



Towards the New Sciences of the Internet: Next Generation Search and the Power of Social Networks

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Acknowledgement

Thanks to the following people at **Yahoo!**
Research for some of material I drew on in this talk:

- SDS team at Yahoo!
- Yahoo! Research people:
 - Andrew Tomkins, Chief Scientist, Search
 - Prabhakar Raghavan, Head of Yahoo! Research
 - Raghu Ramakrishnan, Chief Scientist, Audience
 - Ravi Kumar, Manager of Search Team, US
 - Ricardo Baeza-Yates, Director of Y!R Barcelona and Santiago

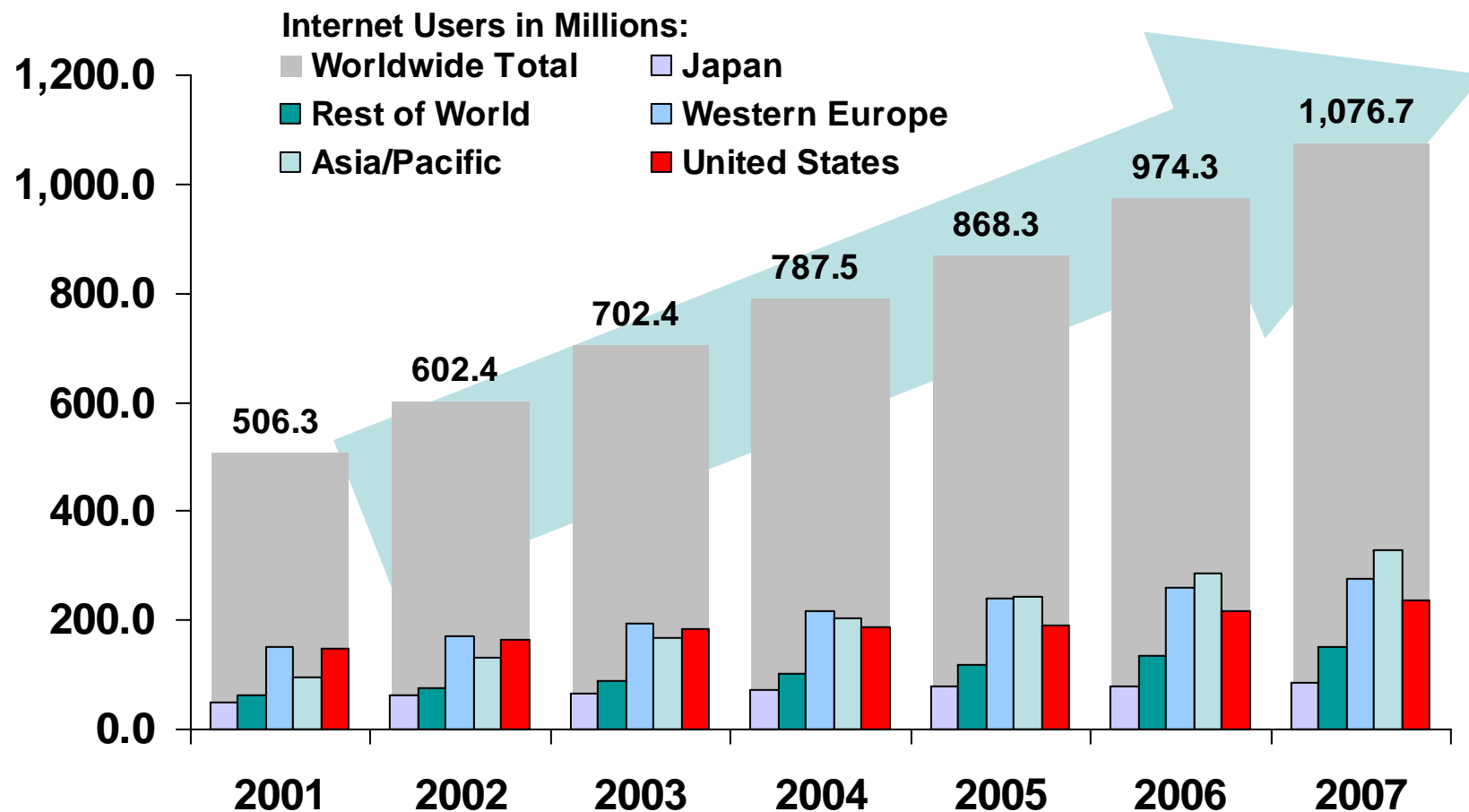


Overview

- About Yahoo! and its business
- Search and Search Advertising
- Targeting to Users for Relevance
- The Evolution of “Social Media”
- Understanding the new Phenomena of the Internet and Social Media
- Yahoo! Research
- Overview of Some Research Challenges
- The Evolution of Search
- Concluding Thoughts



Globally, Internet Users Will Number Over 1 Billion by 2007





Yahoo! is the #1 Destination on the Web

YAHOO!

73% of the U.S. Internet population uses Yahoo!
– Over 500 million users per month globally!

- Global network of content, commerce, media, search and access products
- 100+ properties including mail, TV, news, shopping, finance, autos, travel, games, movies, health, etc.
- **25 terabytes of data collected each day... and growing**
 - Representing thousands of cataloged consumer behaviors

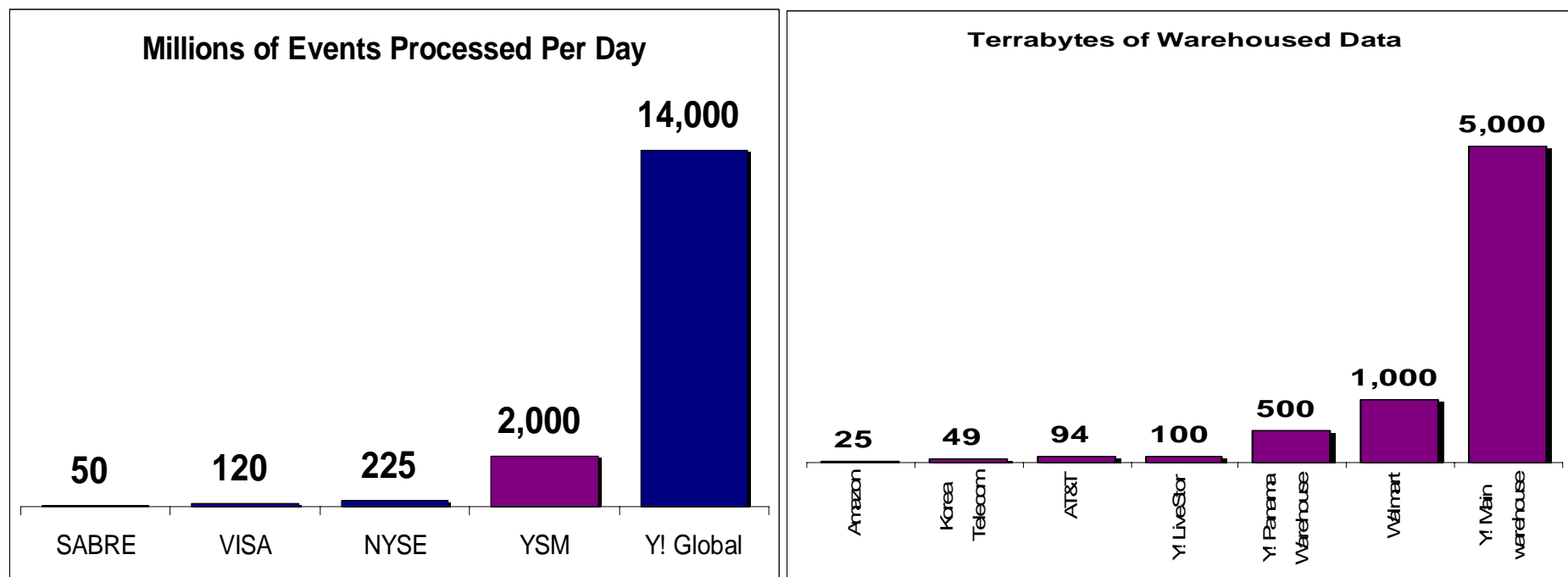
Data is used to develop content, consumer, category and campaign insights for our key content partners and large advertisers

More people visited Yahoo! in the past month than:

- Use coupons
- Vote
- Recycle
- Exercise regularly
- Have children living at home
- Wear sunscreen regularly



Yahoo! Data – A league of its own...



GRAND CHALLENGE PROBLEMS OF DATA PROCESSING

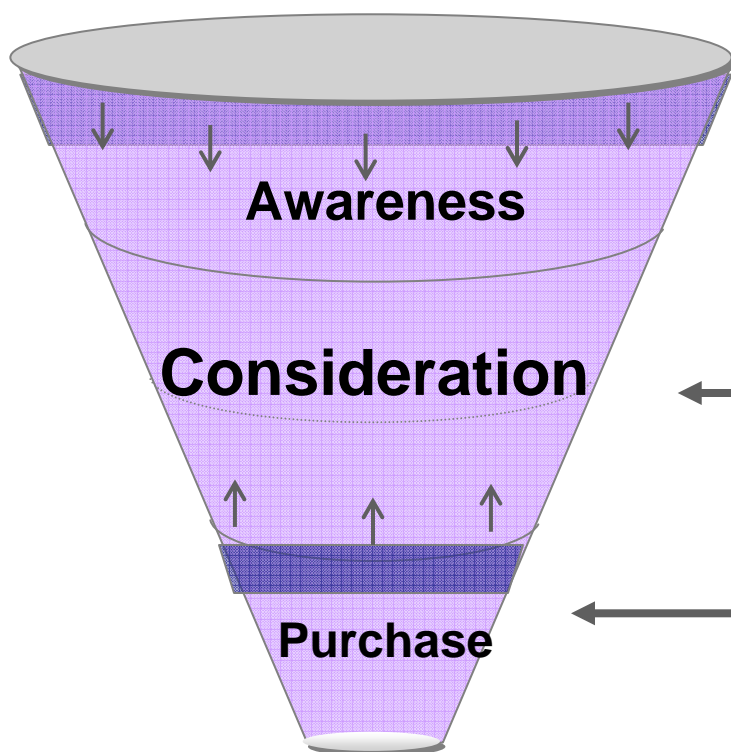
TRAVEL, CREDIT CARD PROCESSING, STOCK EXCHANGE, RETAIL, **INTERNET**

Y! Data Challenge Exceeds others by 2 orders of magnitude



Advertising: Brand and DR

Knowledge of users & their behavior throughout the purchase funnel can grow brand & direct response revenue



> \$200B Brand Advertising Market

Most time & activity is in consideration & engagement, but there are limited metrics & reach strategies

> \$250B Direct response Market



A Tale of Two Search Engines

latin canon

Search

Advanced Options

Advertisements = Monetization

Web results 1-10 of 13,300,000

See also: Images, Video, News, Maps, MSN, More

Algorithmic results = Audience

CANON LATIN AMERICA, INC.

canon latin america, inc. ...

www.canonlatinamerica.com · Cached page · Translate this page

Canon law (Catholic Church) - Wikipedia, the free encyclopedia

This code was promulgated on 27 May 1917 as the Code of Canon Law (Latin : Codex Iuris Canonici) by his successor, Pope Benedict XV , who set 19 May 1918 as the date on which it came into ...

en.wikipedia.org/wiki/Canon_law_%28Catholic_Church%29 · Cached page

Canon of the Mass - Wikipedia, the free encyclopedia

This article incorporates text from the public-domain Catholic Encyclopedia of 1913. Canon of the Mass (Latin : Canon Missæ , Canon Actionis) is the name used in the Roman ...

en.wikipedia.org/wiki/Canon_of_the_Mass · Cached page

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-\$

About Canon: Corporate Overview > Office Locations

Canon Latin America, Inc. 703 Waterford Way, Suite 400 Miami, FL 33126 Phone: 305-260-7400

www.usa.canon.com/templatedata/AboutCanon/ciwofloc.html · Cached page

Muratorian Canon in Latin

Muratorian Canon (original Latin) On Early Christian Writings The single

Sponsored sites

Canon Is at Amazon

Low prices on Canon Is. Qualified orders over \$25 ship free amazon.com

Want a Free DVD Camcorder

Get great new products for Free. Join our member incentive program. ProductTestPanel.com

Buy Canon Products

Shop at Staples.com and Save on Canon Products & Supplies Today! www.Staples.com

Best Camera Deals Online

Incredible prices! Up to 80% off on select items www.topdeallsonweb.com

Canon

Name Brand Photo products STRATEGIC DATA SOLUTIONS FIND. REACH. KNOW.

+\$

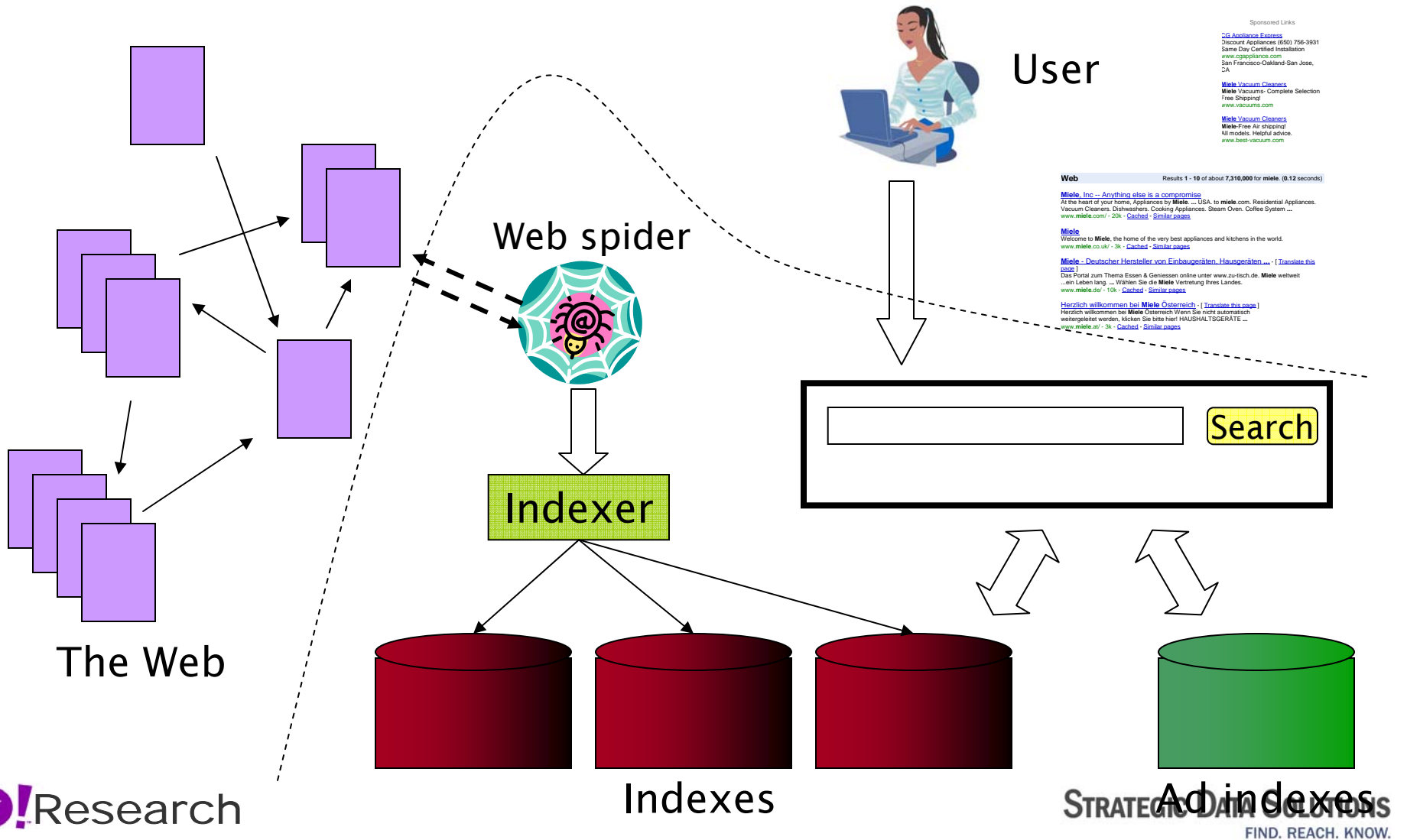


Algorithmic vs. Ad Search

- Analogous to classical separation of editorial vs commercial content
- Technical underpinnings:
 - Some commonalities (IR, ML)
 - Many differences (incentives, spam, mechanism design)
- Will cover both algo and ads



The two engines





1995: The Yahoo! Directory

- Apply human expertise and editorial to organize web sites
- What worked
 - Practical, Navigable
 - Trustworthy, Authoritative
- What didn't
 - Scalability
 - Granularity
 - Etc.





1995 : Altavista (Inktomi, Lycos, etc.)

- Automate the process of acquiring pages; use “information retrieval” techniques to return pages that contain a particular term
- What worked
 - Scalable (query for “IBM” returns 40M pages)
 - Simple
 - Granular
- What didn't
 - Scalability a double-edged sword
 - Ranking and relevance poor
 - Not authoritative (spam, irrelevance, etc.)





c. 1999-2006: PageRank (Google, Yahoo)

- Use topology (link structure) of the web to confer authority
- What works
 - Relevance is greatly improved
 - Navigational query is born (query for “IBM” gets me to ibm.com)
- What doesn't
 - Homogeneity of results (no personalization) means no “subjective” queries – webmasters vote by proxy for everyone – and their answer is the only answer
 - System easily “gamed” by spammers – leads to arms race





Meanwhile, On the Money Front...

- Sponsored search ranking: Goto.com (morphed into Overture.com → Yahoo!)
 - Your search ranking depended on how much you paid
 - Auction for keywords: ***casino*** was expensive!
- 1998+: Link-based ranking pioneered by Google
 - Blew away all early engines except Inktomi
 - Great user experience in search of a business model
 - Meanwhile Goto/Overture's annual revenues were nearing \$1 billion
- Result: Google added sponsored search "ads" to the side, independent of search results
 - 2003: Yahoo follows suit, acquiring Overture (for paid placement) and Inktomi (for search)
- The Monetization Mechanisms... Conversion of marketplace mechanisms in 2007

Search advertising

The screenshot shows a search engine interface with the search term "latin canon". The results are divided into organic search results and sponsored sites. A red circle highlights the sponsored advertisements on the right side of the page.

Live Search Home Hotmail Spaces OneCare Sign

latin canon **Search** Advanced Options

Web results 1-10 of 13,300,000
See also: [Images](#), [Video](#), [News](#), [Maps](#), [MSN](#), [More](#) ▼

CANON LATIN AMERICA, INC.
canon latin america, inc. ...
www.canonlatinamerica.com · [Cached page](#) · [Translate this page](#)

Canon law (Catholic Church) - Wikipedia, the free encyclopedia
This code was promulgated on 27 May 1917 as the Code of Canon Law (Latin : Codex Iuris Canonici) by his successor, Pope Benedict XV , who set 19 May 1918 as the date on which it came into ...
en.wikipedia.org/wiki/Canon_Law_%28Catholic_Church%29 · [Cached page](#)

Canon of the Mass - Wikipedia, the free encyclopedia
This article incorporates text from the public-domain Catholic Encyclopedia of 1913. Canon of the Mass (Latin : Canon Missæ , Canon Actionis) is the name used in the Roman ...
en.wikipedia.org/wiki/Canon_of_the_Mass · [Cached page](#)
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About Canon: Corporate Overview > Office Locations
Canon Latin America, Inc. 703 Waterford Way, Suite 400 Miami, FL 33126
Phone: 305-260-7400
www.usa.canon.com/templatedata/AboutCanon/ciwoflocc.html · [Cached page](#)

Muratorian Canon in Latin
Muratorian Canon (original Latin) On Early Christian Writings ... The single

Sponsored sites

- Canon Is at Amazon**
Low prices on Canon Is. Qualified orders over \$25 ship free
amazon.com
- Want a Free DVD Camcorder**
Get great new products for Free. Join our member incentive program.
ProductTestPanel.com
- Buy Canon Products**
Shop at Staples.com and Save on Canon Products & Supplies Today!
www.Staples.com
- Best Camera Deals Online**
Incredible prices! Up to 80% off on select items
www.topdealsonweb.com
- Canon**
Name Brand Photo products

Web Images Video Local Shopping more
YAHOO! SEARCH cannon camera Search Advanced Search

Search query

Search Results 1 - 10 of about 4,070,000 for cannon camera - 0.20 sec. (About this page)

Did you mean: [canon camera](#)

SPONSOR RESULTS

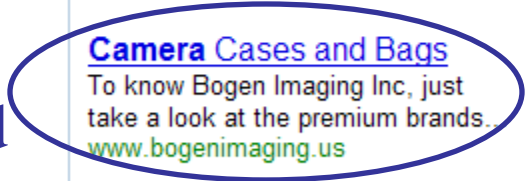
- [Canon Camera at Circuit City](#)
www.CircuitCity.com - Circuit City - Official Site. Free Shipping on Orders \$24 and Up.
- [Cannon Camera](#)
RitzCamera.com - Huge Selection of Canon Cameras. Free Shipping & No Tax. Buy Today.

- [Canon](#) (NYSE: CAJ)
Global manufacturer of copy machines, fax machines, cameras, computer peripherals, and optical products.
www.canon.com - 23k - Cached - More from this site
- [Canon Camera Museum](#)
Showcasing camera history, technology, and design.
www.canon.com/camera-museum - 22k - Cached - More from this site
- [Canon Digital Cameras](#)
Official Canon site for its line of PowerShot and EOS digital cameras, photo printers, and film scanners.
www.powershot.com - 104k - Cached - More from this site
- [Canon USA](#)
Manufacturer of professional and consumer imaging equipment and information systems including copiers, printers, image filing systems, cameras and lenses, and more.

SPONSOR RESULTS

- [Authorized Canon Cameras Pro Dealer](#)
Buy Canon Cameras here. Imageologists: Professional photographic...
www.imageologists.com
- [Canon Cameras](#)
We Offer 3,500+ Digital Cameras. Discover canon cameras.
www.BizRate.com/canon
- [Camera Cases and Bags](#)
To know Bogen Imaging Inc., just take a look at the premium brands.
www.bogenimaging.us
- [Cannon Camera Battery Accessory](#)
Spring Sale. 80% off. Valid till Apr-30. Free Ship coupon over \$30.
www.cellphoneshop.net

Ad





A Question for the audience

- Do you think an “average” user, knows the difference between sponsored search links and algorithmic search results
- Do you think an “average” user knows there are sponsored links on the page?
- Do you think a user knows where a sponsored link would navigate to upon a click?



How it works

Advertiser



I want to bid \$5 on
canon camera

I want to bid \$2 on
cannon camera



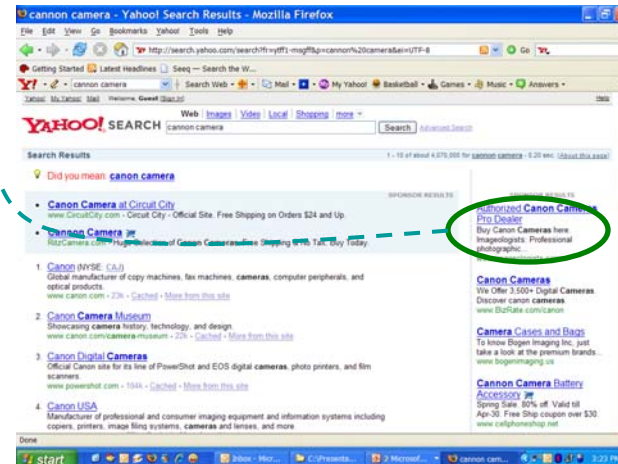
Ad Index

Sponsored
search engine

Engine decides when/where to show this ad.



Landing page



Engine decides how much to charge advertiser on a click.



Monetization

- When a searcher clicks on a displayed ad, advertiser pays the search engine
 - E.g., a Ford dealership may place an ad for the search **Ford**
 - Out of all such ads, engine chooses to display some on each **Ford** search
 - When a searcher clicks an ad, the advertiser who placed it pays



Engine: Three sub-problems

1. Retrieve ads matching query
2. Order the ads
3. Pricing on a click-through

IR

Econ

The screenshot shows a Mozilla Firefox browser window displaying Yahoo! search results for the query 't10'. The search results are listed on the left, and sponsored results are shown on the right. A red dashed arrow points to the sponsored results section.

Search Results:

- 1. [T10 Technical Committee](#)
T10 Technical Committee, which standardizes SCSI ... About T10. SCSI-3 Standards Architecture. Recent Documents and Drafts ... T10 Reflector (email list) ...
- 2. [T10 Working Drafts](#)
This page includes the T10 working draft documents. ... T10 committee working draft revision for a project is retained here. The drafts are used by T10 ...
- 3. [T10 - Wikipedia, the free encyclopedia](#)
T10 may refer to: ... T10 Technical Committee. T10 may also refer to: ... T10 systemet. This disambiguation page lists articles associated with the same title. ...
- 4. [Sony Cyber-shot DSC-T10 Digital Camera - Full Review - The Imaging Resource!](#)
... Review of the Sony Cyber-shot DSC-T10 digital camera, with actual sample images, and ... All Prices for Sony DSC-T10. Your shopping clicks support this site, ...
- 5. [Pentax Optio T10 Digital Photography Review](#)
Pentax Optio T10 Digital Photography Review News ... Pentax has today also announced the Optio T10, which features a large 3-inch LCD ...

SPONSOR RESULTS:

- T10**
T Series digital cameras. Shop Sony's official store & save. [www.SonyStyle.com](#)
- Sony DscT10 Cybershot Digital Camera**
His stylish, yet compact camera incorporates 7.2 MP Super Had™ CCD. ... [www.fotocconnection.com](#)
- Compare Prices Pentax Optio T10**
Find a price on Pentax Optio T10 - at ShopCartusa.com. [www.ShopCartUSA.com](#)
- Plantronics Headsets**
Plantronics headsets & accessories. Buy online or call toll free. [www.TWAccom.com](#)
- Erowed Diet Pill Review**



1. Retrieve ads matching query

- Advertisers bid on keywords/phrases
- Match query to “nearby” bidded keywords
 - Retrieve ads for these bidded keywords
- Not a standard IR problem
 - Bidded keywords skewed to commerce
 - Advertisers and engine (trying to) co-operate
 - Marketplace of keywords
- [Venezia hotels](#)



Retrieving ads

- Standard tricks from IR: phrasing, spell-correction, ranking ...
 - Use both ad snippet and landing page features
 - Advertisers are trying to help! (Anti-spam)

SPONSOR RESULTS

[250 Hotels in Venice - Italy](#)

Save up to 70% on 1 to 5 star **hotels** in Venice. With guest-reviews.

www.booking.com

[Hotel Venezia](#)

Compare **hotel** prices from over 120 top websites and save up to 70%.

Hotels.SideStep.com

[Charming Hotels & Resorts](#)

Venice **Hotel** So Unique, So Very Distinctive !

www.TheCharmingHotels.com

Sign in



Web Images Video News Maps more »

tundra

Search

Advanced Search Preferences

Web Results 1 - 10 of about 11,300,000 for tundra [definition]. (0.06 seconds)

The tundra biome

Tundra is the coldest of all the biomes. Tundra comes from the Finnish word ... Arctic tundra is located in the northern hemisphere, encircling the north ...
www.ucmp.berkeley.edu/exhibits/biomes/tundra.php - 14k - [Cached](#) - [Similar pages](#)

Tundra Biome

All about the Alpine biome, description, global position, climate, and information on specific plants and animals of this biome.
www.blueplanetbiomes.org/tundra.htm - 16k - [Cached](#) - [Similar pages](#)

Tundra

The tundra is the simplest biome in terms of species composition and food chains. ... Distribution: The tundra biome is restricted to the high latitudes of ...
www.radford.edu/~swoodwar/CLASSES/GEOG235/biomes/tundra/tundra.html - 7k - [Cached](#) - [Similar pages](#)

Tundra Semiconductor

Designer, developer and marketer of IC's for system interconnections.
www.tundra.com/ - 45k - [Cached](#) - [Similar pages](#)

Tundra 5

There are two types of tundra in the world, Arctic and Alpine. The arctic tundra is at the top of the world around the North Pole. ...
ths.sns.lane.edu/biomes/tundra5/tundra5.html - 10k - [Cached](#) - [Similar pages](#)

Ads go in slots like these

Sponsored Links

- [Nissan Titan](#)
Standard V8, Fully Boxed Frame, 317HP, 385 LBS Ft. Torque.
www.NissanUSA.com/Titan
- [The 2007 Toyota Tundra](#)
The all-new Tundra has arrived. The truck that's changing it all.
www.Toyota.com/Tundra
- [Top New Truck Prices](#)
Find out our Lowest Possible Price on a new Truck Purchase or Lease!
www.CarPriceSecrets.com
- [AutoUSA](#)
Buy A New Car at a Low Price Available From Dealers in Your Area
www.autousa.com/Toyota
San Francisco-Oakland-San Jose, CA

Sign in



Web Images Video News Maps more »

tundra

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www.blueplanetbiomes.org/tundra.htm - 16k - [Cached](#) - [Similar pages](#)

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ths_sns.lane.edu/biomes/tundra5/tundra5.html - 10k - [Cached](#) - [Similar pages](#)

Done

Sponsored Links

[Nissan Titan](#)

Standard V8, Fully Boxed Frame, 317HP, 385 LBS Ft. Torque.
www.NissanUSA.com/Titan

[The 2007 Toyota Tundra](#)

The all-new Tundra has arrived. The truck that's changing it all.
www.Toyota.com/Tundra

[Top New Truck Prices](#)

Find out our Lowest Possible Price on a new Truck Purchase or Lease!
www.CarPriceSecrets.com

[AutoUSA](#)

Buy A New Car at a Low Price Available From Dealers in Your Area
www.autousa.com/Toyota
San Francisco-Oakland-San Jose, CA

Higher slots get more clicks





2. Order the ads

- Most generally, composite IR+Econ score ... for today's talk, focus on Econ
- Original GoTo/Overture scheme:
 - Order by bid

Edit View Go Bookmarks Yahoo! Tools Help

http://search.yahoo.com/search?fr=ytf1-&p=747&ei=UTF-8

Getting Started Latest Headlines Seeq — Search the ...

747 Search Web My Web Bookmarks My Yahoo! Yahoo! Finance Mail News

47 - Yahoo! Search Results academia.pdf (application/pdf Object)

Yahoo! My Yahoo! Mail Welcome, praghpragh [Sign Out, My Account] Search Home Help

Web Images Video Audio Directory Local News Shopping More »

747 Search the Web My Web (beta)

Web Answers BETA Search Services Advanced Search Preferences

Search Results Results 1 - 10 of about 27,100,000 for 747 - 0.23 sec. (About this page)

Also try: [boeing 747](#), [747 airplane](#), [747 seating chart](#), [747 jumbo jet](#) More...

Bid ordering (Overture/former Yahoo!)

- [Boeing 747-400 Family](#) Corporate product page from Boeing. Category: [Planes](#) > [Boeing 747 Family](#) www.boeing.com/commercial/747family - 11k - [Cached](#) - [More from this site](#) - [Save](#)
- [Wikipedia: Boeing 747](#) The Boeing 747, commonly called the Jumbo Jet, is one of the most recognizable modern airliners and is the largest airliner currently in airline service. First flown commercially in 1970, it held the size record for more than 35 years, although ... The four-engine 747, produced by Boeing Commercial Aircraft, uses a two ... Quick Links: [History](#) - [Development](#) - [In service](#) en.wikipedia.org/wiki/Boeing_747 - 102k - [Cached](#) - [More from this site](#) - [Save](#)
- [Wikipedia: 747](#) ==Events== ... This article is about the year 747. For the aircraft, see Boeing 747. For the song by Kent, see 747 (song). For other uses of 747, see 747 (number ... Quick Links: [Events](#) - [Births](#) - [Deaths](#) en.wikipedia.org/wiki/747 - 16k - [Cached](#) - [More from this site](#) - [Save](#)

SPONSOR RESULTS

[747 on eBay](#)
Shop eBay for anything and everything - from specialized gifts to... www.ebay.com

[Shop Boeing 747-400 Miniature Models](#)
Shop Boeing 747-400 miniature models at FlightMiniatures.com. See... www.flightminiatures.com

[Canon Fax L777 Toner-free Shipping](#)
Save on compatible Canon Fax L777 toner. Purchase our... www.ink-refills-ink.com

[747 Airplanes - Free Shipping](#)
Thousands of hand crafted fully assembled model plane replicas in...



Revenue ordering, simplified

- Each ad j has an expected click-through denoted CTR_{jq} on query q ← Estimated (how?)
- Ad j 's bid is denoted b_j
- Then, expected revenue from this ad is $R_j = b_j \times CTR_{jq}$
- Order ads by R_j



Web Images Groups News Froogle Maps more »

747

Search

Advanced Search Preferences

Revenue ordering?

Web Results 1 - 10 of about 83,900,000 for 747. (0.10 second)

[Boeing: Commercial Airplanes - 747 Home](#)

Boeing Announces First Engineering Releases for New 747-8 Family - Boeing Delivers Malaysia Airlines System's First 747-400 Freighter - Cargolux Expands ...
www.boeing.com/commercial/747family/ - 12k - May 3, 2006 - [Cached](#) - [Similar pages](#)

[Boeing: Commercial Airplanes - 747 - About the 747 Family](#)

The Boeing 747 Family -- The Right Choice for the Large Airplane Market. About the 747 Family. Instantly recognized by passengers around the world, ...
www.boeing.com/commercial/747family/background.html - 26k - [Cached](#) - [Similar pages](#)
[[More results from www.boeing.com](#)]

[Boeing 747 - Wikipedia, the free encyclopedia](#)

The Boeing 747, commonly called the Jumbo Jet, is one of the most ... The 747SP was the longest-range airliner available until the 747-400 entered service ...
en.wikipedia.org/wiki/Boeing_747 - 101k - May 3, 2006 - [Cached](#) - [Similar pages](#)

[Airliners.net: Boeing 747-400](#)

The 747-400 is the latest, longest ranging and best selling model of the 747 family. Boeing launched the 747-400 in October 1985 and the first development ...
www.airliners.net/info/stats.main?id=100 - 27k - May 3, 2006 - [Cached](#) - [Similar pages](#)

[Boeing 747SP Website](#)

Boeing 747SP Production List, Photo Gallery, Incident Reports, Current Status, News and much more.
www.747sp.com/ - 21k - May 3, 2006 - [Cached](#) - [Similar pages](#)

Sponsored Links

[747 On Sale](#)

Chairs, Desks & Cabinets
Everyday Low Prices.
OfficeFurniture.BettyMills.com

[Boeing™ 747-400 Model](#)

Accurately detailed Boeing™ 747-400 desktop display models
www.FlightMiniatures.com

[Boeing's Photo Collection](#)

The world's leading source of still and motion aerospace imagery!
www.boeingphotostore.com

[747](#)

Everything to do with 747 items.
eBay.com





Economic ordering

- Bid and revenue ordering: two forms of ordering by an **econ** score
- Does revenue ordering maximize revenue?
- No – advertisers react to ordering scheme, by changing their bid behavior!
- Lahaie+Pennock ACM EC 2007
 - Family of schemes bridging Bid and Revenue ordering
 - Game-theoretic analysis



A new convergence

- Monetization and economic value an intrinsic part of system design
 - Not an afterthought
 - Mistakes are costly!
- Computing meets humanities like never before – sociology, economics, anthropology ...

A question for the Audience:

***Why is search-related
advertising so powerful?***



Classical web search user needs

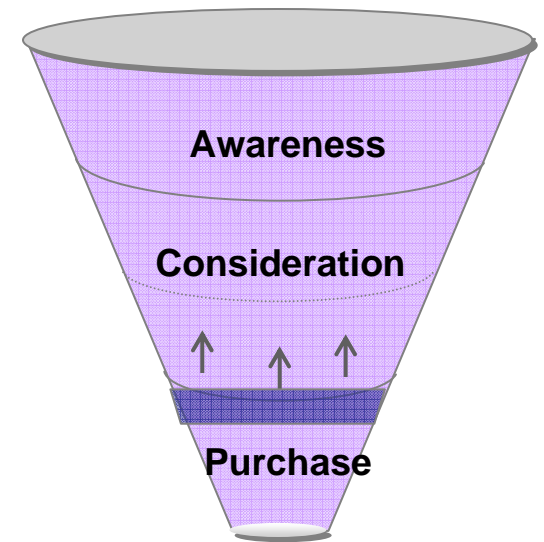
- Informational – want to learn about something (~25%)
 - Low hemoglobin**
- Navigational – want to go to that page (~40%)
 - United Airlines**
- Transactional – want to do something (web-mediated) (~35%)
 - Access a service **Mendocino weather**
 - Downloads **Mars surface images**
 - Shop **Nikon CoolPix**
- Gray areas
 - Find a good hub **Car rental Finland**
 - Exploratory search “see what’s there”



Moving Customers up the Funnel

Impulse Banners

- Target users based on their activity – both search and property -- within the NEXT HOUR
 - Behavioral Categories – Apparel, Computers, Home Appliances – all the same categories that you can use for regular behavioral targeting!





Impulse Banner Example

1

User searches on the word "Credit Card"



2

Sees that "Credit Card" falls under the category: "Finance/Credit and Credit Services"

3

serves "Finance/Credit and Credit Services" banners to User anywhere on the Yahoo! network within 1 HOUR





Way Impulse Works

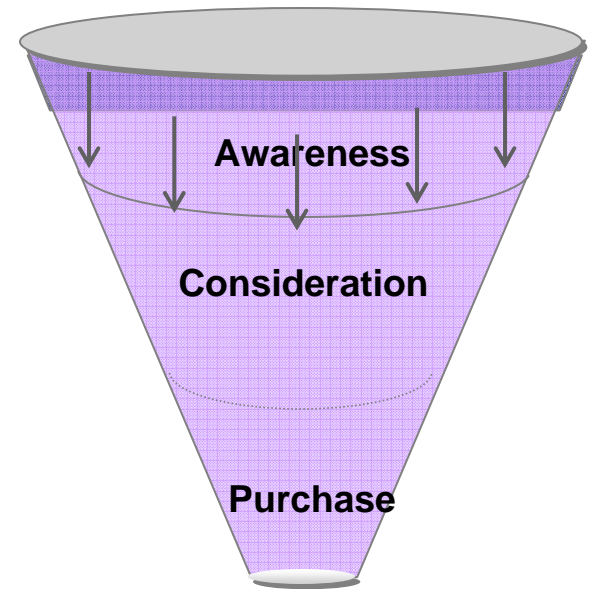
- Searches are not at all associated or tracked through personally identifiable information
- No long-term memory of search terms, all stored on client cookie.
- We generalize the category is targeting is at generic category: e.g. Financial Services, not “credit card”
- All targeting done in anonymous mode



Moving Down the Funnel

- New generation marketing solutions to take brand advertisers down the marketing funnel

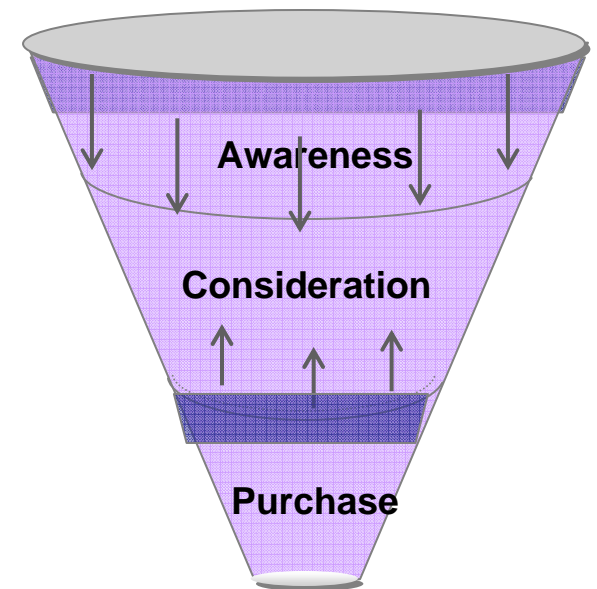
Behavioral Targeting (BT)





Brand Ads and Search Ads Interact!

- *Is ad search strategy enough for a direct marketer?*
- *Do brand ads play a role in search advertising?*
- *Harris Direct Case Study*





Case Study: Harris Direct

Viewing These Ads:



On: {
YAHOO! FINANCE
YAHOO! MAIL
 MY **YAHOO!**

Had This Effect On:

- Aided Brand Awareness
 – Up 7%



- Brand Favorability
 – Up 32%



- Purchase Intent
 – Up 15%





Case Study: Harris Direct

People who saw display ads were **61% more likely to search** on related topics...

The screenshot shows a Yahoo! search for "harris direct". The search bar is at the top with navigation links for Web, Images, Video, Directory, Local, News, and Products. Below the search bar, the search results are displayed. The first result is for Harrisdirect, which offers online trading, real-time quotes, and news. A callout box highlights this result. To the right, there are sponsored results for HarrisDirect, including a \$100 credit offer. A callout box highlights these sponsored results. Below the first result, there is a second result for Harrisdirect with market indices information. A callout box highlights this result. At the bottom left, there is a Harrisdirect logo. A callout box highlights this logo.

...and drove **139% more clicks** on algorithmic and sponsored links...

...specifically driving **249% more sponsored search clicks** ...



...and driving **91% more activity** on the HarrisDirect.com website.



Social Media and Yahoo! Research

Example of challenges of
inventing the new sciences of the Internet



Evolution of Social Media

- Although the “traditional notion” of portal and web content is still attracting growing audiences
- The original notion of “publishing content” to attract audiences is changing fast
 - As people discover the fact that the Internet is an Interactive Medium
 - The uses of the Internet enter areas we could not imagine a short time ago
- A new notion of “publishing” is fast emerging
 - The opportunity of user-generated content



Examples of Social Media

- Blogs
 - The individual as publisher
 - Comments and tags part of the process
- Sharing Photos: e.g. Flickr
- Social Search
 - My Web 2.0
 - Yahoo! Answers
 - Del.icio.us
- Web communities:
 - Yahoo! Groups
 - Individual web presence: Facebook, MySpace, Yahoo! 360, Friendster, ...
- Video sharing: You Tube, Yahoo! Video, etc...



Photos from your contacts

Or, [only show photos from your family and friends](#)

[View as slideshow](#)
([New window](#))



From [cburg](#)



From [thincvox](#)



From [rnair](#)



From [jchaddickson](#)



From [shaneahern](#)



From [Flickmor](#)



From [jeanniey](#)



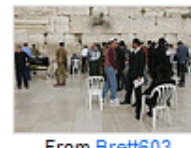
From [Marc Davis](#)



From [heather](#)



From [Kenneth Norton](#)



From [Brett603](#)



From [Esthr](#)



From [Ross Mayfield](#)



From [lantzilla](#)



From [Troutgirl](#)



From [simonpk](#)





What makes Flickr special?

1. User Generated Content

Content not licensed from providers such as Corbis or Getty, but rather contributed by users.



sometimes it snows in april
From Joü



Mum and...
From Chrissie64



Africa Masai boy
From housden photos



slippers
From benjaminhamilton



What makes Flickr special?

2. User Organized Content

Content is tagged, described, organized, discovered, etc. not by “editors” but by the users themselves.


MYSTIC RIVER SUNSET on Flickr - Photo Sharing! - Mozilla Firefox


File Edit View Go Bookmarks Yahoo! Tools Help del.icio.us


http://www.flickr.com/photos/snowriderguy/39009891/


asian freckles Search Web Mail My Yahoo! Games Basketball Music Answers Personals Sign In


Posted 8 months ago. ([permalink](#))


 **Number Six pro** says:
Wonderful composition - so much to hold one's interest.
Posted 8 months ago. ([permalink](#))


 **glaciergirl pro** says:
Beautiful in so many ways.
Posted 8 months ago. ([permalink](#))


 **glaciergirl pro** says:
Wow! gorgeous on so many levels.
Posted 8 months ago. ([permalink](#))

 **ken mccown pro** says:
that's as crisp as you can get a photo! nice!
Posted 8 months ago. ([permalink](#))

 **David Nicolas [deleted]** says:
Stunning :)
Posted 8 months ago. ([permalink](#))

 **Tilak Abeysinghe** says:
Fantastic picture. Congratulations
Posted 8 months ago. ([permalink](#))

 **Magic™ pro** says:
Amazing .. breathtaking photo..
Posted 8 months ago. ([permalink](#))

 **Scatti di vita** says:
Molto bella!!!
Posted 8 months ago. ([permalink](#))

Additional Information

- © All rights reserved
- Taken with a Canon EOS Digital Rebel. [More properties](#)
- Taken on [August 24, 2005](#)
- See [different sizes](#)
- [135 people](#) call this photo a favorite.
- Viewed **4713** times.

Flag this photo as "may offend"?

Done



What makes Flickr special?

3. User Distributed Content

Flickr achieved distribution across the internet, not through “business deals” per se, but rather through the Flickr community which distributed Flickr content on 3rd-party blogs.

Eltable | Bradley Horowitz » The Love Machine - Mozilla Firefox

File Edit View Go Bookmarks Yahoo! Tools Help del.icio.us

http://www.eltable.com/blog/p=16

Search Web Mail My Yahoo! Games Basketball Music Answers Personal Sign D

Last week Prabhakar and I presented some of Yahoo's past and future strategies to a bunch of Benchmark Capital portfolio companies at their recent shindig in Half Moon Bay. Prabhakar presented his compelling vision for Yahoo Research (which I've seen umpteen times before but excites me anew each time.) He also touted some excellent recent hires (including an exciting one that I'm sorry I can't talk about because it's not announced yet.) He covered the joint Yahoo and O'Reilly developed Tech Buzz Game. This game is a "fantasy prediction market for high-tech products, concepts, and trends." Very intriguing concept, worth checking out if you haven't yet.



One of the highlights of the day was giving Philip Rosedale a ride home to San Francisco which gave us a solid 45 minutes to catch up. I've been friendly with Philip since he was CTO of RealNetworks (a long time ago) and have stayed in touch and watched as he and team have developed SecondLife. What's happening in SecondLife is mind-blowing and almost too much to get my head around. I'll take every chance I can get to talk to

UC Berkeley SIMS on 04-26-2006 15:00

Lecture at UCI on 05-01-2006 14:00

Allegis Capital event on 05-10-2006

Content 2.0 London on 06-06-2006

ix Singapore on 06-20-2006

Calendar

April 2006

M	T	W	T	F	S	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

« Mar

Most Recent Posts

- Remix this!
- My free video is loading

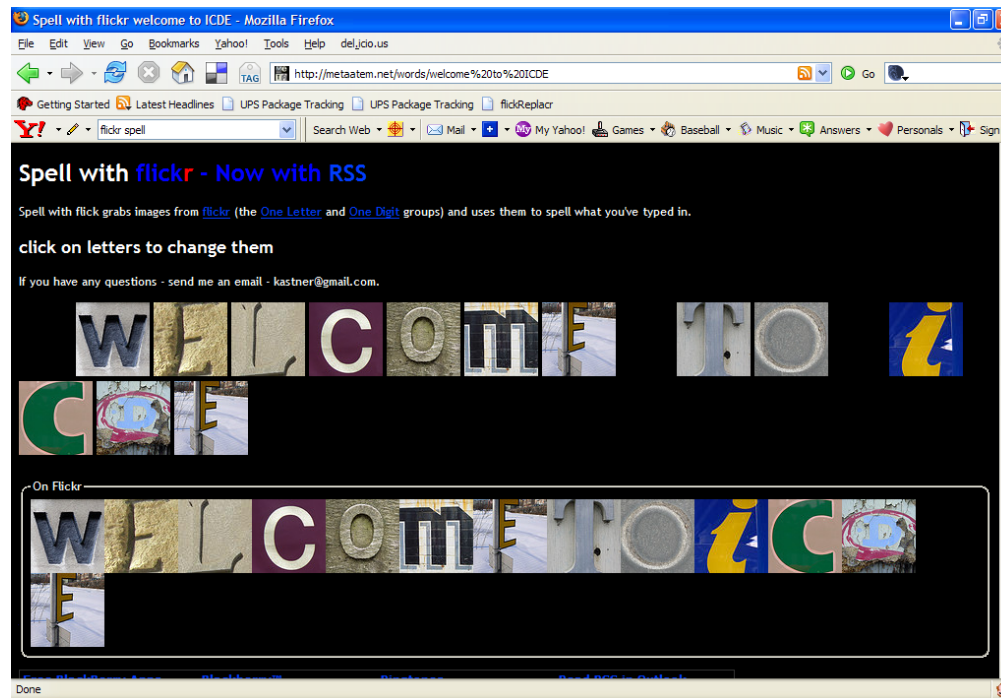
http://www.flickr.com/photos/bradley23/113178962/



What makes Flickr special?

4. User Developed Functionality

Flickr exposed APIs (PHP, Perl, etc.) that allowed the community of developers to build against the Flickr platform.





What makes Flickr special?

1. User Generated Content

Content not licensed from providers such as Corbis or Getty, but rather contributed by users.

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Content is tagged, described, organized, discovered, etc. not by “editors” but by the users themselves.

3. User Distributed Content

Flickr achieved distribution across the internet, not through “business deals” per se, but rather through the Flickr community which distributed Flickr content on 3rd-party blogs.

4. User Developed Functionality

Flickr exposed APIs (PHP, Perl, etc.) that allowed the community of developers to build against the Flickr platform.

**Entire ecosystem created by less than ten employees...
aided by millions in the Flickr community.**



Yahoo! Research

Inventing the new sciences of the Internet



New Science?

- The Internet touches all of our lives: personal, commercial, corporate, educational, government, etc...
- Yet many of the basic notions we talk about:
 - Search, Community, Personalization, Engagement, Interactive Content, Information Navigation, Computational Advertising
 - Are not at all understood, or well-defined
 - These are not disciplines that academia or any industry research labs focus on...



Areas of Research

- **Community:**
 - How do you know what to believe on the Internet?
 - Trust models on-line and trust propagation
 - What makes communities thrive? Whither?
 - Social media, tagging, image and video sharing
- **Microeconomics:** a new generation of economics driven by massive interactions
 - Auction marketplaces
 - The web as a new LEI of activities and economies
- **Information Navigation and Search**
 - We are in the early days of search and retrieval
- **Computational Advertising**
 - Targeting and matching sciences, Inferring user intent
 - Pricing models (CPM, CPC, CPA, CPL, etc...)
 - Large-scale optimization and yield management



Mission & Vision

Vision: Where the Internet's future is invented

- *with innovative economic models for advertisers, publishers and consumers.*

Mission: *NEXT* -- Invent the

*N*ext generation Internet by defining the future media to

*E*ngage consumers and

*eX*tend the economics for advertisers and publishers through new sciences that establish the

*T*echnical leadership of Yahoo!



How we get there

- Scientific excellence
 - World-recognized leadership through Business impact
 - Build the Largest, Deepest and Smartest Research Organization focused on a few chosen areas
 - Explore areas that nobody else is exploring
 - Open model with strong emphasis on publication, peer review, and real problems



A sampling of the Top Researchers now at Yahoo! (Search)



- **Prabhakar Raghavan:** CTO Verity, Web Research architect at IBM, Head of Y!R



- **Rajeev Rastogi:** Well-known expert in databases/data mining, head of Bell Labs India, now head of Yahoo Labs, Bangalore



- **Andrei Broder:** inventor of key search, web spam, technologies



- **Andrew Tomkins:** chief Scientist of WebFountain, inventor of key algorithms, structure of Web graph

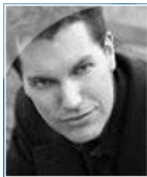
- **Ricardo Baeza-Yates:** renowned expert in text and query mining, authored seminal texts in IR, Director of Y! Research Barcelona and Santiago



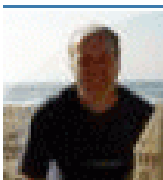
A sampling of the Top Researchers now at Yahoo! (Community, Social Media, and User Experience)



- **Raghu Ramakrishnan** : world authority on data mining, database systems, and community/social search



- **Duncan Watts** : world expert in social networking, lead Yahoo!'s research in human social dynamics. Columbia University, director of the Collective Dynamics Group. Author of *Six Degrees: The Science of a Connected Age*.



- **Malcom Slaney** : multimedia analysis and user models, organized the Stanford CCRMA Hearing Seminar, IBM's Almaden Research Center, Interval Research, Apple's Advanced Technology Group, Schlumberger's Palo Alto Research Laboratory, and Bell Labs. Coauthor of "*Principles of Computerized Tomographic Imaging*," and "*Computational Models of Auditory Function*."



A sampling of the Top Researchers now at Yahoo! (Microeconomics)



- **Preston McAfee:** VP and Research Fellow at Yahoo! Research in Burbank, CA, leads Microeconomics research. Prof at Caltech. Author *Introduction to Economic Analysis*, and *Incentives in Government Procurement*. Author of *Competitive Solutions: The Strategist's Toolkit*. One of 4 editors of the *American Economic Review*, the most prominent economics journal



- **Michael Schwarz:** renowned economist, auctions, web, Faculty at Harvard and U.C. Berkeley, was a National Fellow at the Hoover institution at Stanford, a Robert Wood Johnson Foundation Scholar at UC Berkeley



- **David Pennock:** world expert on expertise is the design and analysis of prediction markets. Very well known experiments with on-line marketplaces.

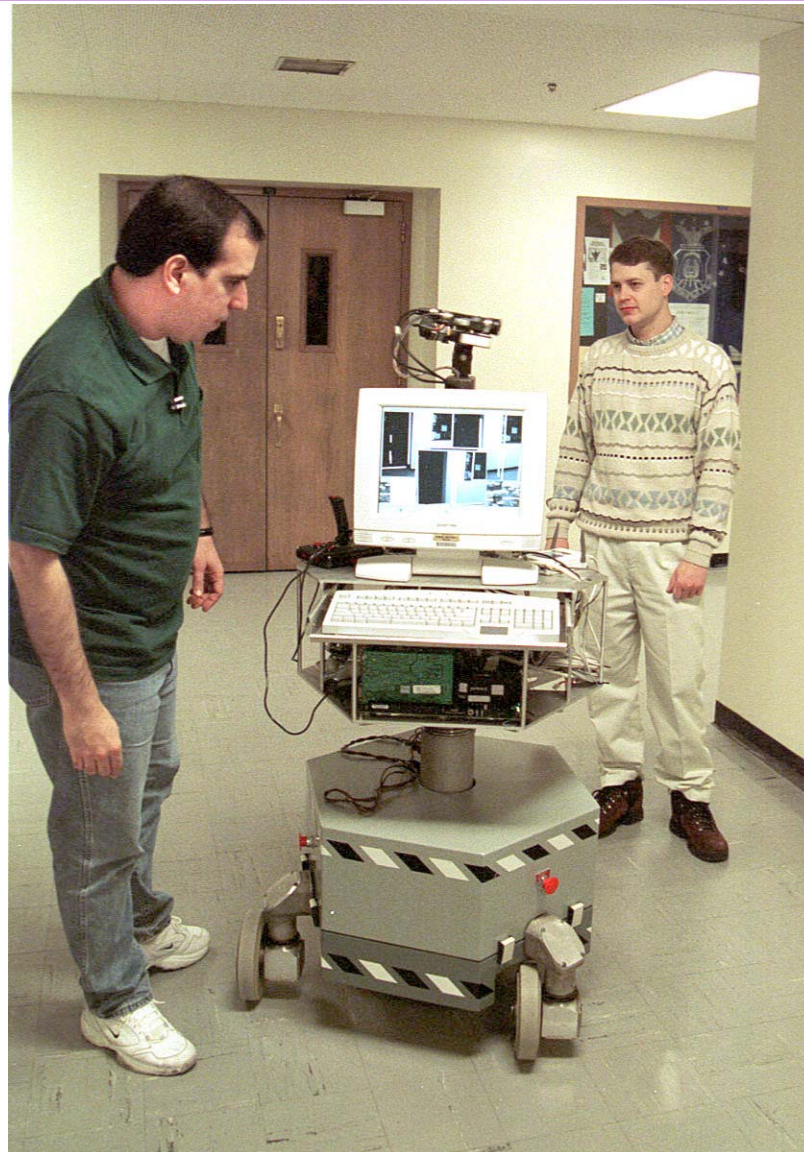
“Social” Search



Is the Turing test always the right question?



A Digression: Computer Vision is hard





10 MILLION
LABELS
COLLECTED

The ESP Game

As seen on CNN and newspapers around the world!

beta

46
Players
LOGGED in

Today's Best Players

GABE-THE-CAT	109685
SLINKYWYCKOFF	57255
DIEGOOLIVIER	54525
EGGZ	43035
CKBLACK	41325
MISSPRINT	31435

Most points in the last 24 hours
(Updated every hour; click reload)

Welcome, **BRADLEY23**
(Not BRADLEY23? [click here](#))

HOW TO Play

) Play NOW (

your profile

top scores

! Did you know?
The ESP Game is helping to label all images on the Web!
learn more...

Play our new game
NEW [Peekaboom](#) **NEW**

[Terms of Service](#) | [FAQ](#) | [ESP Image Search](#) | [Contact Us](#) | [Credits](#)

Funded in part by the National Science Foundation (NSF).
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http://www.espgame.org - The ESP Game - Mozilla Firefox

0:36
Time Left

The ESP Game

0140
score

Taboo Words
SMILE

Your Guesses
WOMAN



Agreed on: WOMAN

Type your next guess:

Pass

Your partner has entered a guess 

Flag

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Applet PlayerClient started 




http://www.espgame.org - The ESP Game - Mozilla Firefox

1:41
Time Left

The ESP Game

0070
score

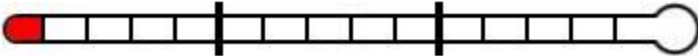
Taboo Words
TIME



Your Guesses
MAGAZINE
RED
PAGE
CORNER
DAILY


Your partner wants to pass
Type your next guess:

Pass

Your partner has entered a guess 

Flag

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Applet PlayerClient started 



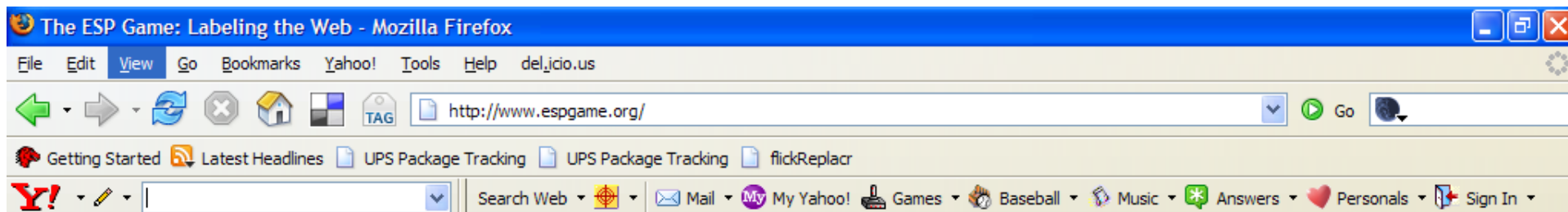
http://www.espgame.org - The ESP Game - Mozilla Firefox

Score:	140
Time Bonus:	0
Total for this Game:	140
Percentile: <small>(Percent of all Games with a lower score)</small>	22
Cumulative score:	33285
Rank:	Gifted
Points needed for next rank:	166715

[Play Again](#)
[View Images and Guesses](#)

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Applet PlayerClient started



**1 MILLION
LABELS
COLLECTED**

The ESP Game

As seen on CNN and newspapers around the world!

beta

**46
Players
LOGGED in**

Today's Best Players

GABE-THE-CAT	109685
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Play our new game
NEW Peekaboom NEW

[Terms of Service](#) | [FAQ](#) | [ESP Image Search](#) | [Contact Us](#) | [Credits](#)

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ADD TO FAVES BLOG THIS ALL SIZES



Tags

- church
- world
- travel
- europa
- cathedral
- paris
- montmarte
- sky [x]

[Choose from your tags](#)

Separate each tag with a space:
cameraphone urban moblog. Or to join 2
 words together in one tag, use double
 quotes: "daily commute".

Signed in as [bradley23](#) (131 new) [Help](#) [Sign Out](#)
[Home](#) [You](#) [Organize](#) [Contacts](#) [Groups](#) [Explore](#) [Search](#)

Search

[Photos](#)
[Groups](#)
[People](#)

[Advanced Search](#)
 Full text Tags only

We found 16,149 photos about **golden** and **retriever**.

[Show details](#)

View: [Most relevant](#) • [Most recent](#) • [Most interesting](#)



From [norisons2005](#)



From [brian_zeqlis](#)



From [brian_zeqlis](#)



From [Laura Jones](#)



From [Jane Gael](#)



From [Kaben](#)



From [Tijos](#)



From [Tijos](#)



Sponsored Results

[Affordable Golden Retriever Puppies](#)

WhiteLakeGoldens.com is your one-stop source for high-quality Golden Retriever...

www.whitelakegoldens.com

[Golden Retriever Guide](#)

Learn how to make your Golden Retriever happy, healthy and obedient. eBook \$19.95 with... www.all-about-puppies.com

[Golden And Retriever at Amazon.com](#)

Shop at Amazon.com for low prices on Golden And Retriever. Free Super Saver Shipping... www.amazon.com

[Information on Golden](#)

Signed in as [bradley23](#) (131 new) [Help](#) [Sign Out](#)
[Home](#) [You](#) [Organize](#) [Contacts](#) [Groups](#) [Explore](#) [Search](#)

Search

[Photos](#)
[Groups](#)
[People](#)

[Advanced Search](#)
 Full text Tags only

✓ We found **16,149** photos about **golden** and **retriever**.

[Show thumbnails](#)

View: [Most relevant](#) • [Most recent](#) • [Most interesting](#)



Pabro パブロ

Uploaded on 16 August 2006



By [norisons2005](#)

See [more photos](#), or visit his [profile](#).

[dog](#), [golden](#), [retrievers](#), [pabro](#)



Rachel and Max

Uploaded on 16 August 2006

Sponsored Results

[Affordable Golden Retriever Puppies](#)

WhiteLakeGoldens.com is your one-stop source for high-quality Golden Retriever...
www.whitelakegoldens.com

[Golden Retriever Guide](#)

Learn how to make your Golden Retriever happy, healthy and obedient. eBook \$19.95 with...
www.all-about-puppies.com

[Golden And Retriever at](#)

Signed in as [bradley23](#) (131 new) [Help](#) [Sign Out](#)[Home](#)[You](#)[Organize](#)[Contacts](#)[Groups](#)[Explore](#)

Search everyone's photos

[Search](#)

Search

[Photos](#)[Groups](#)[People](#)

Everyone's Photos

golden retriever

SEARCH[Advanced Search](#) Full text Tags only**✓ We found 16,149 photos about golden and retriever.**[Show details](#)View: [Most relevant](#) • [Most recent](#) • [Most interesting](#)From [AndrewMorrel...](#)From [bitterlyswee...](#)From [isolano](#)From [AndrewMorrel...](#)From [AndrewMorrel...](#)From [AndrewMorrel...](#)From [AndrewMorrel...](#)From [AndrewMorrel...](#)

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[Golden Retriever Guide](#)Learn how to make your **Golden Retriever** happy, healthy and obedient. eBook \$19.95 with...
[www.all-about-puppies.com](#)**[Golden And Retriever at Amazon.com](#)**Shop at Amazon.com for low prices on **Golden And Retriever**. Free Super Saver Shipping...
[www.amazon.com](#)**[Information on Golden Retrievers](#)**Shocking article exposed the truth about **Golden Retriever** training and how to train...
[www.dog-e-news.com](#)**[Golden Retriever Memorial](#)**

The Sweet-Natured Golden Retriever...

ADD TO FAVES ADD NOTE BLOG THIS ALL SIZES



...caught in mid-play with his brother Sammy. Rest assured - though they look vicious, they are indeed playing. They'll get rough for a few moments, make a few growling noises, then

Uploaded on August 1, 2006
by [AndrewMorrell](#)

AndrewMorrell's photostream



572 photos
[View as slideshow](#)

[←more](#) | [browse](#) | [more→](#)

This photo also belongs to:

Alex and Sammy! (Set)



88 photos
[View as slideshow](#)

[←more](#) | [browse](#) | [more→](#)

[+ Dogs! \(Pool\)](#)

[+ Furry Friday \(Pool\)](#)

[+ "Just Golden Retrievers" \(#1-Lovable Breed\) \(Pool\)](#)

[flickrDogs Blog: Submit photos](#)



[weaving major](#) says:

wow, look at those fangs! great capture!

Posted 2 weeks ago. ([permalink](#))



[Jeanne8](#) says:

As long as they are playing it looked like a mean fight at first. Blessings!

Posted 2 weeks ago. ([permalink](#))



[Amanda Clouse Photography](#) pro says:

cute! Dale and Toby like to do this!

Posted 2 weeks ago. ([permalink](#))



[djjoyboy](#) says:

Amazing Catch Andrew, I wish you would make an EXPOSURE show in Pittsburgh sometime soon!

Posted 2 weeks ago. ([permalink](#))



[Photo Patty](#) pro says:

Great action shot. I'm sure they were having a ball.

Posted 2 weeks ago. ([permalink](#))



[Boston Fan in Michigan](#) pro says:

You tagged that 'gentle'?? Egads. Those teeth look awfully wolfish... :P

Posted 2 weeks ago. ([permalink](#))



[Duogirl](#) says:

HAHA!!!

Posted 2 weeks ago. ([permalink](#))



[saldous](#) says:

...

Tags

- dog
- golden retriever
- morrell
- alex
- sammy
- borell
- docile
- loving
- playful
- gentle
- top20dogpix
- interestingness
- 1500v60f
- SpecAnimal
- exploretop20

[Add a tag](#)

Additional Information

© All rights reserved

- ◇ Taken with a Canon EOS-1D Mark II.
[More properties](#)
- ◇ Taken on [June 23, 2006](#)
- ◇ See [different sizes](#)
- ◇ [215 people](#) call this photo a favorite
- ◇ Viewed 8,339 times

Flag this photo as "[may offend](#)"?

Tags / jaguar / clusters

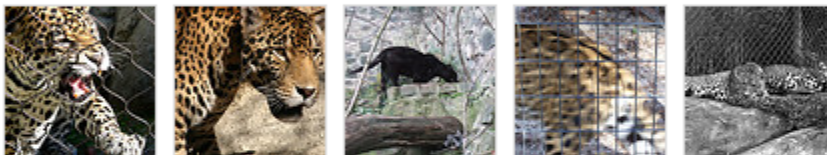
SEARCH

(Or, try an [advanced search](#).)



[car](#), [cars](#), [auto](#), [etype](#), [automobile](#), [classic](#), [vintage](#), [autoshow](#), [red](#), [show](#)

→ [See more in this cluster...](#)



[zoo](#), [animal](#), [cat](#), [animals](#), [bigcat](#), [seattle](#), [woodlandparkzoo](#), [sleep](#), [edinburgh](#), [caged](#)

→ [See more in this cluster...](#)



[guitar](#), [fender](#)

→ [See more in this cluster...](#)



[aircraft](#), [raf](#)

→ [See more in this cluster...](#)



[mac](#), [apple](#)

→ [See more in this cluster...](#)



Challenges in social media

- How do we use these tags for better search?
- What's the ratings and reputation system?
- How do you cope with spam?

- The bigger challenge: where else can you exploit the power of the people?
- What are the incentive mechanisms?



Case Study: Yahoo! Answers & Y!R

Illustrating New Research Challenges



Subjective Queries

The kinds of queries that rely on *domain expertise*...

- “Do you know a reputable plumber in Atlanta?”
- “Where is the cool nightlife in Soho?”
- “What political blogs do you think I’d enjoy reading?”
- “Where can I buy a cool pair of boots?”

These kinds of queries are ill-served by today’s search engines, but are ironically the most valuable (i.e. transactional queries.)

A large, faded watermark of the Yahoo! logo is centered on the page. It consists of a purple oval containing a white 'Y' and a purple exclamation point to its right, with a small 'TM' trademark symbol below the exclamation point.

**“Better Search Through People”
Case Study: Yahoo! Answers**



Making Connections

- Today's state-of-the-art web search (at best) connects a person with a query to a web page that contains those characters
- Even as we nobly try to index every page, (every book, every video, every podcast, etc.) it is worth noting that these are *artifacts* of human knowledge
- Yahoo! Answers addresses this problem. It connects a person with a question to a community of people best suited to answer the question.

Yahoo! My Yahoo! Mail Search the Web Search

YAHOO! ANSWERS BETA [\[Sign In, My Account\]](#)

[Home](#) - [Help](#) - [Forum](#)
What's going on in Answers?

ask. 

Ask a question on any topic and get answers from real people.

(you have **110** characters to work with)

[Post Question](#)


answer. 

Share what you know and you might make someone's day.

Featured Question




Was HAL 9000 (2001: A Space Odyssey) the first villain to be a machine?

discover. 

Learn something new today by browsing resolved questions.

Featured Topic



See what people are asking about in:

Cameras

[Ask Your Question](#) | [My Q&A](#) Ready to participate? - [Get started!](#)

Make [vacation plans](#) with help from Yahoo! Answers!

Search for questions & answers

[Advanced Search](#)

 [Save to My Web](#)

Track new questions on Answers

[+ MY YAHOO!](#) [RSS](#)

Share what you know. Answer open questions.



[why does my computer run different after installing hunting game from value soft?](#)

Asked by [tinkerbell_wj](#) - [Video Games](#) - 12 seconds ago



[What's the firs line from a song lyric that comes on your mind?](#)

Asked by [karinna](#) - [Music](#) - 21 seconds ago

[Why is england using a different flag in all sports, games & even in](#)

Yahoo! Answers - Search - Mozilla Firefox

File Edit View Go Bookmarks Yahoo! Tools Help

http://answers.yahoo.com/search/search_result;_ylt=AqRV5UXrlHefYquyx3fbwp3zy6IX?p=atlanta+buckhead

Search Web Mail My Yahoo! Games Baseball Music Answers Personals

Yahoo! My Yahoo! Mail Search the Web Search

YAHOO! ANSWERS BETA [Sign In, My Account] Home - Help - Forum What's going on in Answers?

ask. answer. discover.

Ask Your Question | My Q&A Ready to participate? - Get started!

Home > Search Results

Search Results

atlanta buckhead Search [Advanced Search]

1 - 10 of 22 results for "atlanta buckhead"

1. [Where is the best place to go in Atlanta ?](#)
Asked by [sanpetiro](#) - 3 weeks ago - in [Atlanta](#) - 2 Answers - Resolved
2. [Does anyone know a place in Atlanta that has good sushi?](#)
Asked by [mbcrain25](#) - 2 months ago - in [Ethnic Cuisine](#) - 4 Answers - Resolved
3. [is atlanta ga a good town to relax and have a nice short vacation? wheres the best place to stay?](#)
Asked by [dougie806](#) - 1 month ago - in [Atlanta](#) - 4 Answers - Resolved
4. [What schools can i go to for fashion designs?](#)
Asked by [hayleyoravetz](#) - 2 months ago - in [Teen & Preteen](#) - 2 Answers -

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Compare Bargain Buckhead Atlanta Hotel Rates at NexTag. Read Reviews, Find Deals, and Make an Informed Booking Choice Today.
[www.nextag.com](#)

[InterContinental Buckhead Hotel](#)
Official site: New luxury Buckhead hotel and spa within walking distance of Atlanta's Buckhead business district and is minutes away from trendy restaurants, nightlife and shopping.
[www.ichotelsgroup.com](#)

[Centennial Olympic Park Atlanta Hotel](#)

ask. answer. discover.

Ask Your Question | My Q&A Ready to participate? - Get started!

Home > Food & Drink > Ethnic Cuisine > Resolved Question


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Categories
→ All Categories
↓ Food & Drink
• Beer, Wine & Spirits
• Cooking & Recipes
• Entertaining
» Ethnic Cuisine

Resolved Question Show me another >

Closed to new answers

 **Does anyone know a place in Atlanta that has good sushi?** Email Question
[mbcrain25](#)
2 months ago
I am looking for a place on the west side of Atlanta that has good sushi, any ideas?
[Report Abuse](#)

 **Best Answer - Chosen by Asker**
The question was specific to Atlanta as I recall! There is a Beni Hana in Atlanta and that is good all around. All the nice places like that are in a section of Atlanta called Buckhead so I suggest checking that out.
[nietzsche754](#)
2 months ago
Asker's Rating: ★★★★★
[Report Abuse](#)

- Categories**
- All Categories
 - ↓ Food & Drink
 - Beer, Wine & Spirits
 - » Cooking & Recipes
 - Entertaining
 - Ethnic Cuisine
 - Non-Alcoholic Drinks
 - Other - Food & Drink
 - Vegetarian & Vegan



Is there a low-fat, low-cal recipe for potato salad?

2 days ago - 1 day left for voting - 9 answers - [Report Abuse](#)

This question is no longer open for answering. Here's your chance to cast a vote if you haven't already.

0 thumbs up 0 thumbs down [flag] [email] [plus]

Ratings become available once you reach Level 2 ?

No definitive answer

Unverifiable answer

Search the Web to research your answer.

Answers Sort By: [Date](#) | [Rating](#)

Answerer 1

no, girl just don't put mayo in it yo!

Source(s):
i just know

2 days ago - [Report Abuse](#)

0 thumbs up 0 thumbs down [flag]

Community consensus

Answerer 2 Mayonnaise is the primary culprit in the fat content of potato salad. Potatoes

Ready to Participate?
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- ↓ Food & Drink
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All English questions

Food & Drink

Incentives

Top Food & Drink Answerer
Swirly - Level 7 - 1071 Best Answers [Top 10 Answerers](#)

Answer Discover Vote
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View by: [Date](#) | [No. of Answers](#)

- [What are the worst foods to have as a part of a regular diet?](#)
Asked by [andy_pann](#) - 0 answers - [Other - Food & Drink](#) - 2 minutes ago
- [what kind of ice cream did thomas jefferson make?](#)
Asked by [ann_e](#) - 0 answers - [Other - Food & Drink](#) - 2 minutes ago
- [what on earth is EGG REPLACER?](#)
Asked by [Allergic To Eggs](#) - 2 answers - [Vegetarian & Vegan](#) - 3 minutes ago
- [duz celery actually have negative calories? becuz ive heard the chewing u do burns more calories than it has.?](#)
Asked by [lena_w](#) - 3 answers - [Vegetarian & Vegan](#) - 3 minutes ago
- [no family support for veganism?](#)
Asked by [andy_pann](#) - 0 answers - [Vegetarian & Vegan](#) - 4 minutes ago
- [Need meal ideas?](#)
Asked by [classychris](#) - 0 answers - [Cooking & Recipes](#) - 4 minutes ago
- [meal planning?](#)
Asked by [falafel](#) - 0 answers - [Cooking & Recipes](#) - 6 minutes ago
- [where can I go to get me slim?](#)

Legitimate?



Where is the Science?

- Which questions are legitimate?
- What is the incentive system?
- How do we validate answers?
- What is the role of the community?
- What is the reputation system?



What are the challenges?

- Community of users
 - Social system
- Incentives and reputations
 - Economic system
- Poorly phrased, grammatically limited queries
 - Language analysis
- Improving user experience from past data
 - Data mining



Evolution of Today's Search

What changes are happening in the short term?



Evolution of Search Today

- Internet firmly moved from a curiosity to a substrate for life activity
- Content growing, changing, diversifying, fragmenting
- Search evolving in response
- Value migrating to ecosystem
- Semantics of content unlock the value in the ecosystem



Towards Getting Things Done... vs. Searching



Example





Example 2

- Loved the vacation, want to make that sweet Italian coffee at home
 - Search: “making good espresso”
 - Browse: cofeegeek.com
 - Study: Temperature surfing a Rancilio Silvia
 - Price comparison: nextag.com
 - Vendor comparison
 - Purchase from chriscoffee.com
 - Frothing milk tutorial
 - Cleaning and maintenance
 - Purchase grouphead brush and Urnex

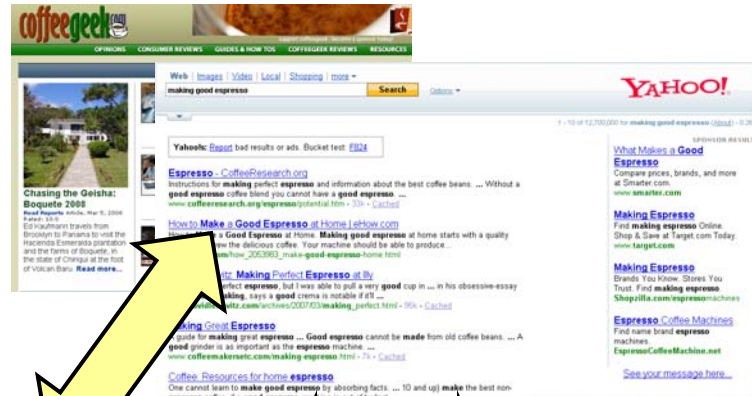
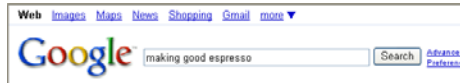
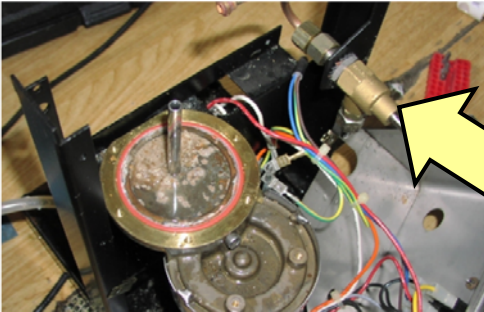


Loved the vacation, want to make that sweet Italian coffee at home

Brewing with Silvia

Limescale!

Well after a bit of a disaster de-scaling the machine, I used some de-scaler that was supposed to be OK with co pipes and I couldnt flush out. I decide to take the machine apart. The amount of limescale in the boiler was quite Here are the before and after pics:



CHRIS
Quality & Service, Seco

Office Coffee Food Service Col
New Items Espresso Machines Grinders Ac
My Cups Coffee Brewers Repair Parts #1 Prop
John Guest Filtrage

888-724-3469

Home
Shop on Line
Product Line
Equipment Deals
Service and Repair
About Us
Contact Us
Regional

Silvia Espresso Machine with Choice
Lots of extras included FREE!

Silvia is Rancilio's semiprofessional it offers excellent performance and h which the Rancilio Company has been appreciated around the world.

Silvia has undergone some major ch.
"NEW POD Adaptable Silvia" check

RESELLERRA
Compare prices, Best & Worst Stores

Cameras & Video PC Hardware

RES: [A](#)[B](#)[C](#)[D](#)[E](#)[F](#)[G](#)[H](#)[I](#)[J](#)[K](#)

Beverage Factory / Cydea Inc
Homepage: <http://www.beveragefactory.com/>

Ratings History Write a Review

Overall Customer Satisfaction Rating

Six-Month Rating: N/A / 10
Six-Month Reviews: 0
Lifetime Reviews: 4

Lifetime Rating: 5.63 / 10
All Stores Avg.: 7.46

RANCILIO Silvia Espresso Machine
Type: Espresso Machine, Coffee Maker, Coffee Grinders. Features: Built-in Grinder

From Rancilio, one of the most respected names in commercial espre respected espresso machines ever introduced for the home market. M price from critics [more...](#)

Part #: Silvia
Seller's Forum: 5
Availability Since: Jun 2, 2005
Lowest Price: \$545.00

Average Rating: ★★★★★ (1 user rating)

[Add to Shopping List](#) [Get Price](#)

Compare Prices	Read 1 Review	Write Product Review	Price History
Seller	Seller Ratings	Description	Price
Coffee&Kitchen	Rate This Seller	In Stock	\$595.00 Go to Store
Whole Latte Love	1 Seller Review	In Stock	\$545.00 Go to Store
BeverageFactory	41 Seller Reviews	In Stock	\$595.00 Go to Store
Zpresso	New Seller	In Stock	\$595.00 Go to Store
amazon.com Marketplace	8 Seller Reviews	In Stock	\$595.00 Go to Store



Trends in task complexity

- Dawn of search:
 - Navigational queries
 - Pockets of information
- Today:
 - Increasing migration of content online
 - New forms of media only available online
 - Infrastructure for payments and reputation sufficient for many users



Things to notice

- Long-running user goals
- Search as hub:
 - start there
 - return for resource discovery and at task boundaries
 - traverse the web broadly to complete task
- Web services integrated into task



Content Growth



Content trends

Content type	Amount of content produced per day
Published content	3-4 GB
Professional web content	~ 2 GB
User generated content	8-10 GB
Private text content	~ 3 TB (300x more)
Upper bound on typed content	~700 TB (~200x more)

[Ramakrishnan and Tomkins 2007]



Metadata trends

Metadata type	Amount of metadata produced per day
Anchortext	100 MB
Tags	40 MB
Pageviews	180 GB
Reviews	Around 10 MB

[Ramakrishnan and Tomkins 2007]



What does this mean to Search?

- Publishers and search engine collaborate
- Users see richer search experience
- Accomplish their tasks faster and more effectively
- Example: abstracts surfacing structured content

Back to the future?



Search results of the future

Higuma Japanese Restaurant - Redwood City, CA 94063



Reviews
Photos
Send to a friend
Send to Phone

Rating: ★★★★★
Address: 540 El Camino Real, Redwood City, CA
Phone: (650) 369-3240
Price Range: \$\$

www.yelp.com/biz/higuma-japanese-restaurant-redwood-city - 300k - [Cached](#)

yelp.com

Gawker: Manhattan Media News and Gossip



Media
Gossip
Pop Culture
Scandal

It seems Meghan McCain, daughter of the Republican presidential candidate, is into the keffiyeh, scarf of Middle Eastern Precious Freedoms Haters, and even wears it on the so-called Straight Talk Express.

www.gawker.com - 110k - [Cached](#)

Gawker

Topics for Getting Pregnant - BabyCenter



www.babycenter.com

New York Che...



www.epicurious.com

WebMD Allergies Health Center - Find allergy information and latest.



[Overview](#)
[Symptoms](#)
[Diagnosis](#)
[Treatment](#)

Allergies are an abnormal response of the immune system. People who have allergies have an immune system that reacts to a usually harmless substance in the environment. This substance (pollen, mold, dander, etc.) is called an allergen.

www.webmd.com/allergies - 111k - [Cached](#)

epicurious

LinkedIn

atlas: Information and Much More from Answers.com



History
Etymology
Modern Atlases
General Atlases

An atlas is a collection of maps or manifolds, traditionally bound into book form, but also found in multimedia formats. As well as geographic features and political boundaries, often feature geopolitical, social, religious statistics.

www.answers.com/topic/atlas - 3k - [Cached](#)

answers.com

WebMD Allergies Health Center - Find allergy information and latest.



Overview
Symptoms
Diagnosis
Treatment

Allergies are an abnormal response of the immune system. People who have allergies have an immune system that reacts to a usually harmless substance in the environment. This substance (pollen, mold, dander, etc.) is called an allergen.

www.webmd.com/allergies - 111k - [Cached](#)

webmd



Search results of the future

Higuma Japanese Restaurant - Redwood City, CA 94063



[Reviews](#)
[Photos](#)
[Send to a friend](#)
[Send to Phone](#)

Ratings: ★★★★★ (18)
 Address: 540 El Camino Real, Redwood City, CA
 Phone: (650) 369-3240
 Price Range: \$\$

www.yelp.com/biz/higuma-japanese-restaurant-redwood-city - 202k - [Cached](#)

yelp.com

Gawker, Manhattan Media News and Gossip



[Media](#)
[Gossip](#)
[Pop Culture](#)
[Scandal](#)

Gossip: It seems Meghan McCain, daughter of the Republican presidential candidate, is into the keffiyeh, scarf of Middle Eastern Precious Freedoms Haters, and even wears it on the so-called Straight Talk Express.

www.gawker.com - 108k - [Cached](#)

Gawker

Topics for Getting Pregnant - BabyCenter



[Tools](#)
[Before you Try](#)
[Active Trying](#)
[Having Trouble](#)

BabyCenter's getting pregnant tools and information can boost your chances of conception by helping you chart your cycle, read your cervical mucus, and pinpoint ovulation.

www.babycenter.com/getting-pregnant - 76k - [Cached](#)

babycenter

Hillary Rodham Clinton News - The New York Times



[Latest News](#)
[Election Guide](#)
[NYT Op-Ed](#)
[Debate Analysis](#)

Recent Results: Wisconsin, Obama 58%, Clinton 41%
 Current Delegate Count: Obama 1,351, Clinton 1,262
 Total Money Raised: Obama \$140.6 M, Clinton \$138.0 M

topics.nytimes.com/top/reference/timestopics/people/...?inline=nyt-per - 106k - [Cached](#)

New York Times

New York Cheesecake Recipe at Epicurious.com



[Recipe](#)
[Photos](#)
[Reviews](#)
[Video](#)

Ingredients: 4 8-ounce packages cream cheese
 1 cup (packed) golden brown sugar
 2 tablespoons (1/4 stick) butter, melted
 5 large eggs, 1 teaspoon vanilla extract

www.epicurious.com/recipes/food/views/102592 - 90k - [Cached](#)

epicurious

LinkedIn: Silvia Quintanilla



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Location: San Francisco Bay Area
 Current: Owner at Industry Gems Research
 Past: Account Executive at Xpedite, Inc.
 Specialities: Providing in-depth Fortune 500 company reports

www.linkedin.com/in/industrygems - 16k - [Cached](#)

LinkedIn

atlas: Information and Much More from Answers.com



[History](#)
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[Modern Atlases](#)
[General Atlases](#)

An atlas is a collection of maps or manifolds, traditionally bound into book form, but also found in multimedia formats. As well as geographic features and political boundaries, often feature geopolitical, social, religious statistics.

www.answers.com/topic/atlas-5 - 62k - [Cached](#)

answers.com

WebMD Allergies Health Center - Find allergy information and latest.



[Overview](#)
[Symptoms](#)
[Diagnosis](#)
[Treatment](#)

Allergies are an abnormal response of the immune system. People who have allergies have an immune system that reacts to a usually harmless substance in the environment. This substance (pollen, mold, dander, etc.) is called an allergen.

www.webmd.com/allergies - 111k - [Cached](#)

webmd



What is a Library?
What is a book?
What is a reference?



But wait... there's more!

The screenshot displays the Flickr map interface. At the top, there are navigation tabs: "Batch Organize", "Your Sets", "Your Groups", and "Map". A search bar contains the text "1700 tysons boulevard mclean" with a "GO" button. Below the search bar, a map shows a street grid with a blue pin marking the location "1700 Tysons Boulevard, Mclean, Virginia, US". A photo thumbnail is overlaid on the map, titled "Still Life" from user "bradley23". The map includes a scale bar (0-30 km, 0-25 mi) and a "Data @Navteq, TeleAtlas" attribution. On the right side, there are map controls for "Map", "Hybrid", and "Satellite" views, along with zoom in/out buttons. At the bottom, a photo gallery shows "All your photos" with a search bar and "SEARCH" button. The gallery indicates "1,705 of your photos :: 0 selected" and includes a "Select all" link. A row of photo thumbnails is visible, including one of a still life with a bread roll.



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You're on page 1 of 1
138 photos taken here

Map
Hybrid
Satellite

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All geotagged photos tagged with lighthouse. [Clear all](#)

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00

138 photos here [3,948 photos worldwide.](#)

View: [Most recent](#) • [Most interesting](#)

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Grand Haven Lighthouse...
from Ramaker

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154 photos taken here



Grand Haven Lighthouse

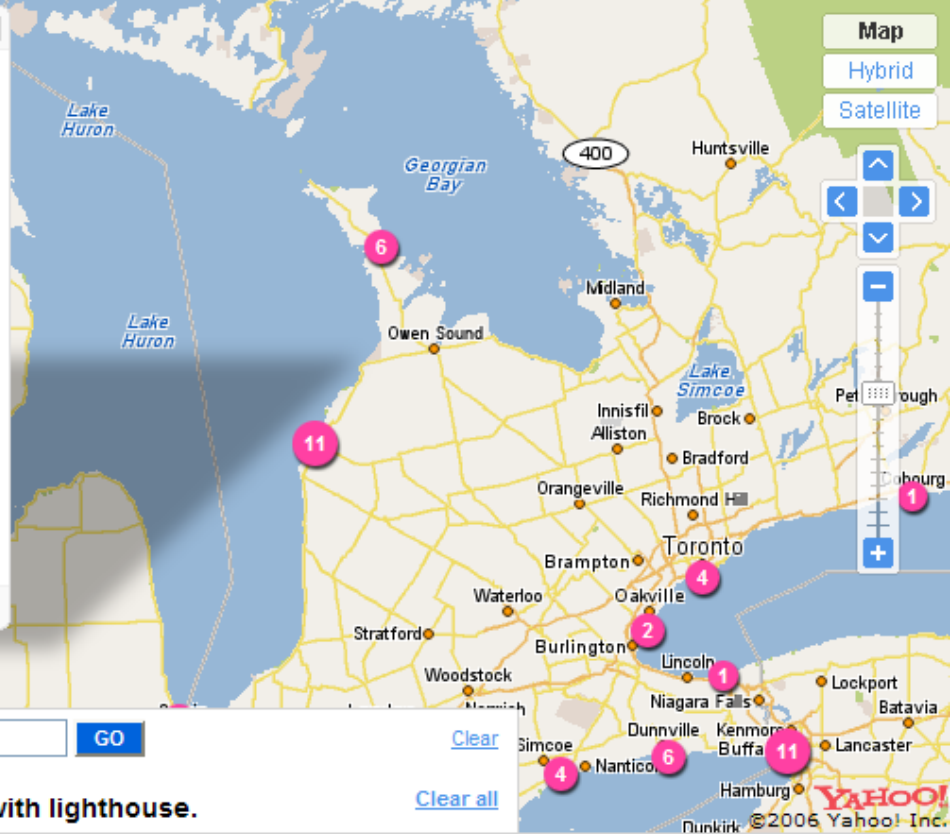
The Grand Haven Lighthouse on Lake Michigan.

Lighthouse, Grand, Haven, Lake Michigan...

Uploaded on February 12, 2006 by [Ramaker](#)

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Map
Hybrid
Satellite

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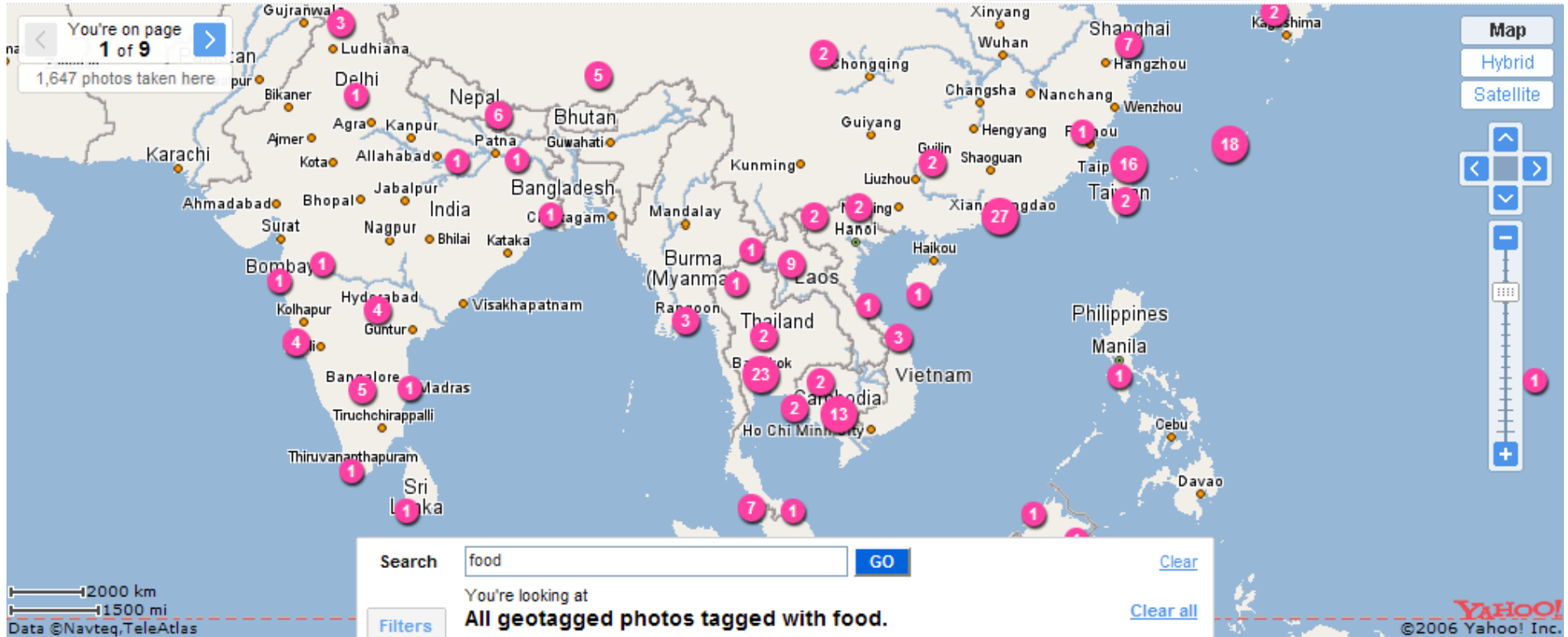
406 photos here 411 photos [worldwide](#) View: [Most recent](#) • [Most interesting](#) Switch to list view Link to this



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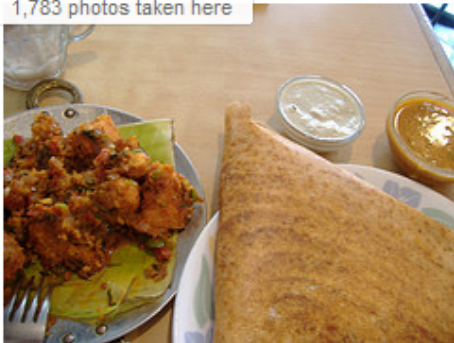


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idlis sambar and masala dosa

belongs to the 'food bigger than your head' category - look at the half pint glass for scale. I have no *idea* how one is meant to eat this

[Mumbai, Maharashtra, churchgate, India...](#)

Uploaded on [June 1, 2006](#) by [digitalia](#)

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1 of 1
1000 km
1500 mi
Data ©Navteq, TeleAtlas

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fried flowers
You can get deep-fried day lilies at 六十石山. Covered with pepper, they're pretty good. They sort of taste like tempura.

[taiwan, hualien, 台灣, 花蓮...](#)

Uploaded on [September 4, 2006](#) by [alidarbac](#)

[★ Add to favorites](#) [View photo page](#)

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206 photos taken here

Map
Hybrid
Satellite

5 km
3 mi
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206 photos here 3,029,472 photos [worldwide](#) View: [Most recent](#) • [Most interesting](#) [Switch to list view](#) [Link to this](#)

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The Kilimanjaro rain forest

The Kilimanjaro rain forest. It was a great climb!


[africa](#), [tanzania](#), [kilimanjaro](#)

Uploaded on [May 3, 2006](#) by [Steve Bate](#)

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[Map](#)
[Hybrid](#)
[Satellite](#)



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5 km
3 mi
Data ©Navteq, TeleAtlas Imagery ©2006 I-c

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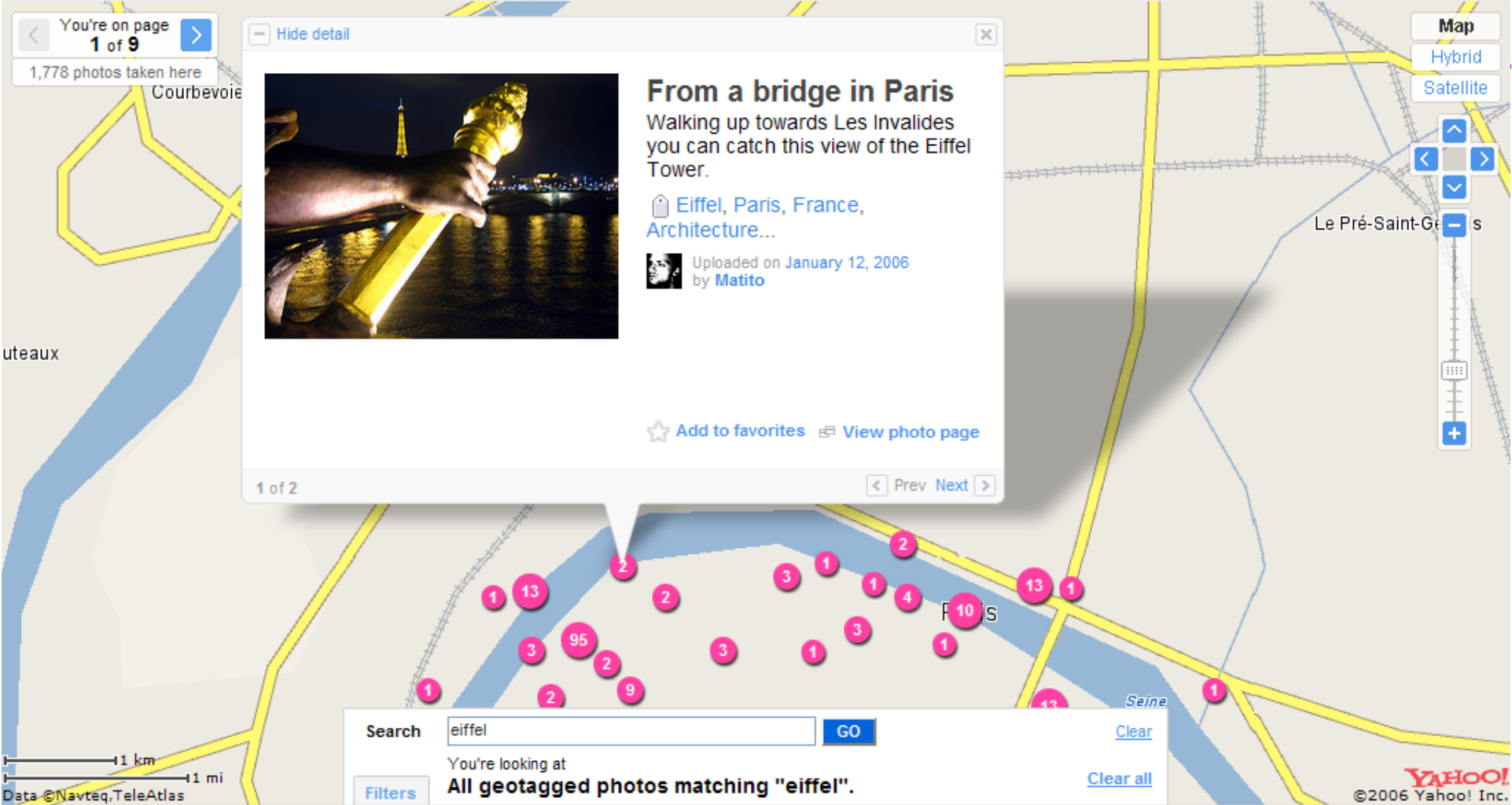
From a bridge in Paris
Walking up towards Les Invalides you can catch this view of the Eiffel Tower.

[Eiffel, Paris, France, Architecture...](#)

Uploaded on [January 12, 2006](#) by [Matito](#)

[Add to favorites](#) [View photo page](#)

1 of 2 [Prev](#) [Next](#)



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1,749 photos taken here

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Eiffel Tower
One of my favs
[Tour, tower, eiffel, paris...](#)
Uploaded on June 27, 2005 by [Matthew d](#)
[Add to favorites](#) [View photo page](#)

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You're looking at **All geotagged photos matching "eiffel".** [Clear all](#)
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Find a location [Search](#)

You're on page **1 of 9** [1,793 photos taken here](#)

Night shot during dinner near the Eiffel...
 Taken from the restaurant "Le ciel de Paris" on the top of the Montparnesse Tower.
 Paris, Eiffel Tower, Eiffel Tower...
 Uploaded on [May 29, 2005](#) by [Fly For Fun](#)

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You're looking at **All geotagged photos matching "eiffel".** [Clear all](#)

1,793 photos here 3,056 photos [worldwide](#) View: [Most recent](#) • [Most interesting](#) [Switch to list view](#) [Link to this](#)



Areas of Research

- **Community:**
 - How do you know what to believe on the Internet?
 - Trust models on-line and trust propagation
 - What makes communities thrive? Whither?
 - Social media, tagging, image and video sharing
- **Microeconomics:** a new generation of economics driven by massive interactions
 - Auction marketplaces
 - The web as a new LEI of activities and economies
- **Information Navigation and Search**
 - We are in the early days of search and retrieval
- **Computational Advertising**
 - Targeting and matching sciences, Inferring user intent
 - Pricing models (CPM, CPC, CPA, CPL, etc...)
 - Large-scale optimization and yield management



Concluding Thoughts (1)

- The notion of “corpus” and publishing is changing fundamentally
- We still do not have the basic sciences to understand what is happening
- The web is changing, content sources are fragmenting and changing the source distribution is radically changing
 - Publisher – consumer divide is becoming fuzzy
- Search engine interface is finally changing to adapt



Concluding Thoughts (2)

- The view that Search is everything is LIMITED (at best)
 - Economics of publishing and advertising
 - Users do not differentiate ad and content
 - Behavioral data is the most powerful
 - “Nothing predicts behavior like behavior”
- Monetization and economic value an intrinsic part of system design
 - Not an afterthought
 - Mistakes are costly!
- Computing meets humanities like never before – sociology, economics, anthropology ...
- A more holistic view of Search and Information Navigation is needed



Thank You! & Questions?

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No time to cover today

- Micro-Economics of the Web
 - Auction marketplaces
 - Marketplace and Exchange Design
 - The economics of Engineering IT Decisions
- Computational Advertising
 - Targeting and matching sciences
 - Inferring user intent
 - Pricing models (CPM, CPC, CPA, CPL, etc...)
 - Large-scale optimization and yield management



What is this science?

- What media experiences grow/thrive?
 - Data-driven stickiness
 - EBay reputations, Amazon recommendations
- Which ones die out?
- More global/youthful demographic
- An intrinsically *data-driven* science



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