

Where we are?

| | Search | Navigation | Recommendation |
|----------------------|---|------------|----------------|
| Content-based | | | |
| Semantics / Metadata | | | |
| Social |  | | |

What is Social Search?

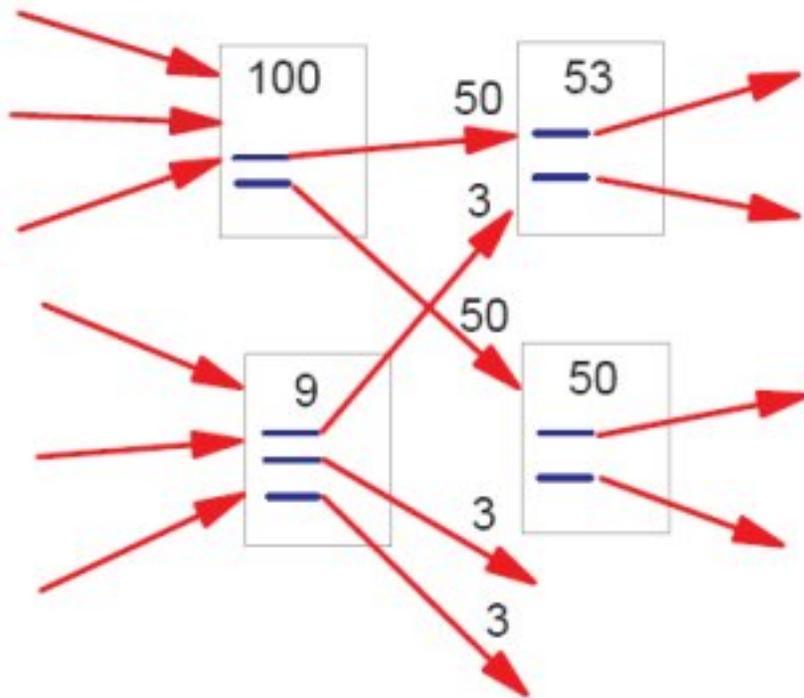
- **Social Information Access**
 - a stream of research that explores methods for organizing users' past interaction with an information system (known as explicit and implicit *feedback*), in order to provide better access to information to the future users of the system
- **Social Search: a set of techniques focusing on**
 - collecting, processing, and organizing traces of users' past interaction
 - applying this “community wisdom” in order to improve search-based access to information

Variables Defining Social Search

- Which users?
 - Creators
 - Consumers
- What kind of interaction is considered?
 - Browsing
 - Searching
 - Annotation
 - Tagging
- What kind of search process improvement?
 - Off-line improvement of search engine performance
 - On-line user assistance

The Case of Google PageRank

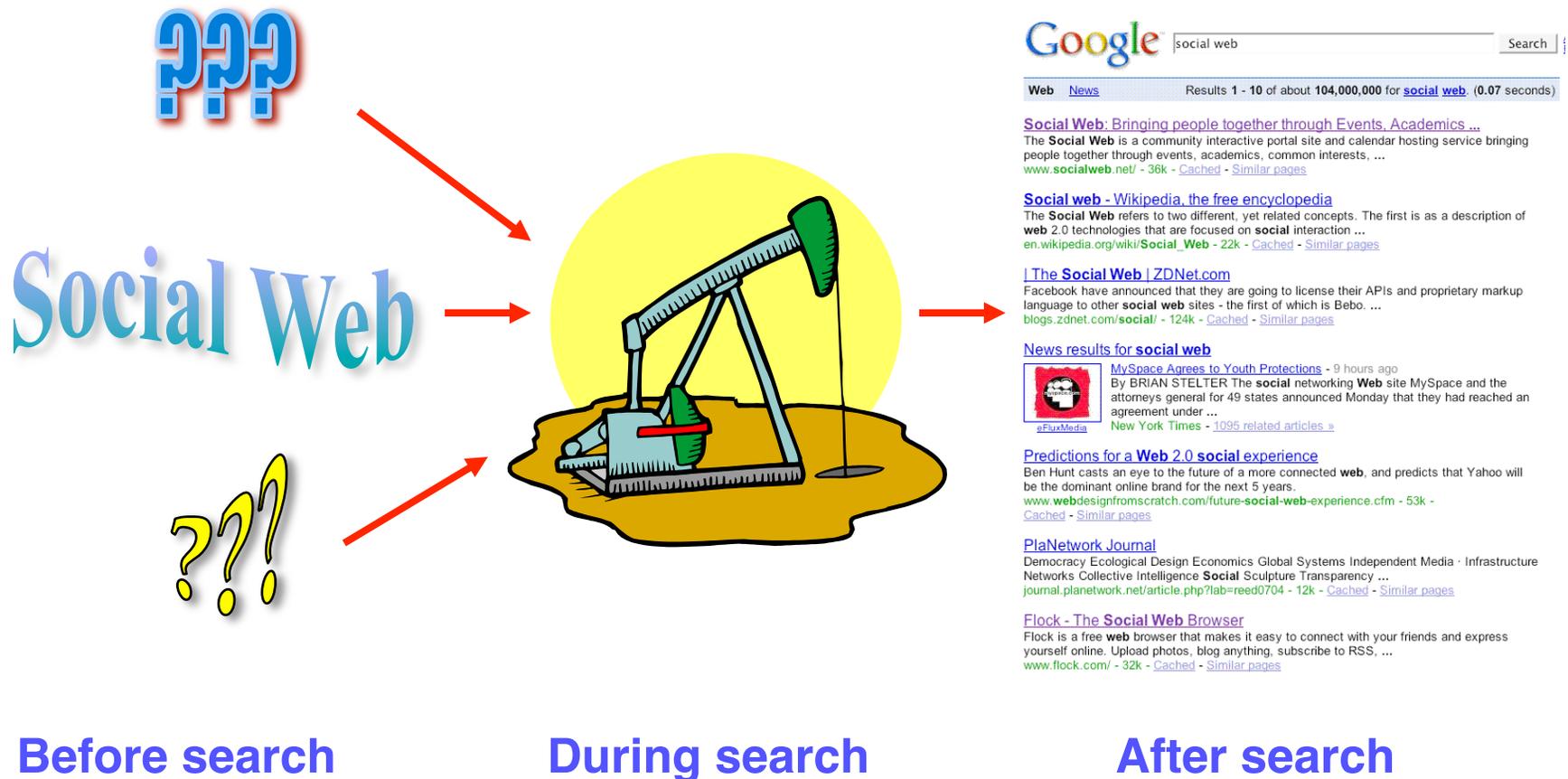
- Which users?
- Which activity?



- What is affected?
- How it is affected?
- How it improves search?

How Search Could be Changed?

- Let's classify potential impact by stages



Improving Search Engine Work

- Search Engine =
Crawling + Indexing + Ranking
- Can we improve crawling?
- Can we improving indexing?
- Can we improve ranking?

Improving Indexing

- What is the problem with the classic approach to indexing?
- How indexing can be improved?

Social Indexing: Some Ideas

- Use social data to expand document index (document expansion)
- What we can get from page authors?
 - *Anchor text* provided on a link to the page
- What we can get from searchers?
 - Page selection in response to the *query* (Scholer, 2002)
 - Query sequences (Amitay, 2005)
- What we can get from other page visitors?
 - *Page annotations* (Dmitriev et al., 2006)
 - *Page tags* (Yanbe, 2007)

Improving Search Engine Ranking

- What we can get from page authors?
 - *Links* (Page Rank)
- What we can get from searchers?
 - Page selection in response to the *query* (DirectHit)
- What we can get from page visitors?
 - *Page tags* (Yanbe, 2007; Bao, 2007)
 - *Page annotations*
 - *Page Tweets* (Yokie – Phelan, 2011)
 - ~~*Page visit count*~~
- Combined approaches
 - PageRate (Zhu, 2001), (Agichtein, 2006)

How We Can Help Before Search?

- Query checking - now standard
- Suggesting related queries
 - How it can be done?
 - Example: query networks (Glance, 2001)
- Query refinement and query expansion
 - Using past queries and query sequences - what the user is really looking for (Fitzpatrick, 1997; Billerbeck, 2003; Huang, 2003)
 - Using anchors (Kraft, 2004)
 - Using annotations, tags

How We Can Help After Search?

- Better ranking (re-ranking)
 - Link ordering
- Suggesting additional sources
 - Link generation
- Annotating results
 - Link annotation
- Post-search system can provide better help by using more data

Some Advanced Approaches

- Improving precision by considering more similar users
 - “Quest” approach
 - Community-based search
 - Combining community-based search and navigation
- Adjusting the precision to the quality of data
 - Site-level recommendation

AntWorld

AntWorld: Describe your quest - Netscape

File Edit View Go Communicator Help

Back Forward Reload Home Search Netscape Print Security Stop

Location: serPass=kantor&aStartURL=http%3A//scils.rutgers.edu/%7Ekantor/SECRET/judgmentScreen.jpg

AntWorld: Describe your quest

(Optional) To log in, enter...

AntWorld username:

AntWorld password:

New user? Leave username/password blank (to login as guest), or [create an account](#)

Standard interface

(Optional) Choose the start page

To start a new quest, enter a short description here:

Optional long description of your quest:

To resume your most recent quest, leave both boxes empty

Document: Done

Start | WS... | Telne... | Telne... | Ant... | Explo... | Micro... | Judg... | 15.47

“Quest” Approach

- Quests establish similarities between users
- Relevance between documents and quests is provided by explicit feedback
- Similar approach: SERF (Jung, 2004)
 - Results with recommendations were shown on over 40% searches.
 - In about 40% of cases the users clicked and 71.6% of these clicks were on recommended links! If only Google results are shown users clicked in only 24.4% of cases
 - The length of the session is significantly shorter (1.6 vs 2.2) when recommendations are shown
 - Ratings of the first visited document are higher if it was recommended (so, appeal and quality both better)

Quest-Based Approach

- What is good/important?
- Critique?

I-SPY: Community-Based Search



the smarter way to search

Communities

About I-Spy

Private Search check box

shakey

Search

PRIVATE SEARCH

computer science: Your Search for shakey returned 35 Results | **Displaying 1 - 35** | **Result Page: 1**

Related Information

Recent Queries

[VIEW ALL](#)

1. [regular expressions for...](#)
2. [java](#)
3. [adaptive search tree](#)
4. [artificial intelligence](#)
5. [irish web hosting provider](#)

Recent Web Pages

[VIEW ALL](#)

1. [RE-Tree: An Efficient I...](#)
2. [Enterprise JavaBeans Te...](#)
3. [Adaptive Structuring Of...](#)
4. [Adaptive Heuristics for...](#)
5. [International Joint Con...](#)

Popular Queries

[VIEW ALL](#)

1. [cbr](#)
2. [java](#)
3. [latex tutorial](#)
4. [adaptive search tree](#)
5. [regular expressions for...](#)

Popular Web Pages

[VIEW ALL](#)

1. [Java Technology](#)
2. [Adaptive Hypermedia 2004](#)
3. [The Javaftml Tutorial](#)
4. [STAIRS 2004](#)

I-Spy Recommends

Showing 2 of 4 promoted results.

0 4

Tip : Move the slider to see more recommended results
Recommended results are marked with

Slider Bar

[SRI Technology: Shakey the Robot](#)

Shakey the Robot Shakey was the first mobile robot to reason about its actions. ...
 Shakey used programs for perception, world-modeling, and acting. ...

<http://www.sri.com/about/timeline/shakey.html>

Related Queries [sri shakey](#) [shakey robot](#) [stanford shakey](#)

Promotional Results

Related Queries

[Moravec Robot book figure](#)

... 1970-Shakey the robot reasons about its blocks Built at Stanford Research Institute, Shakey was remote controlled by a large computer. ...

<http://www.frc.ri.cmu.edu/~hpm/book98/fig.ch2/p027.html>

Other Matching Results

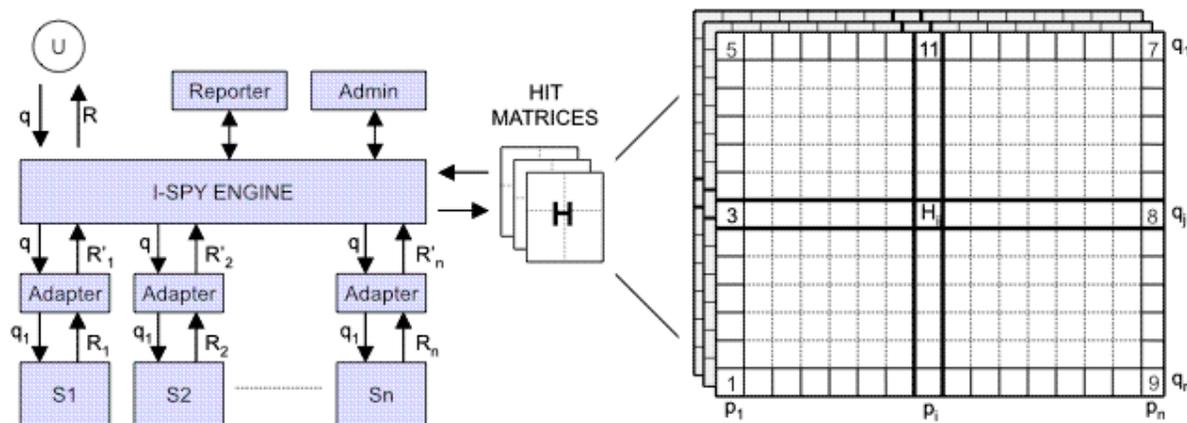
[shakey.com - Welcome](#)

Shane Byrne Official Website - Diary, Latest News, Gallery, Forum and more! ... Check out the new 2005 Shakey Collection in our exclusive online shop! ... figured the best people to model the Shakey gear would be the hard core of Shakey fans

Meta-search Results

I-SPY: Mechanism

- User similarity defined by communities and queries
- Result selection provide implicit feedback



- Smyth, B., Balfe, E., Freyne, J., Briggs, P., Coyle, M., and Boydell, O. (2004) Exploiting Query Repetition and Regularity in an Adaptive Community-Based Web Search Engine. *User Modeling and User-Adapted Interaction* 14 (5), 383-423 [this is the assigned readings!].

I-Spy: Proxy Version

Google **Web** [Images](#) [Groups](#) [News](#) [more »](#)
michael jordan [Advanced Search](#) [Preferences](#)
Search: the web pages from Ireland

Web Results 1 - 10 of about 74,300,000

[NBA.com: Michael Jordan Bio](#)
Michael Jordan | 23. Season statistics & Notes · Season splits · Game-by-game stats · Bio · Printable player file. 2002-03 Statistics. PPG, 20.0. RPG, 6.10 ...
www.nba.com/playerfile/michael_jordan.html - 139k - [Cached](#) - [Similar pages](#)

[NBA.com: Michael Jordan Summary](#)
Michael Jordan By acclamation, **Michael Jordan** is the greatest basketball player of all time. Although, a summary of his basketball career and influence on ...
www.nba.com/history/players/jordan_summary.html - 48k
[[More results from www.nba.com](#)]

[Michael Jordan - Wikipedia, the free encyclopedia](#)
Michael Jordan's basketball talent was clear from his rookie season. **Jordan, Michael** Jeffrey. ALTERNATIVE NAMES, **MJ**; Air Jordan
en.wikipedia.org/wiki/Michael_Jordan - 130k - [Cached](#) - [Similar](#)

Google **Web** [Images](#) [Groups](#) [News](#) [more »](#)
michael jordan [Advanced Search](#) [Preferences](#)
Search: the web pages from Ireland

Web Results 1 - 10 of about 74,300,000

[Jordan, Michael I.](#)  
Graphical models, variational methods, machine learning, reasoning under uncertainty.
www.cs.berkeley.edu/~jordan/ - 9k - [Cached](#) - [Similar pages](#)

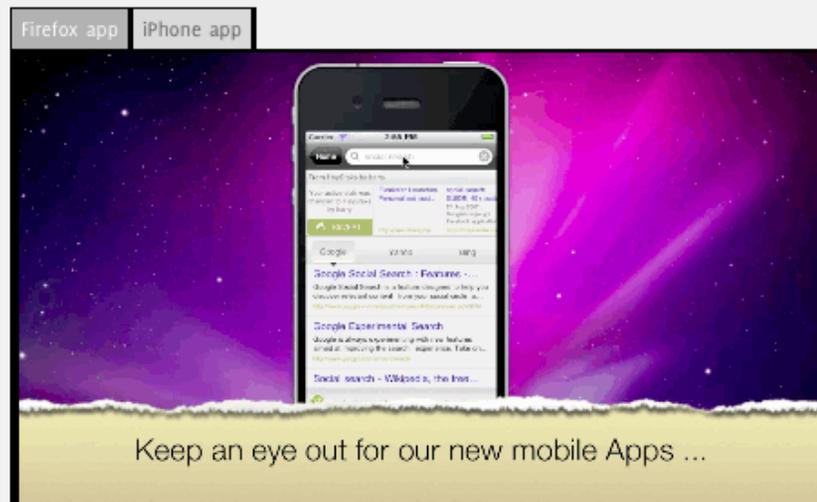
Distinguished Lecturer: [Michael Jordan, Fri, Apr 29, 2005](#)  
Michael Jordan is Professor in the Department of Electrical Engineering and ... on kernel machines, and on applications of statistical machine learning to ...
<http://oldwww.cs.pitt.edu/DL/2005/michael-jordan.29apr2005.html>

[DBLP: Michael I. Jordan](#)   
... Tommi Jaakkola, **Michael I. Jordan**: Mean Field Theory for Sigmoid Belief Networks ...
Michael I. Jordan: Reinforcement Learning by Probability Matching. ...
http://www.informatik.uni-trier.de/~ley/db/indices/a-tree/j/Jordan:Michael_I_.html

I-Spy Approach

- What is good/important?
- Critique?

From iSpy to Heystaks: Folders



<http://www.heystaks.com/>

Social Search + Social Navigation

The screenshot shows the ACM Digital Library search results for the query 'social tagging'. The page includes a header with the library name and navigation links. Below the search bar, there are options to sort results by relevance and display them in an expanded form. A search filter indicates 'Published in CACM' and 'Terms used social tagging'. The results list shows 'Footprints: history-rich tools for information foraging' by Alan Wexelblat and Pattie Maes, published in the proceedings of the SIGCHI conference on Human-Computer Interaction (CHI) in May 1999. The page also features social navigation icons such as 'Related', 'Clock', and 'Share'.

THE ACM DIGITAL LIBRARY [Feedback](#) [Report a problem](#) [Satis](#)

Published in CACM
Terms used **social tagging**

Sort results by: relevance
Display results: expanded form

[Save results to a Binder](#) Try an [Advanced Search](#)
[Search Tips](#) Try this search in [The ACM Digital Library](#)
 Open results in a new window

Results 1 - 20 of 200
Best 200 shown
Result page: 1 2 3 4 5 6 7 8 9 10 next

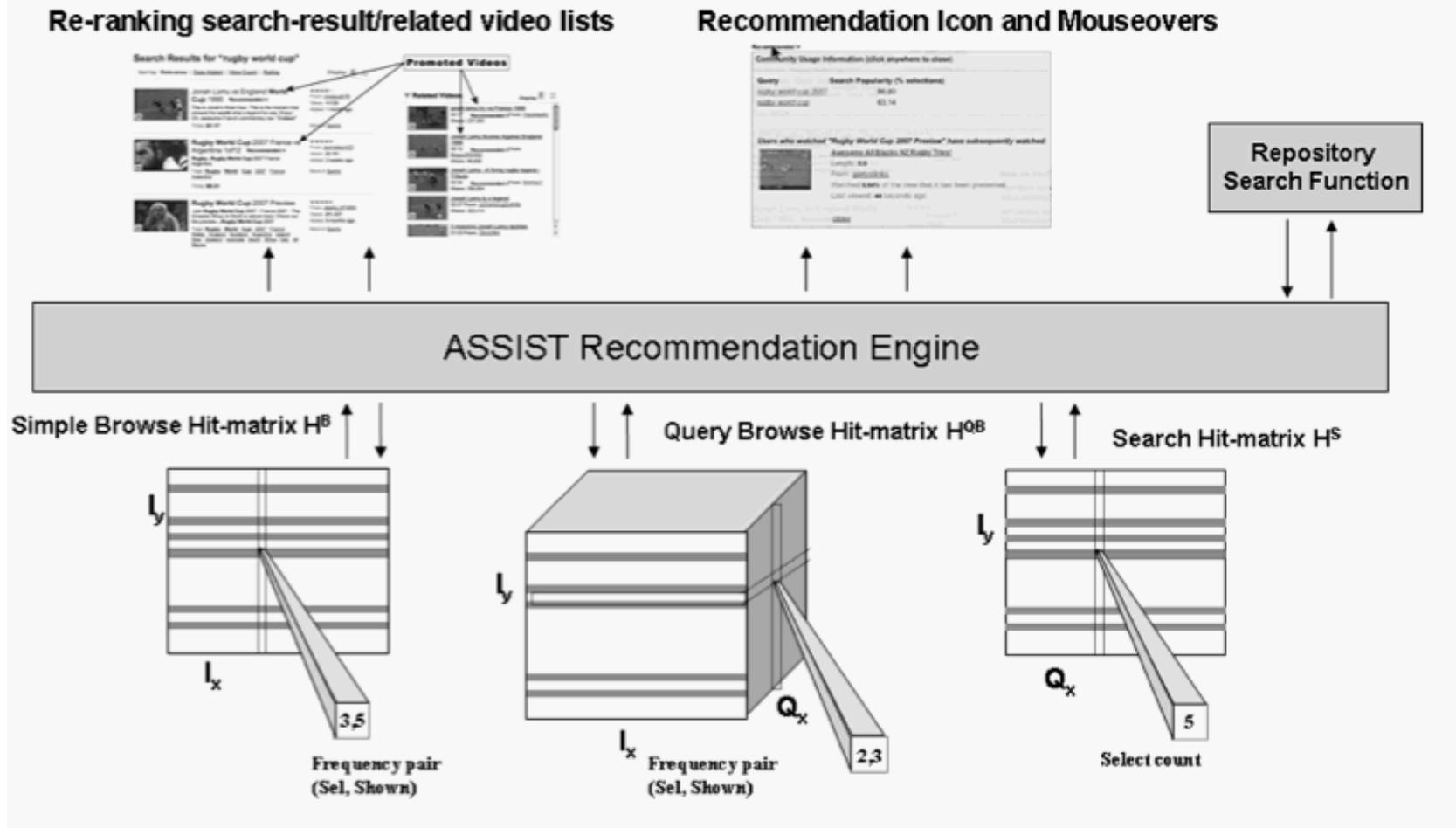
1 [Footprints: history-rich tools for information foraging](#)

Alan Wexelblat, Pattie Maes
May 1999 **Proceedings of the SIGCHI conference on Human-Computer Interaction (CHI)**
computing systems: the CHI is the limit
Publisher: ACM Press
Full text available: [pdf \(1.04 MB\)](#) Additional information: [full citation](#), [abstracts](#), [citations](#), [index terms](#)

Inspired by Hill and Hollans original work [7], we have been developing a theory of interaction history and building tools to apply this theory to

- Farzan, R., Coyle, M., Freyne, J., Brusilovsky, P., and Smyth, B. (2007) ASSIST: adaptive social support for information space traversal. In: Proceedings of 18th conference on Hypertext and hypermedia, HT '07, Manchester, UK, 10-12 September, 2007, ACM Press, pp. 199-208, also available at <http://dx.doi.org/10.1145/1286240.1286299>

ASSIST Architecture



Access for the Rest of Us: An Exploration of Social YouTube. Proceedings of 5th International Conference on Adaptive Hypermedia and Adaptive Web-Based Systems (AH'2008), pp. 93-102

Site-Level Search: Social Ways

The left screenshot shows a search results page for 'hubble'. The main content area displays search results for 'hubble', including a link to 'hubblemain/index.html'. A sidebar titled 'Search Signposts' lists several destinations: 'hubblesite.org', 'heritage.stsci.edu', 'hubble.nasa.gov', 'astrographics.com', 'stsci.edu', and 'telescope.com'. The right screenshot shows a 'Search Signposts' interface with a 'Destination' dropdown menu. Below the dropdown, a list of destinations is shown with popularity bars and search icons. The destinations are: 'hubblesite.org', 'heritage.stsci.edu', 'hubble.nasa.gov', 'astrographics.com', 'stsci.edu', and 'telescope.com'. A tooltip is visible over the 'heritage.stsci.edu' entry, displaying the title 'Title: The Hubble Heritage Project Website'.

- **White, R., Bilenko, M., and Cucerzan, S. (2007)** Studying the use of popular destinations to enhance web search interaction. In: Proceedings of 30th annual international ACM SIGIR conference on Research and development in information retrieval, SIGIR '07, Amsterdam, The Netherlands, July 23 - 27, 2007, ACM Press, pp. 159-166, also available at <http://dx.doi.org/10.1145/1277741.1277771>

Site-level search

- What Kinds of Social Wisdom?
- How Social Wisdom is Used?