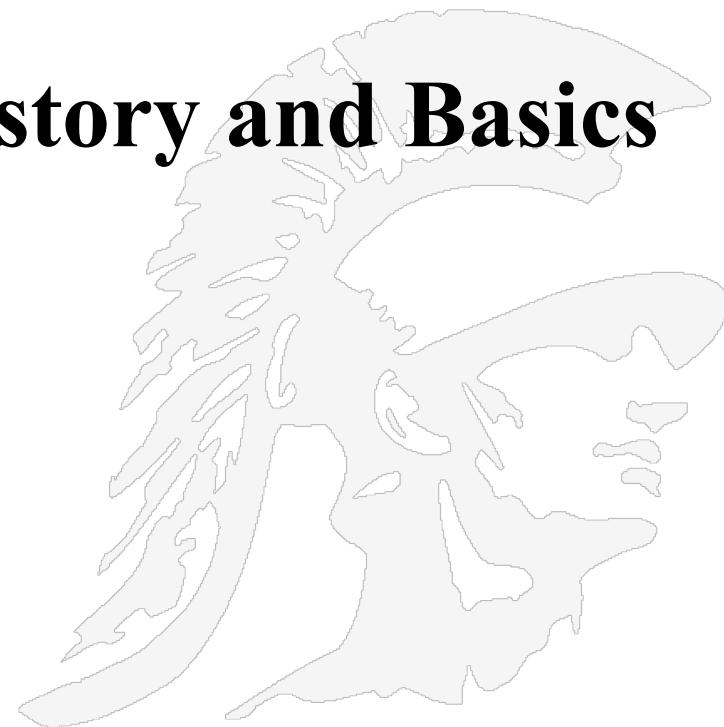


Search Engine History and Basics



A Brief Chronology of Search Engines

- 1991
 - Gopher, Archie, Veronica

early search engines, non-web

- 1993
 - Wanderer,
 - ALIWeb
 - Excite

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

powerful indexing

- 1994
 - Galaxy
 - Yahoo
 - Lycos
 - WebCrawler
 - Alta Vista

<http://www.galaxy.com/>
<http://www.yahoo.com/>
<http://www.lycos.com/>
<http://www.webcrawler.com/>
<http://www.altavista.com/>

Early searchable directory
 Sophisticated searchable directory
 Improved query matching
 Includes full text of pages
 a large index

- 1995
 - Infoseek
 - Metacrawler
 - SavvySearch
 - LookSmart

<http://www.infoseek.com/>
<http://www.metacrawler.com/>
<http://www.savvysearch.com/>
<http://www.looksmart.com>

included in Netscape Navigator
 combines results from other engines
 combines results from other engines
 convenient organization

- 1996
 - Inktomi
 - HotBot,

<http://www.inktomi.com>
<http://www.hotbot.com/>

a large index using commodity hardware
 a large index

- 1997
 - AskJeeves

[http://www.askjeeves.com/](http://www.askjeeves.com)

fancy query processing

- 1998
 - Goto
 - Google

[http://www.goto.com/](http://www.goto.com)
<http://www.google.com>

introduces auctioning of positions
 ranking using content and links

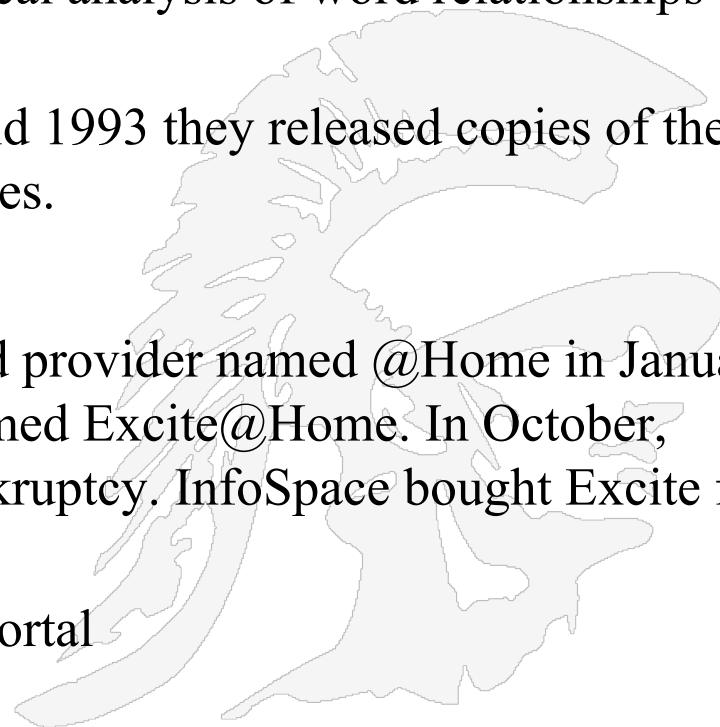
- Today there are hundreds of search engines, many are specialized
- See Search Engine History

- A very long web page describing the history of search Copyright © Ellits Idf goudt in 2011-2019

Archie, Veronica, Gopher

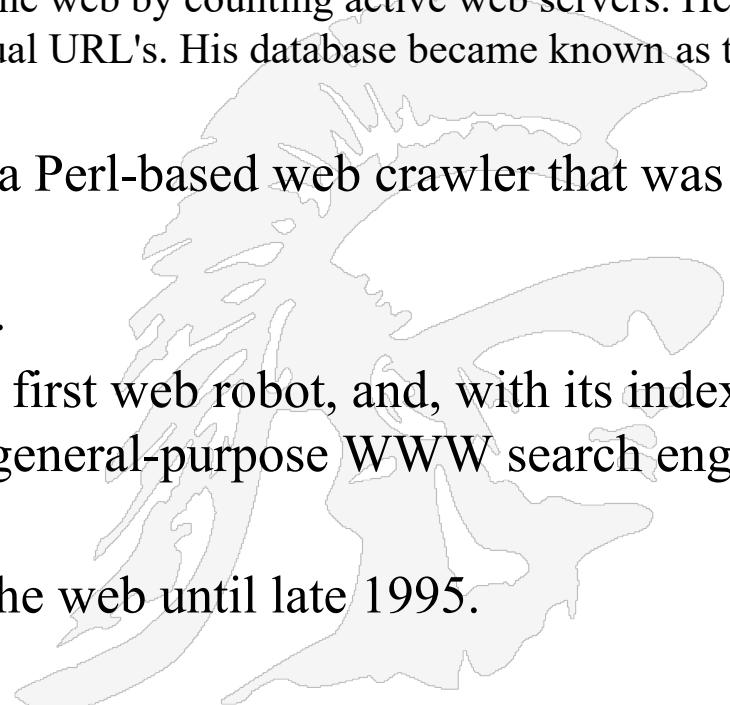
- By late 1980's many files were available by anonymous FTP.
- In 1990, Alan Emtage, P. Deutsch, et al of McGill Univ. developed Archie (short for “archives”)
 - Assembled lists of files available on many FTP servers.
 - Allowed regex search of these file names.
- In 1993, Veronica and Jughead were developed to search names of text files available through Gopher servers
 - The **Gopher protocol** is a TCP/IP application layer protocol designed for distributing, searching, and retrieving documents over the Internet. Strongly oriented towards a menu-document design
 - The Gopher ecosystem is often regarded as the effective predecessor of the World Wide Web

- Excite came from the project Architext, which was started in February, 1993 by six Stanford undergrad students.
 - They had the idea of using statistical analysis of word relationships to make searching more efficient.
 - They were soon funded, and in mid 1993 they released copies of their search software for use on web sites.
- Later developments
 - Excite was bought by a broadband provider named @Home in January, 1999 for \$6.5 billion, and was named Excite@Home. In October, 2001 Excite@Home filed for bankruptcy. InfoSpace bought Excite from bankruptcy court for \$10 million
 - www.excite.com still exists as a portal

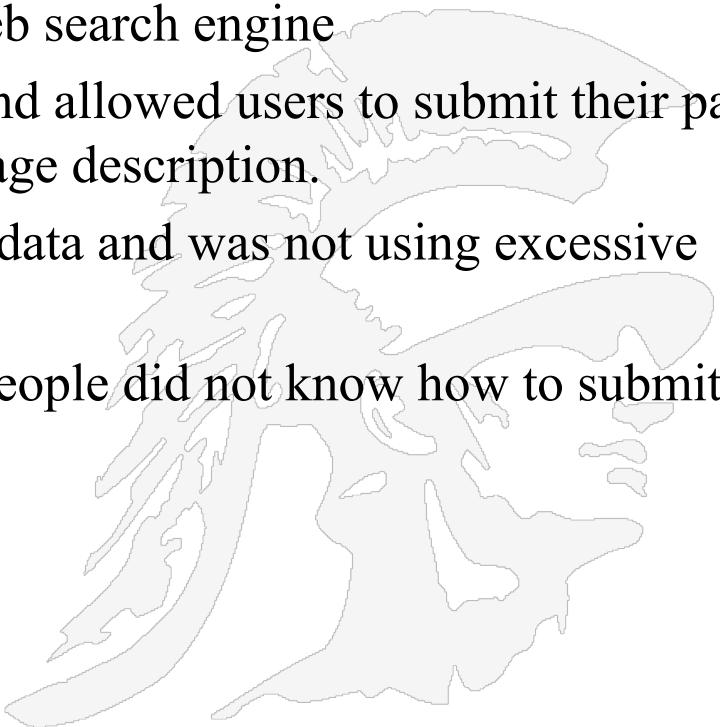


World Wide Web Wanderer

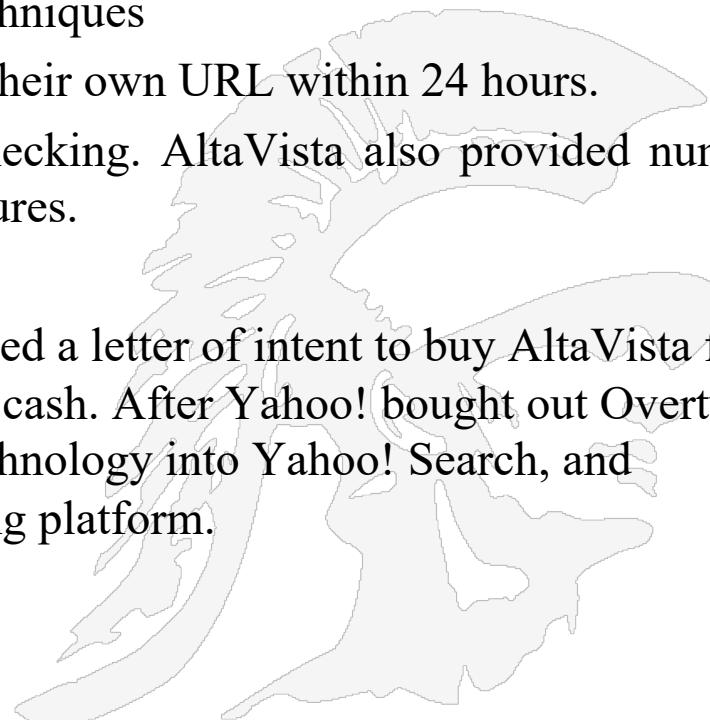
- In June 1993 Matthew Gray while at MIT introduced the World Wide Web Wanderer.
 - Initial goal was to measure the growth of the web by counting active web servers. He soon upgraded the software to capture actual URL's. His database became known as the Wandex.
- The World Wide Web Wanderer was a Perl-based web crawler that was first deployed in June 1993
- Matthew Gray now works for Google.
- While the Wanderer was probably the first web robot, and, with its index, clearly had the potential to become a general-purpose WWW search engine it never went that far
- The Wanderer charted the growth of the web until late 1995.



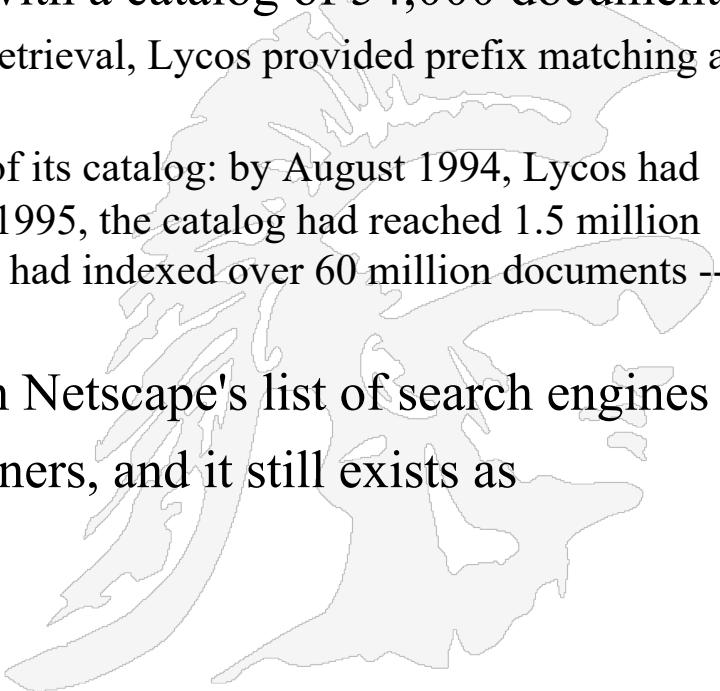
- In November of 1993 Martijn Koster created “Archie-Like Indexing of the Web”, or ALIWEB in response to the Wanderer.
 - Some consider it to be the first Web search engine
- ALIWEB crawled meta information and allowed users to submit their pages they wanted indexed with their own page description.
- This meant it needed no bot to collect data and was not using excessive bandwidth.
- One downside of ALIWEB was that people did not know how to submit their site



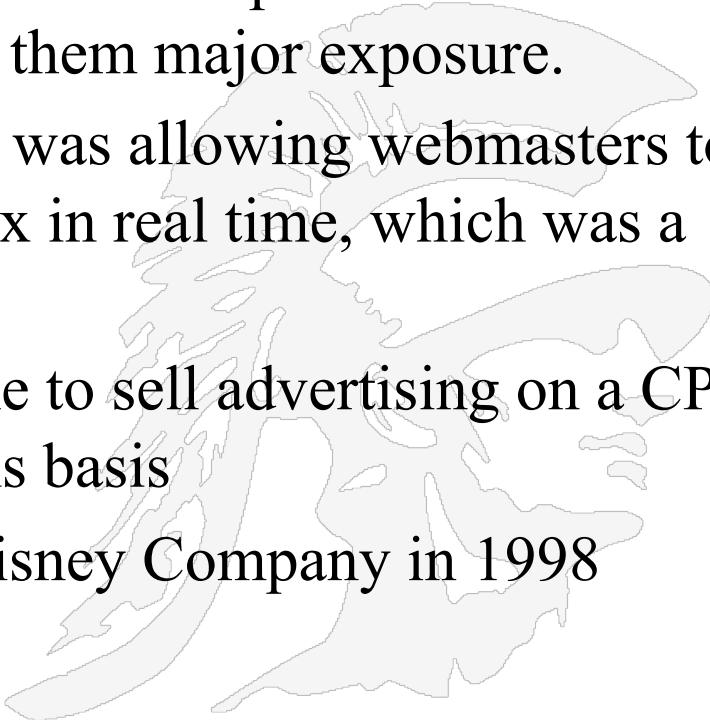
- AltaVista debut online came during December, 1995. AltaVista brought many important features to the web scene.
 - They were the first to allow natural language queries
 - They offered advanced searching techniques
 - They allowed users to add or delete their own URL within 24 hours.
 - They even allowed inbound link checking. AltaVista also provided numerous search tips and advanced search features.
- Later developments
 - On February 18, 2003, Overture signed a letter of intent to buy AltaVista for \$80 million in stock and \$60 million cash. After Yahoo! bought out Overture they rolled some of the AltaVista technology into Yahoo! Search, and occasionally use AltaVista as a testing platform.



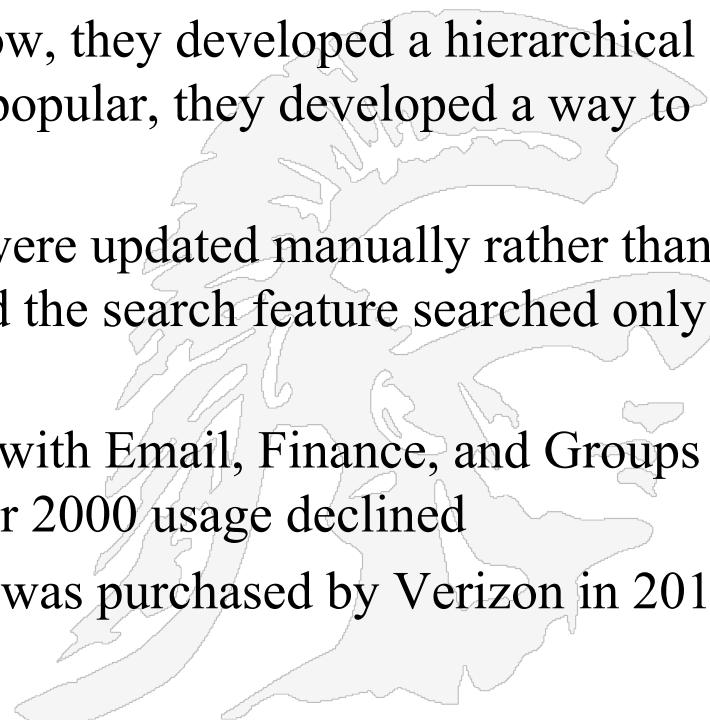
- Lycos was designed at Carnegie Mellon University around July of 1994. Michael Loren Mauldin was responsible for this search engine and remains the chief scientist at Lycos Inc.
- On July 20, 1994, Lycos went public with a catalog of 54,000 documents.
 - In addition to providing ranked relevance retrieval, Lycos provided prefix matching and word proximity bonuses.
 - Lycos' main difference was the sheer size of its catalog: by August 1994, Lycos had identified 394,000 documents; by January 1995, the catalog had reached 1.5 million documents; and by November 1996, Lycos had indexed over 60 million documents -- more than any other Web search engine.
- In October 1994, Lycos ranked first on Netscape's list of search engines
- Lycos has gone through a series of owners, and it still exists as www.lycos.com



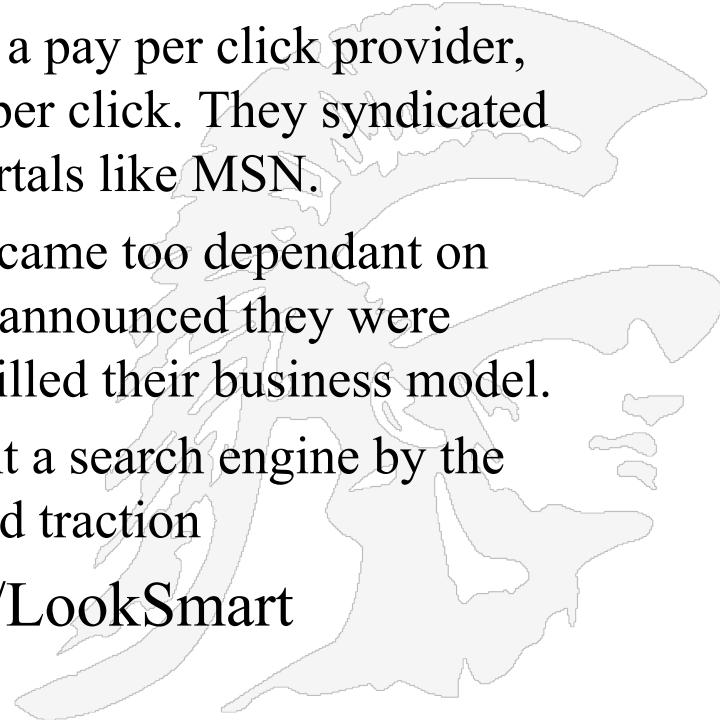
- Infoseek also started out in 1994, founded by Steve Kirsch
- In December 1995 they convinced Netscape to use them as their default search, which gave them major exposure.
- One popular feature of Infoseek was allowing webmasters to submit a page to the search index in real time, which was a search spammer's paradise
- They were the first search engine to sell advertising on a CPM (Cost per Thousand) impressions basis
- Infoseek was bought by Walt Disney Company in 1998



- In 1994, two Stanford Ph.D. students David Filo and Jerry Yang posted web pages with links on them, organized into a topical hierarchy.
- As the number of links began to grow, they developed a hierarchical listing. As the pages become more popular, they developed a way to search through all of the links.
- Early on all the links on the pages were updated manually rather than automatically by spider or robot and the search feature searched only those links
- Yahoo home page acted as a portal with Email, Finance, and Groups being very successful; however after 2000 usage declined
- After many years of decline Yahoo was purchased by Verizon in 2017 for \$4.48 billion



- Looksmart was founded in 1995 in Australia. They competed with the Yahoo! Directory by frequently increasing their inclusion rates
- Later developments
 - In 2002 Looksmart transitioned into a pay per click provider, which charged listed sites a flat fee per click. They syndicated those paid listings to some major portals like MSN.
 - The problem was that Looksmart became too dependant on MSN, and in 2003, when Microsoft announced they were dumping Looksmart that basically killed their business model.
 - In March of 2002, Looksmart bought a search engine by the name of WiseNut, but it never gained traction
- See <https://en.wikipedia.org/wiki/LookSmart>

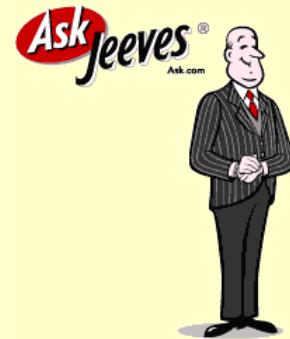




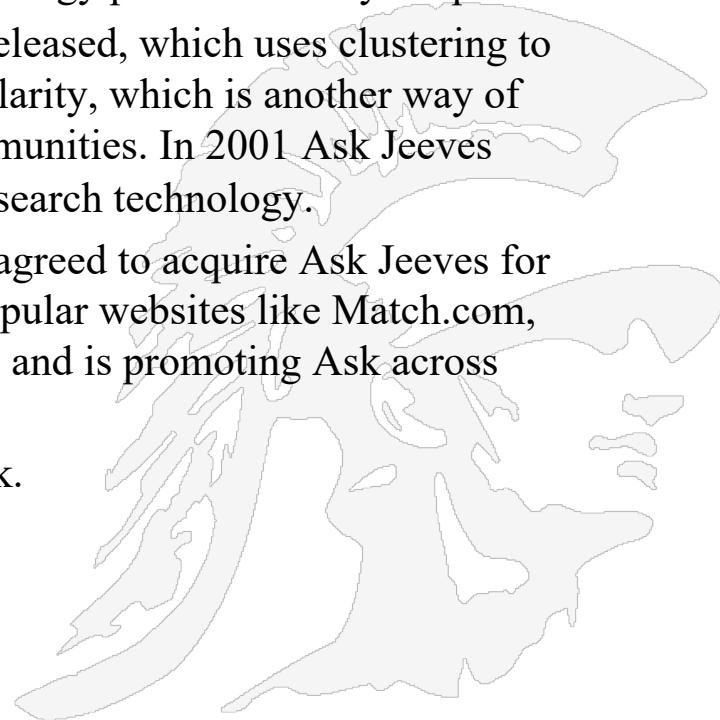
Inktomi

- The Inktomi Corporation came about on May 20, 1996 with its search engine Hotbot. Two Cal Berkeley cohorts created Inktomi from the improved technology gained from their research
- Later developments
 - In October of 2001 Inktomi accidentally allowed the public to access their database of spam sites, which listed over 1 million URLs at that time.
 - Inktomi pioneered ***the paid inclusion model*** in which a website pays a fee to the search engine that guarantees the site will be displayed when certain search terms are entered
 - The model was nowhere near as efficient as the pay-per-click auction model developed by Overture. Licensing their search results also was not profitable enough to pay for their scaling costs. They failed to develop a profitable business model, and sold out to Yahoo! for approximately \$235 million, or \$1.65 a share, in December of 2003.

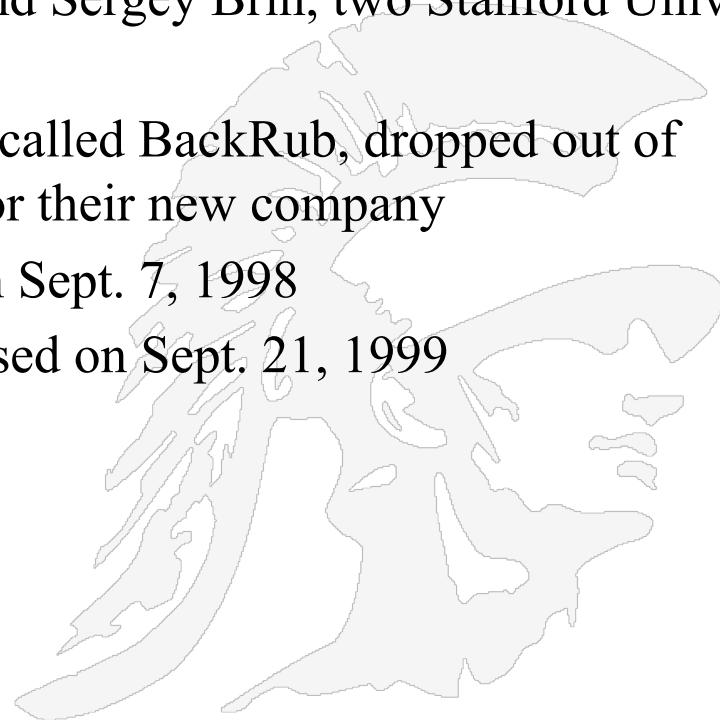
*<http://searchenginewatch.com/article/2066745/Inktomi-Spam-Database-Left-Open-To-Public>



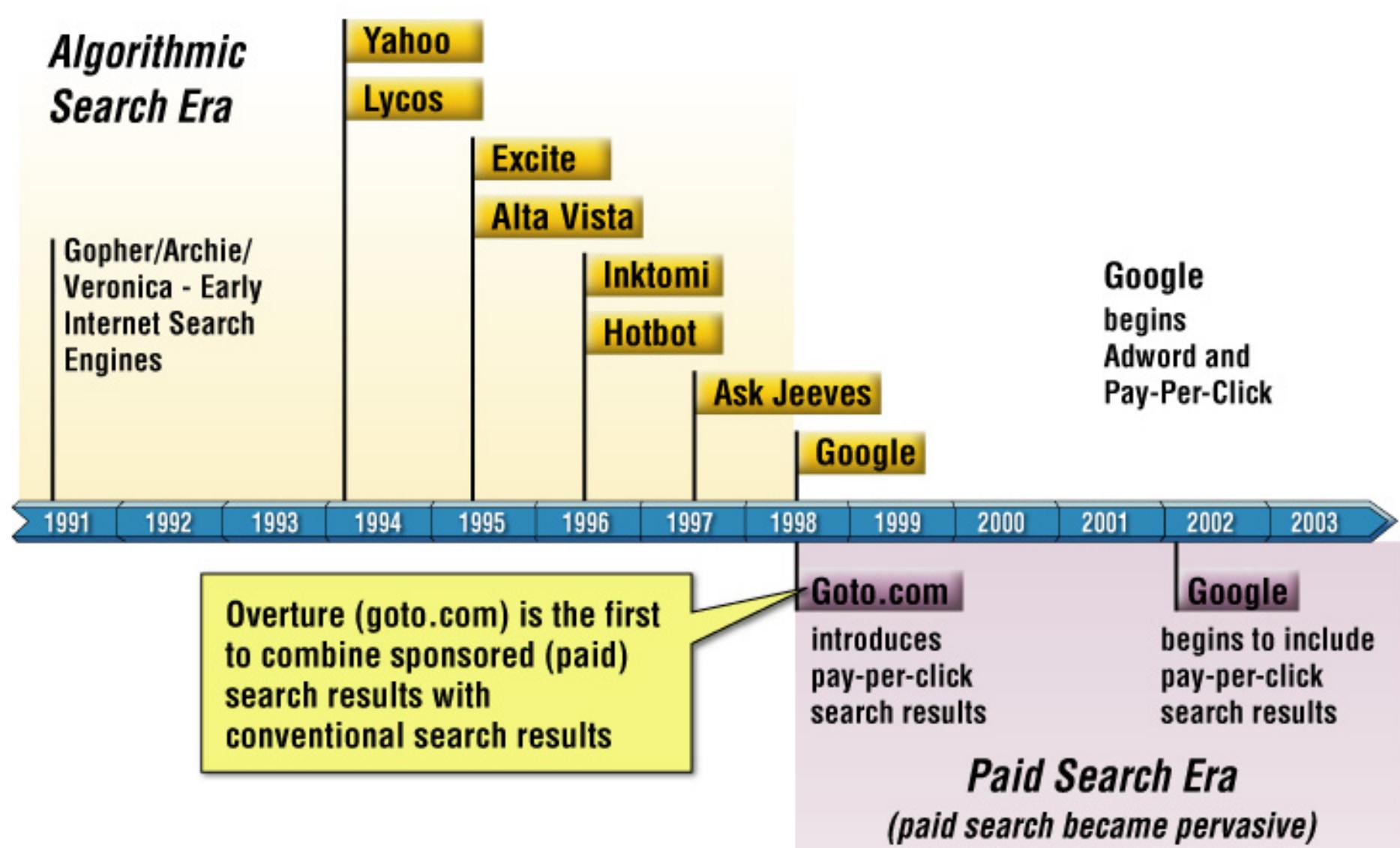
- In April of 1997 Ask Jeeves was launched as a natural language search engine.
 - Ask Jeeves used human editors to try to match search queries.
 - Ask was powered by DirectHit for a while, which aimed to rank results based on their popularity, but that technology proved too easy to spam.
 - In 2000 the Teoma search engine was released, which uses clustering to organize sites by Subject Specific Popularity, which is another way of saying they tried to find local web communities. In 2001 Ask Jeeves bought Teoma to replace the DirectHit search technology.
 - On March 21, 2005 Barry Diller's IAC agreed to acquire Ask Jeeves for 1.85 billion dollars. IAC owns many popular websites like Match.com, Ticketmaster.com, and Citysearch.com, and is promoting Ask across their other properties.
 - In 2006 Ask Jeeves was renamed to Ask.



- Google is a play on the word Googol, coined by Milton Sirotta; it refers to a 1 followed by 100 zeros, 10000000.....0
- A googol is bigger than the number of atoms in the universe
- Google was founded by Larry Page and Sergey Brin, two Stanford Univ. Computer Science graduate students
- In 1998 they built a prototype system called BackRub, dropped out of school, and tried to attract investors for their new company
- Google Inc. released a beta version on Sept. 7, 1998
- www.google.com was officially released on Sept. 21, 1999



A Brief Chronology of Search Engines



Name	Language
Baidu	Chinese, Japanese
Bing	Multilingual
Blekkō	English
DuckDuckGo	English
Exalead	Multilingual
Gigablast	English
Google	Multilingual
Munax	Multilingual
Qwant	Multilingual
Sogou	Chinese
Soso.com	Chinese
Yahoo!	Multilingual
Yandex	Multilingual
Youdao	Chinese

General web search engines

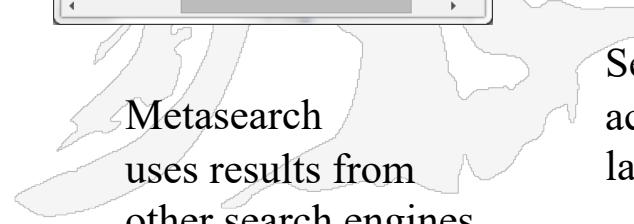
Name	Language
FAROO	English
Seeks (Open Source)	English
YaCy (Free and fully decentralized)	Multilingual

P2P stores search data on user computers

List of Search Engines

http://en.wikipedia.org/wiki/List_of_search_engines

Name	Language
Blingo	English
Yippy (formerly Clusty)	English
DeeperWeb	English
Dogpile	English
Excite	English
Harvester42	
HotBot	English
Info.com	English
Ixquick (StartPage)	Multilingual
Kayak and SideStep	Multilingual
Mamma	
Metacrawler	English
Mobissimo	Multilingual
Otalo	English



Metasearch uses results from other search engines

Search Engine Name	Description	Specialty
VikiTron	Semantic mathematics, chemistry and knowledge engine.	math, numbers, chemistry, geography
Firmily	Specialises in auto-tagging companies websites in economic sectors	business search engine
Invention	Specialises in surfacing concepts from various document types, enterprise	Decision engine for

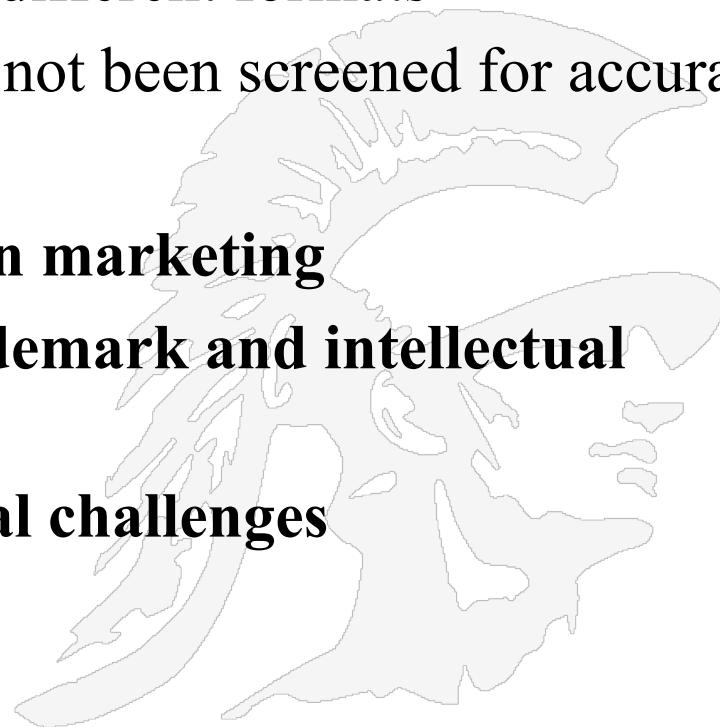
Semantic accepts natural language queries

Search Engine Basic Behavior



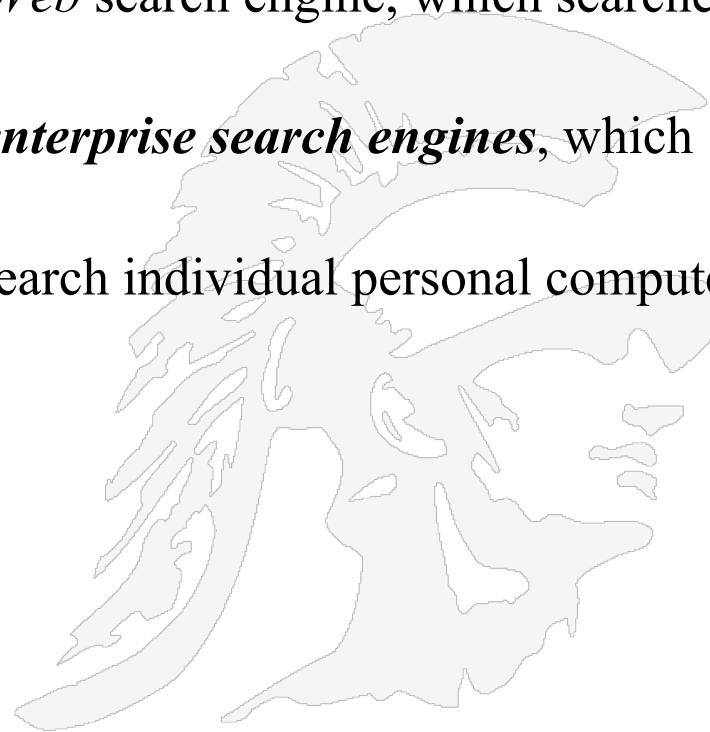
What is Web Search?

- **Providing access to heterogeneous, distributed information that is publicly available on the World Wide Web**
 - Information comes in many different formats
 - Most of the information has not been screened for accuracy
- **Multi-billion dollar business**
- **Source of new opportunities in marketing**
- **Strains the boundaries of trademark and intellectual property laws**
- **A source of unending technical challenges**

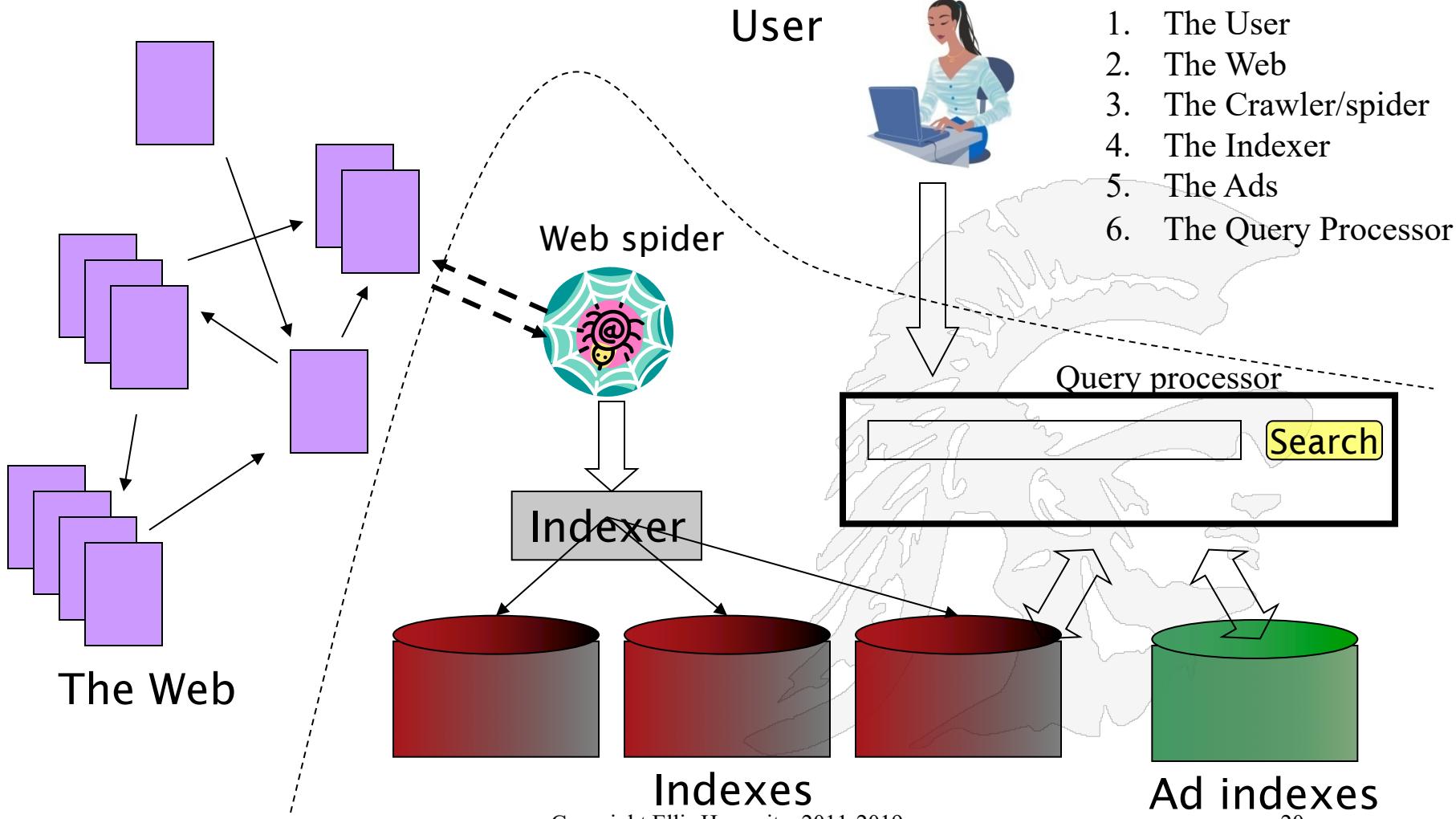


Web Search Engine Definitions

- “A search engine is a program designed to help find information stored on a computer system such as the World Wide Web, inside a corporate or proprietary network or a personal computer” *wikipedia*
 - *search engine* usually refers to a *Web search engine*, which searches for information on the public Web.
 - Other kinds of search engine are *enterprise search engines*, which search on intranets,
 - *personal search engines*, which search individual personal computers

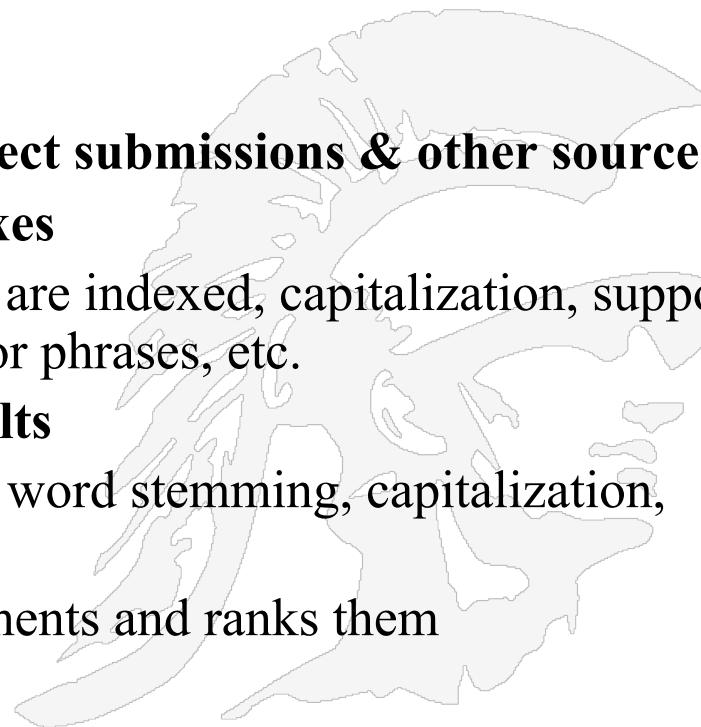


Basic Web Search Internals

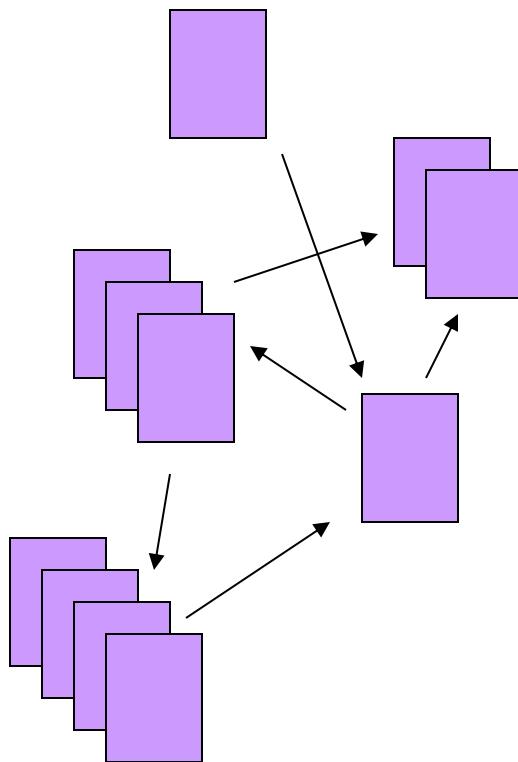


Web Search Engine Elements

- ***Spider* (a.k.a. crawler/robot) – builds **corpus****
 - **Collects web pages recursively**
 - For each known URL, fetch the page, parse it, and extract new URLs
 - Repeat
 - **Additional pages come from direct submissions & other sources**
- **The *indexer* – creates inverted indexes**
 - Various policies wrt which words are indexed, capitalization, support for Unicode, stemming, support for phrases, etc.
- ***Query processor* – serves query results**
 - **Front end** – query reformulation, word stemming, capitalization, optimization of Booleans, etc.
 - **Back end** – finds matching documents and ranks them

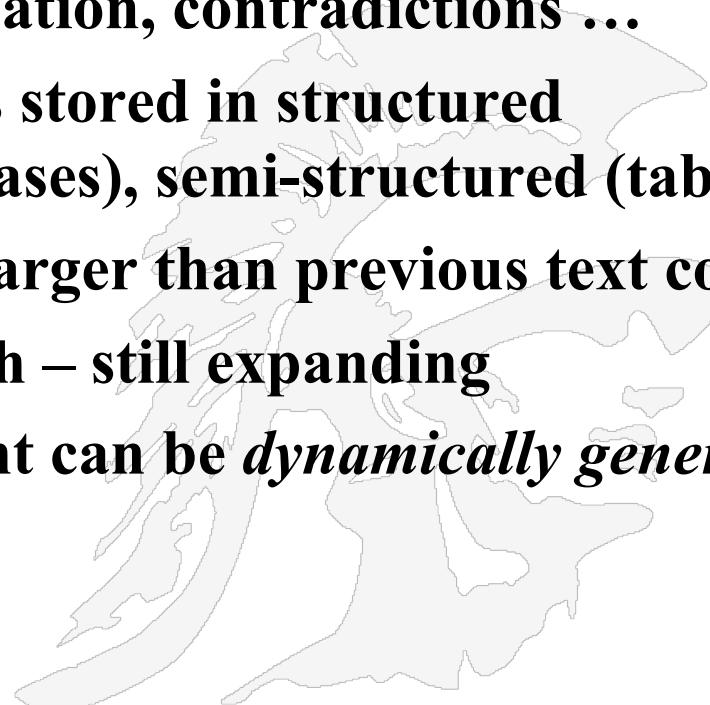


The Web



The Web

- No design/co-ordination
- Distributed content creation, linking
- Content includes truth, lies, obsolete information, contradictions ...
- Data is stored in structured (databases), semi-structured (tables)...
- Scale larger than previous text corpora
- Growth – still expanding
- Content can be *dynamically generated*



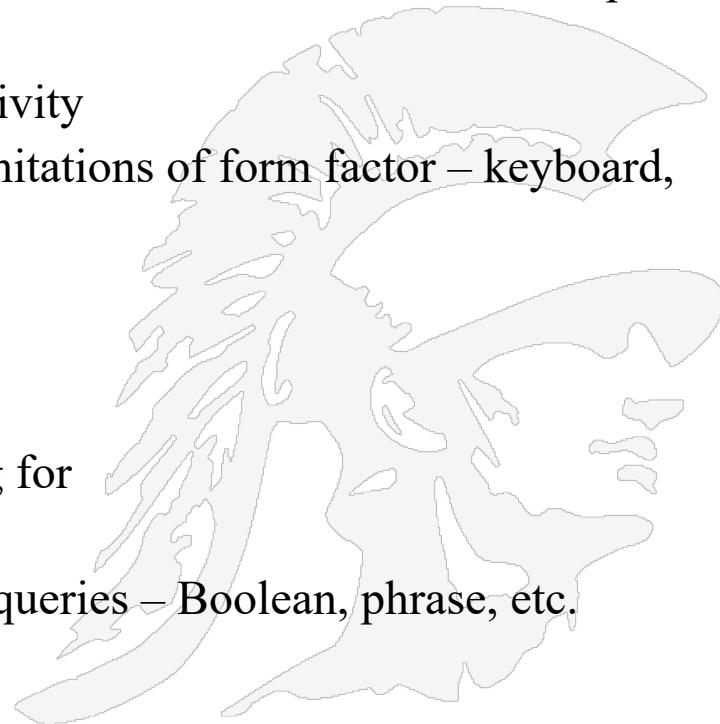
Most Dynamic Content is Missed

- Typically dynamic content is not indexed
- A page without a static html version, e.g.
 - current status of flight AA129
 - current availability of rooms at a hotel
- Dynamic content is usually assembled at the time of a request from a browser
 - To spot dynamic content typically a URL has a ‘?’ character in it
 - Some dynamic content includes malicious spider traps (infinite loops)
- The term *deep web* refers to content missed by search engine crawlers



The User

- **Diverse in background/training**
 - Users sometimes cannot tell the difference between a search bar from the URL address field (**Chrome conflates the two**)
 - Users rarely use the scroll bar, so key results must be at or near the top
- **Diverse in access methodology**
 - Increasingly, high bandwidth connectivity
 - Growing segment of mobile users: limitations of form factor – keyboard, display
- **Diverse in search methodology**
 - Search, search + browse,
 - Average query length ~ 2.5 terms
 - Has to do with what they're searching for
- **Poor comprehension of syntax**
 - Early engines offered rich syntax for queries – Boolean, phrase, etc.
 - Current engines hide these



User's Information Needs Are Diverse

- **Informational** – want to learn about something (~40%)

e.g. Low hemoglobin

- **Navigational** – want to go to that page (~25%)

e.g. United Airlines

- **Transactional** – want to do something (web-mediated) (~35%)

- Access a service

Los Angeles weather

- Downloads

Mars surface images

- Shop

Nikon CoolPix Camera

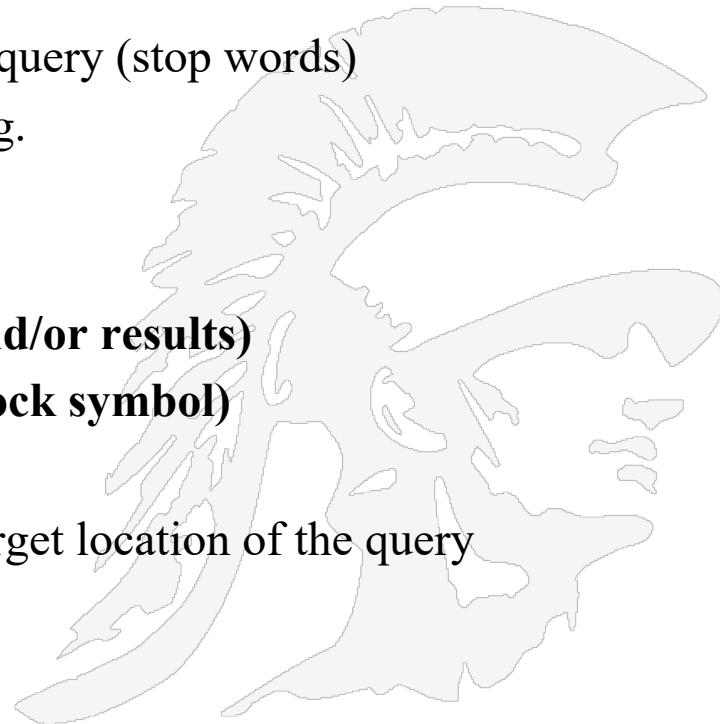
- **Gray areas**

- Find a good hub

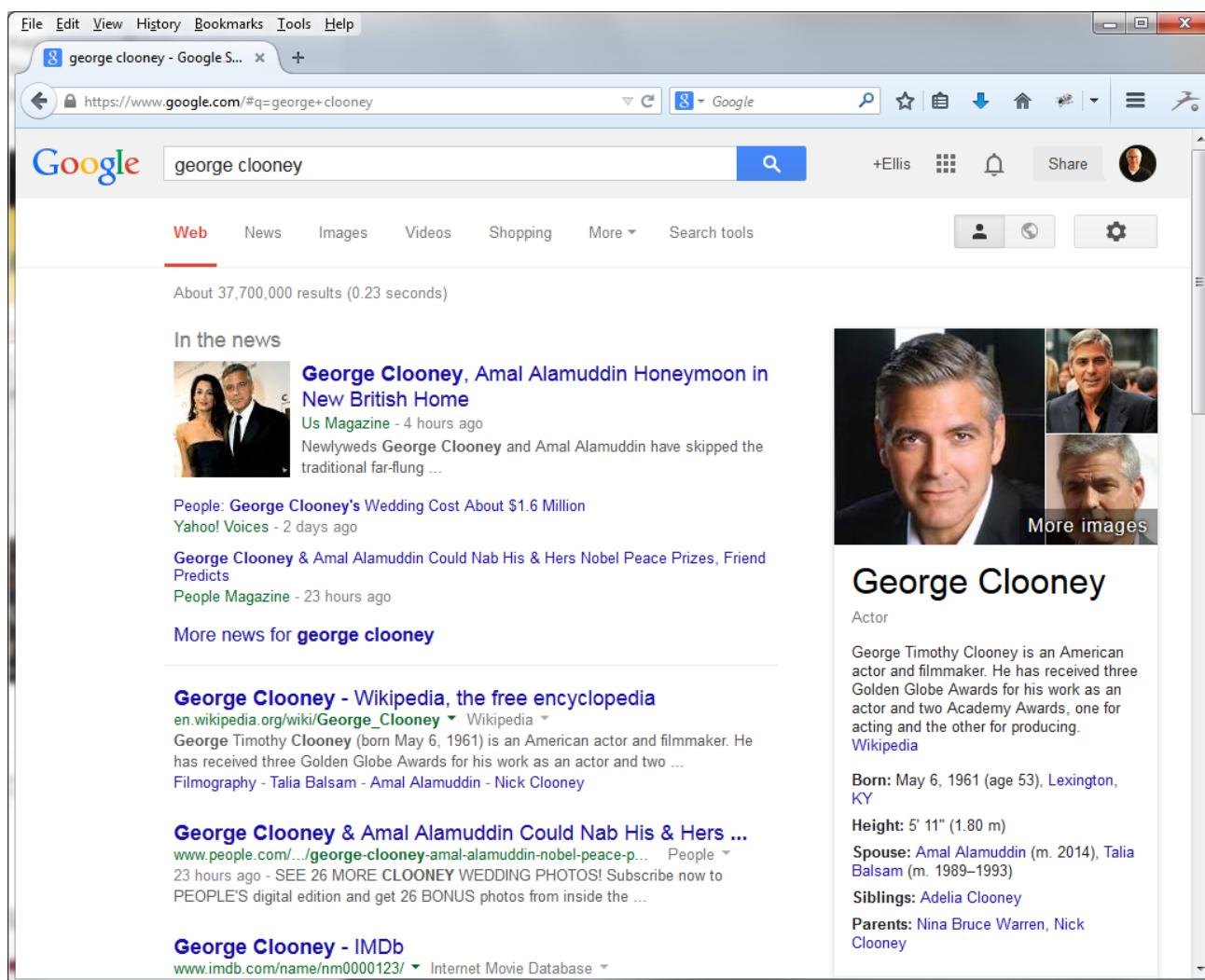
Car rental in Finland

- Exploratory search “see what’s there”

- Query processing involves much more than just matching query terms with document terms
- Semantic analysis of the query includes:
 1. Determining the language of the query
 2. Filtering of unnecessary words from the query (stop words)
 3. Looking for specific types of queries, e.g.
 - **Personalities (triggered on names)**
 - **Cities (travel info, maps)**
 - **Medical info (triggered on names and/or results)**
 - **Stock quotes, news (triggered on stock symbol)**
 - **Company info ...**
 4. Determining the user's location or the target location of the query
 5. Remembering previous queries
 6. Maintaining a user profile



An Example Person Query



The screenshot shows a Google search results page for "george clooney". The search bar at the top contains "george clooney". Below the search bar, there are tabs for "Web", "News", "Images", "Videos", "Shopping", and "More". The "Web" tab is selected, showing approximately 37,700,000 results found in 0.23 seconds. The results include:

- In the news**:
 - George Clooney, Amal Alamuddin Honeymoon in New British Home** - Us Magazine - 4 hours ago. Description: Newlyweds George Clooney and Amal Alamuddin have skipped the traditional far-flung ...
 - People: George Clooney's Wedding Cost About \$1.6 Million** - Yahoo! Voices - 2 days ago.
 - George Clooney & Amal Alamuddin Could Nab His & Hers Nobel Peace Prizes, Friend Predicts** - People Magazine - 23 hours ago.
- More news for george clooney**
- George Clooney - Wikipedia, the free encyclopedia** - en.wikipedia.org/wiki/George_Clooney - Wikipedia. Description: George Timothy Clooney (born May 6, 1961) is an American actor and filmmaker. He has received three Golden Globe Awards for his work as an actor and two ...
- Filmography - Talia Balsam - Amal Alamuddin - Nick Clooney**
- George Clooney & Amal Alamuddin Could Nab His & Hers ...** - www.people.com/.../george-clooney-amal-alamuddin-nobel-peace-p... - People - 23 hours ago - SEE 26 MORE CLOONEY WEDDING PHOTOS! Subscribe now to PEOPLE'S digital edition and get 26 BONUS photos from inside the ...
- George Clooney - IMDb** - www.imdb.com/name/nm0000123/ - Internet Movie Database

On the right side of the search results, there is a detailed profile for George Clooney. It includes a large portrait photo, a "More images" link, his name, title (Actor), and a biography. Below the biography, there are sections for birth information, height, spouse, siblings, and parents.

Includes the following:

Latest news

Biography

Photos

Basic facts

born

married

parents

career

An Example Place Query

las vegas - Google Search

<https://www.google.com/search?q=las+vegas&oq=las+vegas&aqs=chrome..69i57j0l5.1920j0j8&sourceid=chrome&ie=UTF-8>

Apps CSCI152 Home Page CSCI571 Home Page CSCI351 Home Page Ellis Horowitz' Hom... Computer Science D... Other bookmarks

Google las vegas

Web News Images Maps Videos More Search tools

About 168,000,000 results (0.41 seconds)

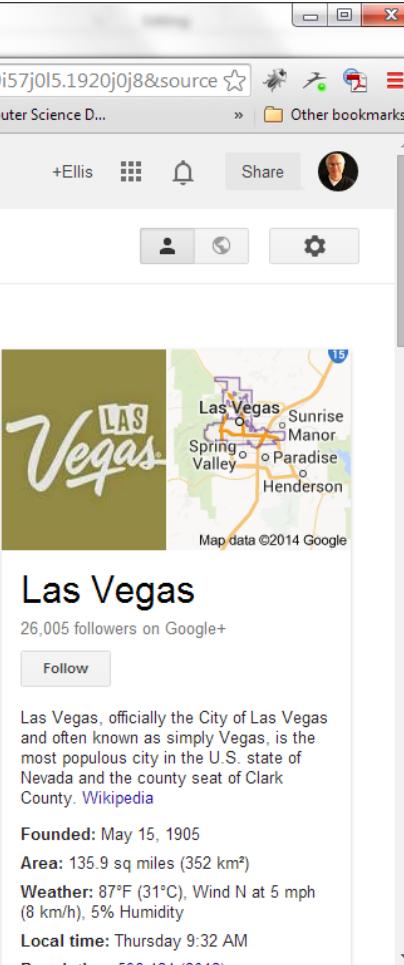
Las Vegas - VEGAS.com™
Ad www.vegas.com/ Las Vegas Shows, Hotels and more. The Official VEGAS Travel Site™. Vegas.com has 767 followers on Google+. Las Vegas Air + Hotel - Las Vegas Hotels - Headliners and Concerts

Attractions In Las Vegas - TravelNevada.com
Ad www.travelnevada.com/ Order Your Free Visitor's Guide & Plan Your Vacation To Las Vegas! Travel Nevada has 1,238 followers on Google+

Las Vegas 5 Day Room Sale - SouthPointCasino.com
Ad www.southpointcasino.com/ South Point Hotel Casino Spa Rates From \$35 Sun-Thurs \$60 Fri. & Sat. Restaurants - Hotel Packages & Promos - Nightlife & Entertainment - Casino

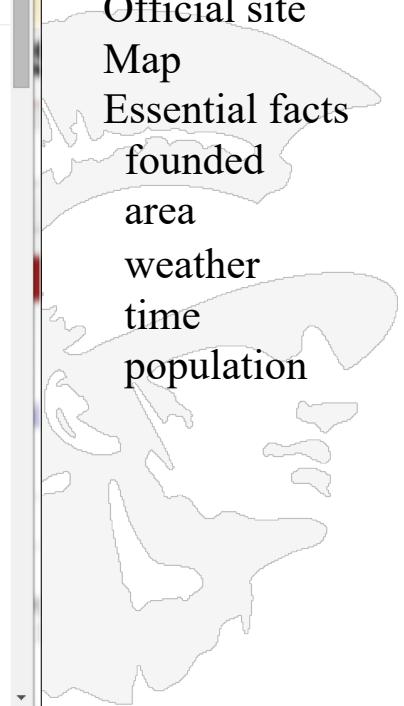
(Official City of Las Vegas Web Site)
www.lasvegasnevada.gov/ Las Vegas The City of Las Vegas (Official Government Site) ... City of Las Vegas: Serving You Online Rather Than In Line, Photo: Downtown Las Vegas ...

Las Vegas Hotels, Shows, Casinos, Restaurants, Maps and ...
www.lasvegas.com/ Your official What happens in Vegas, stays in Vegas resource. Plan hotels and things to do for your trip on the only official website of Las Vegas. Shows & Events - Las Vegas Hotels - Air + Hotel Packages - Special Offers & Deals

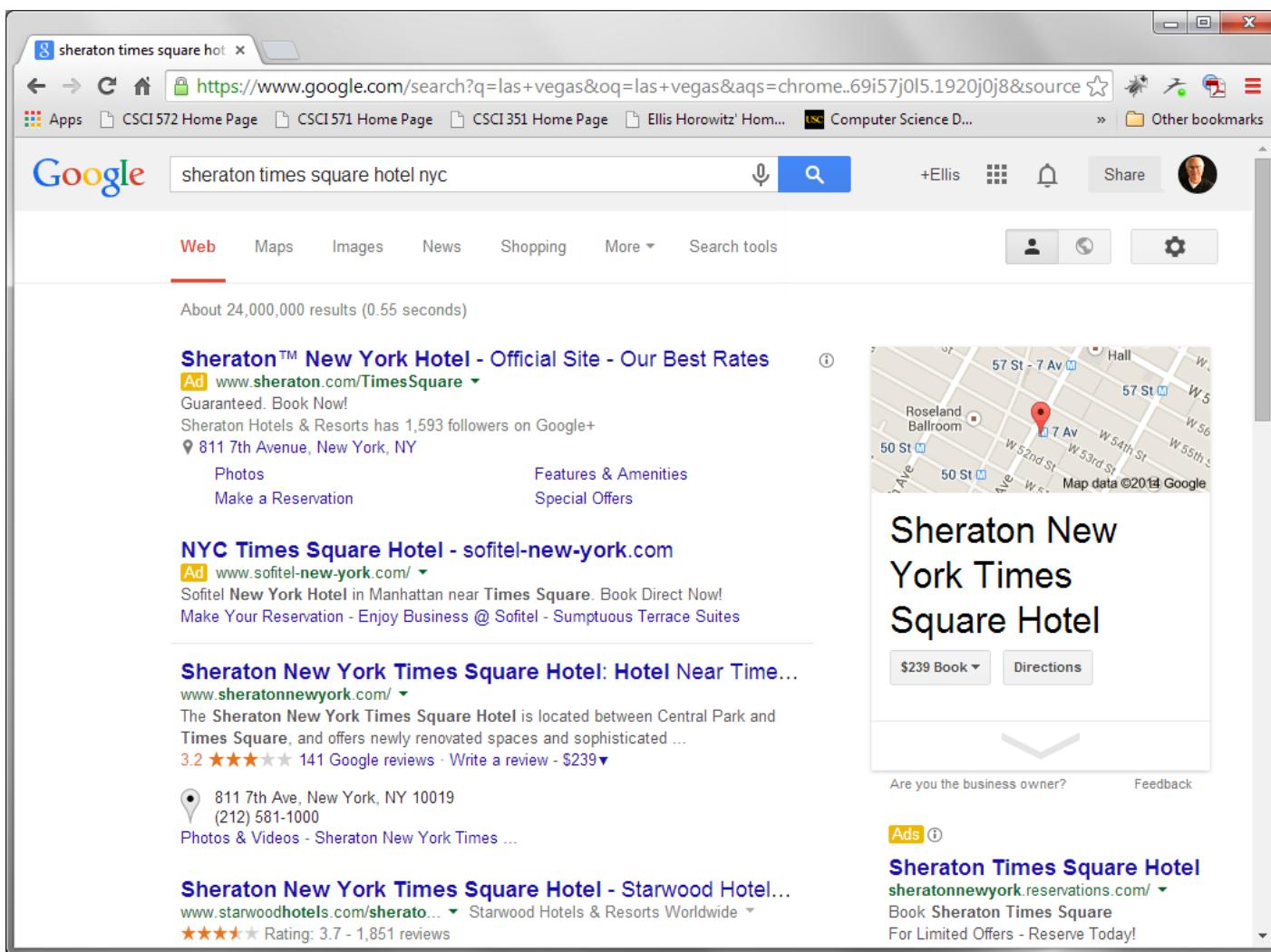


Includes the following:

Official site
Map
Essential facts
founded
area
weather
time
population



An Example Hotel Query



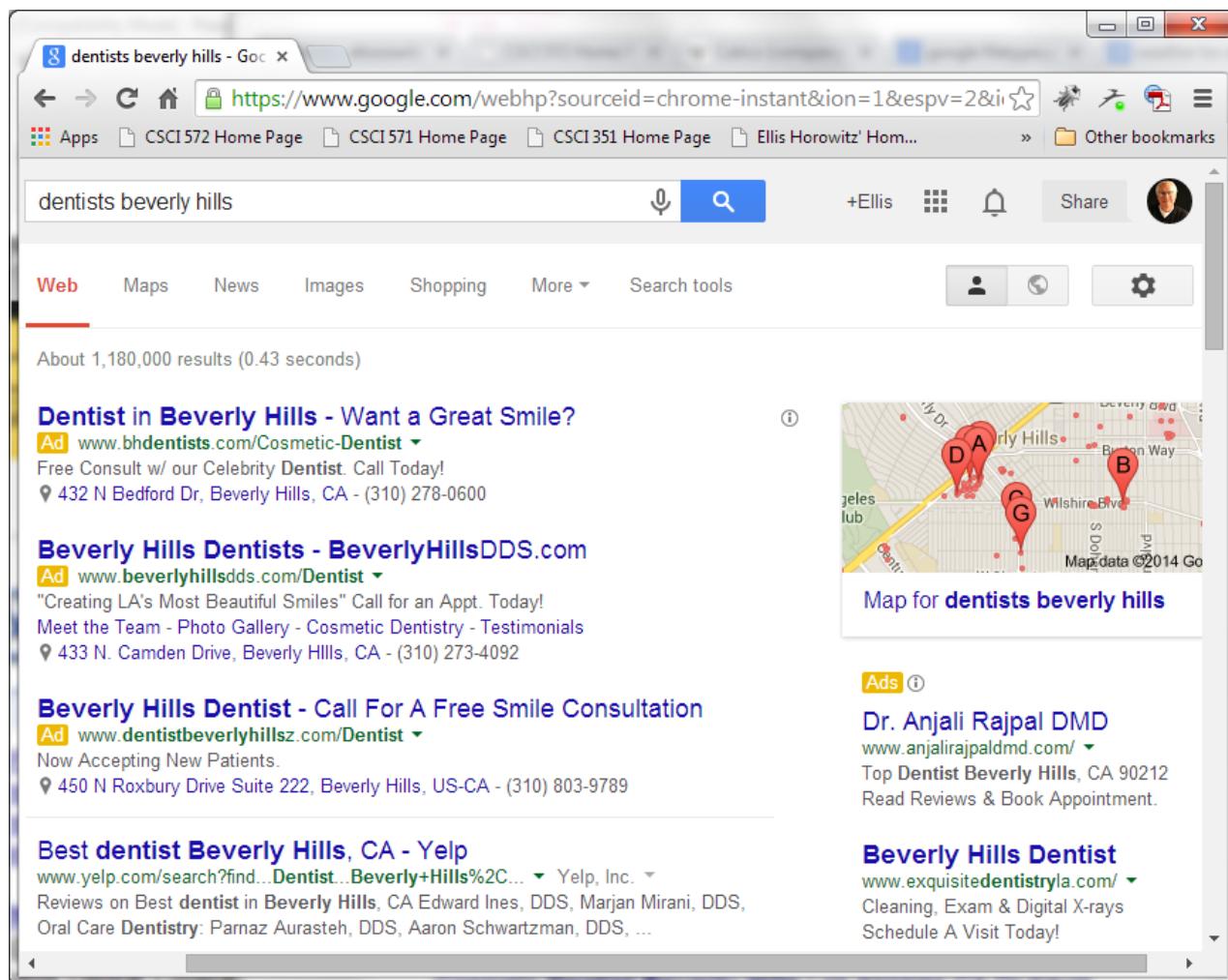
A screenshot of a Google search results page. The search query is "sheraton times square hotel nyc". The results include:

- Sheraton™ New York Hotel - Official Site - Our Best Rates**
Ad www.sheraton.com/TimesSquare ▾
Guaranteed. Book Now!
Sheraton Hotels & Resorts has 1,593 followers on Google+
811 7th Avenue, New York, NY
Photos Make a Reservation Features & Amenities Special Offers
- NYC Times Square Hotel - sofitel-new-york.com**
Ad www.sofitel-new-york.com ▾
Sofitel New York Hotel in Manhattan near Times Square. Book Direct Now!
Make Your Reservation - Enjoy Business @ Sofitel - Sumptuous Terrace Suites
- Sheraton New York Times Square Hotel: Hotel Near Time...**
www.sheratonnewyork.com ▾
The Sheraton New York Times Square Hotel is located between Central Park and Times Square, and offers newly renovated spaces and sophisticated ...
3.2 ★★★★☆ 141 Google reviews - Write a review - \$239▼
811 7th Ave, New York, NY 10019 (212) 581-1000 Photos & Videos - Sheraton New York Times ...
- Sheraton New York Times Square Hotel - Starwood Hotel...**
www.starwoodhotels.com/sherato... ▾ Starwood Hotels & Resorts Worldwide ▾
★★★★☆ Rating: 3.7 - 1,851 reviews

On the right side of the search results, there is a map showing the location of the Sheraton New York Times Square Hotel on 811 7th Avenue, near Times Square. Below the map, there is a summary box for the Sheraton New York Times Square Hotel with a "Book" button and a "Directions" button.

Includes the following:
Main hotel website
Map
Address
Phone number
Price of a room
Directions

Find a Professional Query



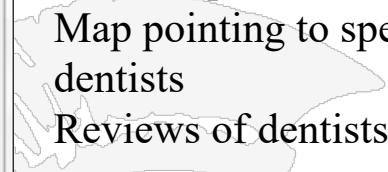
A screenshot of a Google search results page for "dentists beverly hills". The search bar at the top shows the query. Below it, there are several search result cards. The first card is for "Dentist in Beverly Hills - Want a Great Smile?", which is an ad from www.bhdentists.com/Cosmetic-Dentist. It includes a phone number and address. The second card is for "Beverly Hills Dentists - BeverlyHillsDDS.com", also an ad, with a phone number and address. The third card is for "Beverly Hills Dentist - Call For A Free Smile Consultation", another ad, with a phone number and address. The fourth card is for "Best dentist Beverly Hills, CA - Yelp", linking to www.yelp.com/search?find...Dentist...Beverly+Hills%2C.... It includes a snippet about reviews and names like Edward Ines, DDS, Marjan Mirani, DDS, and Parmaz Aurasteh, DDS. To the right of the search results is a map of Beverly Hills with red pins labeled A, B, C, D, E, F, and G, corresponding to the dentist locations. Below the map is a link to "Map for dentists beverly hills".

Includes the following:

Ads at top and side

Map pointing to specific dentists

Reviews of dentists (Yelp)



Query expansion for “Dentists”

8 dentists beverly hills - Goo x

https://www.google.com/webhp?sourceid=chrome-instant&ion=1&espv=2&i...

Apps CSCI 572 Home Page CSCI 571 Home Page CSCI 1351 Home Page Ellis Horowitz' Hom... Other bookmarks

Beverly Hills Pediatric Dentist - Beverly Hills Pediatric Dental Care. Welcome to our practice! Drs. Gross, Lempert, and associates have been providing the ...

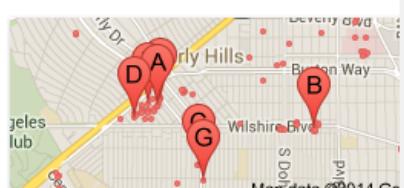
Beverly Hills Dentist | Top Los Angeles Cosmetic Dentistry
www.drmaddahi.com/
by Kourosh Maddahi - in 52 Google+ circles
As a top Beverly Hills cosmetic dentist, Dr. Maddahi is known throughout the world by his patients as the smile transformation expert. Our Los Angeles Dental ...

Beverly Hills Dentist, Prosthodontics, Cosmetic Dentistry
www.beverlyhillsdds.com/
Beverly Hills CA Prosthodontists provide Dental Implants, Porcelain Veneers, Teeth Whitening, Restorative Dentistry, Full Mouth Reconstruction. 310-273-4092.

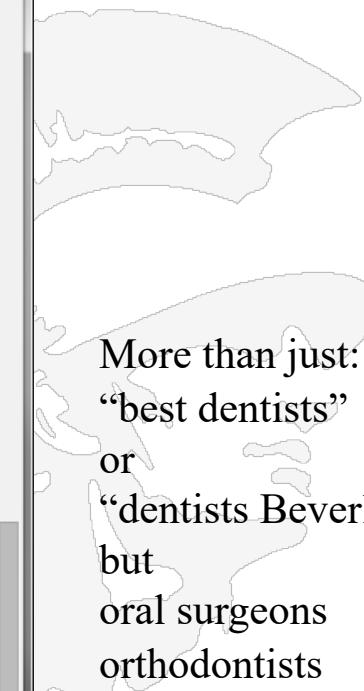
Searches related to **dentists beverly hills**

oral surgeons beverly hills best dentists beverly hills
yellow pages beverly hills dentists beverly hills **saturday hours**
orthodontists beverly hills beverly hills **dental**
dentists hollywood beverly hills **dentist reviews**

Goooooooooooooogle >
1 2 3 4 5 6 7 8 9 10 Next

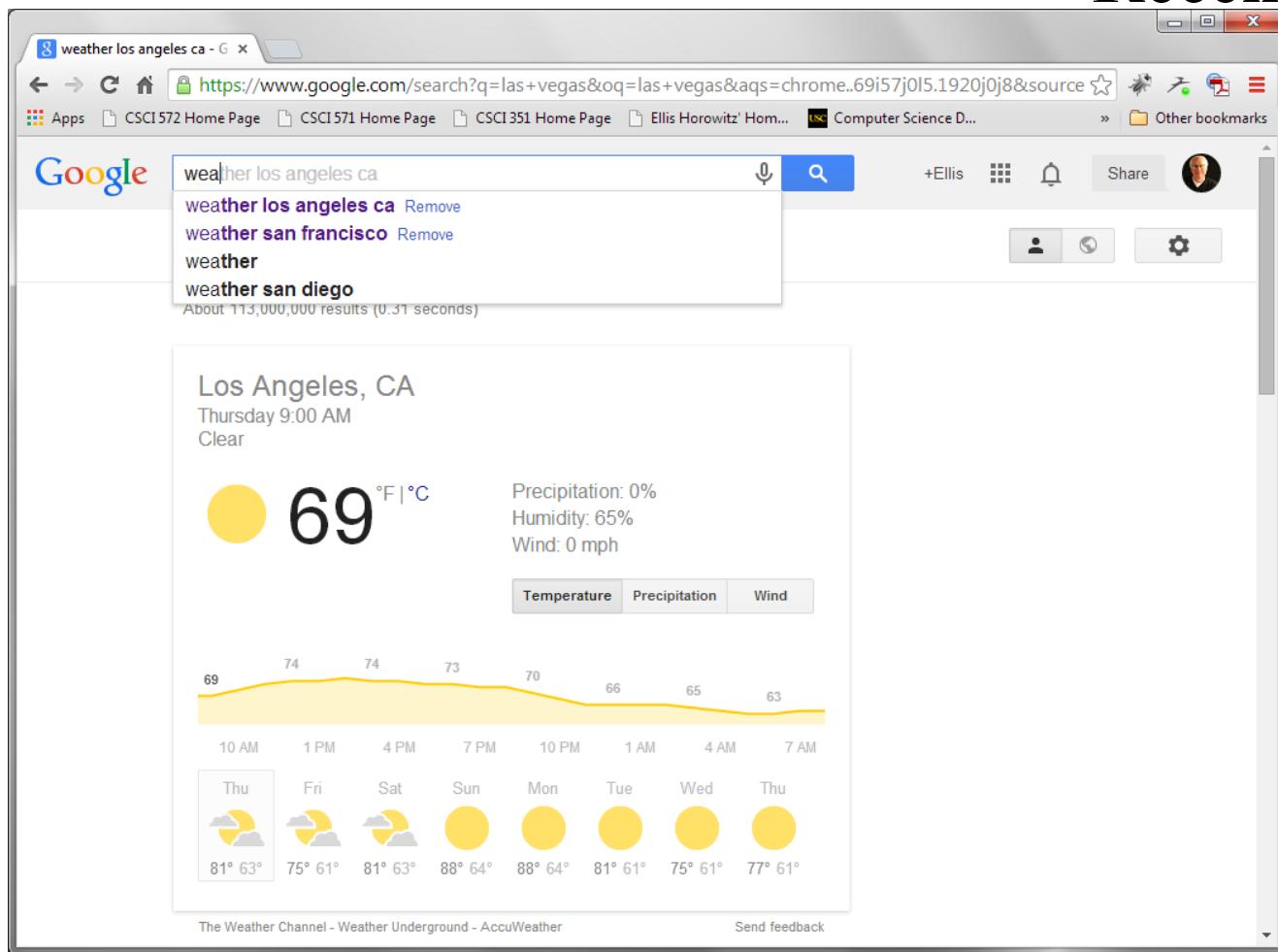


Map for dentists beverly hills



More than just:
“best dentists”
or
“dentists Beverly Hills”
but
oral surgeons
orthodontists

Google Maintains Your Recent Query History

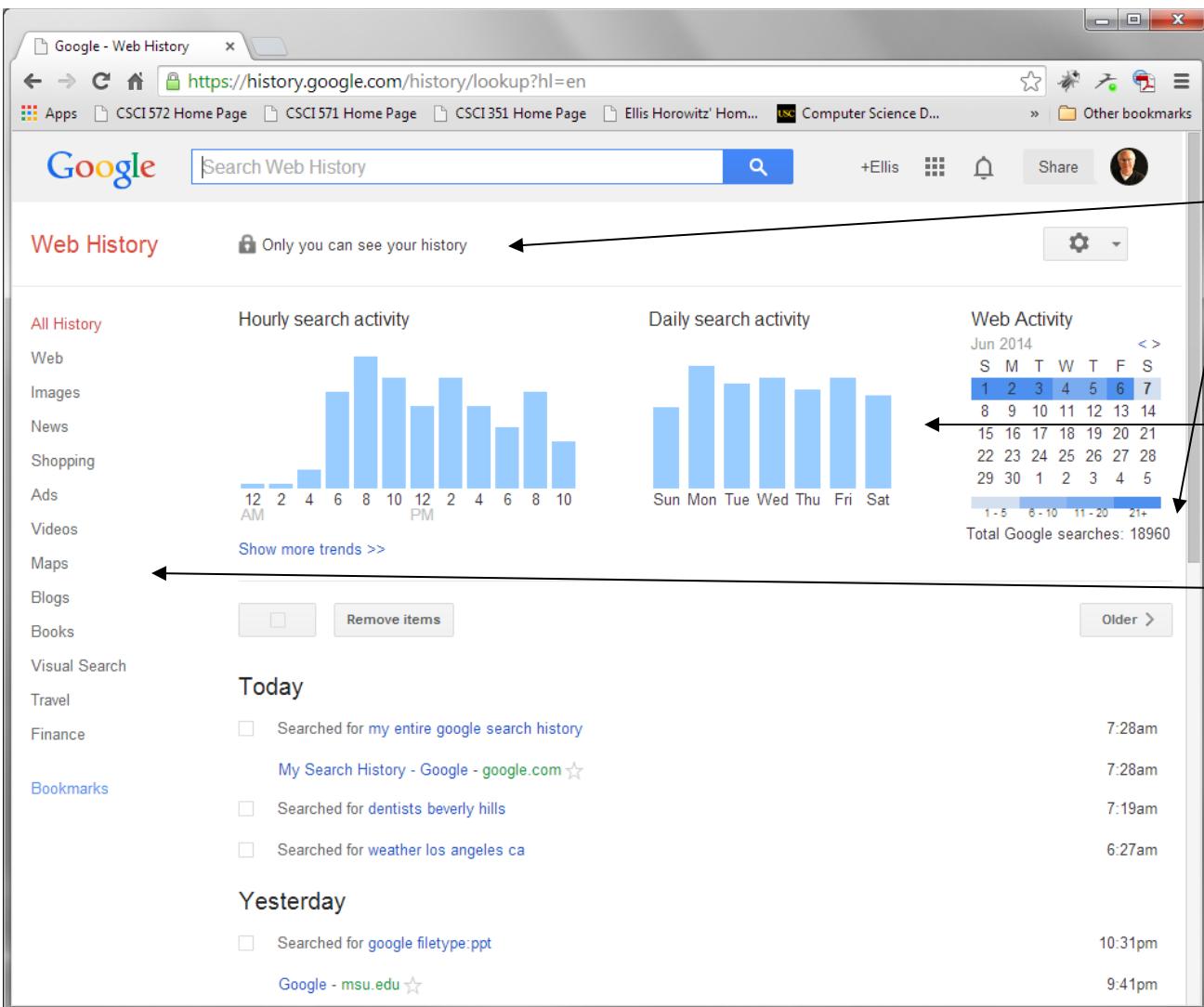


A screenshot of a Google search results page. The search query "weather los angeles ca" is entered in the search bar. Below the search bar, a dropdown menu shows recent queries: "weather los angeles ca", "weather san francisco", "weather", and "weather san diego". The main search results show the current weather for Los Angeles, CA, with a temperature of 69°F (21°C), clear skies, and a 0% chance of precipitation. A graph shows the daily temperature forecast from 10 AM on Thursday to 7 AM on Thursday, with temperatures ranging from 63° to 74°. Below the graph, a weekly forecast is shown with icons and temperatures for each day.

Day	Icon	Temp (°F)	Temp (°C)
Thu	Sun	81°	63°
Fri	Sun	75°	61°
Sat	Sun	81°	63°
Sun	Sun	88°	64°
Mon	Sun	88°	64°
Tue	Sun	81°	61°
Wed	Sun	75°	61°
Thu	Sun	77°	61°

Maintain previous queries
Helps to minimize typing
Allow users to remove old ones

Google Retains a User's Entire Query History!



The screenshot shows the Google Web History interface at <https://history.google.com/history/lookup?hl=en>. The interface includes:

- Hourly search activity:** A bar chart showing search volume from 12 AM to 10 PM. Data (approximate values): 2, 4, 6, 8, 10, 12, 2, 4, 6, 8, 10.
- Daily search activity:** A bar chart showing search volume from Sunday to Saturday. Data (approximate values): Sun (low), Mon (high), Tue (medium), Wed (medium), Thu (medium), Fri (medium), Sat (low).
- Web Activity:** A calendar for June 2014 with highlighted dates 1-7. Total Google searches: 18960.
- Category Filter:** A sidebar on the left lists categories: All History, Web, Images, News, Shopping, Ads, Videos, Maps, Blogs, Books, Visual Search, Travel, Finance, and Bookmarks.
- Recent Searches:** Lists recent queries:
 - Today: Searched for my entire google search history (7:28am), My Search History - Google - google.com (7:28am), Searched for dentists beverly hills (7:19am), Searched for weather los angeles ca (6:27am)
 - Yesterday: Searched for google filetype:ppt (10:31pm), Google - msu.edu (9:41pm)

They claim that only I can see my history;
I have issued a total of 18,960 queries;

Graphs show my queries by hour and by week;

I can view my Web queries as distinct from my Image queries or my News queries, etc

As a result, Google now knows a great deal about us!

Search Engines are an Industry

- The search engine industry is 20+ years old, having started with WebCrawler and Lycos in 1994 who sold banner ads as their business model
- Search engine revenue today
 - **Google:** 2017: \$109 Billion; 2016: \$90 Billion; 2015: \$74.5 Billion; 2014: \$66 Billion; 2013: \$37 Billion
 - **Baidu:** 2017: \$13 Billion; 2016: \$10.1 Billion; 2015: \$10.2 Billion; 2014: 8.0 Billion
 - **Yahoo:** 2015: \$4.9 Billion; 2014: 4.6 Billion; 2013: 4.6Billion
 - **Bing:** 2017 \$1.8 Billion
 - Microsoft says that in Q1 2016 Bing became profitable
- For a visual comparison of the three search engines in 2014 see <https://www.ventureharbour.com/visualising-size-google-bing-yahoo/>

