Social Search

Peter Brusilovsky
School of Information Sciences
University of Pittsburgh, USA

Where we are?

	Search	Navigation	Recommendation
Content-based			
Semantics / Metadata			
Social			

What is Social Search?

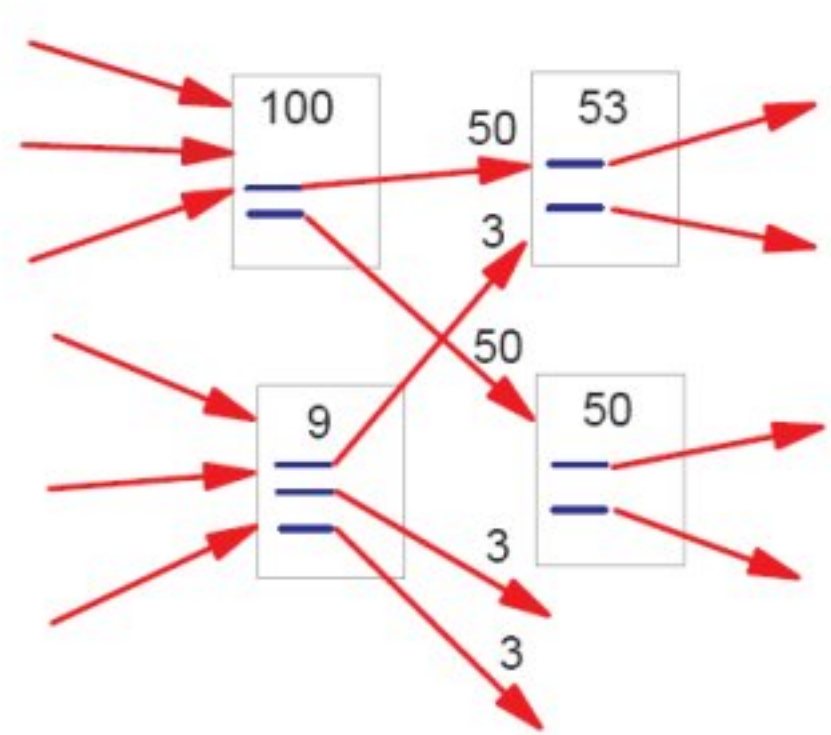
- Social Information Access
  - a stream of research that explores methods for organizing users' past interaction with an information system (known as explicit and implicit *feedback*), in order to provide better access to information to the future users of the system
- Social Search: a set of techniques 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

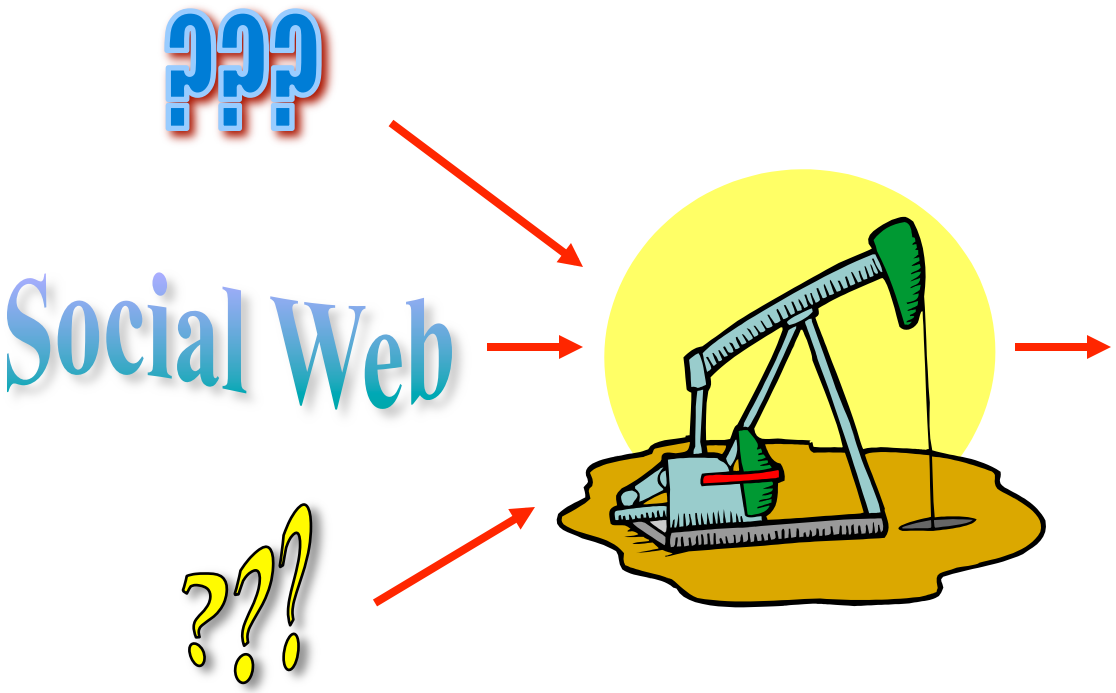
- Which users?
- Which activity?



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

How Search Could be Changed?

- Let's classify potential impact by stages



Before search **During search** **After search**

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

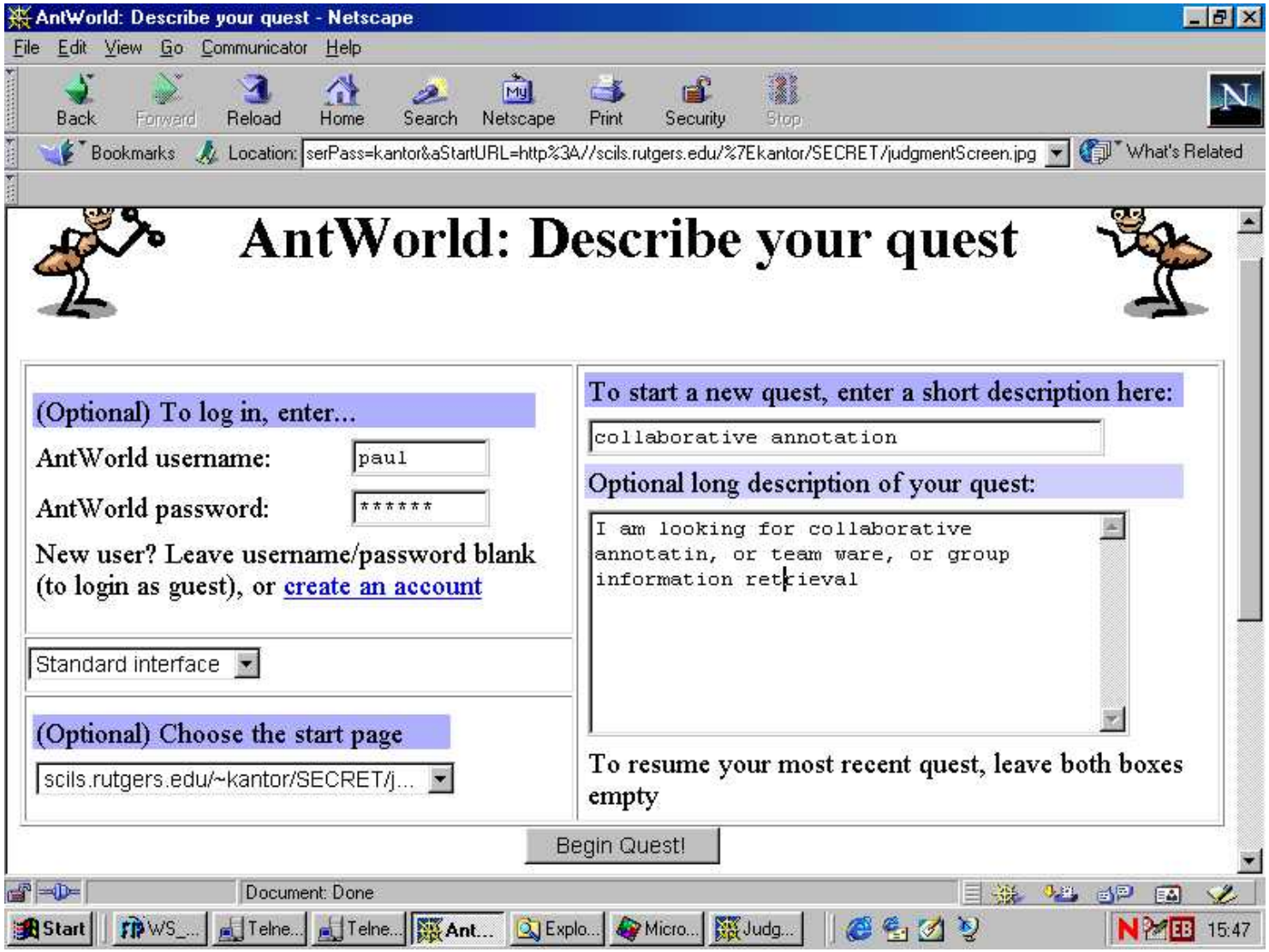
How We Can Help After Search?

- 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
Bookmarks Location: serPass=kantor&aStartURL=http%3A//scils.rutgers.edu/%7Ekantor/SECRET/judgmentScreen.jpg What's Related
AntWorld: Describe your quest
(Optional) To log in, enter...
AntWorld username: paul
AntWorld password: ******
New user? Leave username/password blank (to login as guest), or create an account
Standard interface
(Optional) Choose the start page
scils.rutgers.edu/~kantor/SECRET/j...
To start a new quest, enter a short description here:
collaborative annotation
Optional long description of your quest:
I am looking for collaborative annotatin, or team ware, or group information retrieval
To resume your most recent quest, leave both boxes empty
Begin Quest!
Document: Done
Start
15:47

“Quest” Approach

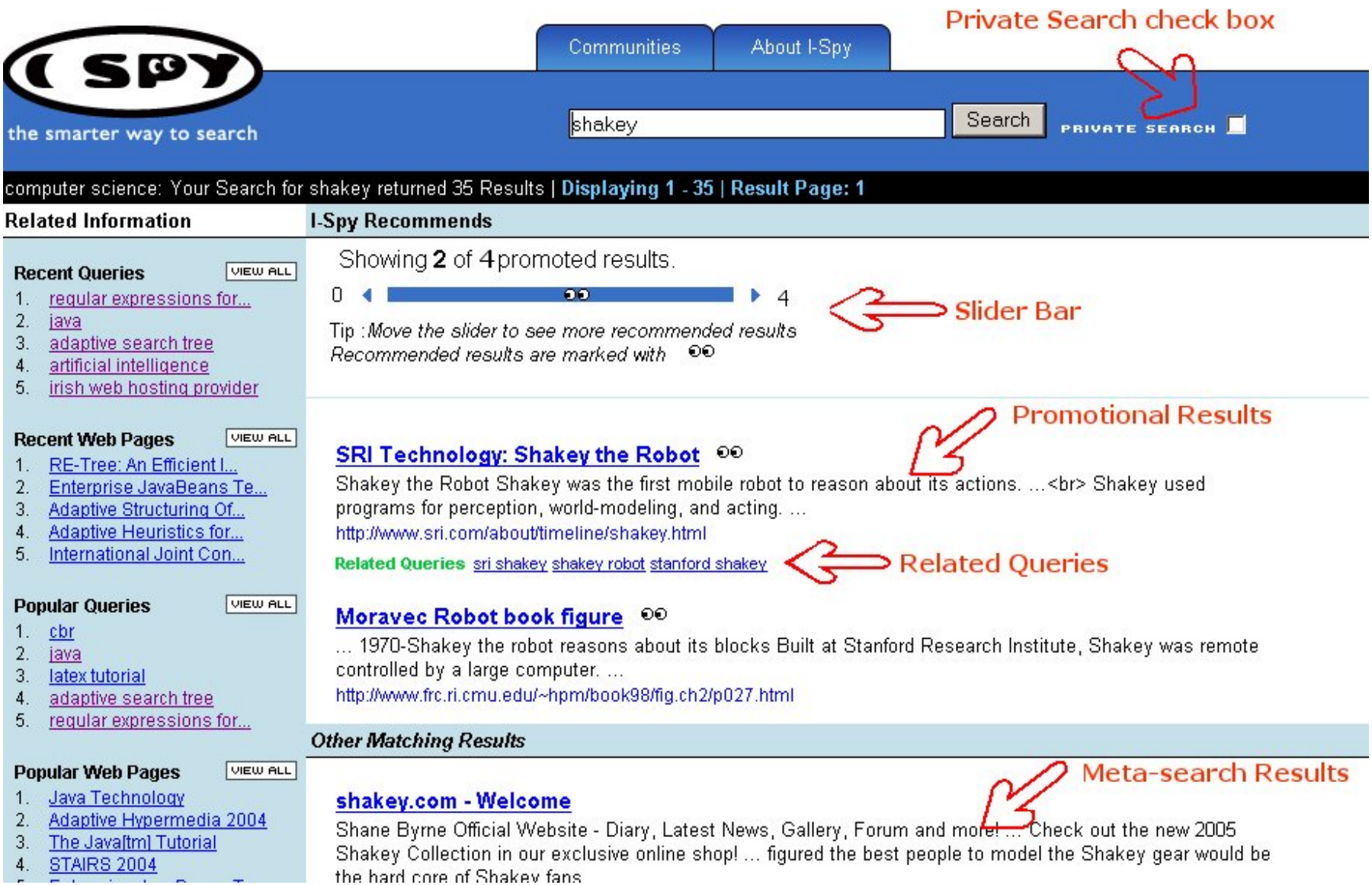
- Quests establish similarities between users
- Relevance between documents and quests is provided by explicit feedback
- Similar approach: SERF (Jung, 2004)
  - Results with recommendations were shown on over 40% searches.
  - In about 40% of cases the users clicked and 71.6% of these clicks were on 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?

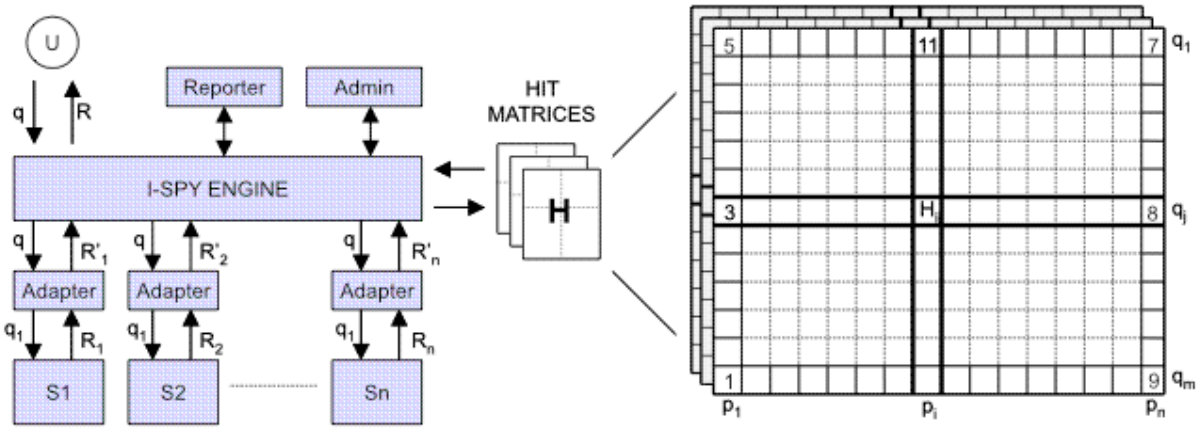
- Critique?

I-SPY: Community-Based Search



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 Search Advanced S Preferences

Search: the web pages from Ireland

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

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 sea

Jordan, **Michael** Jeffrey. ALTERNATIVE NAMES, **MJ**; Air **Jorda**

en.wikipedia.org/wiki/**Michael_Jordan** - 130k - Cached - Similar

Google

Web Images Groups News more »

michael jordan Search Advanced S Preferences

Search: the web pages from Ireland

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

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 2 Related

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** 1 Related

... 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?

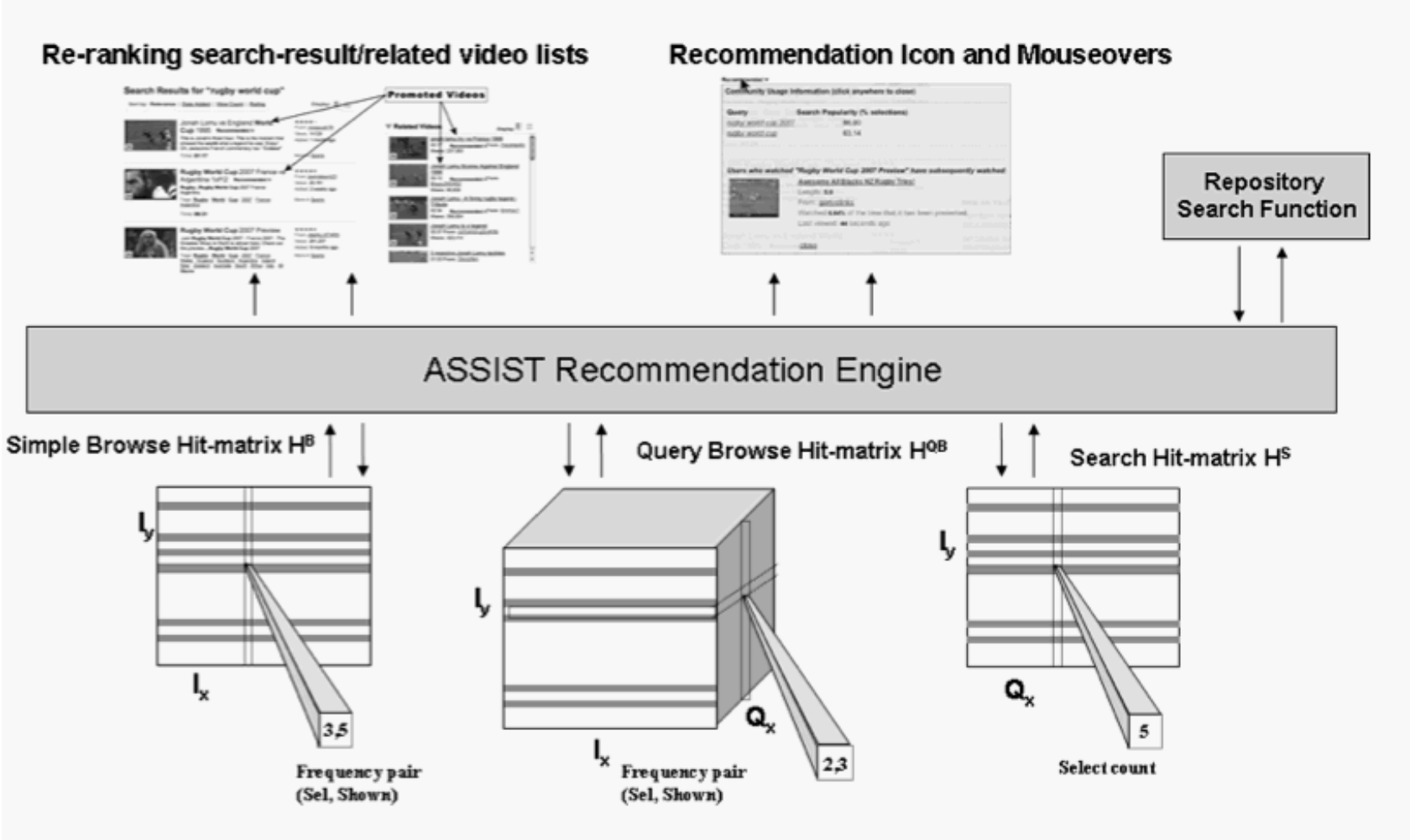
From iSpy to Heystaks: Folders

http://www.heystaks.com/

Social Search + Social Navigation

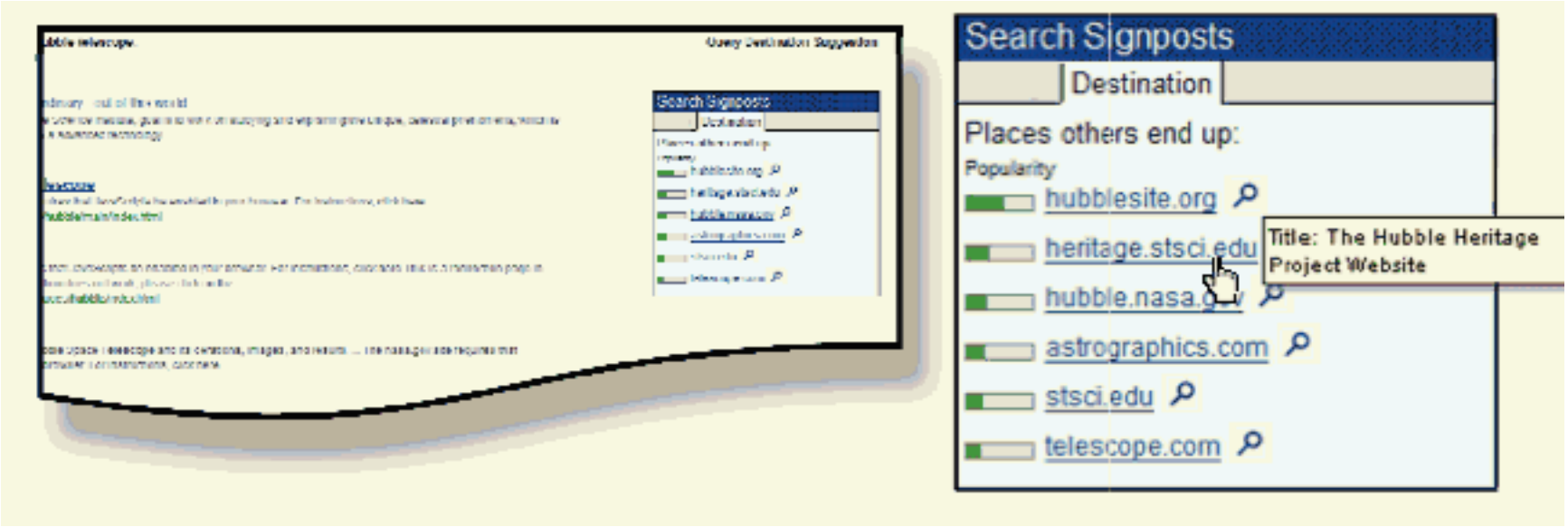
- **Farzan, R., Coyle, M., Freyne, J., Brusilovsky, P., and Smyth, B.** (2007) ASSIST: adaptive social support for information space traversal. In: Proceedings of 18th conference on Hypertext and hypermedia, HT '07, Manchester, UK, 10-12 September, 2007, ACM Press, pp. 199-208, also available at http://dx.doi.org/10.1145/1286240.1286299

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



- **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?