

Breadcrumbs

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What is Breadcrumbs?

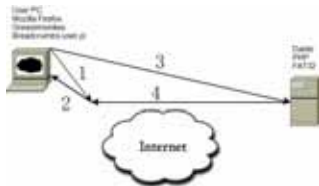
User search strategies differ between initially finding and re-finding information. When re-finding information users are unlikely to use a re-finding tool such as a bookmark and instead are far more likely to directly enter a URL, use a search engine or access pages via another website. Breadcrumbs is an information re-finding tool unlike bookmarks or browser history because it automatically tracks and places a visual cue next to each link a user has visited. This visual cue helps users identify resources they have used in the past so they may disregard irrelevant information. When a user needs to re-find a page they have found useful in the past Breadcrumbs helps them do so more efficiently by cutting down on fruitless browsing behavior.

Information Re-finding Facts

- Users use many "out-of-the-box" methods for re-finding information such as post-its, emailing to self and copying and emailing themselves URLs, suggesting that technologies within the browser are insufficient.
- Weaknesses in current web re-finding tools such as Bookmarks include poor default naming conventions, lack of user willingness to organize and outdated links.
- Users forget to bookmark valuable information.
- 76% of web re-finding behaviors involve methods that require no initial input in the finding stage. These methods include: re-searching on search engine, entering a URL and following links from other websites.
- Sites such as cnn.com frequently change the location of particular link (news article, etc..) rendering it hard to relocate.
- Users frequently take advantage of visual queues such as page layout, familiar titles and memorable images to help guide them through an information space.

Technology Corner; How Does it Work?

To create Breadcrumbs we used an already available Firefox extension, Greasemonkey, to assist in our implementation. Greasemonkey enables access to the DOM elements of every page and insert an image next to every link node. All of the processing is done using server side PHP .



1. User requests a website from the internet.
2. Website is retrieved by http.
3. A connection is made to Dante and the website is added to a tracking file.
4. Crumbs are added to the website by checking the tracking file to see how often a user has been there.



What we Envisioned

Our initial vision was to have multiple colors of crumbs to signify usage from green (lightly used) to red-hot (heavily used). Note that we intended to have multiple statistics for the mouse-over for each link.

What it Looks Like

After user feedback we decided to change from red and green crumbs to ones that were semi-transparent when lightly used to fully opaque when heavily used. This screenshot is of a fully working prototype of Breadcrumbs and thus we did not have time to implement all of the usage statistics we wanted.



Potential Uses of Breadcrumbs:

To help you understand how Breadcrumbs can aid in information re-finding, consider the following examples:

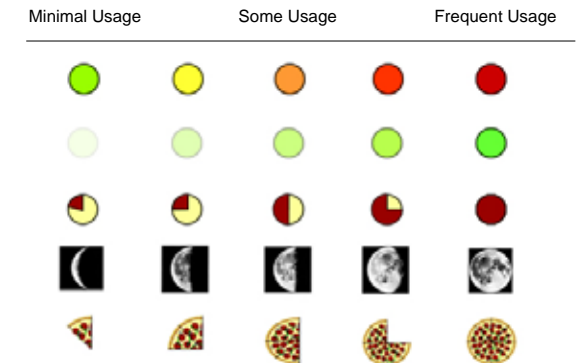
You are reading an article on CNN.com and three weeks later you wish to re-visit the story. It is no longer on the front page and you can't remember the exact title. You enter the archive and type in a few keywords. A long list of results appears but you immediately spot the story you are looking for because a Breadcrumb appears next to it.

You are searching for online guitar tuners and find dozens of results, each with different capabilities but equally generic names such as "Guitar Tuner," "Guitar World's Tuner," and "Ultimate Guitar Tuner." After finding the right fit you eagerly close your browser and begin playing without bookmarking. When you re-search for guitar tuners on Google, the one you spent the most time at will be easy to spot with Breadcrumbs.

You are an IT professional with hundreds of users to support and not a lot of spare time. You sift through many sites a day researching solutions to technical problems. You have no time to bookmark and even less time to organize the bookmarks you currently have. You are constantly re-searching for sites that helped you with that one specific problem five months ago. By following your trail of Breadcrumbs, you can eliminate sites you haven't been to and sites that didn't prove useful.

Which Breadcrumbs make sense to you?

The colors of Breadcrumbs anchored next to links differ based on usage statistics. Which scheme is most intuitive to you?



Conclusion

Breadcrumbs has taught us that there is a niche to be filled in the field of Information Management that is currently not filled by any available tools. Through our design and implementation we have discovered many interesting facets of information re-finding, and believe that we could move forward with a viable product based upon our findings.

We have also learned about the power of user-centered design and its ability to challenge our assumptions and guide our project towards something that makes sense to the user as opposed to fulfilling our pre-conceived notions about how we think our product will be used. This will be hopefully be a useful lesson for us in our future careers.

Future Work

In the future, we would like to take the time to implement the following features:

- Replace the user tracking plain text file with a more secure SQL database.
- Include more usage statistics on mouse-overs including: time and date of last visit, duration of last visit and average visit length.
- Allow users to edit Breadcrumbs (deleting unwanted crumbs, etc...).
- Add user profiles for multiple users sharing a computer.
- Allow users to hide Breadcrumbs and still have tracking enabled.
- Allow users to change the skins and colors of their breadcrumbs.

Bibliography

- S. Reich, L. Carr, D. D. Roum, and W. Hall. "Where have you been from here? Trails in Hypertext Systems". ACM Computing Surveys, 31(4), December 1999.
- Bruce, H., Jones, W. and Dumais, S. "Keeping and Re-Finding Information on the Web: What Do People Do And What Do They Need?" ASIST 2004: Proceedings of the 67th ASIST annual meeting, Chicago, IL, Information Today, Inc., October, 2004.
- Trevan, J. "Where'd I Go?": Re-Finding Information in the Changing Web." Student Oxygen Workshop, Gloucester, MA, 2003.
- Robert G. Capra, Manuel A. Pérez-Quitones. "Re-Finding Found Things: An Exploratory Study of How Users Re-Find Information" Department of Computer Science, Virginia Tech, 2005.
- MacKay, B., Kellar, M. and Watters, C. "An Evaluation of Landmarks for Re-finding Information on the Web" CHI Portland, OR, 2005
- Capra, R., Pimney, M. and Pérez-Quitones, M. A. "Re-finding Is Not Finding Again" ACM, 6 Oct 2003.