



## What is Social Search?

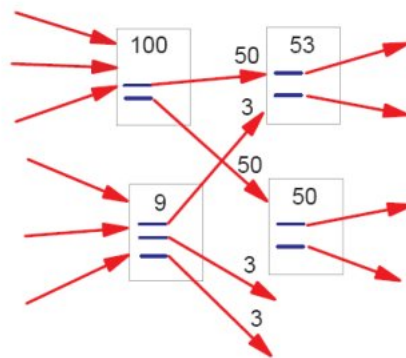
- **Social Information Access**
  - a stream of research that explores methods for organizing users' past interaction with an information system (known as explicit and implicit *feedback*), in order to provide better access to information to the future users of the system
- **Social Search: a set of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

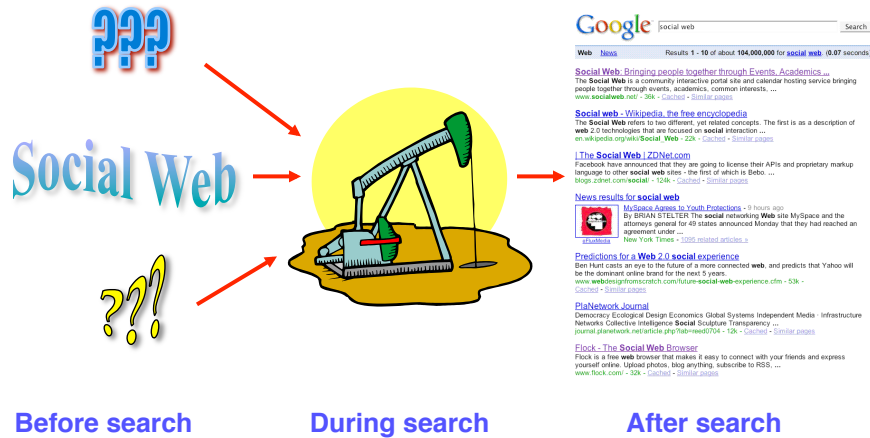
- Which users?
- Which activity?



- 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

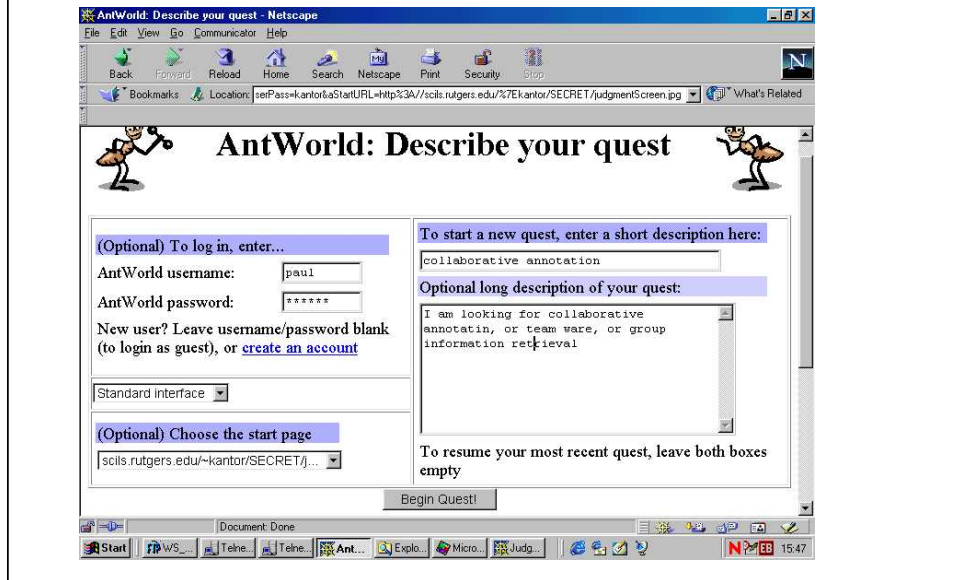
## How We Can Help After Search?

- 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



## “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 screenshot shows the I-Spy search engine interface. At the top, there is a search bar with the text "shakey" and a "Search" button. To the right of the search bar is a "Private Search check box" with a red arrow pointing to it. Below the search bar, the text reads "computer science: Your Search for shakey returned 35 Results | Displaying 1 - 35 | Result Page: 1".

The main content area is divided into several sections:

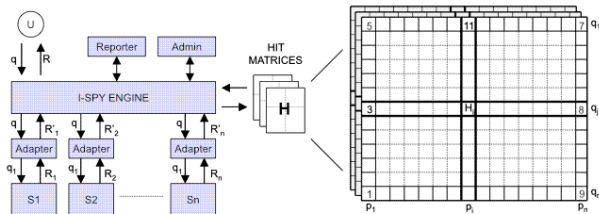
- Related Information**: Contains "Recent Queries" and "Recent Web Pages".
- I-Spy Recommends**: Shows "Showing 2 of 4 promoted results." with a slider bar from 0 to 4. A red arrow points to the slider bar with the label "Slider Bar". Below the slider bar is a tip: "Tip: Move the slider to see more recommended results. Recommended results are marked with [eye icon]".
- Promotional Results**: The first result is "SRI Technology: Shakey the Robot" with a red arrow pointing to it and the label "Promotional Results". The description says: "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**: Below the promotional result, there are "Related Queries" with a red arrow pointing to them and the label "Related Queries". The queries are: "sri shakey", "shakey robot", and "stanford shakey".
- Other Matching Results**: The first result is "Moravec Robot book figure" with a red arrow pointing to it and the label "Meta-search Results". The description says: "... 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/flg.ch2/p027.html".

At the bottom left, there are sections for "Popular Queries" and "Popular Web Pages".



# 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 Search 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 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 Search Advanced Search 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](#)   
 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

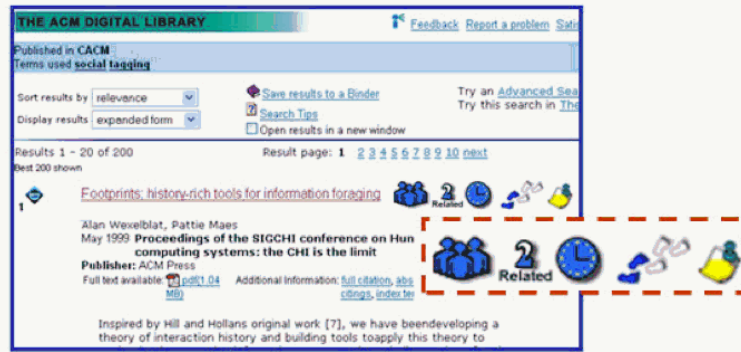
- What is good/important?
- Critique?

## From iSpy to Heystaks: Folders



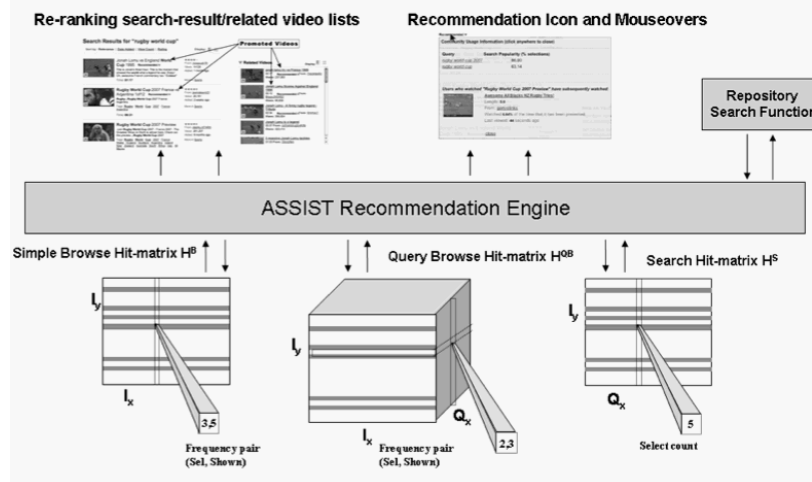
<http://www.heystaks.com/>

# Social Search + Social Navigation



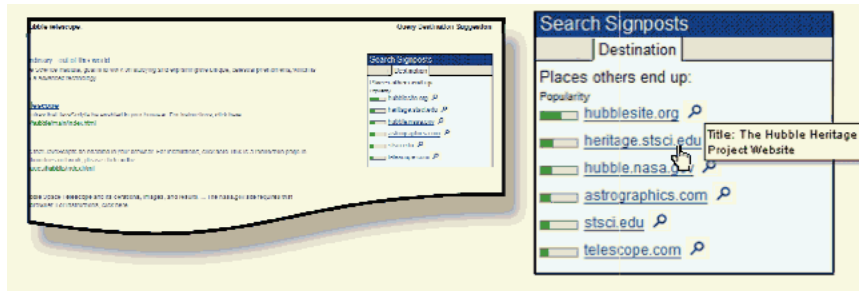
- Farzan, R., Coyle, M., Freyne, J., Brusilovsky, P., and Smyth, B. (2007) ASSIST: adaptive social support for information space traversal. In: Proceedings of 18th conference on Hypertext and hypermedia, HT '07, Manchester, UK, 10-12 September, 2007, ACM Press, pp. 199-208, also available at <http://dx.doi.org/10.1145/1286240.1286299>

# 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?