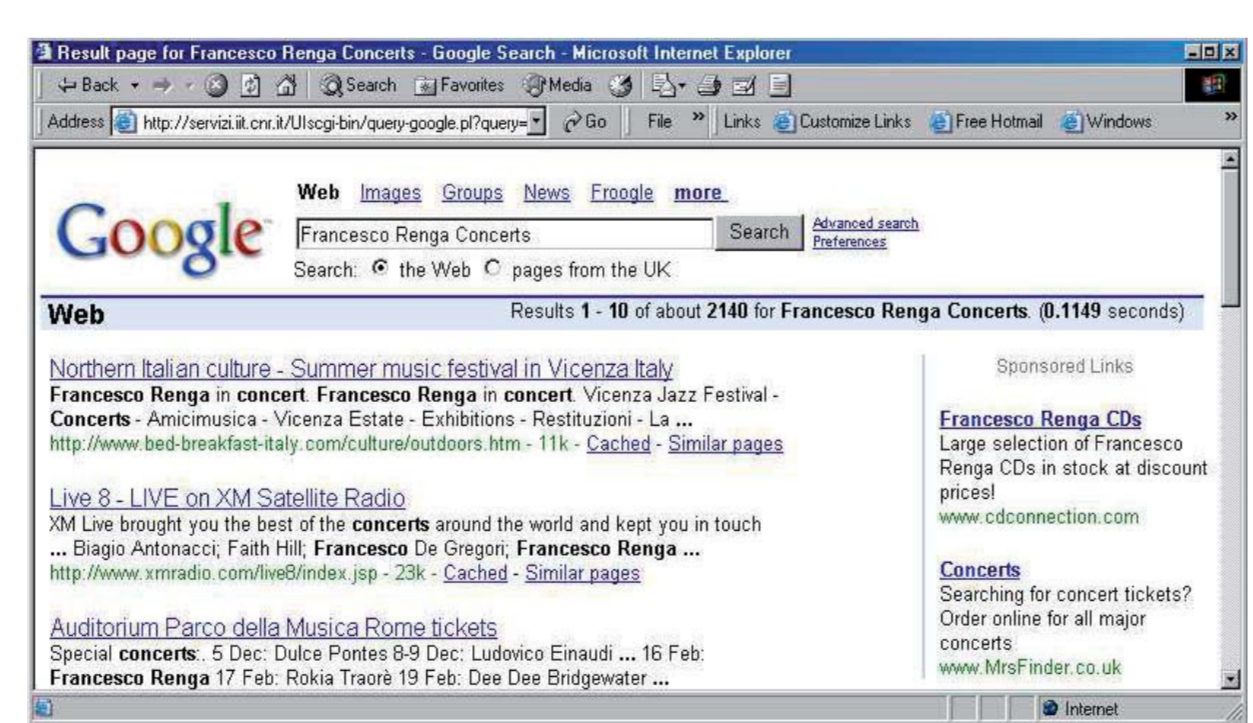
Web
Link Images
Link Groups
Link News alt+n
Link More >

Heading level 1 Searching for:
Edit alt+s
Google Search Button
I'm Feeling Lucky Button

Search:
The Web alt+w Radio button checked 1 of 2 pages from the UK alt+p Radio button not checked 2 of 2

Heading level 2 Advanced search:
Link Advanced Search alt+a
Link Preferences
Link Language Tools
...

modified Google results page



Visiting order with Tab key navigation in the modified results page:

Search results (i.e. Results 1 - 10 of about...);
First result, Second result, etc. (cached and similar links are skipped);
Result pages (Prev, 1, 2, ...);
Search Tools (i.e. "Search within results" and "Search Tips");
Sponsored Links;
Searching for;
Advanced Search
Navigation bar;
Google Info and other links;
Cached and similar page links.

Result page for airport rome

Link Graphic Go to Google Home alt+g
Edit airport rome alt+s
Link Navigation Help alt+h
Web
Link Images
Link Groups
Link News alt+n
Link More >

Heading level 2 Searching for:
Edit airport rome alt+s
Google Search Button
I'm Feeling Lucky Button

Search:
The Web alt+w Radio button checked 1 of 2 pages from the UK alt+p Radio button not checked 2 of 2

Heading level 2 Advanced search:
Advanced Search alt+a
Link Preferences

Web
Heading level 1 Search results:
Results 1 - 10 of about 1,080,000 for airport rome. (0.12 seconds)

1
Link ADR - Sito ufficiale Aeroporti di Roma - Homepage -
[Link Translate this page]
Sito ufficiale della Società Aeroporti di Roma. Informazioni, notizie e rubriche su azienda, aeroporti di Fiumicino e Roma Ciampino, orario voli, compa-

nie aeree ...
http://www.adr.it/ - 43k -
Link Cached -
Link Similar Pages

2
Link ADR - Aeroporti di Roma Official Site - Homepage -
[Link Translate this page]
...HubPage: Airport Guide: Rome Fiumicino Airport: Rome Fiumicino Airport. Airwise - The Airport and Air Travel Guide... Rome Fiumicino Airport News. Rome Hotels...
http://www.airwise.com/airports/europe/FCO/FCO_01.html - 14k
Link Cached -
Link Similar pages
[... other result links...]

3
Link Rome Fiumicino Airport -
[Link Translate this page]
...HubPage: Airport Guide: Rome Fiumicino Airport: Rome Fiumicino Airport. Airwise - The Airport and Air Travel Guide... Rome Fiumicino Airport News. Rome Hotels...
http://www.airwise.com/airports/europe/FCO/FCO_01.html - 14k
Link Cached -
Link Similar pages
[... other result links...]
Heading level 1 Result page:
1
Link 2
Link 3
...
Link Next alt+ ...