Inventing the New Sciences of the Internet:
Towards Understanding the New Interactive Media

INRIA, Sophia Antipolis – France, Jan 31, 2008

Usama Fayyad, Ph.D.
Chief Data Officer & Executive VP
Yahoo! Inc.

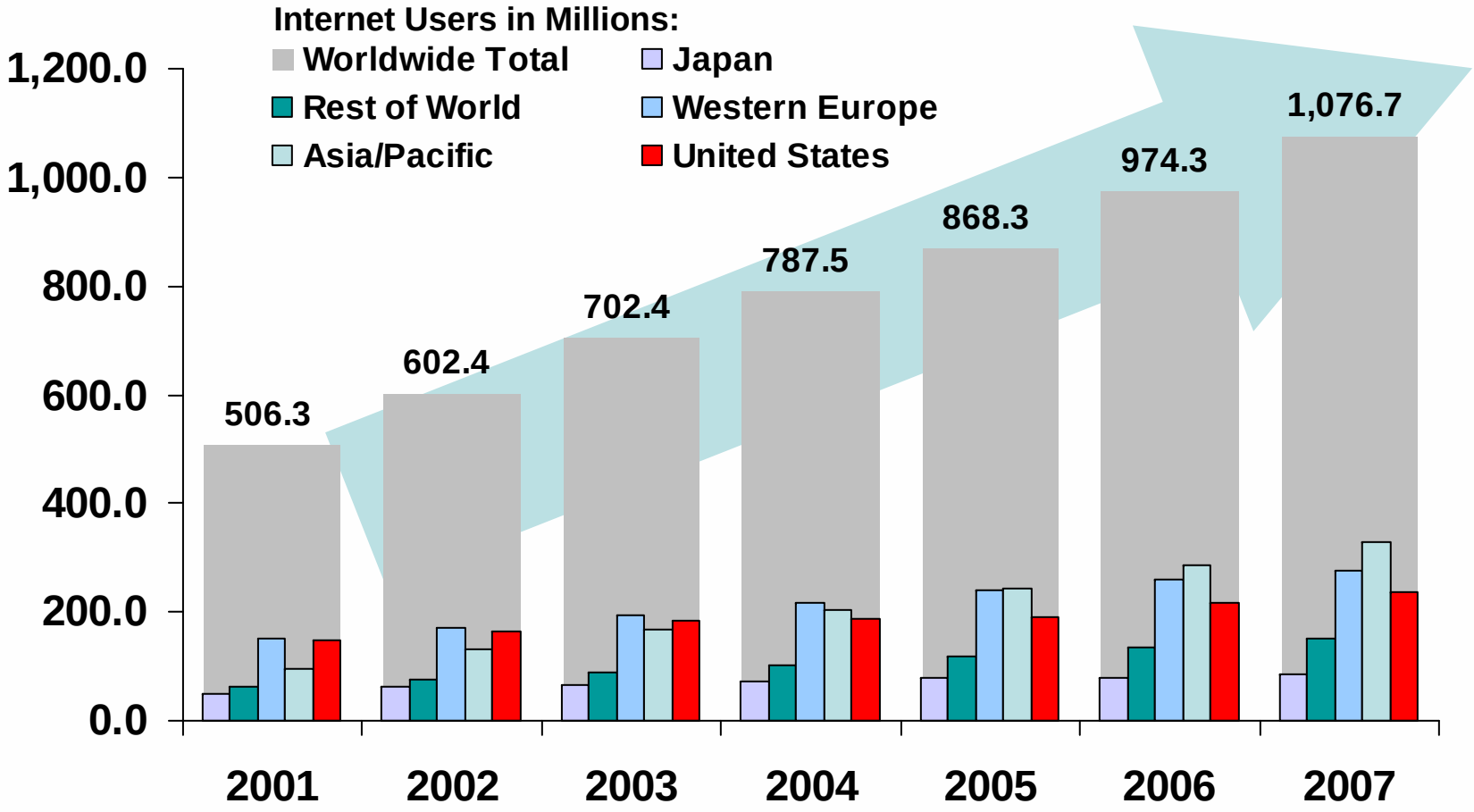
Y! Research

STRATEGIC DATA SOLUTIONS
FIND. REACH. KNOW.

Overview

- About Yahoo! and its business
- The Evolution of “Social Media”
- The Evolution of the Publishing Model
- Understanding the new Phenomena of the Internet and Social Media
- Yahoo! Research
- Overview of Some Research Challenges
- Concluding Thoughts

Globally, Internet Users Will Number Over 1 Billion by 2007



Source: IDC, December 2003.

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

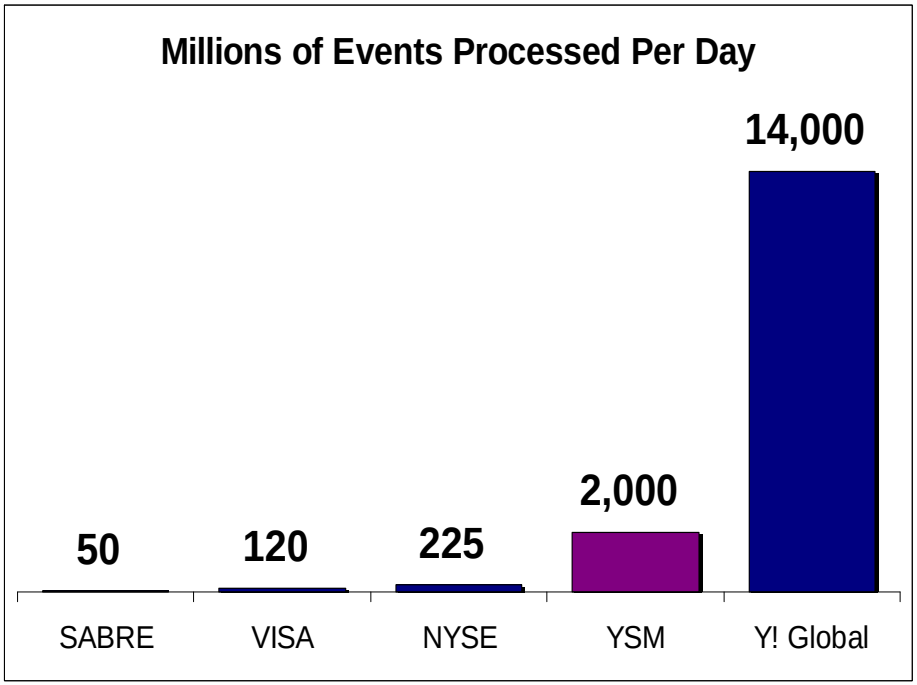
More people visited Yahoo! in the past month than:

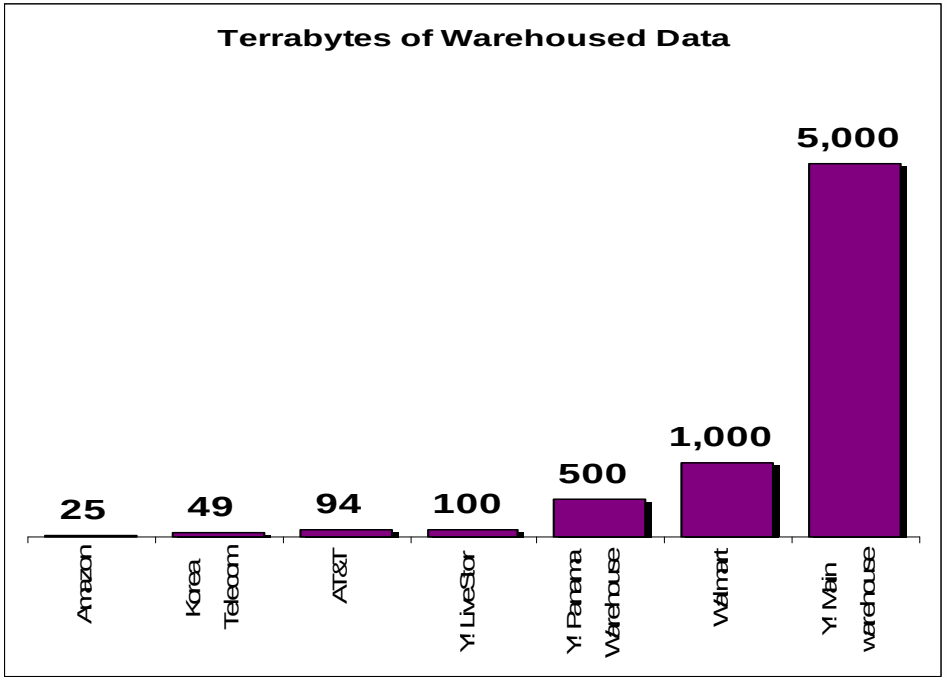
- Use coupons
- Vote
- Recycle
- Exercise regularly
- Have children living at home
- Wear sunscreen regularly

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

Sources: Mediamark Research, Spring 2004 and comScore Media Metrix, February 2005.

Yahoo! Data – A league of its own…





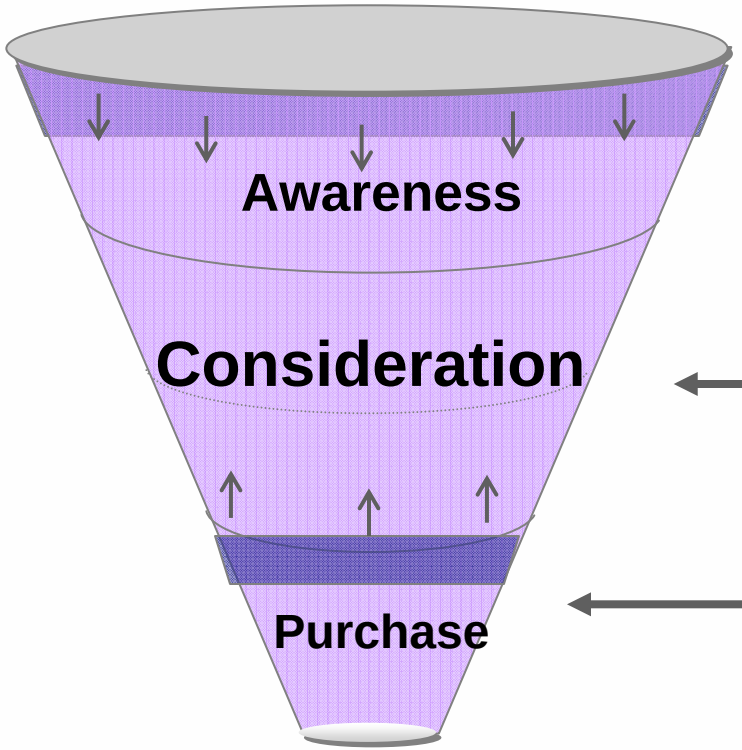
GRAND CHALLENGE PROBLEMS OF DATA PROCESSING

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

> $200B Direct Marketing Market

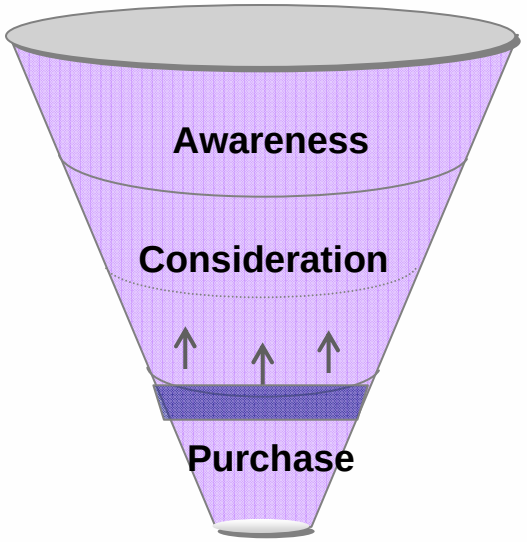
A question for the Audience:

Why is search-related advertising so powerful?

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

YAHOO!

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

3

YAHOO!

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

All within 1 HOUR

25% - 261% higher CTR than RON

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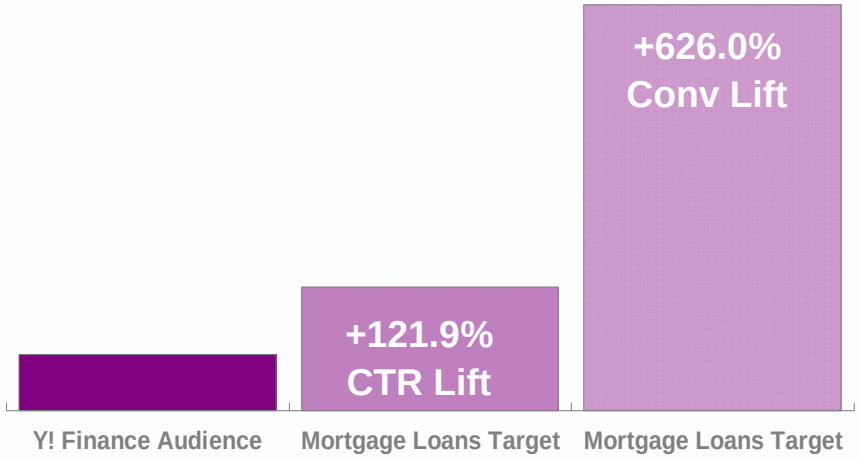
Way Impulse Works

- 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

Finance | Loans | Mortgage

Behavioral Targeting: Shoppers

Results from a Jan'2007 campaign on Yahoo! Network



1,900,000 people looking for mortgage loans.

Includes users anywhere on the Yahoo! Network who actively manifest Interest.

Users searched keywords such as:

Mortgages Home Loans Refinancing Ditech

Users visited pages such as:

Financing section in Real Estate

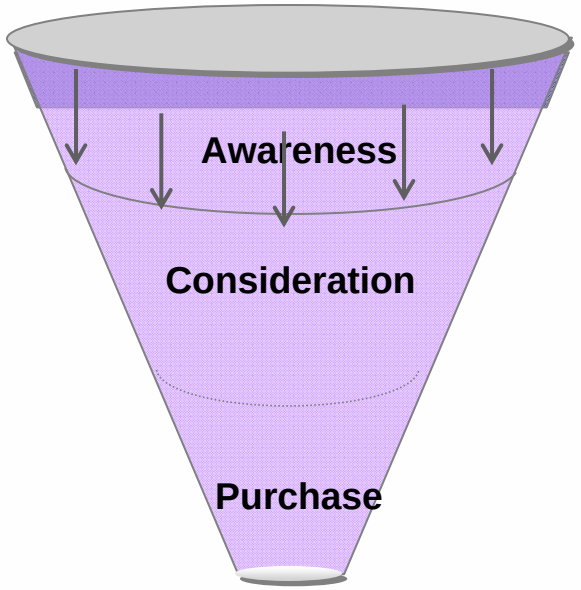
Mortgage Loans area in Finance

Real Estate section in Yellow Pages

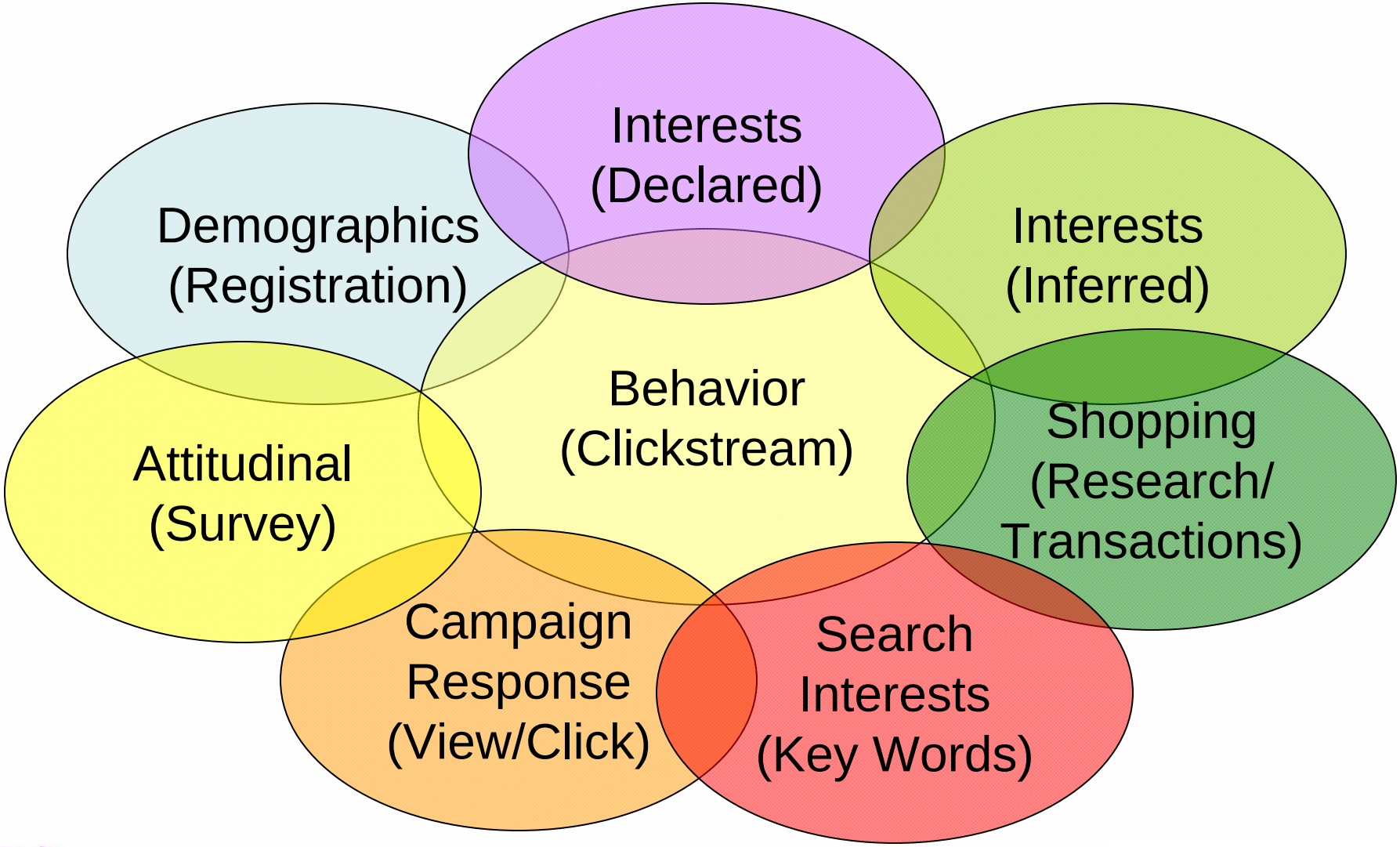
Source: Campaign Click thru Rate lift is determined by Yahoo! Internal research. Conversion is the number of qualified leads from clicks over number of impressions served. Audience size represents the audience within this behavioral interest category that has the highest propensity to engage with a brand or product and to click on an offer.

Moving Down the Funnel

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



Types of Data Captured Across the Yahoo Network



Identifying Car Shoppers

1. Identify relevant actions that indicate buying intent and aggregate them on an user basis
2. Compute a "purchase intent" score for each user
3. Segment results by score to identify top prospects

YAHOO! AUTOS

- Browse specs
- Loan Calculator
- Compare vehicles
- Configure and price

YAHOO! search

- Car manufacturers
- Car dealers
- Car buying guides

YAHOO! LOCAL Yellow Pages

- Local dealer lookups

What Can We Do With This Data?

- Using rich click stream data on Y!, we can identify consumers shopping for a car…
  - Capability unique to online medium; hard to identify "in the market" consumers off-line
- …with a reasonable degree of accuracy
  - 70% identified "in the market" users looking to buy within 3 months
  - 24% users said they actually made a purchase within a month (results from a self-reported survey)

How Big is the Opportunity?

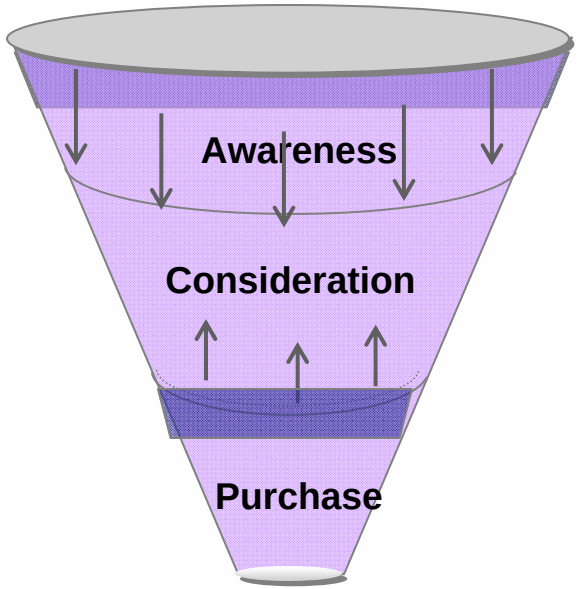
- Can identify ~250,000 “leads” a month on Yahoo (at 90% confidence level)
  - About 30% of total new cars sold in the U.S. every month to individuals
- More opportunities
  - Car financing, Car insurance, Used car listings
  - *Other categories*: travel intenders, high net worth individuals, small businesses, etc…

An Example

- A test ad-campaign with a major Euro automobile manufacturer
  - Designed a test that served the same ad creative to test and control groups on Yahoo
  - Success metric: performing specific actions on Jaguar website
- Test results: 900% conversion lift vs. control group
  - Purchase Intenders were 9 times more likely to configure a vehicle, request a price quote or locate a dealer than consumers in the control group
  - ~3x higher click through rates vs. control group

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:

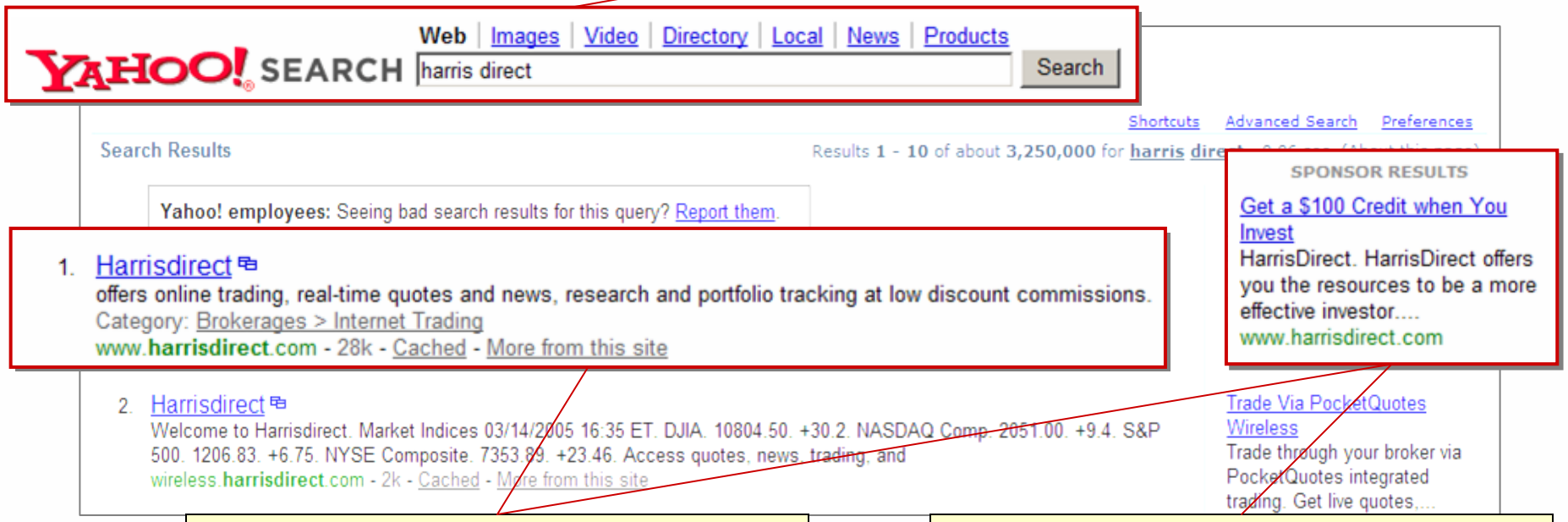
- Aided Brand Awareness
  - **Up 7%**

- 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…



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

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

HARRISdirect℠

…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

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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…

Something Special is Happening on the Internet…

Web 2.0

Culture of Participation

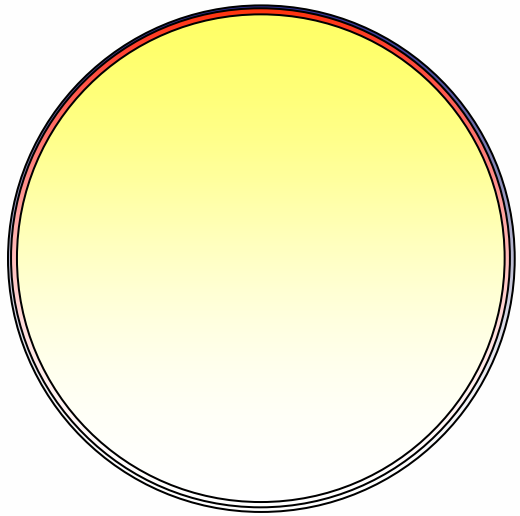
User Generated Content

Wisdom of Crowds

Web 2.0 Community Dynamics

Moving beyond “users”…

Web 2.0 Community Dynamics



100% creators

100% synthesizers

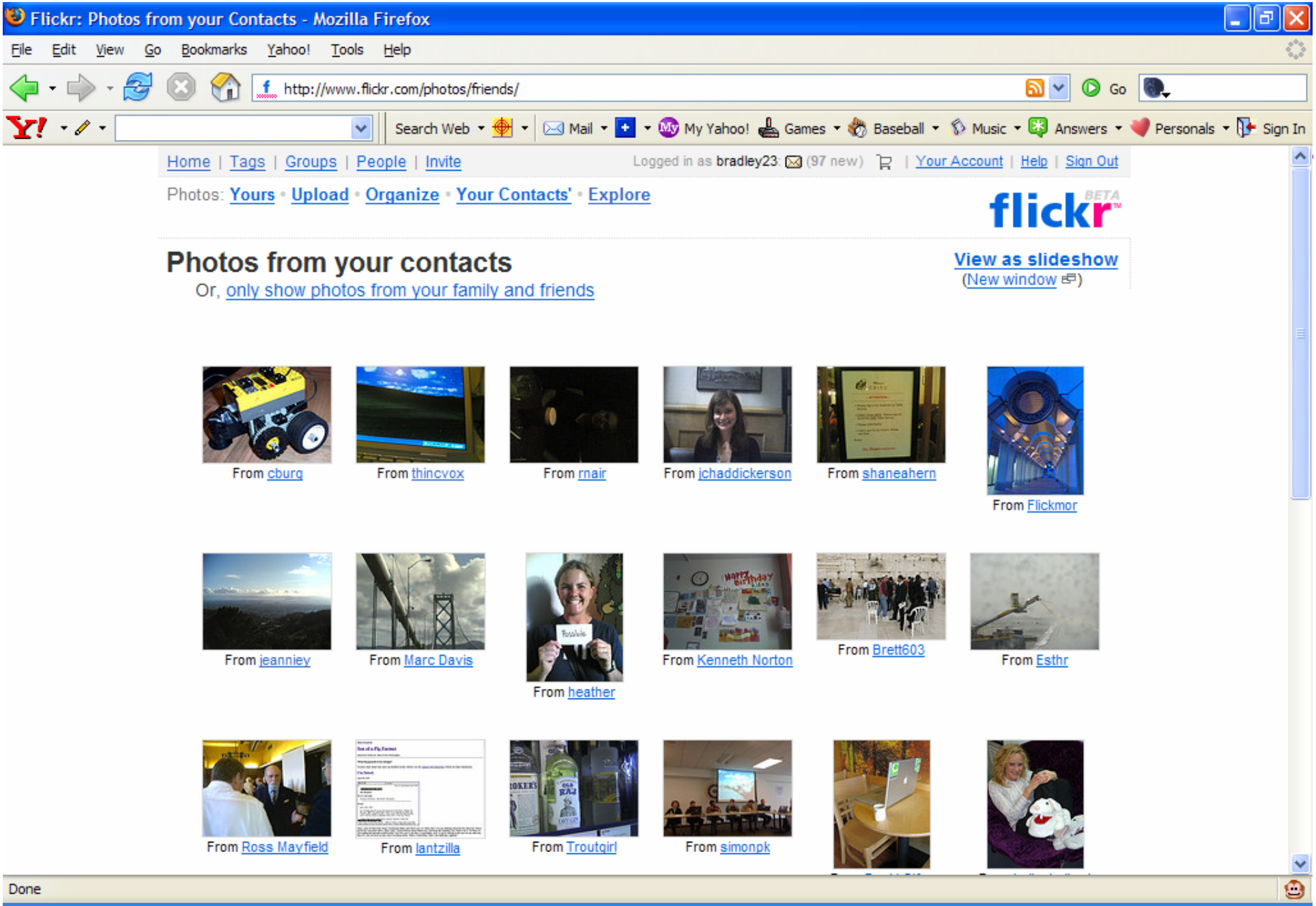
100% consumers

Happenstance artistes…

Anyone with a _____ is now a _____

keyboard
camera
iPod
browser

author
photographer
deejay
publisher


Flickr: Photos from your Contacts - Mozilla Firefox
File Edit View Go Bookmarks Yahoo! Tools Help
http://www.flickr.com/photos/friends/
Go
Search Web Mail My Yahoo! Games Baseball Music Answers Personals Sign In
Home | Tags | Groups | People | Invite
Logged in as bradley23 (97 new) | Your Account | Help | Sign Out
Photos: Yours • Upload • Organize • Your Contacts' • Explore
flickr BETA
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 jchaddickerson
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
Done

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

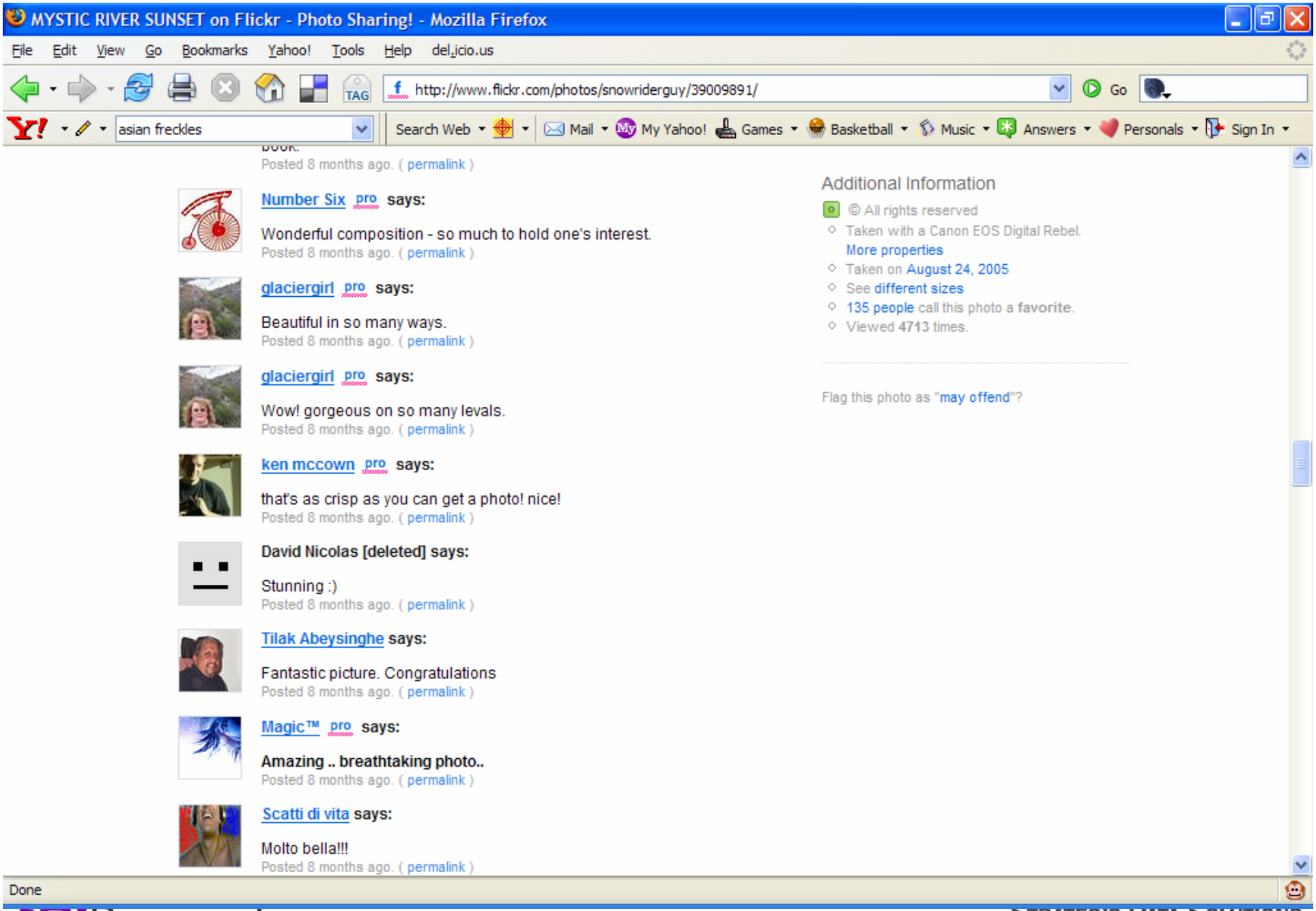
Africa Masai boy
From housden photos

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/
Go
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 levals.
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?

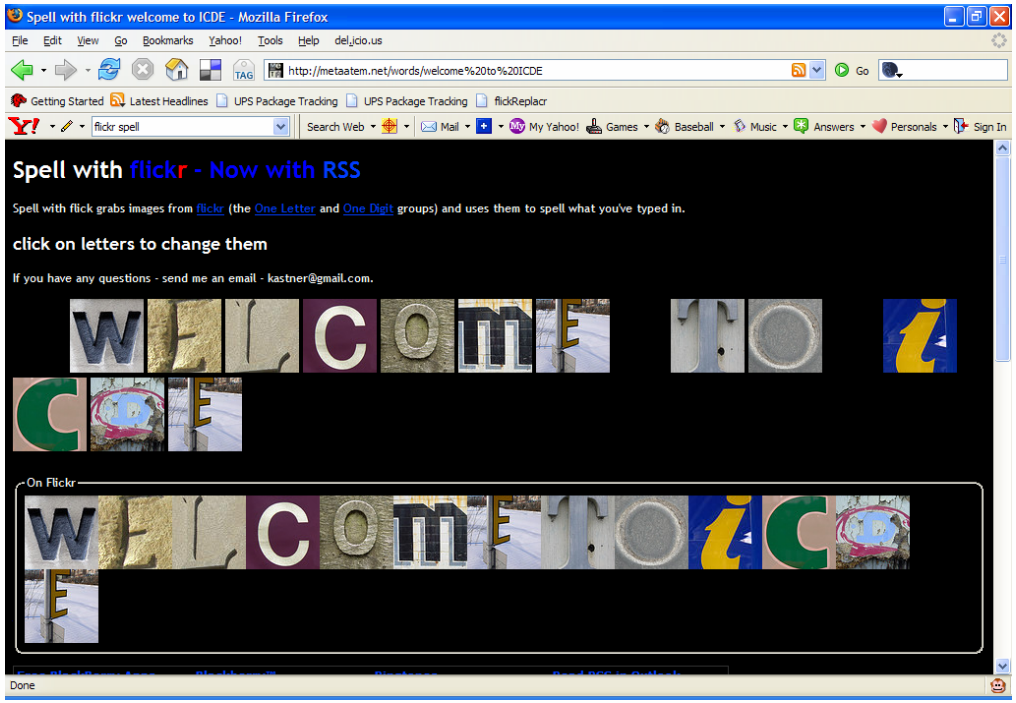
3. User Distributed Content

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.

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.



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

Yahoo! Research

Inventing the new sciences of the Internet

Y! Research

STRATEGIC DATA SOLUTIONS
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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**

Mission & Vision

Vision: Where the Internet's future is invented

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

Mission: *NEXT --* Invent the

Next generation Internet by defining the future media to

Engage consumers and

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

Technical 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

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

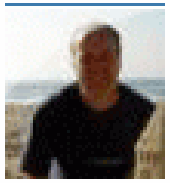
– **Andrew Tomkins:** chief Scientist of WebFountain, inventor of key algorithms, structure of Web graph

– **Ricardo Baeza-Yates:** renowned expert in text and query mining, authored seminal texts in IR

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.

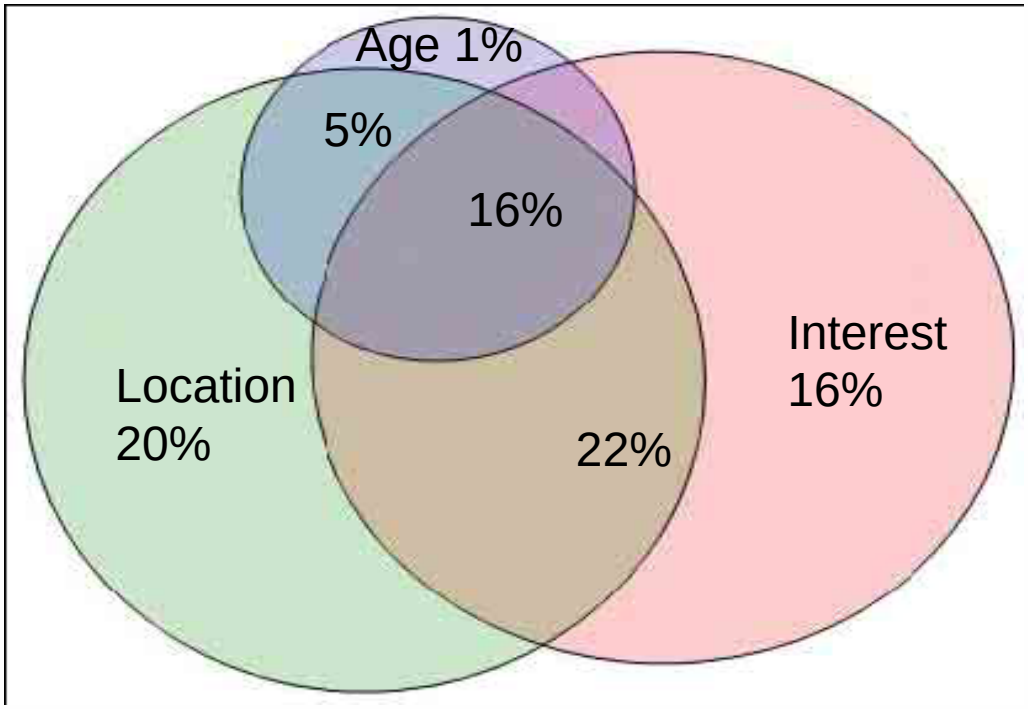
Yahoo! Case Study: Blogs

Ravi Kumar, Jasmine Novak, Prabhakar Raghavan Andrew Tomkins, et. Al.

WWW May 2003; CACM Dec 2004; PNAS Aug 2005; KDD Aug 2005; WIP

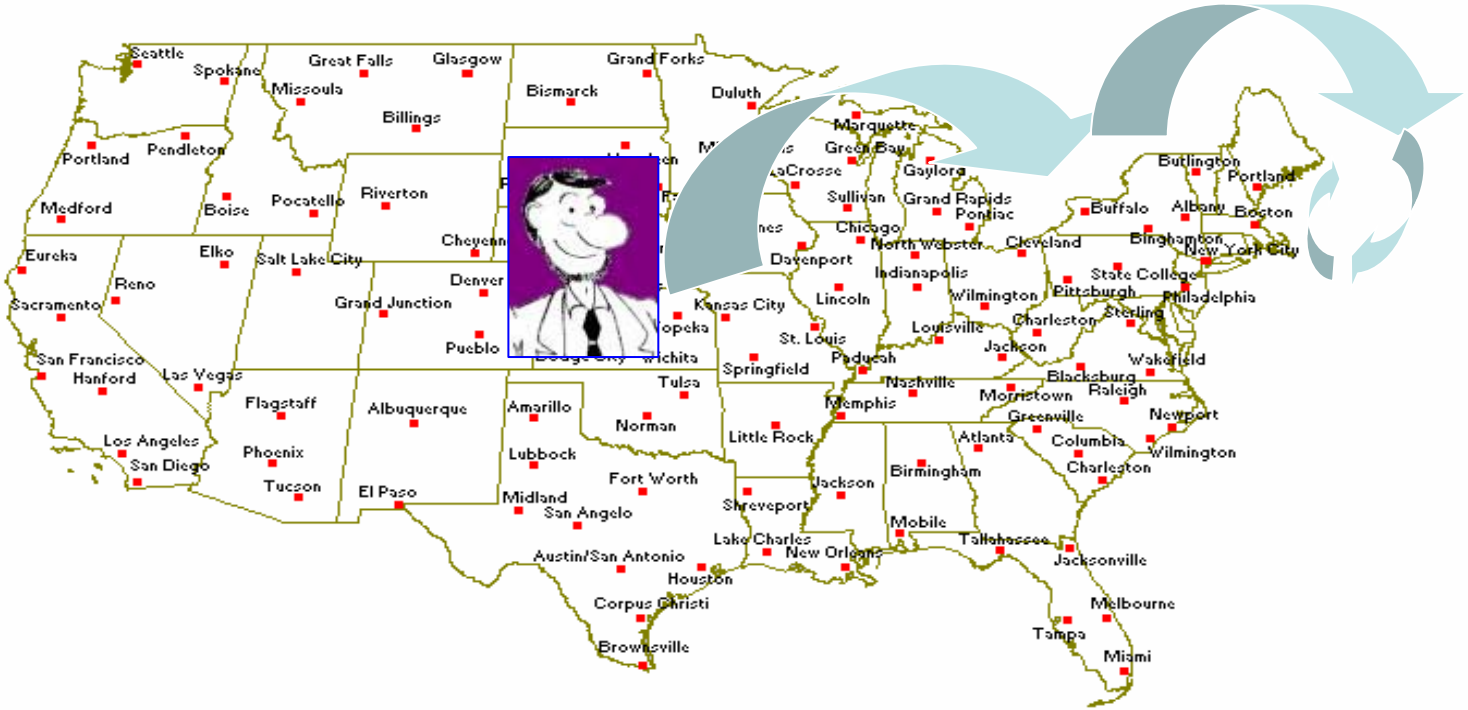
Friendship graph

- Directed
- 80% mutual
- Average degree ~ 14
- Power law degrees
- Clustering coeff. ~ 0.2
- Most friendships explained age, location, interest



Message forwarding

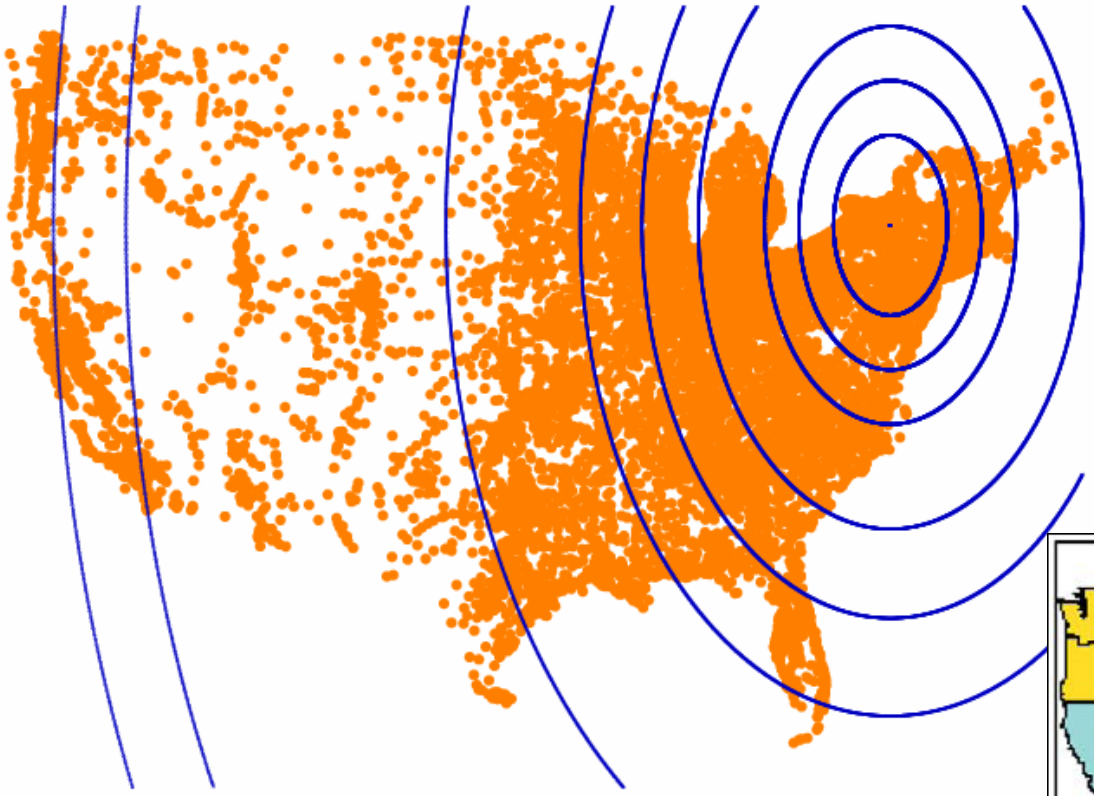
- Stanley Milgram: short paths in social networks, small worlds, and “Six degrees of separation”, 1967.



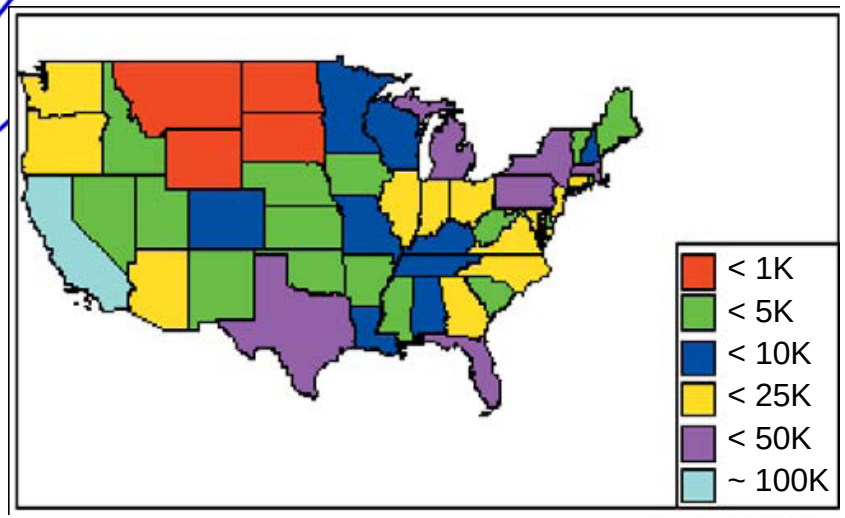
What's surprising about Milgram?

- Surprising fact number one (observed by Milgram): network contains short paths
- Surprising fact number two (observed much later by Kleinberg): a purely local algorithm allows discovery of these short paths

Population density



- Dot for every inhabited location
- Each circle represents 50,000 bloggers
- Centered on Ithaca, NY



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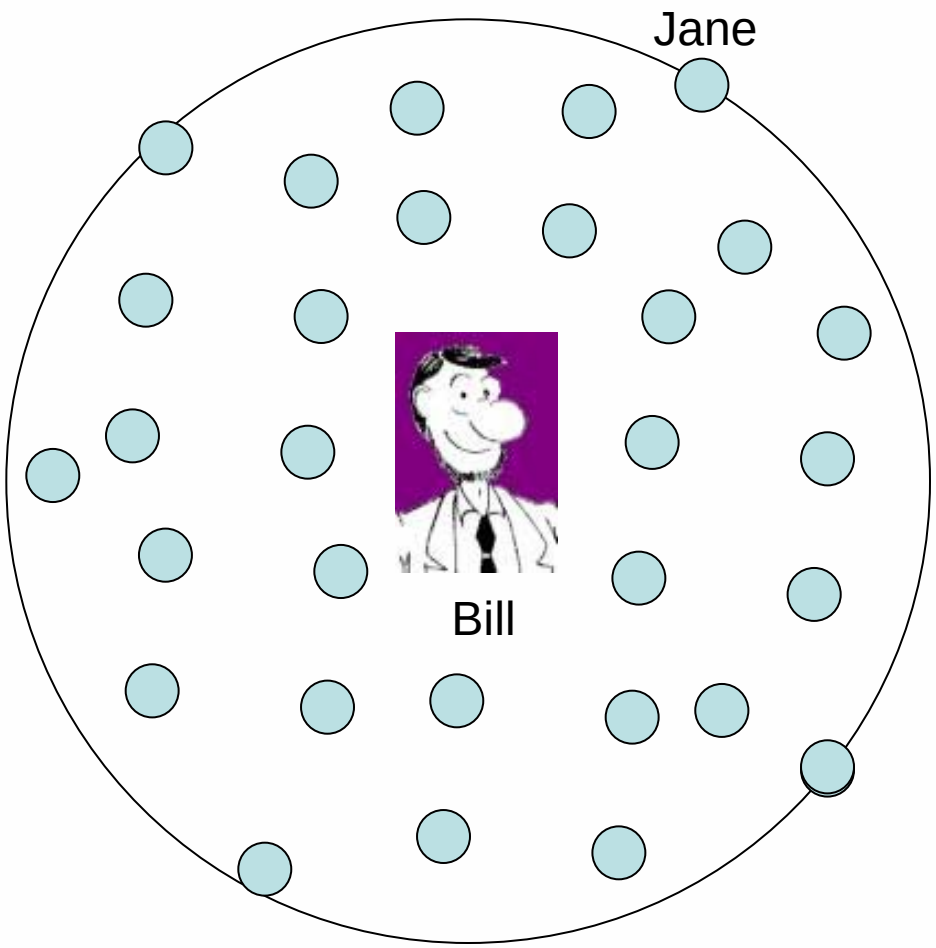
Modeling distance

- Why use distance to determine friendship probabilities?
  - Two people who live a mile apart in Beijing will never meet
  - Two people who live a mile apart in Iowa will be close acquaintances
- What's the difference?
  - Within Manhattan, there are thousands of people living within a mile
  - Within Iowa, there are very few
- Probability of friendship should depend on the size of the candidate population



Pr[friendship] ~ 1 / (# of closer people)

Properties of Rank-based friendship

- Population density determines relationship between distance and friendship

- For uniform density, rank-based friendship is equivalent to Kleinberg – same theorems hold
- For non-uniform density, a similar theorem can be shown…

Theorem

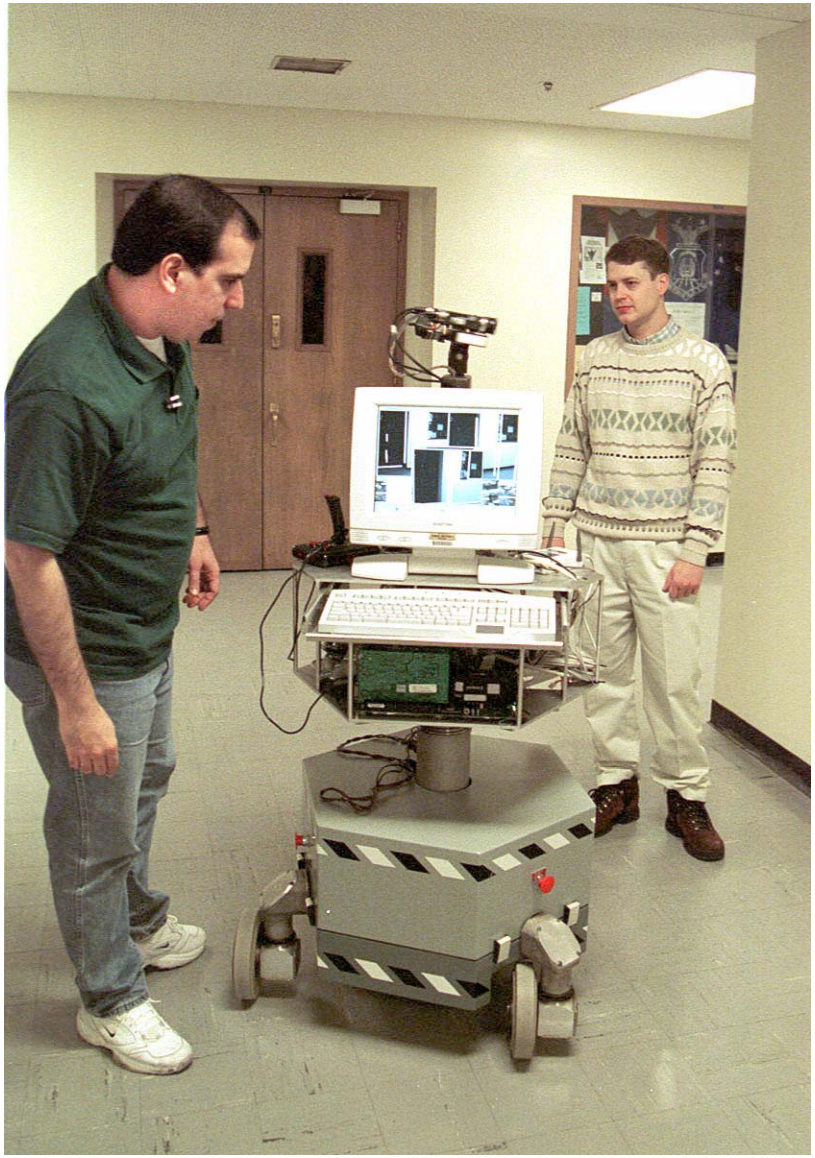
- For any *n*-person population network, for arbitrary source *s*, and uniformly-chosen target *t*, the expected length of a geographic greedy routing path from s to the location of t is $O(\log^3 n)$

- Compared to Kleinberg:
  - Lose: expectation rather than with high probability
  - Lose: another log factor
  - Gain: arbitrary population distributions

“Social” Search

Is the Turing test always the right question?

A Digression: Computer Vision is hard

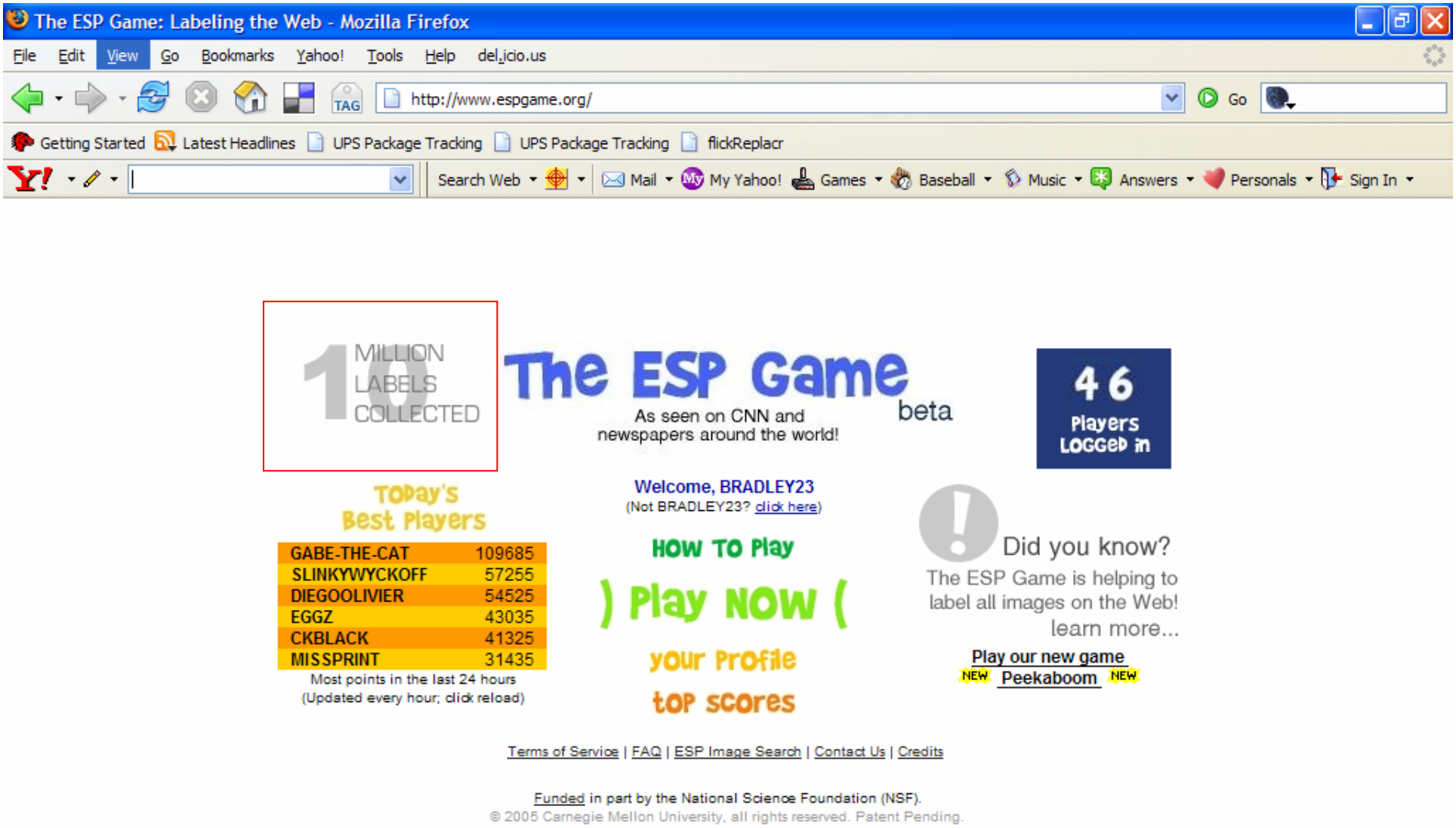


The ESP Game: Labeling the Web - Mozilla Firefox
File Edit View Go Bookmarks Yahoo! Tools Help del.icio.us
http://www.espgame.org/
Go
Getting Started
Latest Headlines
UPS Package Tracking
UPS Package Tracking
flickReplacr
Search Web
Mail
My Yahoo!
Games
Baseball
Music
Answers
Personals
Sign In
1 MILLION LABELS COLLECTED
The ESP Game beta
As seen on CNN and newspapers around the world!
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).
© 2005 Carnegie Mellon University, all rights reserved. Patent Pending.
Done

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
© 2005 Carnegie Mellon University, all rights reserved. Patent Pending.
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
© 2005 Carnegie Mellon University, all rights reserved. Patent Pending.
Applet PlayerClient started

http://www.espgame.org - The ESP Game - Mozilla Firefox
Score: 140
Time Bonus: 0
Total for this Game: 140
Percentile: 22
(Percent of all Games with a lower score)
Cumulative Score: 33285
Rank: Gifted
Points needed for next rank: 166715
Play Again
View Images and Guesses
© 2005 Carnegie Mellon University, all rights reserved. Patent Pending.
Applet PlayerClient started


The ESP Game: Labeling the Web - Mozilla Firefox
File Edit View Go Bookmarks Yahoo! Tools Help del.icio.us
http://www.espgame.org/
Go
Getting Started
Latest Headlines
UPS Package Tracking
UPS Package Tracking
flickReplacr
Search Web
Mail
My Yahoo!
Games
Baseball
Music
Answers
Personals
Sign In
1 MILLION LABELS COLLECTED
The ESP Game beta
As seen on CNN and newspapers around the world!
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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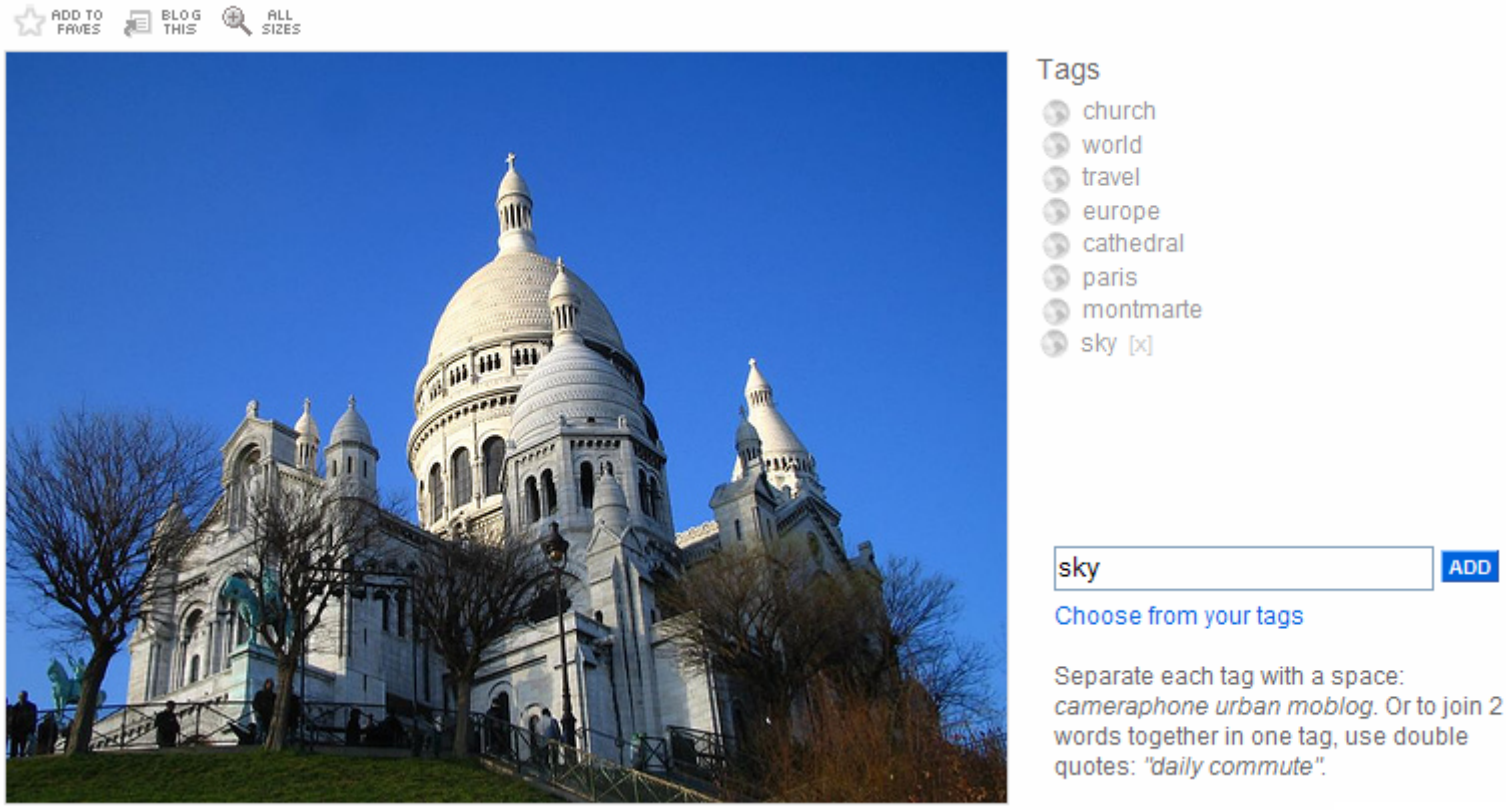
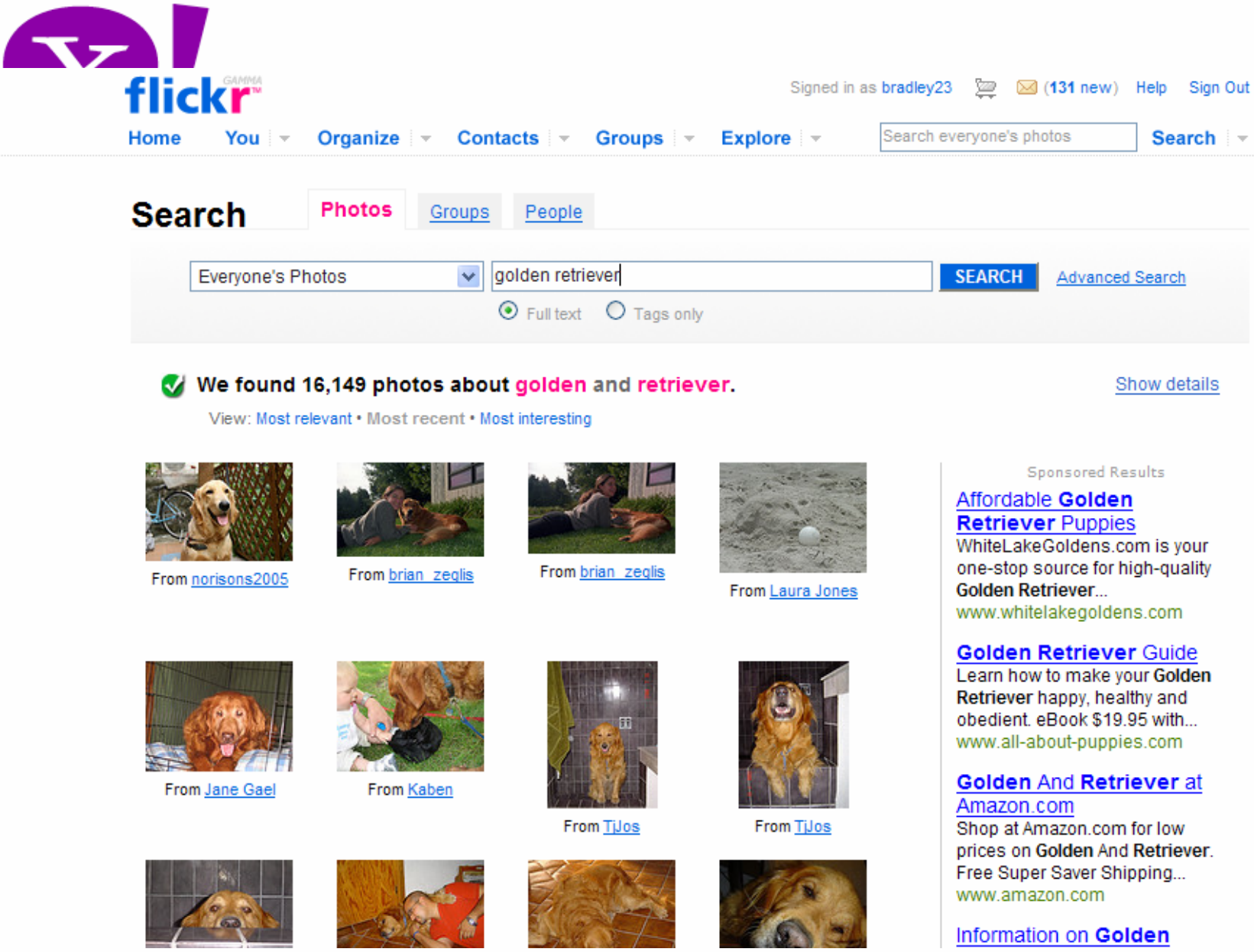
Done

What makes Flickr special?

2. User Organized Content

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




flickr
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 norisons2005
From brian_zeglis
From brian_zeglis
From Laura Jones
From Jane Gael
From Kaben
From TjJos
From TjJos
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

flickr GAMMA

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 thumbnails

View: Most relevant • Most recent • Most interesting

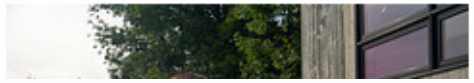
Pabro パブロ

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

flickr

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

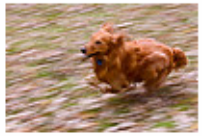
View: Most relevant • Most recent • Most interesting

From AndrewMorrel...

From bitterlyswee...

From isolano

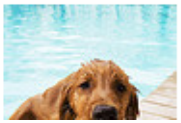
From AndrewMorrel...


From AndrewMorrel...

From AndrewMorrel...

From AndrewMorrel...

From AndrewMorrel...



Sponsored Results

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

flickr GAMMA

Signed in as bradley23 (131 new) Help Sign Out

Home You Organize Contacts Groups Explore Search everyone's photos Search

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:

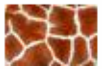
Great action shot. I'm sure they were having a ball.
Posted 2 weeks ago. (permalink)

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"?

flickr BETA

Tags / jaguar / clusters

jaguar 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

Y!Research

STRATEGIC DATA SOLUTIONS
FIND. REACH. KNOW.

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

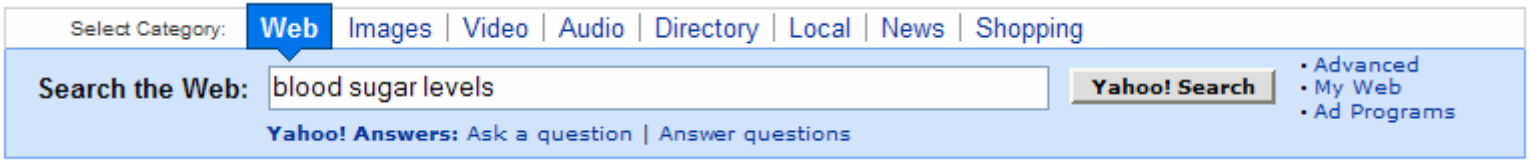
- What didn’t
  - Scalability a double-edged sword
  - Ranking and relevance poor
  - Not authoritative (spam, irrelevance, etc.)

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

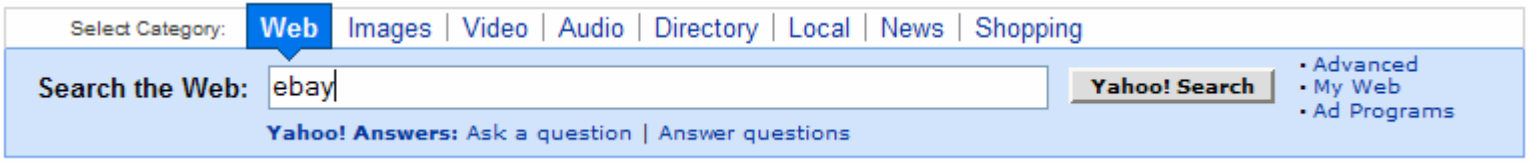
- Use topology (link structure) of the web to confer authority
- What works
  - Relevance is greatly improved
  - Navigational query is born (query for “IBM” gets me to ibm.com)
- What doesn’t
  - Homogeneity of results (no personalization) means no “subjective” queries – webmasters vote by proxy for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

Query composition

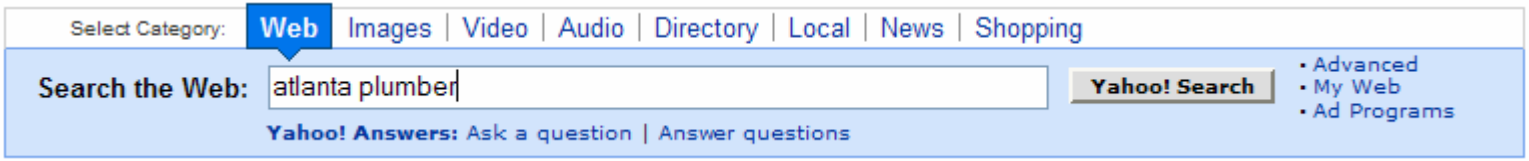
~25% Informational



•~40% Navigational



•~35% Transactional



Subjective Queries

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

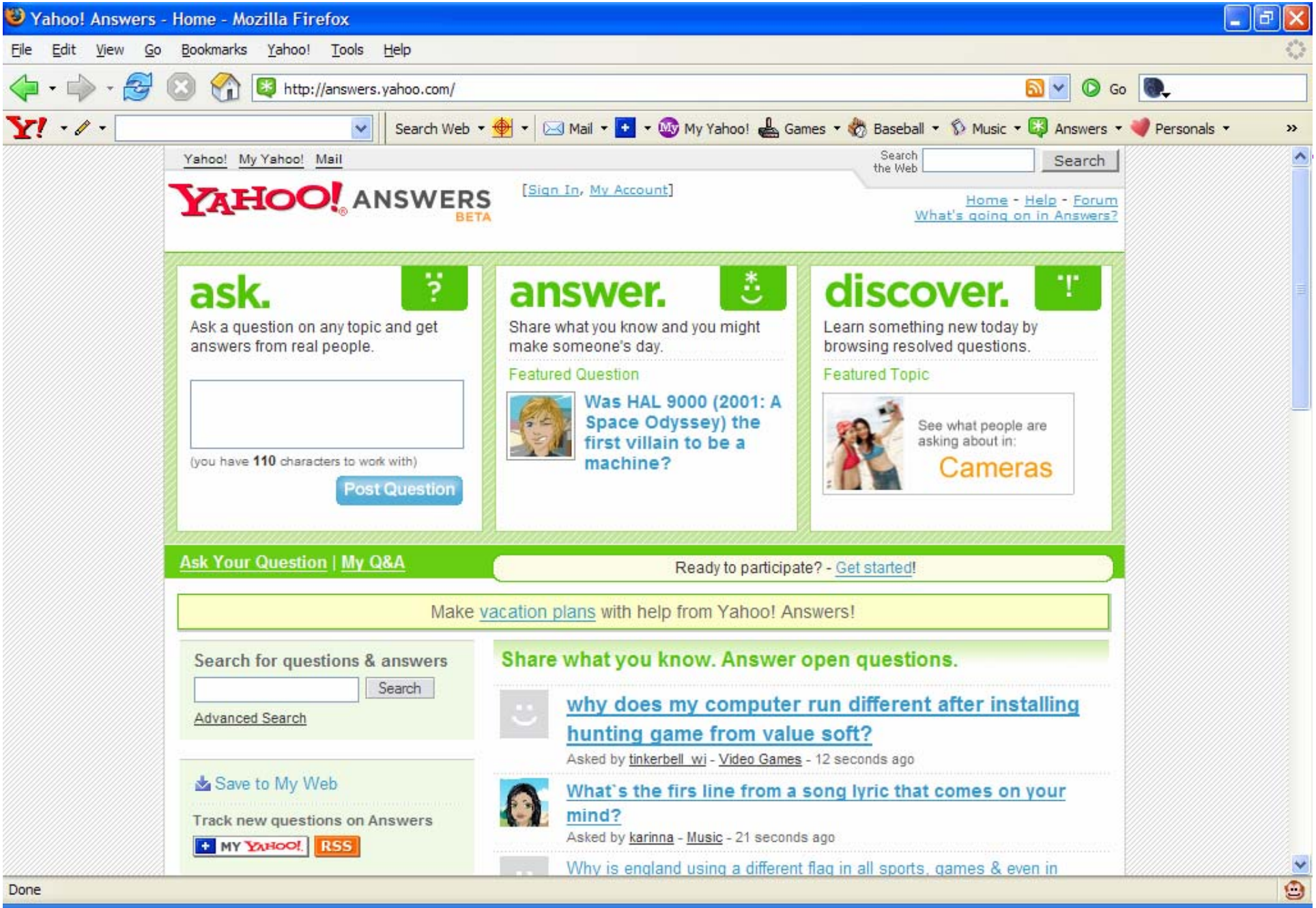
- "Do you know a reputable plumber in Atlanta?"
- "Where is the cool nightlife in Soho?"
- "What political blogs do you think I'd enjoy reading?"
- "Where can I buy a cool pair of boots?"

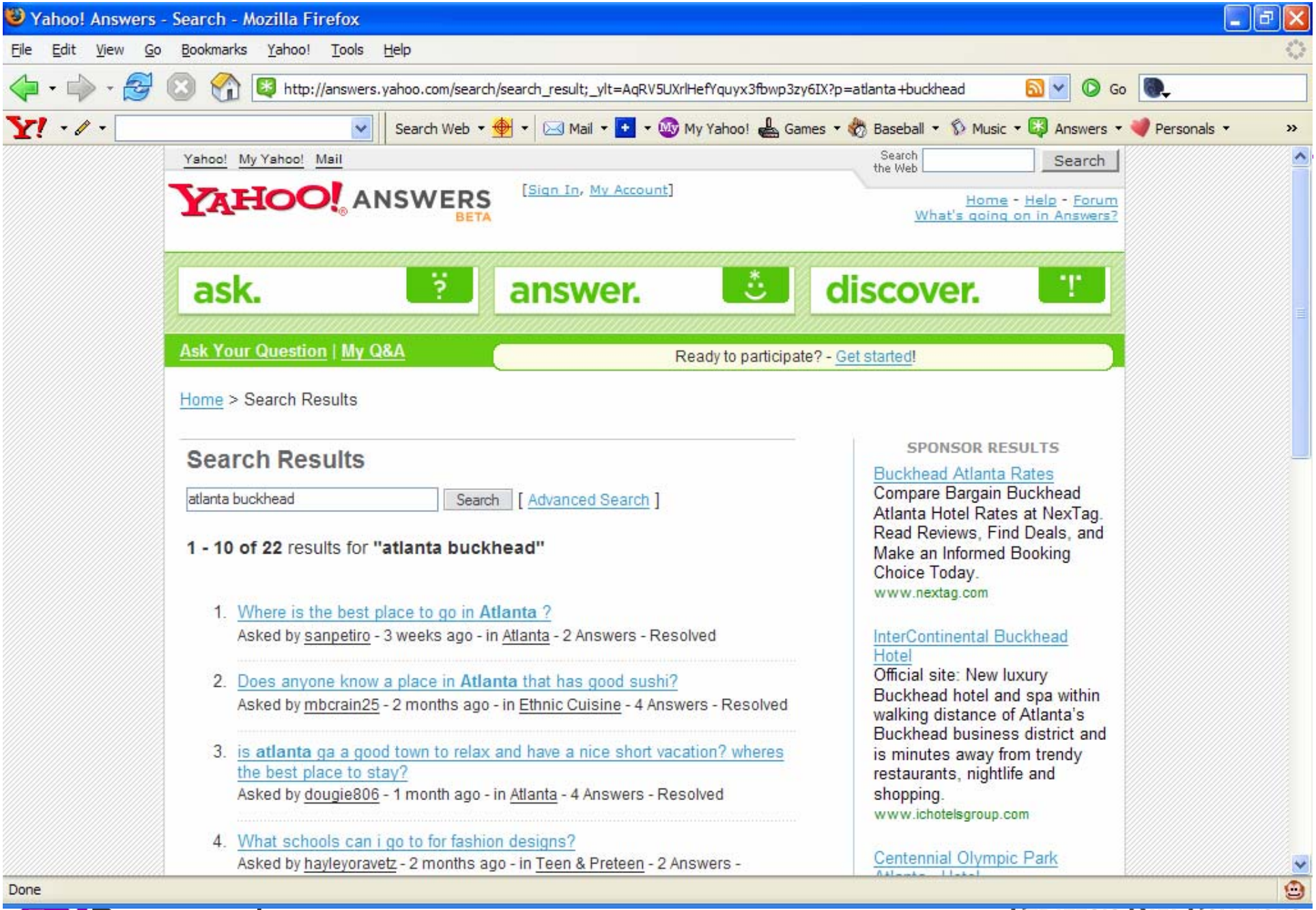
These kinds of queries are ill-served by today's search engines, but are ironically the most valuable (i.e. transactional queries.)

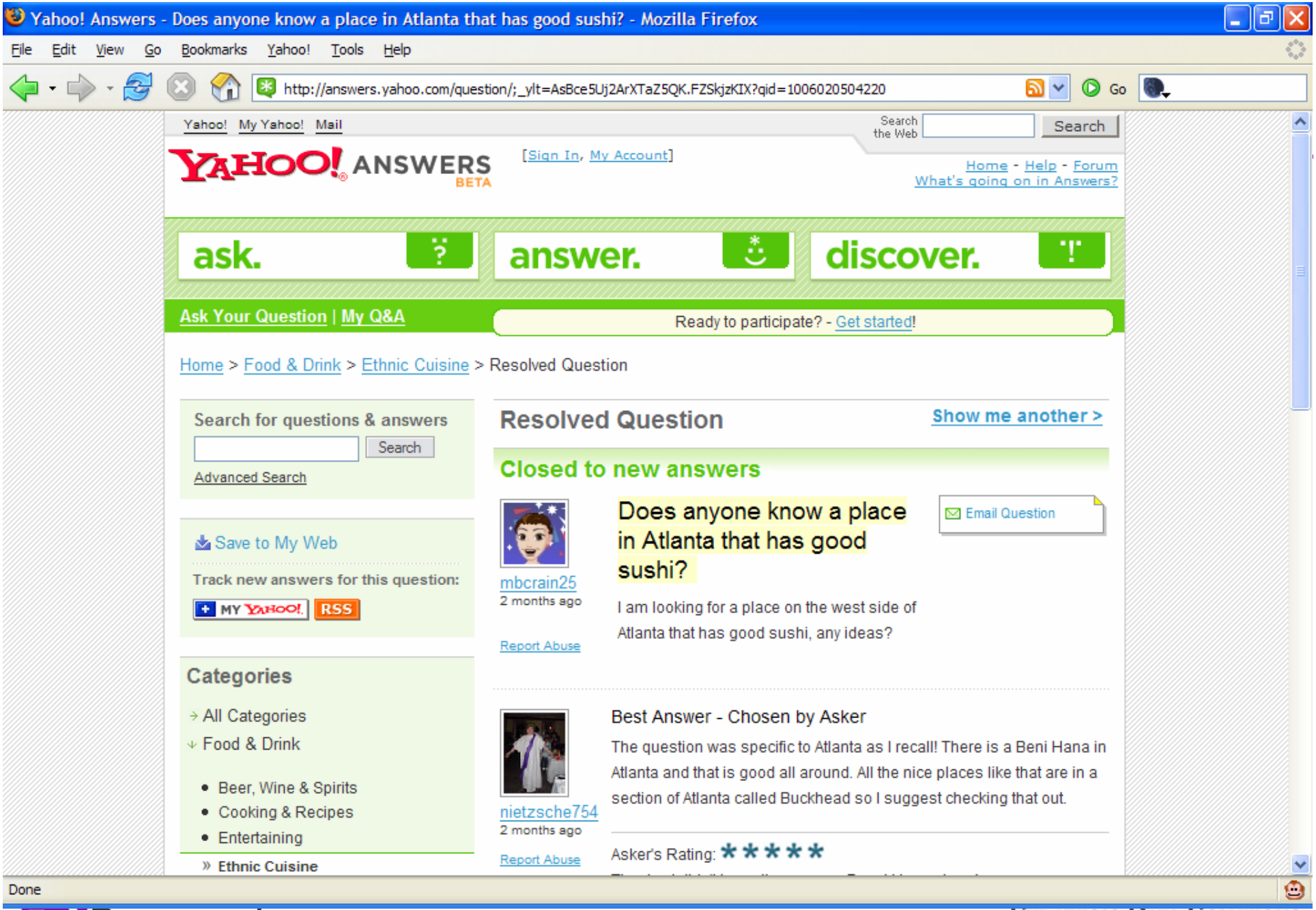
“Better Search Through People”
Case Study: Yahoo! Answers

Making Connections

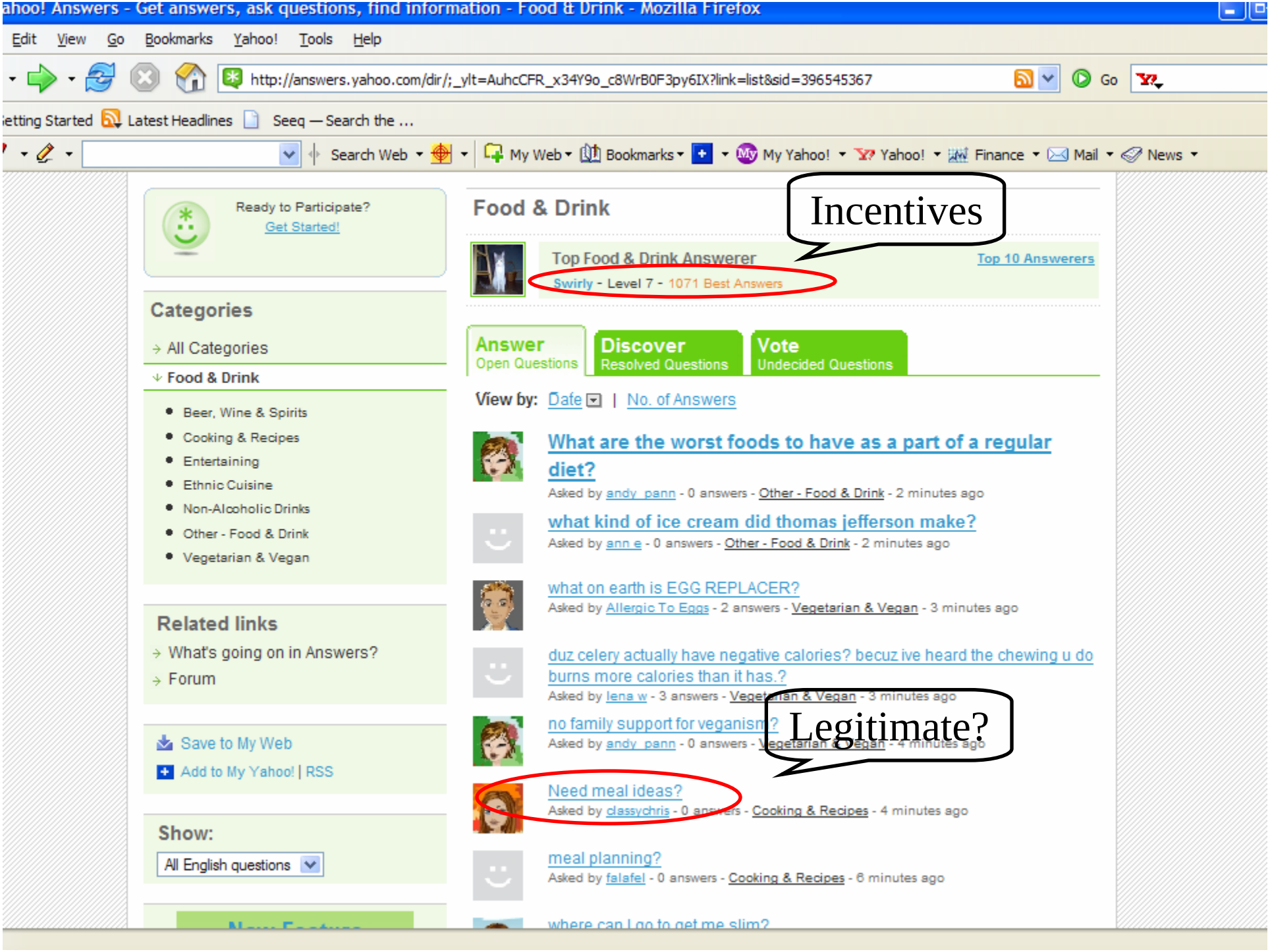
- Today's state-of-the-art web search (at best) connects a person with a query to a web page that contains those characters
- Even as we nobly try to index every page, (every book, every video, every podcast, etc.) it is worth noting that these are *artifacts* of human knowledge
- Yahoo! Answers addresses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


Yahoo! Answers - Home - Mozilla Firefox
File Edit View Go Bookmarks Yahoo! Tools Help
http://answers.yahoo.com/
Go
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.
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
Search
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_wi - 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
Done


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
Go
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 -
SPONSOR RESULTS
Buckhead Atlanta Rates
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
Done


Yahoo! Answers - Does anyone know a place in Atlanta that has good sushi? - Mozilla Firefox
File Edit View Go Bookmarks Yahoo! Tools Help
http://answers.yahoo.com/question/;_ylt=AsBce5Uj2ArXTaZ5QK.FZSkjzKIX?qid=1006020504220
Go
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 > Food & Drink > Ethnic Cuisine > Resolved Question
Search for questions & answers
Search
Advanced Search
Save to My Web
Track new answers for this question:
MY YAHOO!
RSS
Categories
All Categories
Food & Drink
Beer, Wine & Spirits
Cooking & Recipes
Entertaining
Ethnic Cuisine
Resolved Question
Show me another >
Closed to new answers
Email Question
Does anyone know a place in Atlanta that has good sushi?
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
Report Abuse
Asker's Rating: *****
Done

ahoo! Answers - Is there a low-fat, low-cal recipe for potato salad? - Mozilla Firefox
Edit View Go Bookmarks Yahoo! Tools Help
http://answers.yahoo.com/question/index;_ylt=Aox7SJQKUlYaPCXf0gwtRRbzy6IX?qid=20061002185210AA2c1Dg
Go
Latest Headlines
Seeq — Search the ...
Search Web
My Web
Bookmarks
My Yahoo!
Yahoo!
Finance
Mail
News
Categories
All Categories
Food & Drink
Beer, Wine & Spirits
Cooking & Recipes
Entertaining
Ethnic Cuisine
Non-Alcoholic Drinks
Other - Food & Drink
Vegetarian & Vegan
JB_HR2007
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.
No definitive answer
0 0
Ratings become available once you reach Level 2
Search the Web to research your answer.
Search the Web
Unverifiable 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
Vote as Best Answer
0 0
Community consensus
Answerer 2
Mayonnaise is the primary culprit in the fat content of potato salad. Potatoes


ahoo! Answers - Get answers, ask questions, find information - Food & Drink - Mozilla Firefox
Edit View Go Bookmarks Yahoo! Tools Help
http://answers.yahoo.com/dir/;_ylt=AuhcCFR_x34Y9o_c8WrB0F3py6IX?link=list&sid=396545367
Go
etting Started Latest Headlines Seeq — Search the ...
Search Web My Web Bookmarks My Yahoo! Yahoo! Finance Mail News
Ready to Participate?
Get Started!
Categories
All Categories
Food & Drink
Beer, Wine & Spirits
Cooking & Recipes
Entertaining
Ethnic Cuisine
Non-Alcoholic Drinks
Other - Food & Drink
Vegetarian & Vegan
Related links
What's going on in Answers?
Forum
Save to My Web
Add to My Yahoo! | RSS
Show:
All English questions
Food & Drink
Incentives
Top Food & Drink Answerer
Top 10 Answerers
Swirly - Level 7 - 1071 Best Answers
Answer
Open Questions
Discover
Resolved Questions
Vote
Undecided Questions
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
Legitimate?
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?

Where is the Science?

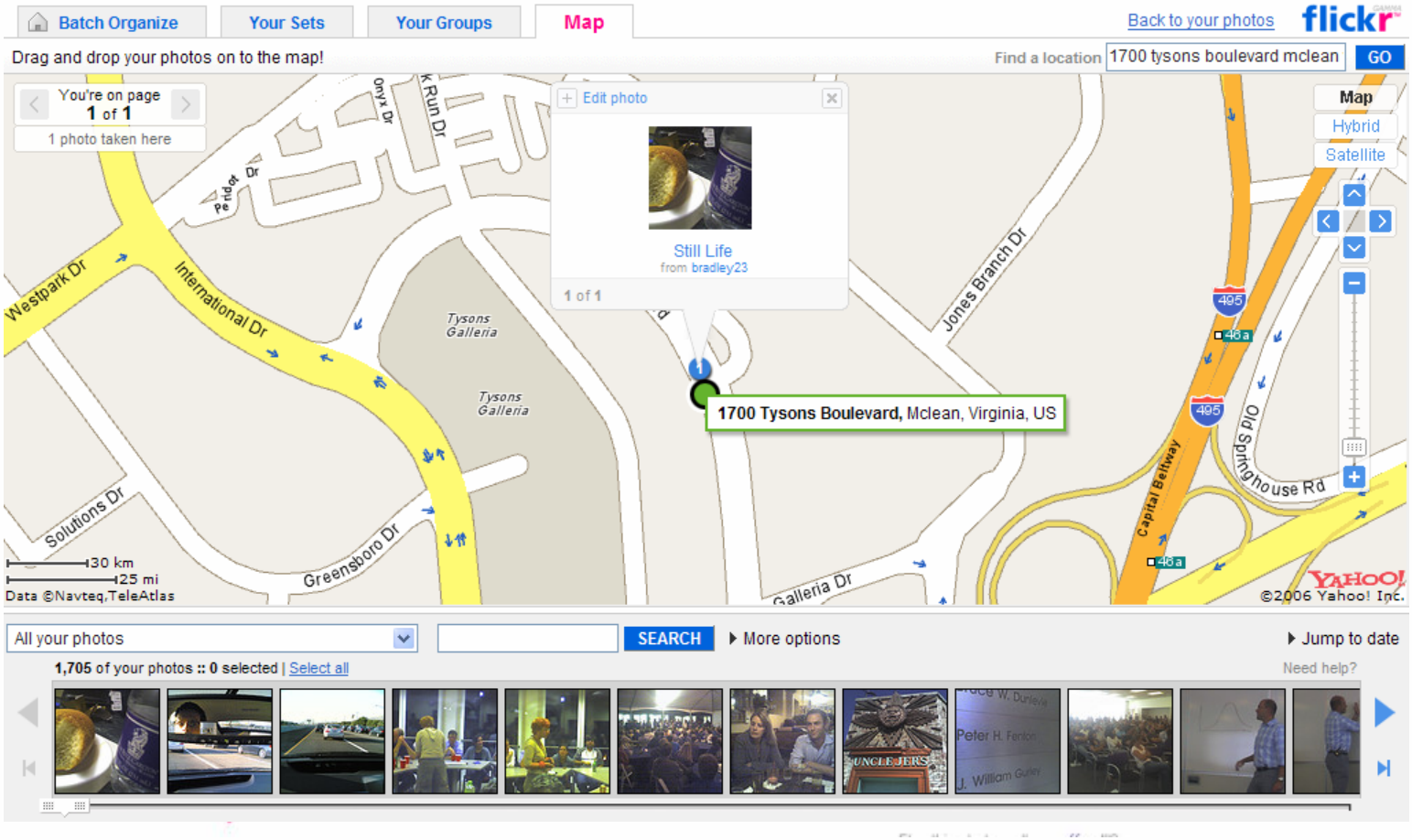
- Which questions are legitimate?
- What is the incentive system?
- How do we validate answers?
- What is the role of the community?
- What is the reputation system?

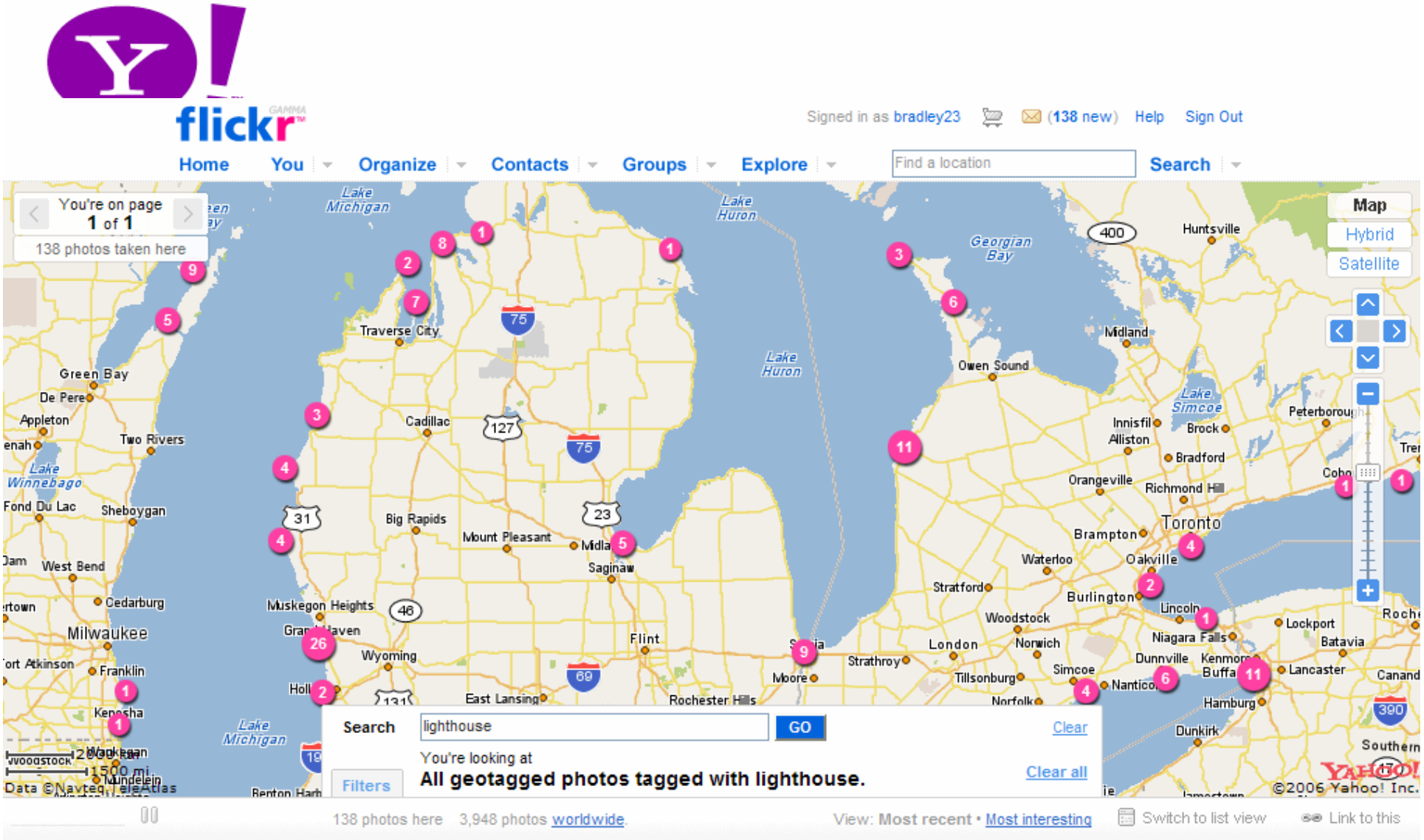
What are the challenges?

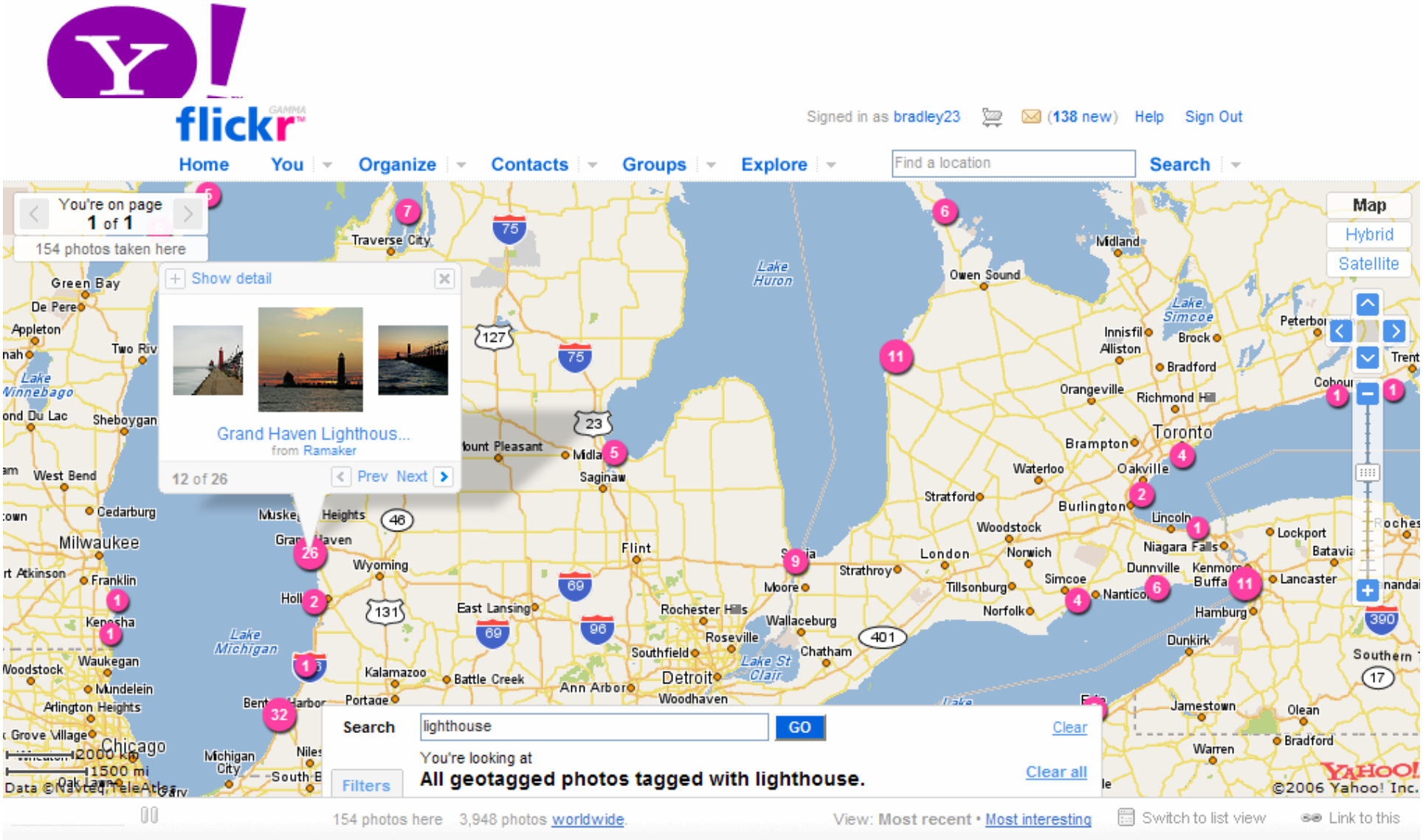
- Community of users
  - Social system
- Incentives and reputations
  - Economic system
- Poorly phrased, grammatically limited queries
  - Language analysis
- Improving user experience from past data
  - Data mining

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

But wait… there's more!




flickr
Signed in as bradley23
(138 new)
Help
Sign Out
Home
You
Organize
Contacts
Groups
Explore
Find a location
Search
You're on page 1 of 1
138 photos taken here
Map
Hybrid
Satellite
Search
lighthouse
GO
Clear
You're looking at
All geotagged photos tagged with lighthouse.
Clear all
Filters
138 photos here
3,948 photos worldwide.
View: Most recent • Most interesting
Switch to list view
Link to this
Data ©Navteq, TeleAtlas
©2006 Yahoo! Inc.


flickr
Signed in as bradley23
(138 new)
Help
Sign Out
Home
You
Organize
Contacts
Groups
Explore
Find a location
Search
You're on page 1 of 1
154 photos taken here
Show detail
Grand Haven Lighthous...
from Ramaker
12 of 26
Prev
Next
Map
Hybrid
Satellite
Search
lighthouse
GO
Clear
You're looking at
All geotagged photos tagged with lighthouse.
Clear all
Filters
154 photos here
3,948 photos worldwide.
View: Most recent • Most interesting
Switch to list view
Link to this
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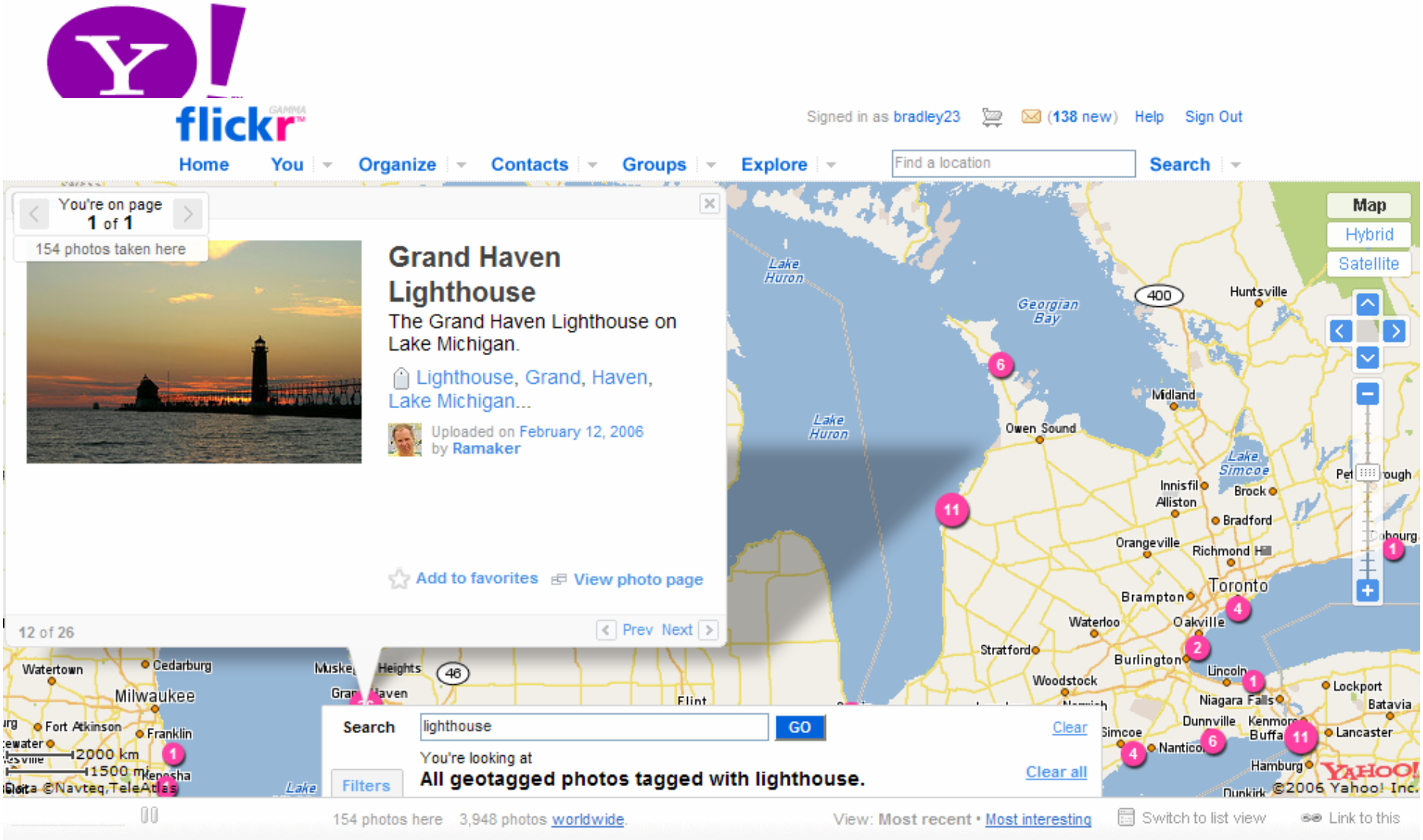
flickr
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You're on page 1 of 1
154 photos taken here
Grand Haven Lighthouse
The Grand Haven Lighthouse on Lake Michigan.
Lighthouse, Grand, Haven, Lake Michigan...
Uploaded on February 12, 2006 by Ramaker
Add to favorites
View photo page
12 of 26
Prev
Next
Map
Hybrid
Satellite
Lake Huron
Georgian Bay
Owen Sound
Midland
Huntsville
Lake Simcoe
Innisfil
Alliston
Brock
Bradford
Orangeville
Richmond Hill
Toronto
Brampton
Waterloo
Oakville
Stratford
Burlington
Lincoln
Woodstock
Niagara Falls
Lockport
Batavia
Lancaster
Hamburg
Dunnville
Milwaukee
Watertown
Cedarburg
Fort Atkinson
Franklin
Search
lighthouse
GO
Clear
You're looking at
All geotagged photos tagged with lighthouse.
Clear all
Filters
154 photos here
3,948 photos worldwide.
View: Most recent • Most interesting
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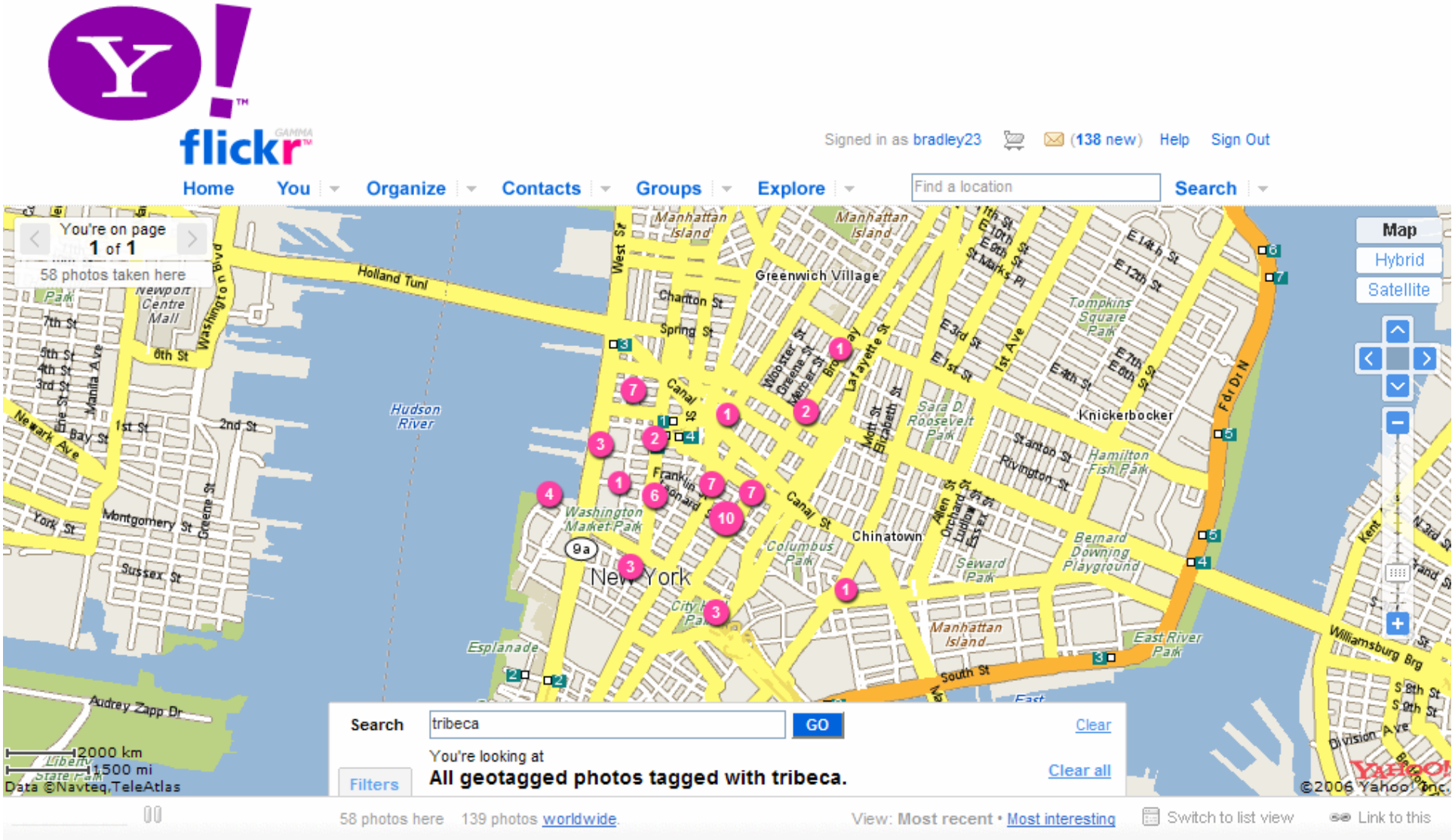
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58 photos taken here
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Satellite
Search
tribeca
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All geotagged photos tagged with tribeca.
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Filters
58 photos here
139 photos worldwide.
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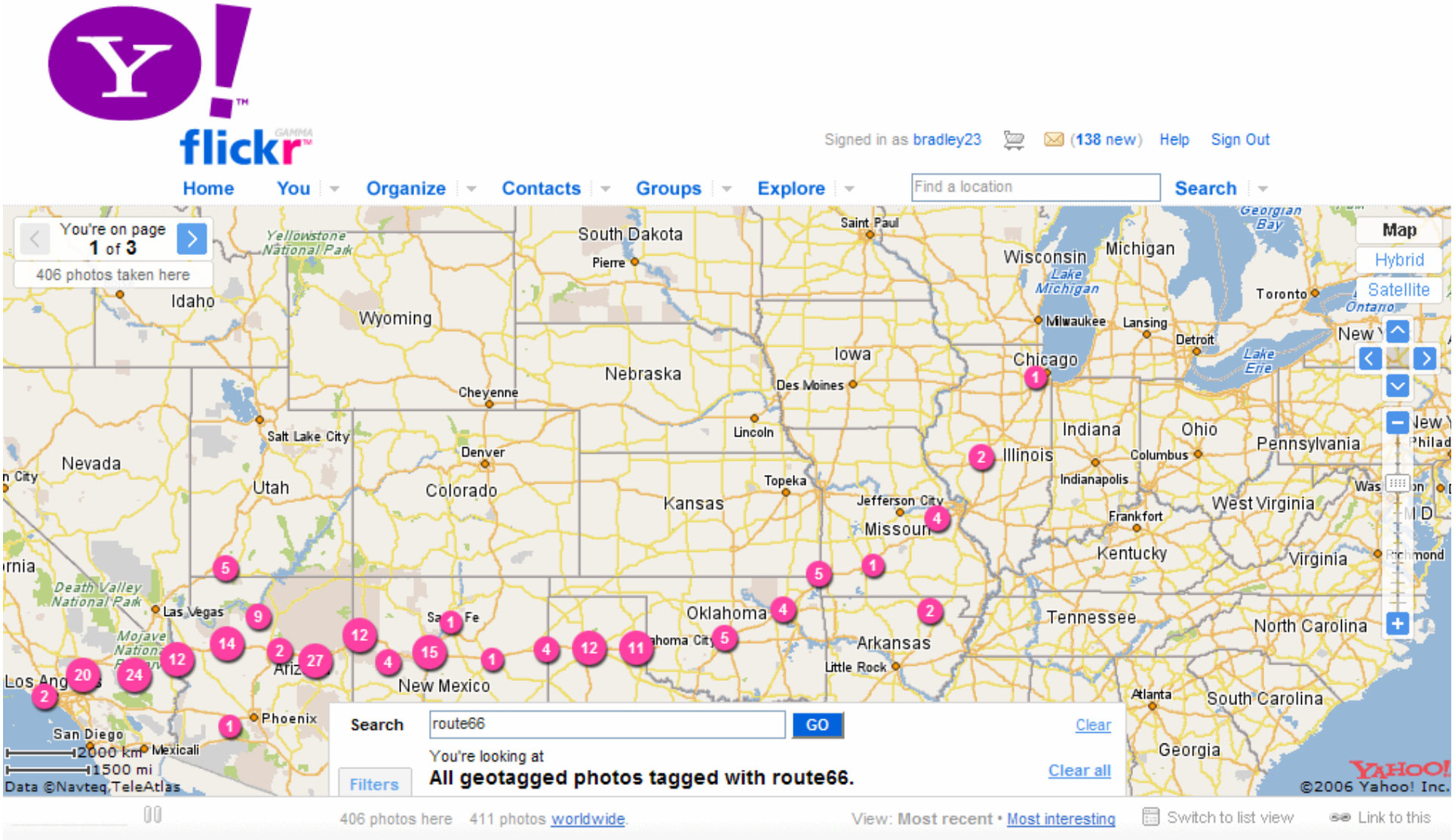
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Find a location
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You're on page 1 of 3
406 photos taken here
Map
Hybrid
Satellite
Search
route66
GO
Clear
You're looking at
All geotagged photos tagged with route66.
Clear all
Filters
406 photos here
411 photos worldwide
View: Most recent • Most interesting
Switch to list view
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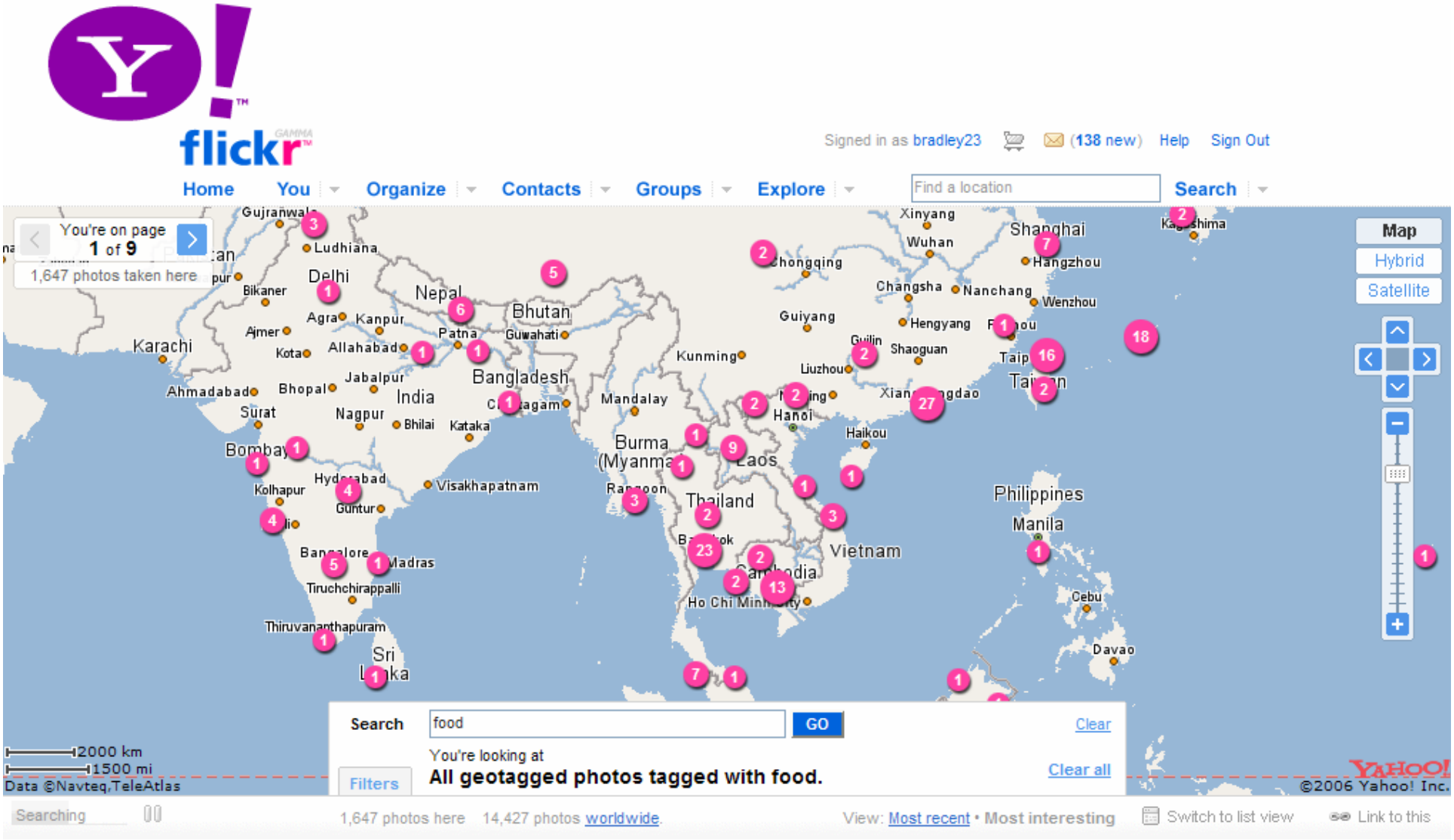
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Sign Out
Home
You
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Groups
Explore
Find a location
Search
You're on page 1 of 9
1,647 photos taken here
Map
Hybrid
Satellite
Search
food
GO
Clear
You're looking at
All geotagged photos tagged with food.
Clear all
Filters
2000 km
1500 mi
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Searching
1,647 photos here
14,427 photos worldwide.
View: Most recent • Most interesting
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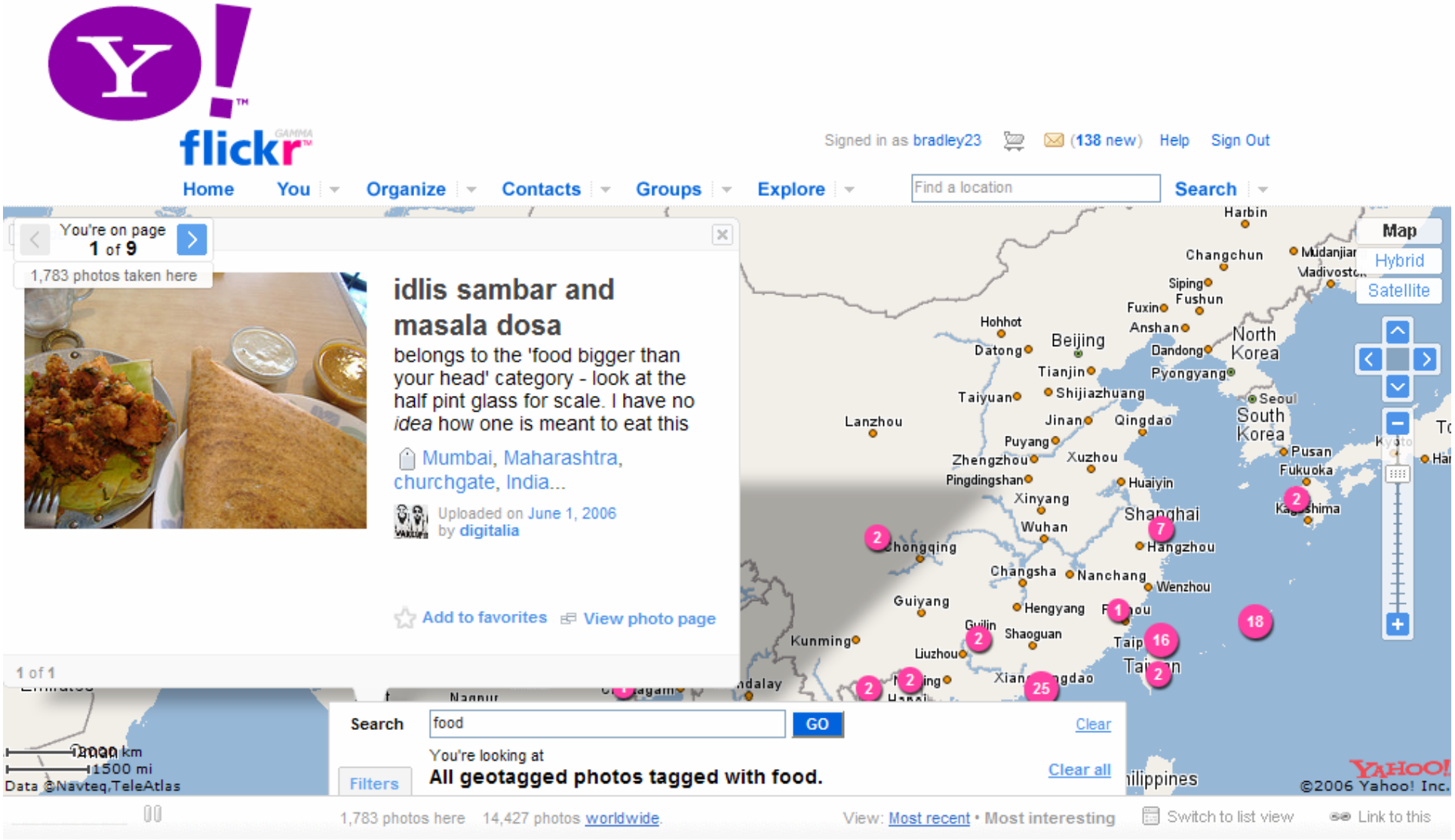
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Search
You're on page 1 of 9
1,783 photos taken here
idlis sambar and masala dosa
belongs to the 'food bigger than your head' category - look at the half pint glass for scale. I have no idea how one is meant to eat this
Mumbai, Maharashtra, churchgate, India...
Uploaded on June 1, 2006 by digitalia
Add to favorites
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1 of 1
Map
Hybrid
Satellite
Harbin
Changchun
Siping
Fushun
Fuxin
Anshan
Hohhot
Beijing
Datong
Dandong
North Korea
Tianjin
Pyongyang
Taiyuan
Shijiazhuang
Seoul
South Korea
Lanzhou
Jinan
Qingdao
Puyang
Zhengzhou
Xuzhou
Pusan
Fukuoka
Pingdingshan
Huaiyin
Xinyang
Shanghai
Wuhan
Hangzhou
Chongqing
Changsha
Nanchang
Wenzhou
Guiyang
Hengyang
Guilin
Shaoguan
Kunming
Liuzhou
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food
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All geotagged photos tagged with food.
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Filters
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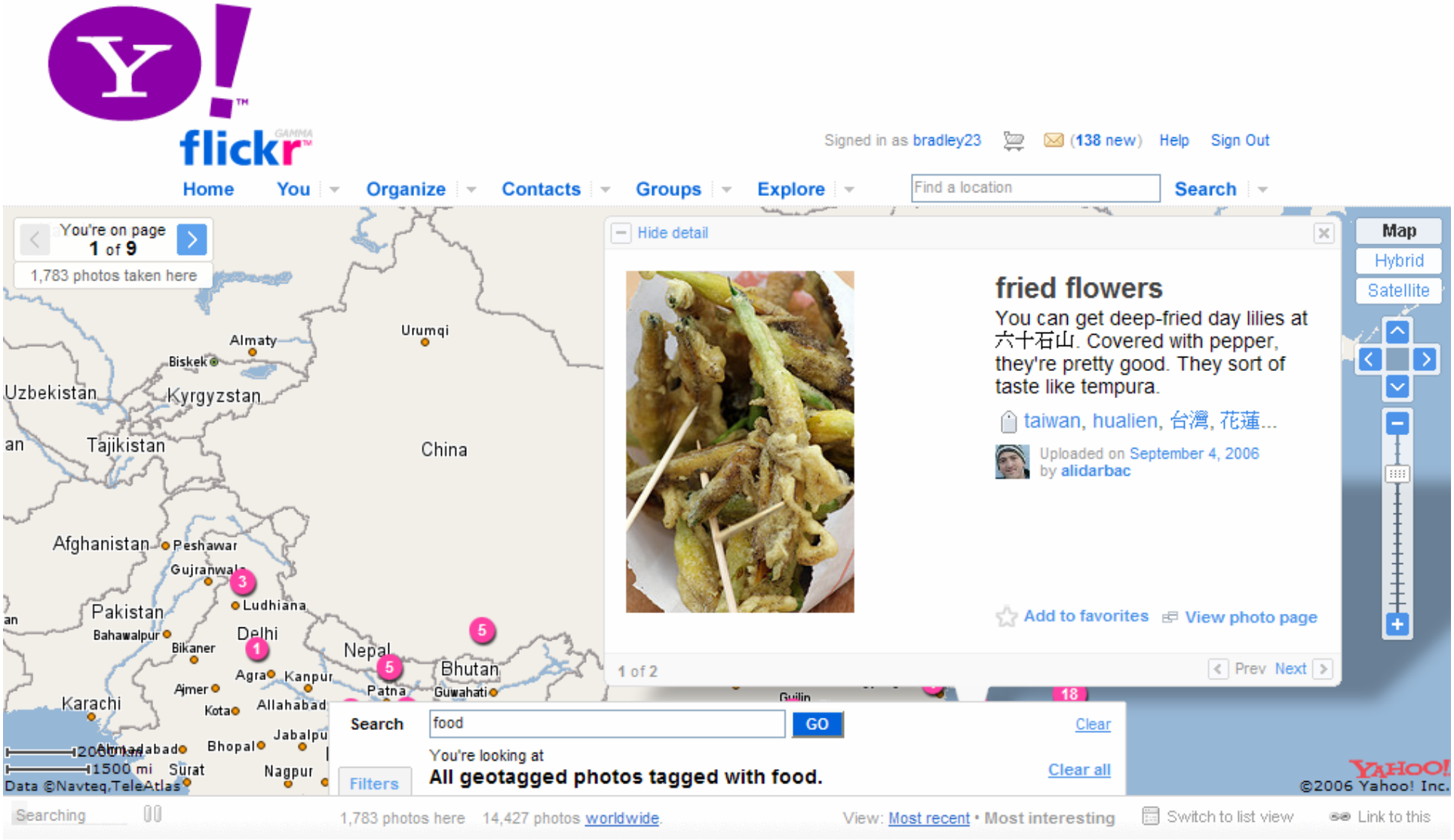
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Find a location
Search
You're on page 1 of 9
1,783 photos taken here
Hide detail
fried flowers
You can get deep-fried day lilies at 六十石山. Covered with pepper, they're pretty good. They sort of taste like tempura.
taiwan, hualien, 台灣, 花蓮...
Uploaded on September 4, 2006 by alidarbac
Add to favorites
View photo page
1 of 2
Prev
Next
Map
Hybrid
Satellite
Almaty
Biskek
Urumqi
Uzbekistan
Kyrgyzstan
Tajikistan
China
Afghanistan
Peshawar
Gujranwala
Ludhiana
Pakistan
Bahawalpur
Delhi
Bikaner
Nepal
Bhutan
Agra
Kanpur
Ajmer
Patna
Guwahati
Karachi
Kota
Allahabad
Jabalpur
Bhopal
Surat
Nagpur
Search
food
GO
Clear
You're looking at
All geotagged photos tagged with food.
Clear all
Filters
2000 km
1500 mi
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Searching
1,783 photos here
14,427 photos worldwide.
View: Most recent • Most interesting
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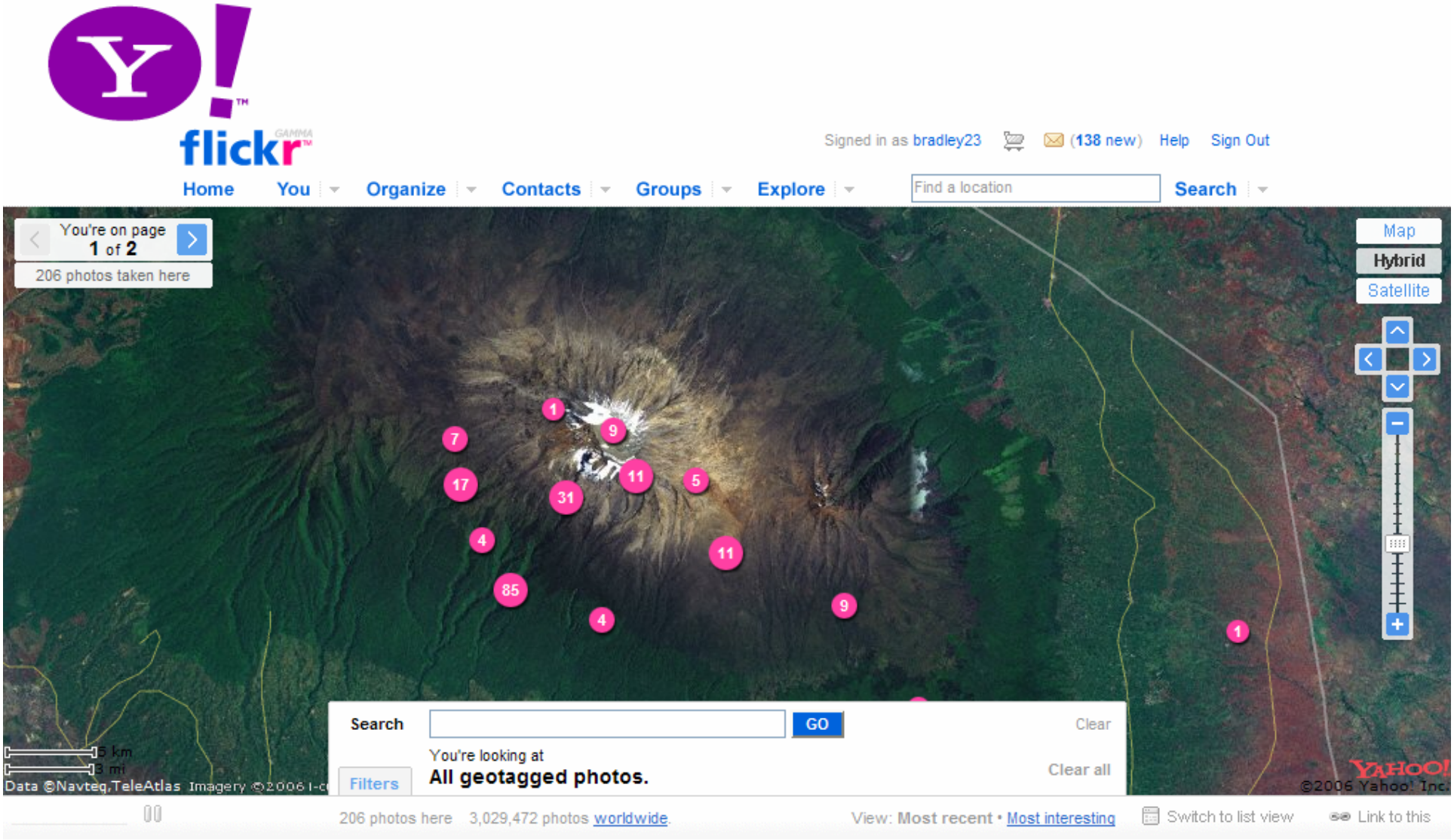
Link to this


flickr
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Help
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You're on page 1 of 2
206 photos taken here
Map
Hybrid
Satellite
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7
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17
31
4
11
85
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Search
GO
Clear
You're looking at
All geotagged photos.
Filters
Clear all
5 km
3 mi
Data ©Navteq,TeleAtlas Imagery ©2006 I-c
YAHOO!
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206 photos here
3,029,472 photos worldwide.
View: Most recent • Most interesting
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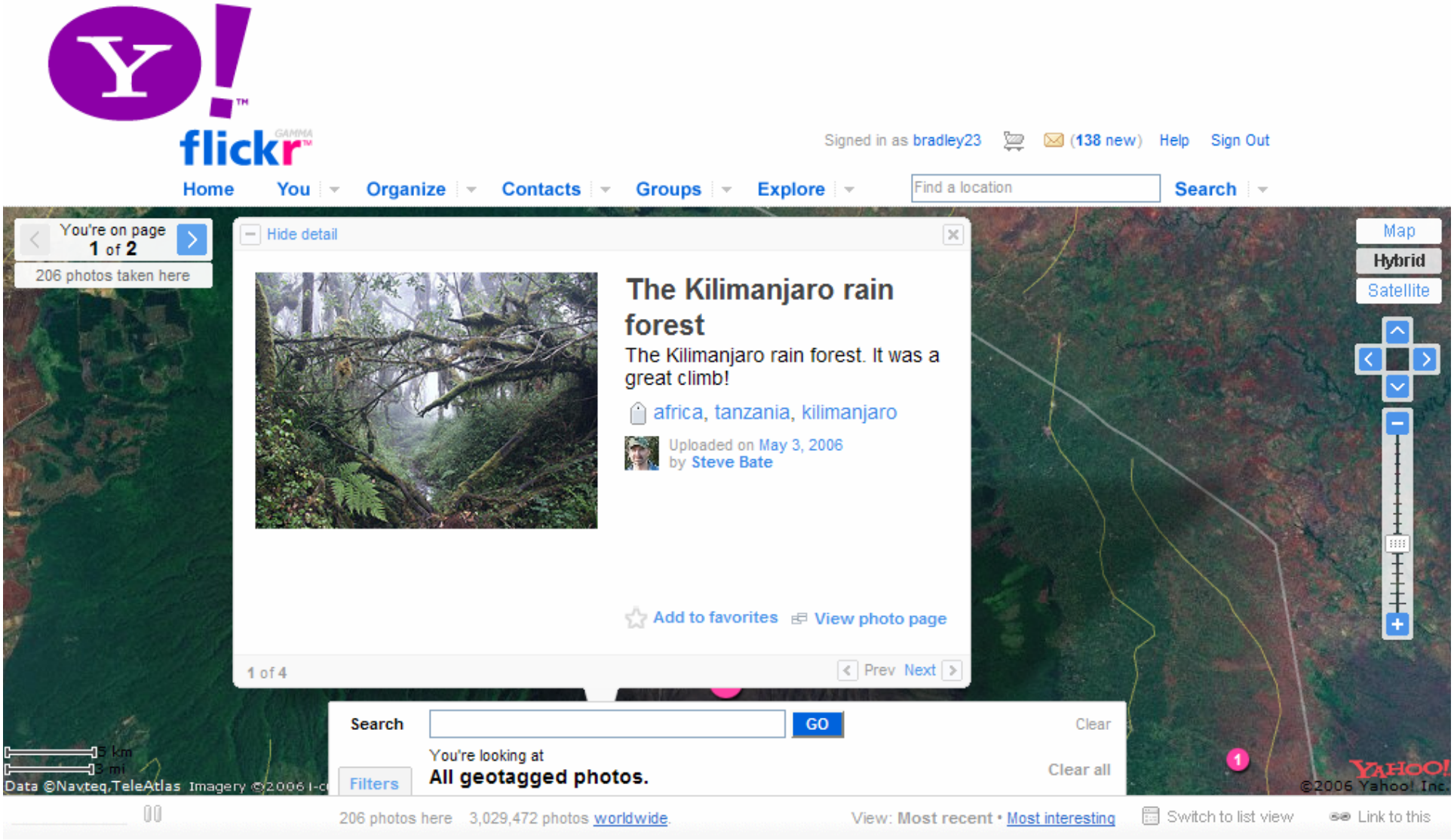
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Find a location
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You're on page 1 of 2
206 photos taken here
Hide detail
The Kilimanjaro rain forest
The Kilimanjaro rain forest. It was a great climb!
africa, tanzania, kilimanjaro
Uploaded on May 3, 2006
by Steve Bate
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Hybrid
Satellite
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GO
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You're looking at
All geotagged photos.
Filters
Clear all
5 km
3 mi
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3,029,472 photos worldwide.
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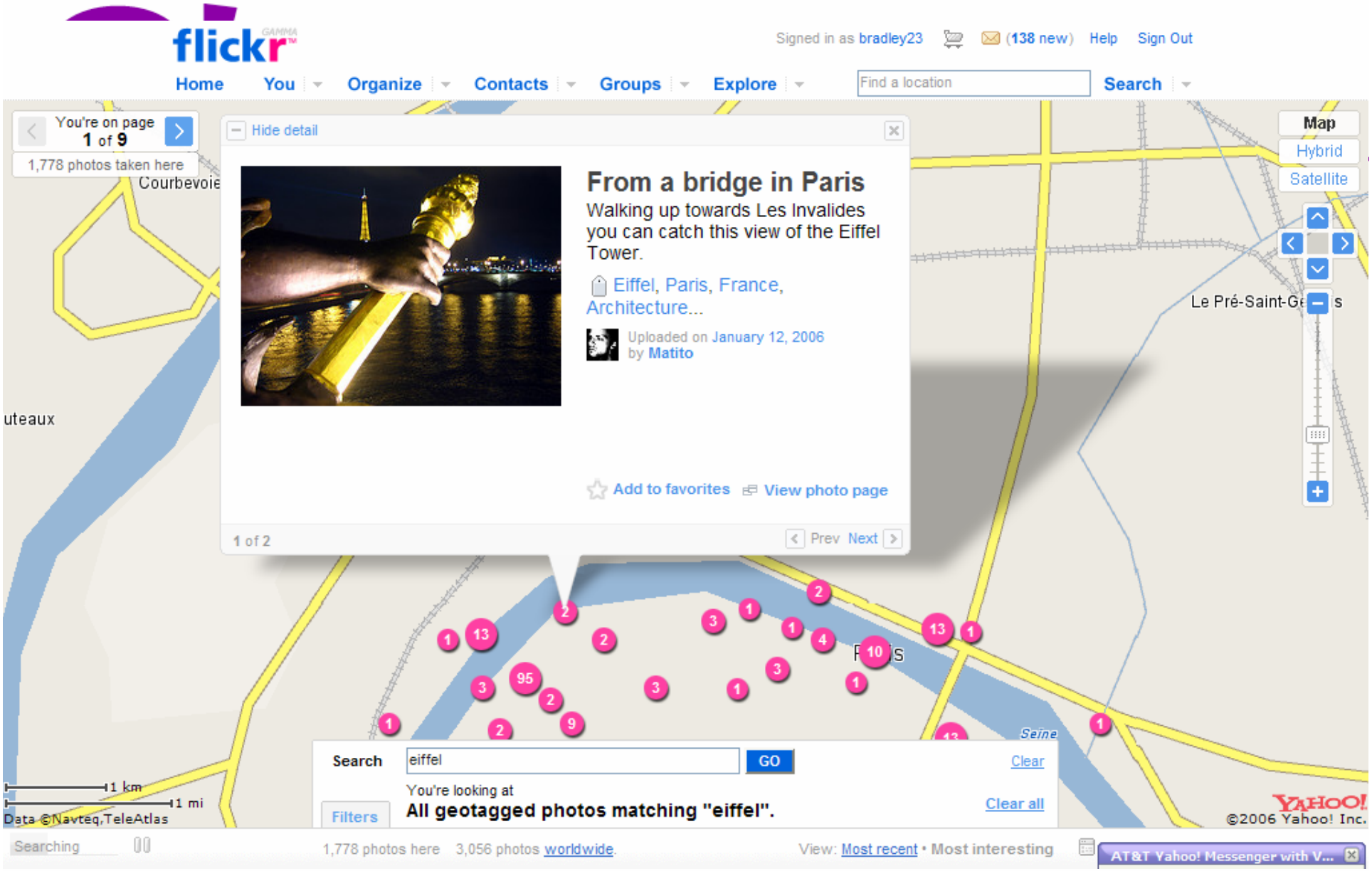
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You're on page 1 of 9
1,778 photos taken here
Hide detail
From a bridge in Paris
Walking up towards Les Invalides you can catch this view of the Eiffel Tower.
Eiffel, Paris, France, Architecture...
Uploaded on January 12, 2006 by Matito
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1 of 2
Prev
Next
Map
Hybrid
Satellite
Courbevoie
uteaux
Le Pré-Saint-Ge
Seine
Search
eiffel
GO
Clear
You're looking at
All geotagged photos matching "eiffel".
Filters
Clear all
1 km
1 mi
Data ©Navteq,TeleAtlas
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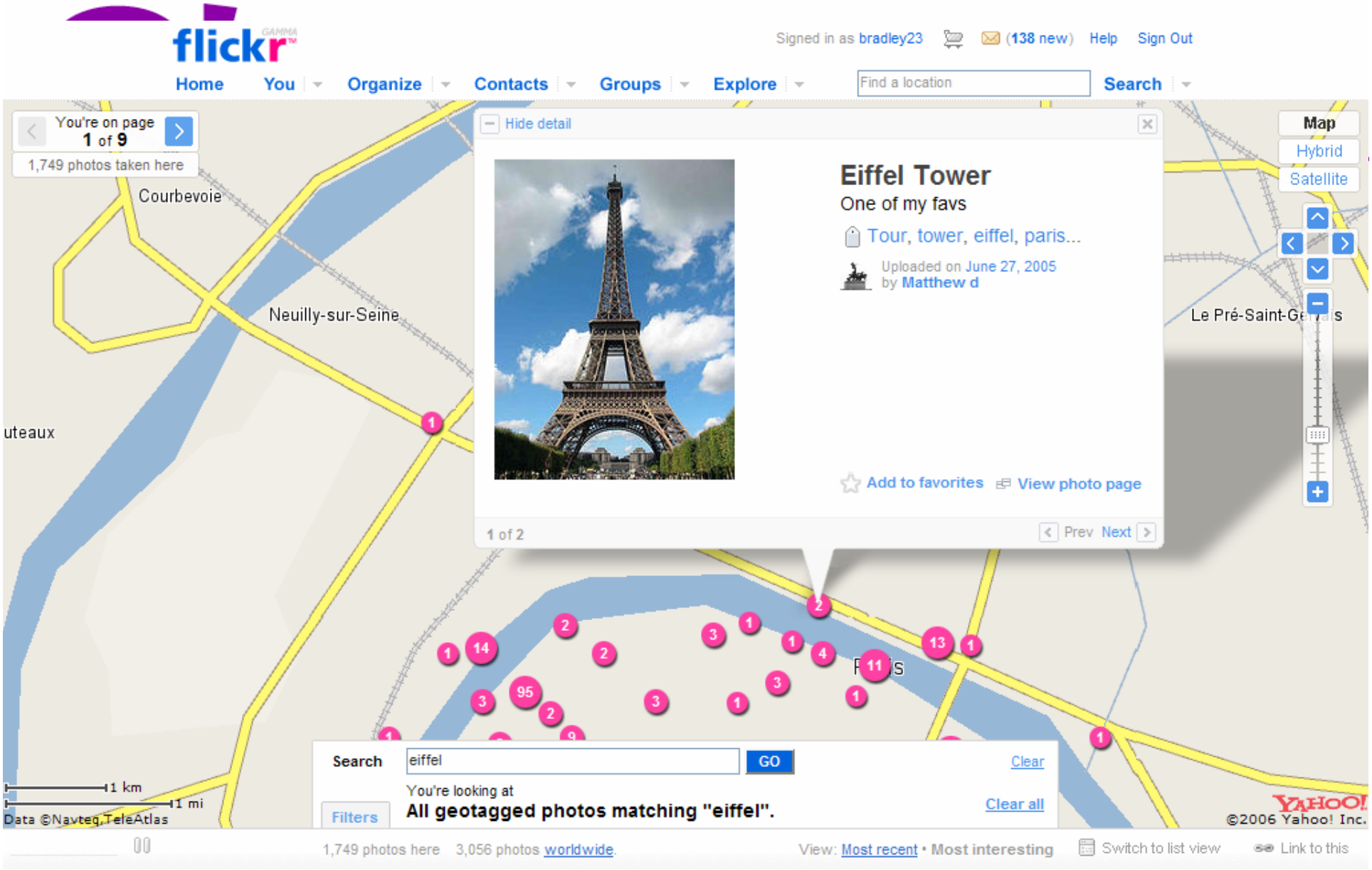
Searching
1,778 photos here
3,056 photos worldwide.
View: Most recent • Most interesting
AT&T Yahoo! Messenger with V...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Groups
Explore
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You're on page 1 of 9
1,749 photos taken here
Courbevoie
Neuilly-sur-Seine
Hide detail
Eiffel Tower
One of my favs
Tour, tower, eiffel, paris...
Uploaded on June 27, 2005
by Matthew d
Add to favorites
View photo page
1 of 2
Prev
Next
Map
Hybrid
Satellite
Search
eiffel
GO
Clear
You're looking at
All geotagged photos matching "eiffel".
Clear all
Filters
1 km
1 mi
Data ©Navteq,TeleAtlas
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1,749 photos here
3,056 photos worldwide.
View: Most recent • Most interesting
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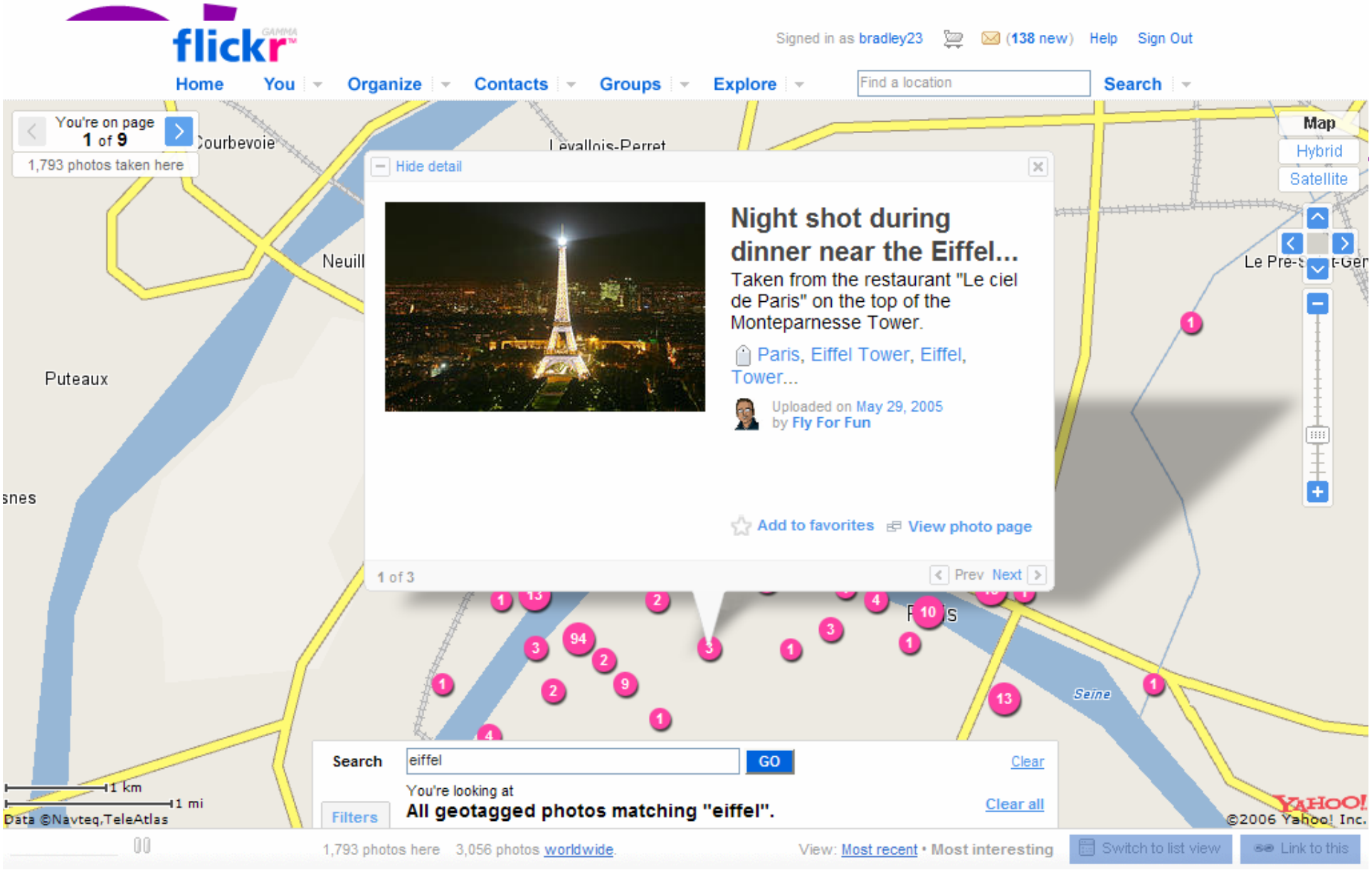
Link to this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Home
You
Organize
Contacts
Groups
Explore
Find a location
Search
You're on page 1 of 9
1,793 photos taken here
Hide detail
Night shot during dinner near the Eiffel...
Taken from the restaurant "Le ciel de Paris" on the top of the Monteparnesse Tower.
Paris, Eiffel Tower, Eiffel, Tower...
Uploaded on May 29, 2005 by Fly For Fun
Add to favorites
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1 of 3
Prev
Next
Map
Hybrid
Satellite
Puteaux
Seine
Search
eiffel
GO
Clear
You're looking at
All geotagged photos matching "eiffel".
Clear all
Filters
1 km
1 mi
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1,793 photos here
3,056 photos worldwide.
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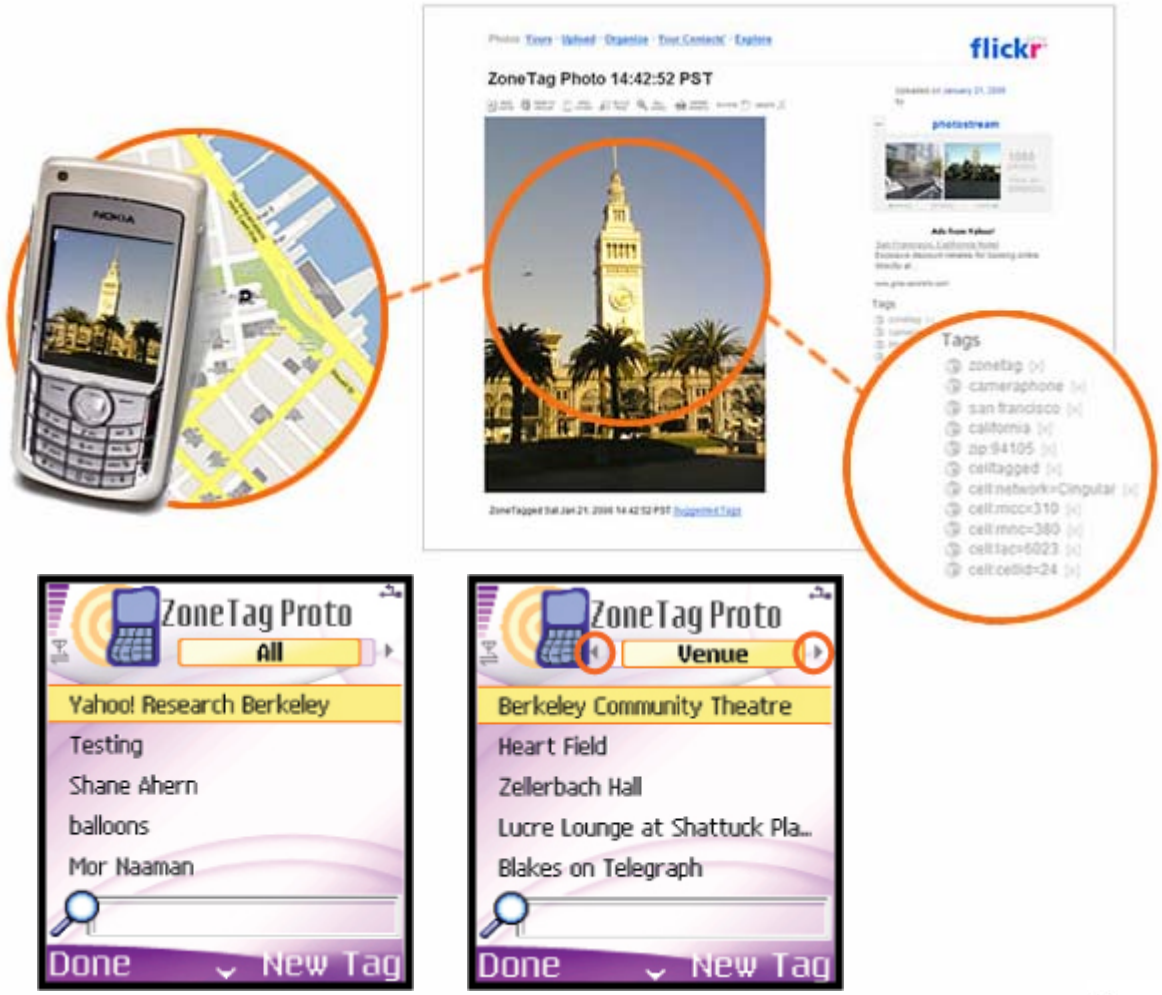
Link to this

ZoneTag – implicit context

Take a picture —— Instant upload to Flickr with location tags



Concluding Thoughts

- The notion of “corpus” and publishing is changing fundamentally
- We still do not have the basic sciences to understand what is happening
- How do you scale
  - Review and filtering of “content”?
  - Reputation and Trust?
- How do you maintain a live, fast-changing “reference”?
  - The mass audiences still prefer “programming” (as in TV, movies, magazines and newspapers)
- Knowledge management has gained a whole new “dynamic” and fast-changing dimension
- What is the role of the IT Research Community in such a world?

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

Thank You! & Questions?

Usama_fayyad@yahoo.com

Y! Research

STRATEGIC DATA SOLUTIONS
FIND. REACH. KNOW.

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