

Web Search

From information retrieval to microeconomic modeling



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Yahoo! Research



Agenda

- Web search leading up to today
 - Two search engines in web search
- Where algorithmic search is going
 - The hard research problems
- Search advertising
 - IR meets markets



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](#)

[Show more results from en.wikipedia.org](#)

-\$

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

+\$

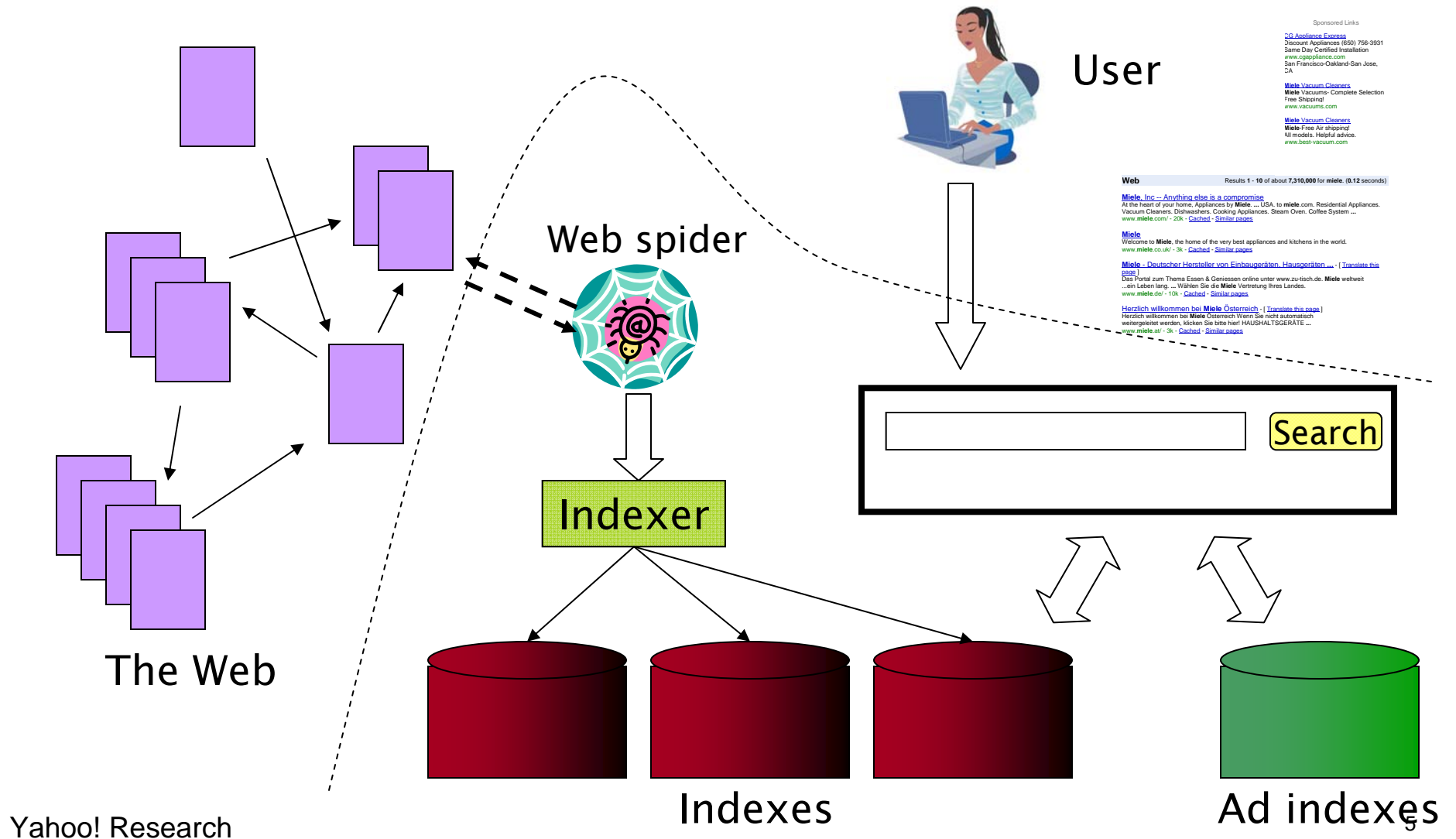


1. [CANON LATIN AMERICA, INC.](#) - [Translate this page](#)
CANON LATIN AMERICA, INC. Argentina. Bolivia. Brazil. Chile. Colombia. Ecuador. Guyana. Paraguay ... St. Vincent. Tortola. Trinidad. Turks & Caicos. Choose ...
www.canonlatinamerica.com - 23k - [Cached](#)
2. [Canon of the Mass - Wikipedia, the free encyclopedia](#)
Canon of the Mass (**Latin**: **Canon** Missæ, **Canon** Actionis) is the name given in the ... **Canon** was a compromise between the older Greek Anaphoras and variable **Latin** ...
Quick Links: [Name and place of the Canon](#) - [History of the Canon](#) - [Mystical interpretations](#)
en.wikipedia.org/wiki/Canon_of_the_Mass - 42k - [Cached](#)
3. [The Canon of Medicine - Wikipedia, the free encyclopedia](#)
... the Qanun was translated into **Latin** as **Canon** medicinae by Gerard of Cremona in ... The first three books of the **Latin Canon** were printed in 1472, and a complete ...
Quick Links: [Overview](#) - [Avicenna's Canon of Medicine in Europe](#) - [See also](#)
en.wikipedia.org/wiki/The_Canon_of_Medicine - 33k - [Cached](#)
4. [The "Canon" of English Literature](#)
The "**Canon**" of English Literature. **Canon**: n., from the **Latin canon** or "rule. ... (also, "The Apocrypha"), from the **Latin** apocryphus or "spurious," itself a loan ...
faculty.goucher.edu/eng211/canon_of_english_literature.htm - 6k - [Cached](#)
5. [CATHOLIC ENCYCLOPEDIA: Latin Church](#)

“No
results”



The two engines





Brief (non-technical) history

- Early keyword-based engines
 - Altavista, Excite, Infoseek, Inktomi, Lycos, ca. 1995-1997
- 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!



Brief (non-technical) history

- 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)



(Personal) history

- Keynote at ACM SODA 1997:
 - *What if AltaVista had all the computing power in the world – could it give us better results?*
- Biggest bottlenecks in modeling user cognition, not computational
- If only we could find a computationally expensive way to solve the problem
 - then we know how to make it go faster



Classical user information 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”



Algorithmic search is changing

- Already, more than a list of docs
- Moving towards identifying a user's task
 - (As expressed in the query box)
- Enabling task completion

Web Images Video Local Shopping more
YAHOO! SEARCH papa johns Search

Answers

Search Results 1 - 10 of about 761,000 for papa johns - 0.09 sec. (About this page)

Did you mean: papa john's

- Papa John's (Nasdaq: PZZA)
Official site for the pizza delivery and carry-out chain **Papa John's**. Includes store locator, nutritional info, and franchise and employment opportunities.
Papa John's near you
www.papajohns.com - 14k - [Cached](#) - [More from this site](#)
- Welcome to Papa John's Online Ordering
Order **Papa Johns** Pizza online today. It's easy to register and order online. ... Welcome to **Papa John's Online Ordering**. New online customer? Click Here to get ...
www.papajohnsonline.com - 9k - [Cached](#) - [More from this site](#)
- Papa John's Menu
Get a glimpse of **Papa John's** basic menu for both our restaurants and online ordering. ... **Papa John's** does not add monosodium glutamate to any of our pizza toppings. ...
www.papajohns.com/menu/index.htm - 49k - [Cached](#) - [More from this site](#)
- Papa John's Restaurant Locator
Find the neighborhood **Papa Johns** location in your area. You can order online or by phone. ...
©Copyright 2007 **Papa John's International Inc.** All Rights Reserved ...
www.papajohnsonline.com/restlocator.jsp - 18k - [Cached](#) - [More from this site](#)
- Papa John's Pizza UK - America's Number 1
Better Ingredients, Better Pizza - UK Delivery Operator Of The Year 2004 And 2005 ... Privacy Statement | Terms and Condition | **Papa John's (GB) Ltd** 2006 ...
www.papajohns.co.uk - 10k - [Cached](#) - [More from this site](#)

SPONSOR RESULTS

Papa John's Official Site
\$10.40 Tax Special - Large Pizza With 5 Toppings. Order Online.
www.papajohns.com

Papa Johns For Less
Looking for **papa johns**? Find exactly what you want today.
www.eBay.com

Free Pizza
Get Free Pizza for a Year. Hurry Offer Ends Soon. Free Pizza.
www.totally-free-stuff.org

[See your message here...](#)



Dining out?
 Get the top rated restaurants for your area with Yahoo! Toolbar
[What is this?](#) **Add Button** [Get more buttons.](#)

Search: Web Search

49°F

Saratoga City Guide > Papa Johns

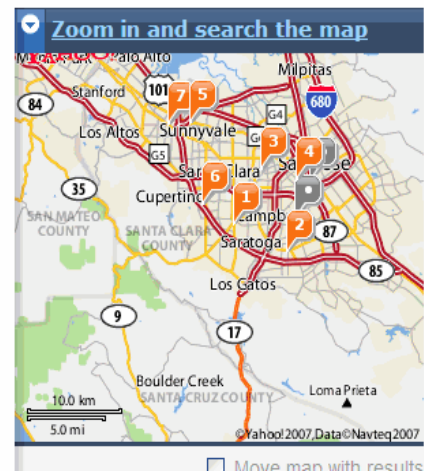
- Did you know you can enter a full address in the location field above? Example: 701 First Ave., Sunnyvale CA 94089
- Did you mean: [Papa John's?](#)

Results 1-7 out of 7 total [\(About these results\)](#)

Narrow your search by category, rating, and more.
 Sorted by: **top results** | distance [Print results](#)

1 [Papa John's Pizza](#)
 (408) 370-7272
 1824 Saratoga Ave, Saratoga, CA
[Get Directions](#)
pizzabizinc.com/
 "...near the Burrito Factory about 3 blocks away, their pizza is much better. **Papa...**"

★★★★☆ (6) 1.37 mi
 a Yahoo! Local User - "Papa John's Pizza is the best pizza in the valley, as..." [more](#)





Web Images Video News Maps more »

sfo bos apr 25

Search

Advanced Search Preferences

Web Results 1 - 10 of about 652,000 for sfo bos apr 25. (0.10 sec)

Flights from San Francisco, CA to Boston, MA

Departing: 04/25 Returning: 05/02 CheapTickets - Expedia - Hotwire - Orbitz - Priceline - Travelocity

FoRK Archive: Re: Oh, the trials of Lamacchia

UA 04-APR-97 0033 BOS SFO 2704 2704 5408 UA 01-APR-97 0160 LAX BOS 2611 2611 5222 UA 28-MAR-97 0159 BOS LAX 2611 2611 5222 UA 25-MAR-97 0160 LAX BOS 2611 ... www.xent.com/FoRK-archive/may97/0789.html - 10k - Cached - Similar pages - Note this

San Francisco (SFO) to Boston (BOS) departing Apr 2007

San Francisco (SFO) to Boston (BOS) departing Apr 2007 Get this by email Get this ... Top 25 Airport Idea. add another. World Cities, United States, Europe ... www.pinpointtravel.com/h/buzz/view?dt=A&code=SFO&dest=BOS&tm=200704 - 66k - Cached - Similar pages - Note this

ESPN.com - MLB - Box Score - Twins at Royals

MLB Scoreboard - April 25, 2006. - American League - BOS, 8, F ... Batters faced: S Elarton 25; L Hudson 3; A Sisco 3; A Burgos 4 ... sports.espn.go.com/mlb/boxscore?gameId=260425107 - 130k - Cached - Similar pages - Note this

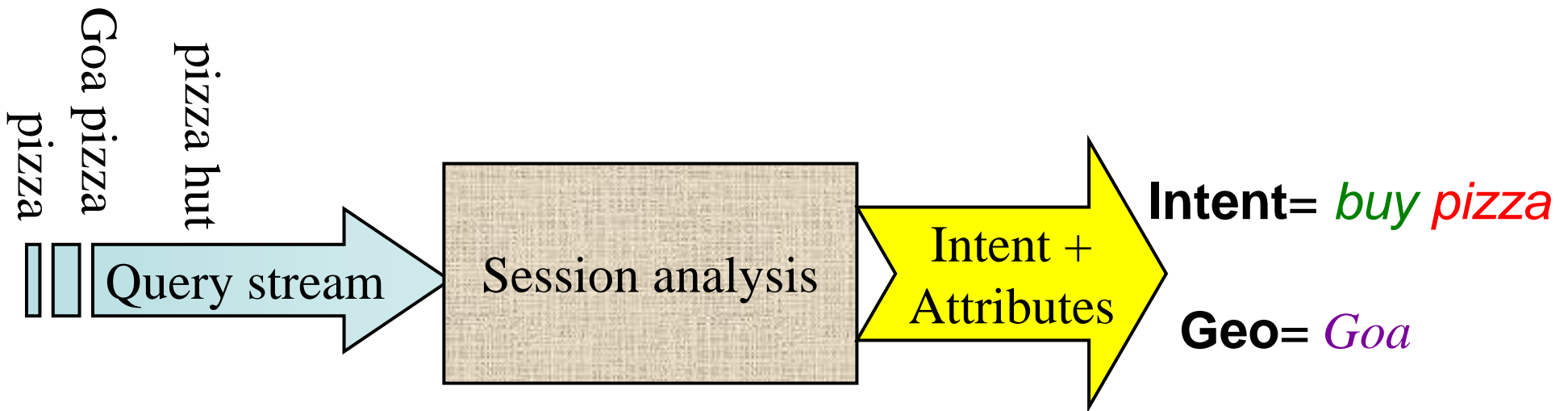
ESPN.com - MLB - Box Score - Devil Rays at Yankees

MLB Scoreboard - April 25, 2006. - American League - BOS, 8, F. CLE, 6. TAM, 1. NYY, 9, F. BAL, 3 ... STL, 6, F. ARI, 7, F. SDG, 0. NYM, 4, F. SFO, 1 ... sports.espn.go.com/mlb/boxscore?gameId=260425110 - 120k



Search and content supply

- Premise:
 - People don't want to search
 - People want to get tasks done





User's experience

- No longer a list of 10 documents

Pizza Hut Goa	
Address:	
Tel: <i>12345678</i>	Click to call
Reviews	
1. Blah blah ...	
2. ...	



Net: new vista of Search

- Yahoo! Mobile OneSearch, Google Universal Search, Ask ...
- Intents are satisfied by juxtapositions of *objects* and *transactional services*
 - Objects are people, places, businesses, universities ...
 - Services let you do things



Hard problems to be solved

- What's the data model for the web of objects?
 - What logic/algebra governs it?
- What objects/services are retrieved on a query/intent?
- How do you measure fulfillment for the user?



Fundamentally inter-disciplinary

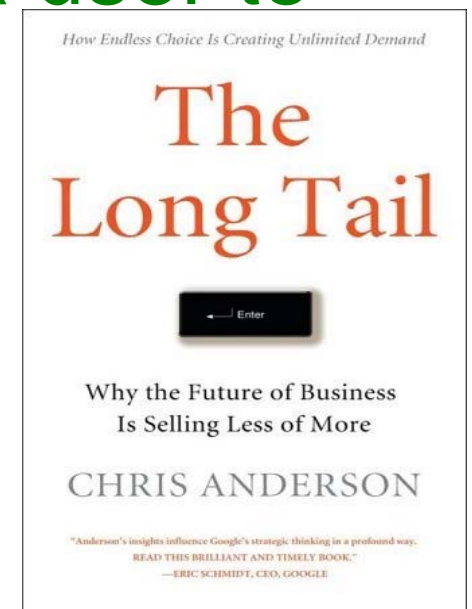
- Needs computer science to meld with
 - Sociology
 - Ethnography
 - Cognitive psychology
 - Statistics
 - Optimization



Sample: Estimating user responses

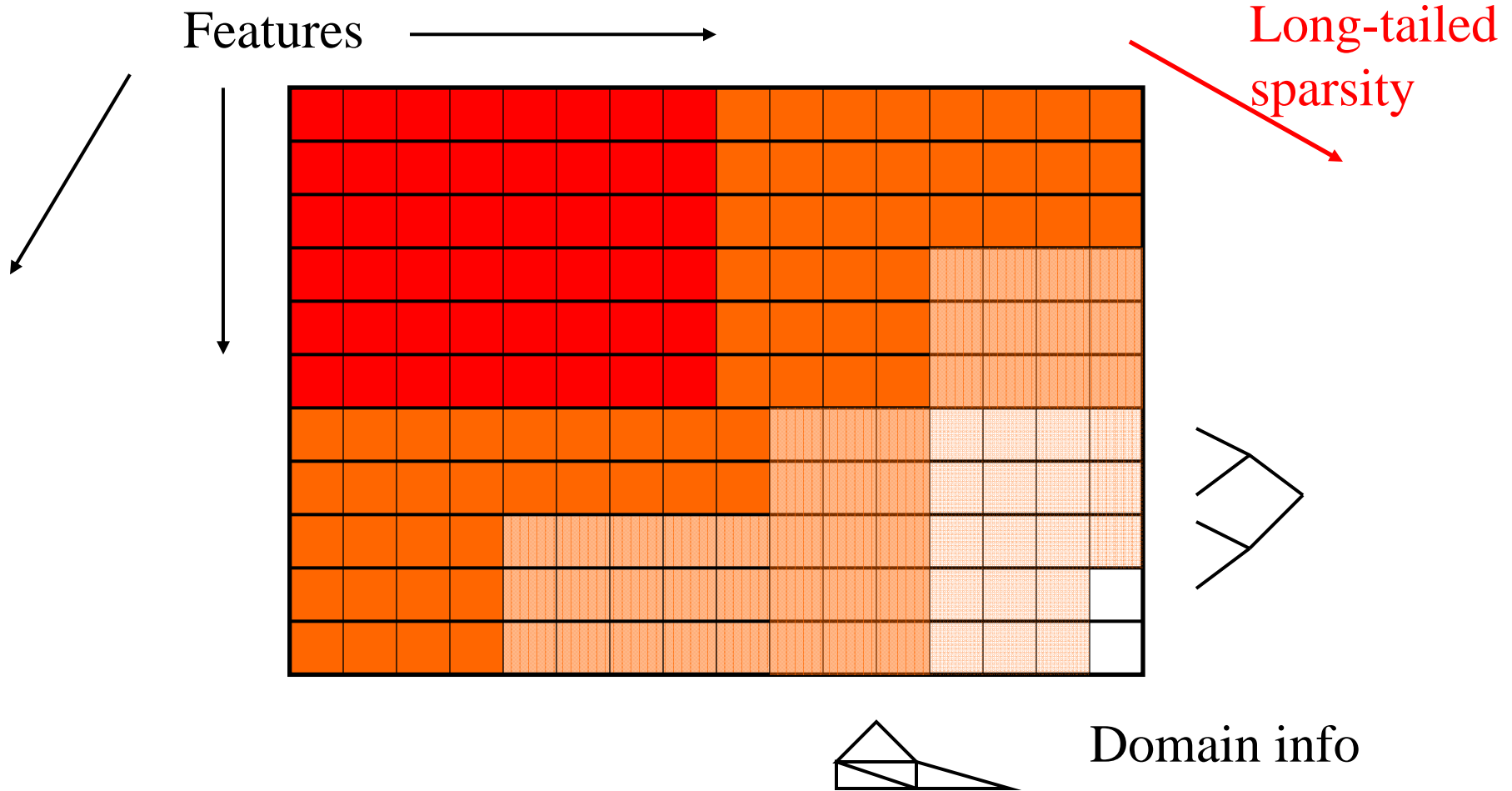
- The expected number of times a query is asked is a constant
 - But the mass in the tail is non-trivial.
- What is the likely response of a user to a page view?
 - (Response prediction)

Fresh challenges in building and optimizing computing artifacts.





Learning in long-tailed spaces





Community content

Long-tail authorship

Photos: [Explore Flickr](#) • [Learn More](#)



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...](#)

These are the *most recent* photos tagged with jaguar. [See more...](#)





The power of social tagging

- Flickr – community phenomenon
- Millions of users share and tag each others' photographs (why???)
- The wisdom of the crowd can be used to search
- The principle is not new – anchor text used in “standard” search
- Don't try to pass the Turing test?



Challenges in tag-based search

- How do we use these tags better?
 - How do you cope with spam?
 - What's the ratings and reputation system?
- The bigger challenge: where else can you exploit the power of the people?
- What are the incentive mechanisms?
 - Luis von Ahn, ESP Game

The ESP Game

As seen on CNN and newspapers around the world! beta

10 MILLION LABELS COLLECTED

[TOP SCORES](#)
[HOW TO Play](#)
New to the ESP Game?
[Sign up for FREE!](#)

common image

0:09 Time Left **The ESP Game** **0077** score

Taboo Words	Your Guesses
HOUSE	CORRIDOR
PLANT	COLUMNS
ROOM	

Your partner wants to pass
Type your next guess:

progress

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Done

ask.



Can't find it with search? Ask

Post Question

answer.



Share knowledge
Help others
Earn points

What people think of Answers
How does it work?

discover.



65 million answers and counting. Learn something new today.

Featured Topic



See what people are saying in:
Cameras

Search for questions:

Search

Advanced

My Q&A



Hello **Andrew T**
Total Points 129
Level 1

Categories

- Best of Answers
- Arts & Humanities
- Beauty & Style
- Business & Finance
- Cars & Transportation
- Computers & Internet
- Consumer Electronics
- Dining Out
- Education & Reference
- Entertainment & Music
- Family & Relationships
- Food & Drink
- Games & Recreation
- Health
- Home & Garden
- Local Businesses

Best of Answers



It's that time of the year to start thinking about taxes. The main question on mjasfvpld's mind is where to start. If anyone know of a good place to file taxes, let him know. Photo by ^Vanessa^.



Where do you suggest going to files your taxes?

32 ☆ Asked by [mjasfvpld](#) - United States

Answer Questions

Recent

Popular



What is a good way to get free Ipod songs?

0 ☆ In [Music & Music Players](#) - Asked by [Mike O](#) - 4 seconds ago



Does anyone know the exact address or the exact street that the legendary hell house is on in ellicott city md

0 ☆ In [General - United States](#) - Asked by [mzmaglooltee](#) - 4 seconds ago



What places to visit near Bangalore?

0 ☆ In [Bangalore](#) - Asked by [Sukhi](#) - 6 seconds ago



When is the grand finale of Big Boss??

0 ☆ In [Television](#) - Asked by [p. kumar](#) - 9 seconds ago



Describe the development of approved new anti-cancer drugs and what are the obstacles for

Edit View Go Bookmarks Yahoo! Tools Help


http://answers.yahoo.com/question/index?qid=20070203203625AATUzKn&qid_list=RsQuXTK.U7

Setting Started Latest Headlines Seeq — Search the W...

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

Level 1

Pick the best answer





SillyBill...

I have two enthranet adapters and a hub,,,, would bridging connection help speed?

Can I bridge my two enthranet cards with my speedstream dsl modem and a hub???


1 week ago (Tiebreaker) - 3 answers - [Report Abuse](#)

This question is no longer open for answering. Here's your chance to cast a vote if you haven't already. The voting period was extended because it ended in a tie.

0 ☆   

[Show who starred](#) ☆

Search the Web to research your answer.

 Search the Web

Answers Show:

Answerer 1 **That will not increase speed.**
1 week ago - [Report Abuse](#)

[Vote as Best Answer](#)

Social content **Social capital**

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
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Food & Drink


Incentives


Top Food & Drink Answerer [Top 10 Answerers](#)
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- 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
- 

[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?](#)



Incentives and trust

- What assignment of incentives leads to good user behavior?
 - What’s “good” user behavior?
 - Good questions, good answers, new questions ... ?
- Whose content do you trust and why?
- Interface of CS and microeconomics.

Search advertising

The screenshot shows a search engine interface with the query "latin canon". The search results are divided into organic and sponsored sections. A red circle highlights the sponsored sites 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](#) ▼

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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 ...
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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.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

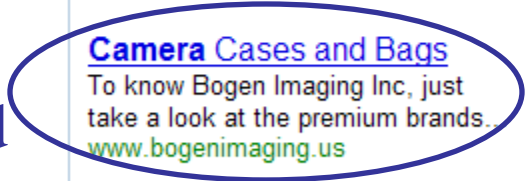
- [Canon Camera at Circuit City](#)
www.CircuitCity.com - Circuit City - Official Site. Free Shipping on Orders \$24 and Up.
- [Cannon Camera](#)
RitzCamera.com - Huge Selection of Canon Cameras. Free Shipping & No Tax. Buy Today.

- [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.

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- [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





Landing page

Bogen Imaging Inc. | photo - audio - cine - broadcast - video - digital - Mozilla Firefox

File Edit View Go Bookmarks Yahoo! Tools Help

http://www.bogenimaging.us/Jahia/site/bius/pid/5460

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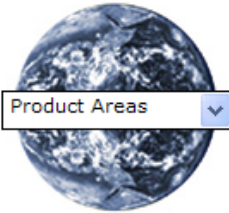
Bogen Imaging Inc. | photo - au... Camera - EOS (SLR) Camera System...

bogen
imaging

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Distributing
the finest
quality products
for imaging



Special features
for a new era
503HDV
Pro Fluid Head

Manfrotto



... see more

SEE MORE SPOTLIGHTS

Premier
BRANDS

MANFROTTO | KATA | GITZO | AVENGER | IFF | METZ | LASTOLITE | ELINCHROM | GOSSEN |
ROTATRIM | NATIONAL GEOGRAPHIC | CROCKETT & CO | THE POD | REFLECMEDIA | FORMATT FILTERS

PROMOTIONS

FULL LISTING



**Rebates
Are
Back!**

There's never
been a better time to buy a first rate flash



NEWS BREAKERS

FULL LISTING

New Cases
keep you
**Mobile
Organized
Protected**



FEATURE

SmarTips by Will Crockett

smarTip
FOR BETTER IMAGING

With World-class photographer
Will Crockett

Part 1: Tripods



Yahoo



How it works

Advertiser



I want to bid \$5 on
canon camera

I want to bid \$2 on
cannon camera



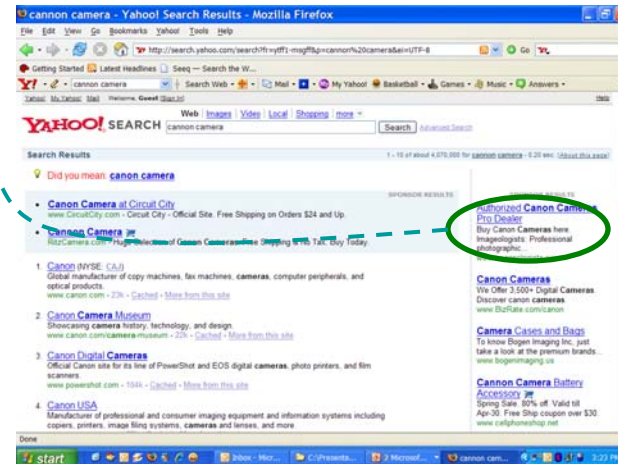
Ad Index

Sponsored
search engine

Engine decides when/where to show this ad.



Landing page



Engine decides how much to charge advertiser on a click.



A marketplace

- For each keyword, a *market* in which advertisers compete for attention
 - Advertisers willing to pay for placement on ads next to search results
- Market varies by keyword
 - Commercial vs non-commercial intent in keywords
 - ***Ford vs Stanford map***



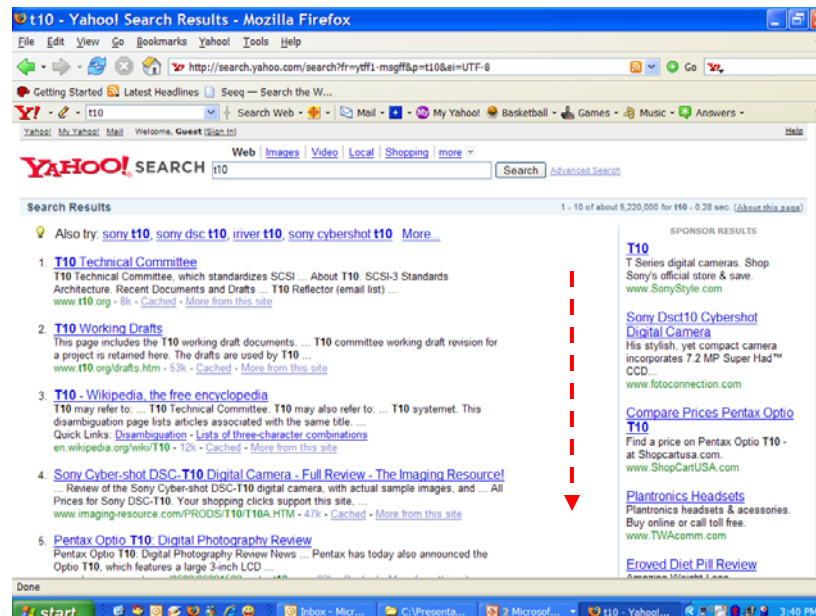
Monetization

- 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





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!

YAHOO!

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

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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



Net of retrieval

- Given a query, the retrieval step yields a set of candidate ads, together with an *IR score* for each

Ribero-Neto et al SIGIR 2005; Yih et al WWW2006

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tundra

Search

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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.
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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

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tundra

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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

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747 Search the Web My Web (beta)

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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!)

1. [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](#)

2. [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](#)

3. [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_j
- Ad j 's bid is denoted b_j ← Estimated (how?)
- Then, expected revenue from this ad is
 $R_j = b_j \times CTR_j$
- Order ads by R_j



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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 **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



More generally

- Rank ordering determined from a machine-learned function
- Features are bids, ad text- and landing-page content, query terms ...



3. Pricing on a click-through

- For the keyword *tundra*, say an advertiser has a value of \$10 per click.
- How much should he bid?
- How much should he be charged?

The value of a slot for an advertiser, what he bids and what he is charged, may all be different.



Competitive market

- We have multiple advertisers, users, and the central service;
- Each has an economic incentive in participation
- How do we set up a system of payments that works for all?
 - *Mechanism design*
 - Sub-field of *game theory*




Mechanism design

- Before the players play in the auction, we get to set the rules
- Designing the rules = *mechanism design*
- These rules govern players' behavior



Marketplace design

- What tools do you give advertisers?
 - What information do they get on the market?
- What do they get to bid on?
 - *Laptop* vs *Ultralight laptop*


<https://adwords.google.com/select/KeywordToolExternal?defaultView=0>

[Web Search](#)
[Bookmarks](#)
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[Finance](#)

(0 unread) Yahoo! ... Google AdWord... Advertising Your B...

cikm 2007 Use synonyms

[Filter my results](#)

Choose columns to display:

More specific keywords - sorted by relevance

Keywords	Advertiser Competition	October Search Volume	Avg Search Volume	Match Type: <input type="button" value="Help"/>
cikm 2007	<input type="text"/>	No data	<input type="text"/>	Add <input type="button" value="Down"/>
cikm 2005	<input type="text"/>	No data	<input type="text"/>	Add <input type="button" value="Down"/>
cikm 2006	<input type="text"/>	No data	<input type="text"/>	Add <input type="button" value="Down"/>

[Add all 3 »](#)

Download all keywords: [text](#), [.csv \(for excel\)](#), [.csv](#)

Additional keywords to consider - sorted by relevance

Keywords	Advertiser Competition	October Search Volume	Avg Search Volume	Match Type: <input type="button" value="Help"/>
call for papers 2007	<input type="text"/>	<input type="text"/>	<input type="text"/>	Add <input type="button" value="Down"/>
cikm conference	<input type="text"/>	No data	<input type="text"/>	Add <input type="button" value="Down"/>
2007 calendar	<input type="text"/>	<input type="text"/>	<input type="text"/>	Add <input type="button" value="Down"/>
international conference 2007	<input type="text"/>	No data	<input type="text"/>	Add <input type="button" value="Down"/>
acm cikm	<input type="text"/>	No data	<input type="text"/>	Add <input type="button" value="Down"/>



Sample questions

- Do you set reserve prices on bids?
- What's the effect of targeting?
 - E.g., geo-targeting
 - Effect on market “thickness”
 - Effect on retrieval engine



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 ...

Thank you.



Questions?

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<http://research.yahoo.com>