

Slides originally from:

- <http://web.stanford.edu/class/cs276/>
- Then modified by Don Patterson

Christopher Manning
Pandu Nayak

Introduction to **Information Retrieval**

CS276: Information Retrieval and Web Search
Lecture 19: Web Question Answering

Web Search in 2020?

The web, it is a changing.

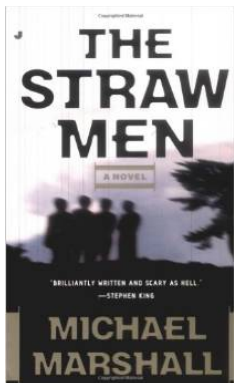
What will people do in 2020?

- Type key words into a search box?
- Use the Semantic Web?
- Speak to your computer with natural language search?
- Use social or “human powered” search?

Getting information

The common person's view? [From a novel]

"I like the Internet. Really, I do. Any time I need a piece of shareware or I want to find out the weather in Bogota ... I'm the first guy to get the modem humming. But as a source of information, it sucks. You got a billion pieces of data, struggling to be heard and seen and downloaded, and anything I want to know seems to get trampled underfoot in the crowd."



Michael Marshall. *The Straw Men*. HarperCollins, 2002.

“Information retrieval”

- The name “information retrieval” is standard, but as traditionally practiced, it’s not really right
- All you get is document retrieval, and beyond that the job is up to you

What do we know that's happening?

- Much of what is going on is in the products of companies, and there isn't exactly careful research explaining or evaluating it

Google

What's been happening? 2014–2015

- “Mobilegeddon” (Apr 21, 2015):
 - “Mobile friendliness” as a major ranking signal
- “Pigeon” update (July 2014):
 - More use of distance and location in ranking signals
- “App Indexing” (Android, iOS support May 2015)
 - Search results can take you to an app
- Why?
 - About half of all searches are now from mobile
 - Making/wanting good changes, but obvious self-interest in trying to keep people using mobile web rather than apps

Google

What's been happening? 2014

- New search index at Google: “Hummingbird”
 - <http://www.forbes.com/sites/roberthof/2013/09/26/google-just-revamped-search-to-handle-your-long-questions/>
- Answering long, “natural language” questions better
 - Partly to deal with spoken queries on mobile
- More use of the Google Knowledge Graph
 - Concepts versus words

What's been happening

- Google Knowledge Graph
- Facebook Graph Search
- Bing's Satori
- Things like Wolfram Alpha

Common theme: Doing graph search over structured knowledge rather than traditional text search

What's been happening

- More semi-structured information embedded in web pages
 - schema.org

The screenshot shows the New York Times website interface. At the top, there are navigation links for 'SECTIONS', 'HOME', and 'SEARCH'. The main headline is 'After Nadal and Ferrer, Spanish Tennis Talent Pool Looks Thin' by Christopher Clarey. Below the headline, there is a sub-headline 'PARIS — The future of Spanish tennis may not be Spanish in the future.' and a photo of Garbiñe Muguruza. A ChromeCast advertisement is visible above the article.

```

275 <p class="byline-column">
276   On Tennis
277   <p class="byline">By
itemtype="http://schema.org/Person"
itemid="http://topics.nytimes.com/top/reference/timestopics/people/c/christopher_clarey/index.html">
278     <a
href="http://topics.nytimes.com/top/reference/timestopics/people/c/christopher_clarey/index.html" rel="author"
title="More Articles by CHRISTOPHER CLAREY">
279     </a>
name="Christopher Clarey" itemprop="name">CHRISTOPHER CLAREY</span>
280     </p>

```

What's been happening

- Move to mobile favors a move to speech which favors “natural language information search”
 - Will we move to a time when over half of searches are spoken?



Towards intelligent agents

Two goals

- Things not strings
- Inference not search

Two paradigms for question answering

- Text-based approaches
 - TREC QA, IBM Watson
- Structured knowledge-based approaches
 - Apple Siri, Wolfram Alpha, Facebook Graph Search

(And, of course, there are hybrids, including some of the above.)

At the moment, structured knowledge is back in fashion, but it may or may not last

Example from Fernando Pereira (GOOG)

painkillers that don't thin blood

painkillers that don't **thin blood**

painkillers that don't **cause constipation**

painkillers that don't **cause nausea**

painkillers that don't upset stomach frequent query

painkillers that don't

About 89,300 results (0.14 seconds)[Advanced search](#)

painkillers that don't upset stomach



Search

About 29,700 results (0.15 seconds)

[Advanced search](#)

► [Symptoms of Crohn's](#)

Sponsored link

www.crohnsonline.com

Do You Know the Signs of Crohn's? Read About Symptoms and More Now.

[Best Pain Reliever, Over the Counter Pain Relievers, Prescription ...](#)

For **stomach upset**, eating or drinking milk before you take a painkiller can help. ... **Don't** expect **painkillers** to relieve all your pain, but the best pain ...

www.healthblurbs.com/best-pain-reliever-over-the-counter-pain-relievers-prescription-analgesic-painkillers/ - [Cached](#) - [Similar](#)

[Why do painkillers make your stomach hurt? - Yahoo! Answers](#)

Aug 30, 2008 ... **stomach upset**, reflux/indigestion, or if severe ulcers ... I often take **painkillers** FOR **stomach** aches lol. **Don't** do this again. 2 years ago ...

answers.yahoo.com > Health > Other - Health - [Cached](#) - [Similar](#)

[How are painkillers bad for you?](#) - Apr 13, 2010

[What effect do painkillers have on you?](#) - Sep 30, 2009

[What's the difference between OTC painkillers? \(Advil, Aleve ...](#) - Nov 19, 2008

[Is it bad to take painkillers on an empty stomach ?](#) - Aug 20, 2008

[More results from answers.yahoo.com »](#)

[Phys Ed: Does Ibuprofen Help or Hurt During Exercise? - NYTimes.com](#)

Sep 1, 2009 ... When are ibuprofen and other anti-inflammatory **painkillers** justified? ... Can't take NSAIDS due to **upset stomach**. — bonemri ... Perhaps part of the problem is that you **don't** always have the option to rest your injury if ...

well.blogs.nytimes.com/.../phys-ed-does-ibuprofen-help-or-hurt-during-exercise/ - [Cached](#) - [Similar](#)

class negation synonyms

painkillers that don't upset stomach



Search

About 29,700 results (0.15 seconds)

[Advanced search](#)

► [Symptoms of Crohn's](#)

Sponsored link

www.crohnonline.com

Do You Know the Signs of Crohn's? Read About Symptoms and More Now.

[Best Pain Reliever, Over the Counter Pain Relievers, Prescription ...](#)

For **stomach upset**, eating or drinking milk before you take a painkiller can help. ... **Don't** expect **painkillers** to relieve all your pain, but the best pain ...

www.healthblurbs.com/best-pain-reliever-over-the-counter-pain-relievers-prescription-analgesic-painkillers/ - [Cached](#) - [Similar](#)

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answers.yahoo.com > [Health](#) > [Other - Health](#) - [Cached](#) - [Similar](#)

[How are painkillers bad for you?](#) - Apr 13, 2010

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[More results from answers.yahoo.com »](#)

[Phys Ed: Does Ibuprofen Help or Hurt During Exercise? - NYTimes.com](#)

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well.blogs.nytimes.com/.../phys-ed-does-ibuprofen-help-or-hurt-during-exercise/ -

[Cached](#) - [Similar](#)

"painkillers such as * tylenol"



Search

About 19,200 results (0.21 seconds)

[Advanced search](#)

[TYLENOL® Official Site](#)

Sponsored link

[Tylenol.com](#) Pain Relief from TYLENOL. Get Information and Coupons Here.
Head & Body Pain - Arthritis Pain - Sinus - Cold & Flu

[Ovarian hyperstimulation syndrome \(OHSS\): Treatments and drugs ...](#)

To ease abdominal discomfort, take over-the-counter painkillers such as acetaminophen Tylenol others) or ibuprofen (Advil, Motrin, others). ...

[www.mayoclinic.com/.../DSECTION=treatments-and-drugs](#) - [Cached](#) - [Similar](#)

tylenol \Rightarrow painkiller

painkiller "adverse effects include" stomach



Search

About 266,000 results (0.14 seconds)

[Advanced search](#)

[Painkiller Comparison Chart](#)

Oct 31, 2008 ... Chart showing prescription and non-prescription **painkillers** and what they are used for. ... menstrual pain, fever, Common **adverse effects include**: nausea, ... asthma, upset **stomach**, not for last pregnancy trimester. ...

www.disabled-world.com/.../painkiller-chart.shtml - [Cached](#) - [Similar](#)

[\[PDF\] List of Painkillers and what they are used for: Over the Counter ...](#)

File Format: PDF/Adobe Acrobat - [Quick View](#)

Common **adverse effects include**: nausea, dyspepsia, gastrointestinal ulceration/bleeding. ... upset **stomach**, not for last pregnancy trimester. Individuals ...

healingwithsoftlasers.com/.../Painkiller%20side%20effects%20chart%20.pdf

upset stomach \Rightarrow adverse effect (on stomach)

tylenol stomach



Search

About 1,390,000 results (0.28 seconds)

[Advanced search](#)

► [Pain Relievers And Upset Stomach - Tylenol Extra Strength Pain ...](#)

Tylenol Extra Strength Pain Reliever Fever Reducer 100 Caplets - User Rating: 5 stars.

Review Summary: Taking the wrong pain reliver can cause you **stomach** ...

[www.epinions.com](#) › [Wellness & Beauty](#) › [Health Aids](#) - [Cached](#) - [Similar](#)

[Treatment: Pain: Merck Manual Home Edition](#)

TYLENOL has virtually no useful anti-inflammatory activity, does not affect the blood's ability to clot, and has almost no adverse effects on the **stomach** ...

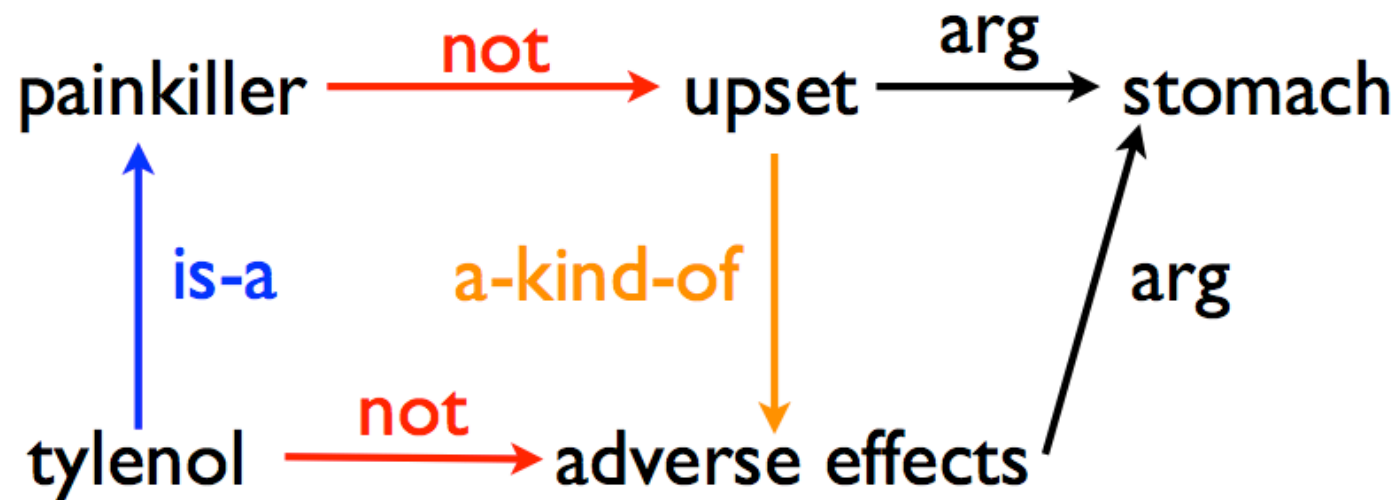
[www.merck.com/mmhe/sec06/ch078/ch078d.html](#) - [Cached](#) - [Similar](#)

tylenol \Rightarrow no adverse effects (on stomach)
 \Rightarrow no upset stomach

painkiller

upset

stomach



“Things, not strings”

From	To	Requires
Term	Concept	Parsing, disambiguation, coreference
Term identity	Entailment	Concept relations
Co-occurrence	Syntactic relation	Document structure, parsing
Term index	Semantic index	Concept disambiguation, inference

Slides from Patrick Pantel (MSFT)

Entity Detection

Structured Recommendations

YAHOO!

Seven Samurai

82,800,000 results

WEB IMAGES VIDEO SHOPPING BLOGS MORE

Also try: [seven samurai movie](#), [seven samurai remake](#), [more...](#)

Seven Samurai (1954)
[movies.yahoo.com](#)
[Yahoos B+](#) A Japanese farming village, constantly besieged and pillaged by an army of bandits, recruits seven independent... [more](#)

Running Time: 2 hr 40 min
Directed by: [Akira Kurosawa](#)
Starring: [Takashi Shimura](#), [Toshiro Mifune](#), [Yoshio Inaba](#), [Seiji Miyaguchi](#), ... [more](#)

Play trailer

Structured Data

RELATED MOVIES

- Dreams
- Ran
- Dersu Uzala
- Throne of Blood
- Yojimbo
- Stray Dog

The image is a screenshot of a Yahoo! search results page for the movie 'Seven Samurai'. The search bar at the top contains the text 'Seven Samurai'. Below the search bar, there are tabs for 'WEB', 'IMAGES', 'VIDEO', 'SHOPPING', 'BLOGS', and 'MORE'. The 'WEB' tab is selected. The search results show a list of related movies on the left, including 'Dreams', 'Ran', 'Dersu Uzala', 'Throne of Blood', 'Yojimbo', and 'Stray Dog'. The main result is for 'Seven Samurai (1954)' from 'movies.yahoo.com'. It includes a synopsis, running time, director, and cast. There are four red callout boxes with white text: 'Entity Detection' points to the search bar, 'Structured Recommendations' points to the 'RELATED MOVIES' section, 'Play trailer' points to the movie poster, and 'Structured Data' points to the movie details box.

bing
Web

flights to maui

Web Flights More▼

Flights from Seattle, WA to Maui, HI

FROM TO
Seattle, WA (SEA) - Seatl Kahului, HI (OGG) - Kahul

LEAVE RETURN
03/23/2012 03/25/2012 Find flights

bing.com/travel

WEEKEND ESTIMATES

↗ \$639 Depart March 09
↘ \$748 Depart March 16
↘ \$649 Depart March 23

Price prediction

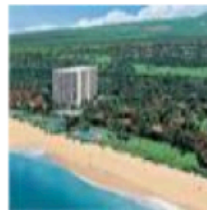
Task completion

bing
Web

royal lahaina resort

Web Hotels Images More▼

Royal Lahaina Resort - Bing Travel



2780 Kekaa Dr · Lahaina
(808) 661-9469

[Details](#) · [Photos](#) · [Amenities](#) · [Directions](#) · [Website](#)

★★★★☆ (12)

Sample rate: \$230

Aggregate ratings

Compare rates from major travel sites
CHECK IN CHECK OUT

03/15/2012 03/17/2012 Find rate

bing.com/travel/hotels/search?q=royal+lahaina+resort

Task completion

Introduction to Information Retrieval



mel gibson movies



Web

Images

Videos

Maps

News

More

9

Sign in



Mel Gibson - movies

All genres

Popular first



The Expendables 3 (2014)
★★★★★



Mad Max (1980)
★★★★★



Braveheart (1995)
★★★★★



Mad Max 2: The Road Warrior (1982)
★★★★★



Get the Gringo (2012)
★★★★★



Edge of Darkness (2010)
★★★★★



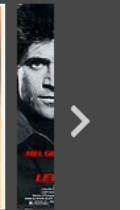
The Passion of the Christ (2004)
★★★★★



Apocalypse (2006)
★★★★★



Mad Max Beyond Thunderdome... (1985)
★★★★★



Let's Kill (1991)
★★★★★

Mel Gibson - IMDb

www.imdb.com/name/nm0000154

Born Jan 03, 1956 · 59 years old · 368 photos

Mel Gibson, Actor: **Braveheart**. **Mel Columcille Gerard Gibson** was born January 3, 1956 in Peekskill, New York, USA, as the sixth of eleven children of **Hutton Gibson**, a ...
[Biography](#) · [Awards](#) · [Films](#) · [News](#)

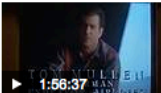
Mel Gibson Movies | Movies.com

www.movies.com/actors/mel-gibson/mel-gibson-movies/p181347

50 rows · Get the full list of all **Mel Gibson** movies. See who they starred with and ...
[Linda Hunt](#) · [Beth Orton](#) · [Watch at Home](#) · [Contact Us](#) · [Bill Kerr](#) · [Mad Max](#)

Videos of mel gibson movies

bing.com/videos



Ransom (1996) - Full Movie
YouTube



'The Beaver' Trailer
YouTube



Ransom Trailer HQ (1996)
YouTube



Payback Trailer
YouTube

[See more videos of mel gibson movies](#)

Mel Gibson - Wikipedia, the free encyclopedia

en.wikipedia.org/wiki/Mel_Gibson

Mel Colm-Cille Gerard Gibson AO (born January 3, 1956) is an American actor and filmmaker. He is most well known as an action hero, for roles such as Martin Riggs in ...
[Early life](#) · [Career](#) · [Film work](#) · [Prospective films](#) · [Personal life](#)

Mel Gibson filmography - Wikipedia, the free encyclopedia

Mel Gibson

American Actor



Mel Colm-Cille Gerard Gibson AO is an American actor and filmmaker. He is most well known as an action hero, for roles such as Martin Riggs in the Lethal Weapon buddy cop film series and Max Rockatansky in the first three films in the Ma... +



[Wikipedia](#)



[IMDb](#)



[Facebook](#)

Born: Jan 03, 1956 (age 59) · [Peekskill](#)

Height: 5' 10" (1.77 m)

Romance: [Oksana Grigorieva](#) · [Oksana Pochepa](#)

Spouse: [Robyn Moore Gibson](#) (1980 - 2011)

Children: [Hannah Gibson](#) (Daughter) · [Christian Gibson](#) (Son) · [Edward Gibson](#) (Son) · [Louis Gibson](#) (Son) · [William Gibson](#) (Son) +

Upcoming movies: [Hacksaw Ridge](#)

People also search for

[See all \(10+\)](#)



[Oksana Grigorieva](#)
Former partner



[Sylvester Stallone](#)








[Harrison Ford](#)



[Arnold Schwarzenegger](#)



[Robert Downey Jr.](#)

manning@stanford.edu




[Web](#) [Images](#) [News](#) [Shopping](#) [Videos](#) [More](#) [Search tools](#)

About 102,000,000 results (0.55 seconds)

45 years (March 27, 1970)

Mariah Carey, Age

Direct Answer

Madonna
56 yearsNick Cannon
Spouse
34 yearsJennifer Lopez
45 years

Feedback

Mariah Carey - Wikipedia, the free encyclopedia

en.wikipedia.org/wiki/Mariah_Carey - Wikipedia

Mariah Carey was **born on March 27, 1969** or 1970 in Huntington, New York. Her father, Alfred Roy, was of African American and Venezuelan (including Afro-Venezuelan) descent, while her mother, Patricia (Hickey), is of White Irish descent.

[Nick Cannon - Tommy Mottola - Albums - Me. I Am Mariah... The Elusive ...](#)

Nick Cannon & Mariah Carey Fighting: Split Caused By ...

hollywoodlife.com/.../nick-cannon-mariah-carey-fightin... - Hollywood Life

Aug 22, 2014 - Nick Cannon and Mariah Carey announced their separation after **six years** of marriage, and now HollywoodLife.com has learned EXCLUSIVELY what caused the power couple to split up. Nick Cannon, 33, and Mariah Carey, 44, have separated after **six years** of marriage, and two beautiful children together.

Mariah Carey - Biography - Music Producer, Film Actress ...

www.biography.com/people/mariah-carey-9542177 - FYI

Mariah Carey was born **March 27, 1970**, in Huntington, Long Island, New York, and began taking voice lessons at **age four**. At 18 she signed with Columbia ...

Mariah Carey Divorce Explained: Nick Cannon Cheating ...


www.celebdirtylaundry.com/.../mariah-carey-divorce-nick-cannon-cheat...


Aug 29, 2014 - **Mariah Carey Divorce Explained: Nick Cannon Cheating and Paying For 23-Year Old Mistress Jasmine Sanders and Dancer Brittany Dailey.**

Mariah Carey

Singer-songwriter

Ads Listen now

 Google Play Listen with **free trial**

 Spotify Listen for **free**

Mariah Carey is an American singer, songwriter, record producer, and occasional actress. She rose to prominence after releasing her self-titled debut studio album Mariah Carey in 1990; it went multiplatinum ... [Wikipedia](#)





Born: March 27, 1970 (age 45), Huntington, NY
Height: 5' 9" (1.75 m)
Children: Moroccan Scott Cannon, Monroe Cannon
Spouse: Nick Cannon (m. 2008), Tommy Mottola (m. 1993–1998)

Songs

Without You	1993	Music Box
Hero	1993	Music Box
I Want to Know Wh...	2009	Memoirs of an I...
I'll Be There	1990	Mariah Carey
We Belong Together	2005	The Emancipatio...

Albums

[View 20+ more](#)



Patrick Pantel talk

(Then) Current experience

The screenshot shows a Bing search results page for the query "jetbeam rrt-0". The page layout includes a top navigation bar with links to Web, Images, Videos, Shopping, News, Maps, and More, along with MSN and Hotmail links. The Bing logo is on the left, and the search bar contains the query "jetbeam rrt-0". Below the search bar, there are tabs for "Web", "Videos", and "More". The search results are displayed in a list format, with the first result being "JETBeam RRT-0 R5 with Infinite Ramping LED Flashlight ...". The second result is "Jetbeam RRT-0" and the third is "JETBeam RRT-0 Overview With Lots of Pictures". The left sidebar contains "RELATED SEARCHES" and "SEARCH HISTORY".

Web Images Videos Shopping News Maps More | MSN Hotmail

Thomas Sign out Rewards

bing MS Beta

jetbeam rrt-0

Web Videos More

RELATED SEARCHES

- JETBeam RRT 0 Review
- JETBeam Flashlights
- JETBeam RRT-0 R5
- JETBeam Raptor
- JETBeam M1X
- JETBeam
- RRT-0 R5
- 240 Lumens

SEARCH HISTORY

Search more to see your history

See all

Clear all · Turn off

ALL RESULTS 1-10 of 6,600 results · [Advanced](#)

[JETBeam RRT-0 R5 with Infinite Ramping LED Flashlight ...](#)
Going Gear JETBeam RRT-0 R5 with Infinite Ramping LED Flashlight [jetbeamrrt0r5] - The popular RRT-0 has been updated to be an even more versatile flashlight, ...
goinggear.com/index.php?main_page=product_info&cPath=14_22&products_id=438 · [Mark as spam](#)

[Jetbeam RRT-0](#)
Now In Stock! Model: RRT-0 (S2) Specially designed for Military, Law Enforcement, Self-defense, Hunting, Search & Rescue and General Outdoors The Rapid ...
www.jetbeamusa.com/products/RRT%2d0.html · [Mark as spam](#)

[JETBeam RRT-0 Overview With Lots of Pictures](#)
I got my JETBeam RRT-0 Raptor today. All I can say is to JETBeam! This thing is a ... PICTURES QUICKLY.... BEFORE MY HEAD EXPLODES!!! Ok... it didnt ...
323 replies since November 2009
www.candlepowerforums.com/vb/showthread.php?248375-JETBeam-RRT-0-Overview-With-Lots-of- · [Mark as spam](#)

[JETBeam Flashlights](#)
Specification: Model: JETBeam RRT-0(R2) Flashlight; Specially designed for Military, Law Enforcement, Self-defense, Hunting, Search & Rescue and Outdoorsman
jetbeamblog.com · [Mark as spam](#)

Desired experience: Towards actions

Recognize
entity in query

Actions easily
accessible

Web Images Videos Shopping News Maps More | MSN Hotmail

Thomas Sign out Rewards


bing MS Beta

jetbeam rrt-0

Web Videos More

ENTITY

ALL RESULTS 1-10 of 6,600 results · [Advanced](#)



JETBeam RRT-0 Flashlight (Product)

JETBeam RRT-0 R5 with Infinite Ramping LED Flashlight ...
Going Gear JETBeam RRT-0 R5 with Infinite Ramping LED Flashlight [jetbeamrrt0r5] - The popular RRT-0 has been updated to be an even more versatile flashlight, ...
goinggear.com/index.php?main_page=product_info&cPath=14_22&products_id=438 · [Mark as spam](#)

Jetbeam RRT-0
Now In Stock! Model: RRT-0 (S2) Specially designed for Military, Law Enforcement, arch & Rescue and General Outdoors The Rapid ...
[Amazon.com](#) [CandlePowerForums](#) [Epinions.com](#) [FlashlightReviews.com](#) [review With Lots of Pictures](#)
more ...
323 replies since November 2009
www.candlepowerforums.com/vb/showthread.php?248375-JETBeam-RRT-0-Overview-With-Lots-of-... · [Mark as spam](#)

RELATED SEARCHES
[JETBeam RRT 0 Review](#)
[JETBeam Flashlights](#)

ACTIONS
[Read Reviews](#)
[Watch Demo Video](#)
[Product Comparisons](#)
[Social Discounts](#)
[Find Locally](#)
[Buy Online](#)
[Price Predictions](#)

Politician

Recognize
entity in query

Actions easily
accessible

The screenshot shows a Bing search results page for the query "Obama". The page layout includes a top navigation bar with links to Web, Images, Videos, Shopping, News, Maps, and More, along with MSN and Hotmail logos. Below the navigation bar is the Bing logo and the search query "Obama". The search results are categorized into "ENTITY" and "ACTIONS".

ENTITY

Barack Obama (President)

ACTIONS

- Watch Weekly Address
- Follow Social Updates
- Read Biography
- View Approval Ratings
- Support Candidacy

ALL RESULTS 1-10 of 511,000 results · [Advanced](#)

Official Obama Website Ad

www.BarackObama.com · Respect. Empower. Include. Win. Join Barack Obama's campaign now.

Other ideas: [obama barack bio](#) · [president obama website](#)

Obama for America | 2012

Barackobama.com is the official re-election campaign website of President Barack Obama. Visit the site for the latest updates from the Obama campaign, 2012 election news ...

www.barackobama.com · Mark as spam

[Ronojoy Chakrabarti](#) and [Caroline Mackey](#) like Barack Obama

Barack Obama - Wikipedia, the free encyclopedia

career · Legislative career ... · Presidential campaigns

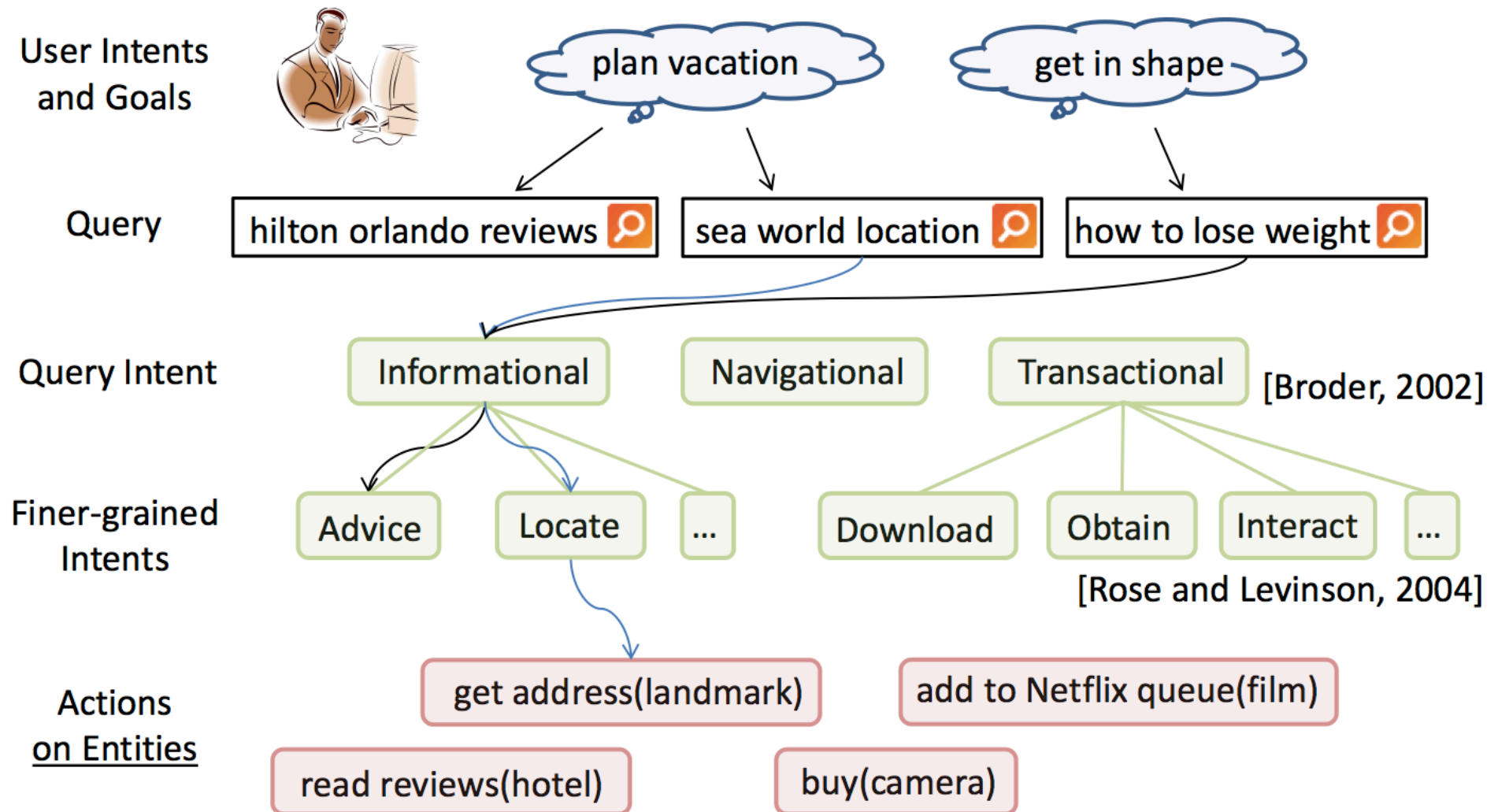
[Barack Obama II](#) (born August 4, 1961) is the 44th and current President of the United States. He is the first African American to hold the office. [Obama ...](#)

en.wikipedia.org/wiki/Obama · Mark as spam

RELATED SEARCHES

[Barack Obama and other U.S. politicians by office, state, and branch of government](#)

Actions vs. Intents



Learning actions from web usage logs

- Three months of us-en web logs
- Annotate with Freebase entities
- Keep queries with an entity in set of 21 types
- Filter out navigational queries
- Filter out clicked hosts that weren't clicked at least 100 times

2,164,579 (query, host) pairs over 3 months	235,385 entities	21 types
	129,088 contexts	58,123 hosts

get reviews	←	Orlando hotel reviews
read biography		Does Hope Solo have a boyfriend?
download software		Free Winzip download
watch shows online		watch family guy online

The screenshot shows a Bing search results page for the query "hannah montana". The browser address bar shows "http://www.bing.com/se" and the search bar contains "hannah montana". The page displays various search results, including a top result for "Hannah Montana Forever | Disney Channel" and a Wikipedia entry for "Hannah Montana". A red callout box with a pointer to the search bar contains the following text:

- A hodgepodge of related **strings**
- Only actionable through search

The search results include:

- RELATED SEARCHES:** Miley Cyrus, Billy Ray Cyrus, Hannah Montana Games, Hannah Montana Style, Hannah Montana Sing, Hannah Montana Information, Hannah Montana Dress Up Games, Disney Channel Hannah Montana.
- SEARCH HISTORY:** Turn on search history to start remembering your searches. Turn history on.
- ALL RESULTS:** 1-10 of 14,800,000 results - Advanced.
- Top Result:** [Hannah Montana Forever | Disney Channel](#). Explore the Hannah Montana Forever home page for videos, full-length episodes, character bios, games, photos, downloads, music, and more! tv.disney.go.com/disneychannel/hannahmontana · Mark as spam.
- News Snippets:** NASHVILLE, Tenn. (AP) -- Billy Ray Cyrus says the Disney TV show "Hannah Montana" destroyed his family, causing his divorce and sending daughter Miley Cyrus spinning out of... [Yahoo Finance](#) · 10 hours ago. Miley Cyrus Angry With Dad Over Hannah Montana Slur [Entertainmentwise](#). Popversations: Lady Gaga at the Grammys, HBO shows and Hannah Montana [Florida Times-Union](#).
- Wikipedia Entry:** [Hannah Montana - Wikipedia, the free encyclopedia](#). Production · Cast · Episodes · Films. **Hannah Montana** is an American television series, which debuted on March 24, 2006 on Disney Channel, and also airs Saturday mornings on ABC as part of the ABC Kids block. en.wikipedia.org/wiki/Hannah_montana · Mark as spam.
- Character Bios:** [Character Bios | Hannah Montana Forever | Disney Channel](#). Meet Miley, Lilly, Oliver, Rico, and the rest of the gang from Disney Channel's **Hannah Montana Forever!** tv.disney.go.com/disneychannel/hannahmontana/characters/index.html · Mark as spam.
- Sponsored sites:** [Hannah Montana Forever](#). Pre-Order The Final Season Ultimate Fan Experience. Free Charm Set! www.DisneyShoppingCart.com/Hannah. [Watch TV Shows at Bing™](#). Browse Video Clips and Popular Episodes at Bing Today! bing.com/videos. [Hannah Montana](#). Free Shipping \$50 on 100,000 Items Shop **Hannah** etc. Online at Target. www.Target.com. [Hannah Montana Items](#). We Have The **Hannah Montana** Items To Complete Any Fans Collection! Hannah-Montana.BradfordExchange.com. [From Hannah Montana](#). Compare Choices and Prices. Everything You Want and Need! Shopzilla.com. See your message here.

At the bottom right, there are buttons for "Internal preview" and "Help improve Bing".

Web Images Videos Shopping News Maps More | MSN Hotmail Sign in Redmond, Washington Preferences

bing MS Beta br1011 hannah montana

Web Videos News TV Shopping Images More

RELATED PRODUCTS

- Girl Talk Game
- Hannah Montana Doll
- Kids Rock Guitar

RELATED PEOPLE

- Billy Ray Cyrus
- Aaron Kelly

RELATED MUSIC

- Miley Cyrus: Soundtrack 2009
- Taylor Swift: Our Song 2010

RELATED VIDEOS

- Miley Cyrus Performs At Idol

ALL RESULTS 1-10 of 14,500,000 results - Advanced


Hannah Montana Forever | Disney Channel
Explore the **Hannah Montana** Forever home page for videos, full-length episodes, character bios, games, photos, downloads, music, and more!
tv.disney.go.com/disneychannel/hannahmontana · Mark as spam

Hannah Montana Games
Disney Channel Games
Good Luck Charlie

Sonny With A Chance
TV Shows
Phineas & Ferb
Fish Hooks

Show more results from tv.disney.go.com

Entertainment News: **hannah montana**

 Billy Ray Cyrus: 'Hannah Montana' destroyed family
NASHVILLE, Tenn. (AP) -- Billy Ray Cyrus says the Disney TV show "Hannah Montana" destroyed his family, causing his divorce and sending daughter Miley Cyrus spinning out of... [Yahoo Finance](#) · 10 hours ago

Miley Cyrus Angry With Dad Over **Hannah Montana** Slur [Entertainmentwise](#)
Popversations: Lady Gaga at the Grammys, HBO shows and **Hannah Montana** [Florida Times-Union](#)

Hannah Montana - Wikipedia, the free encyclopedia
Production · Cast · Episodes · Films
Hannah Montana is an American television series, which debuted on March 24, 2006 on Disney Channel, and also airs Saturday mornings on ABC as part of the en.wikipedia.org/wiki/Hannah_montana · Mark as spam

Character Bios | Hannah Montana Forever | Disney Channel
Meet Miley, Lilly, Oliver, Rico, and the rest of the gang from Disney Channel's **Hannah Montana** Forever!
tv.disney.go.com/disneychannel/hannahmontana/characters/index.html · Mark as spam

Sponsored sites

Watch TV Shows at Bing
Browse Video Clips and Popular Episodes at Bing Today!
bing.com/videos

Hannah Montana
Free Shipping \$50 on 100,000 Items
Shop **Hannah** etc. Online at Target.
www.Target.com

Hannah Montana Items
We Have The **Hannah Montana** Items To Complete Any Fans Collection!
Hannah-Montana.BradfordExchange.com

From Hannah Montana
Compare Choices and Prices.
Everything You Want and Need!
Shopzilla.com

Hannah Montana Wigs
15,000 Costumes - All Sizes & Styles.
Low Prices & Same Day Shipping!
www.BuyCostumes.com

See your message here

Internal preview Help improve Bing

The screenshot shows a Bing search results page for the query "hannah montana". The page includes various sections: "Web", "Shopping", "Related Products", "Related People", "Related Music", and "Related Videos". A green callout box titled "Big Wins" is overlaid on the right side of the page, containing a bulleted list of features. The list includes "Typed relations", "User Interface accesses structured data", and "Click through experience can now leverage strongly-typed identifier". The callout box also contains several links to websites related to Hannah Montana, such as "Montana.BradfordExchange.com", "From Hannah Montana", "Hannah Montana Slur", "Hannah Montana Wigs", and "Hannah Montana Wigs".

Big Wins

- Typed relations
- User Interface accesses structured data
- Click through experience can now leverage strongly-typed identifier

us says the Disney TV show "Hannah Montana" is about a girl who becomes a pop star after her divorce and sending daughter Miley Cyrus to Hollywood. The show debuted on March 24, 2006 on Disney Channel.

Montana.BradfordExchange.com

From Hannah Montana
Compare Choices and Prices.
Everything You Want and Need!
Shopzilla.com

Hannah Montana Wigs
15,000 Costumes - All Sizes & Styles.
Low Prices & Same Day Shipping!
www.BuyCostumes.com
See your message here

Internal preview Help improve Bing

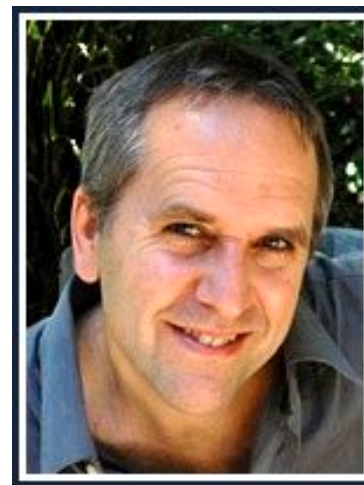
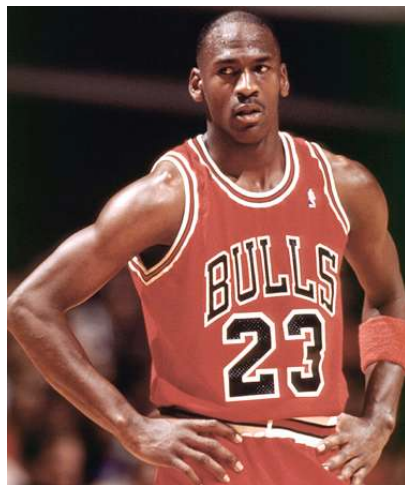
The screenshot shows a Bing search results page for the query "hannah montana". The page layout includes a top navigation bar with links to Web, Images, Videos, Shopping, News, Maps, and More, along with MSN and Hotmail links. The search results are organized into several sections: RELATED PRODUCTS, ALL RESULTS, RELATED PEOPLE, RELATED MUSIC, and RELATED VIDEOS. Annotations are present on the page:

- Big Wins** (Green box):
 - Typed relations
 - User Interface accesses structured data
 - Click through experience can now leverage strongly-typed identifier
 - **Brokered Actions (one click conversions)**
- Add to Amazon cart** (Green arrow pointing to the "Hannah Montana Doll" product listing).
- Connect on Twitter** (Green arrow pointing to the "Billy Ray Cyrus" profile link).
- Play track** (Green arrow pointing to the "Miley Cyrus: Soundtrack" music listing).

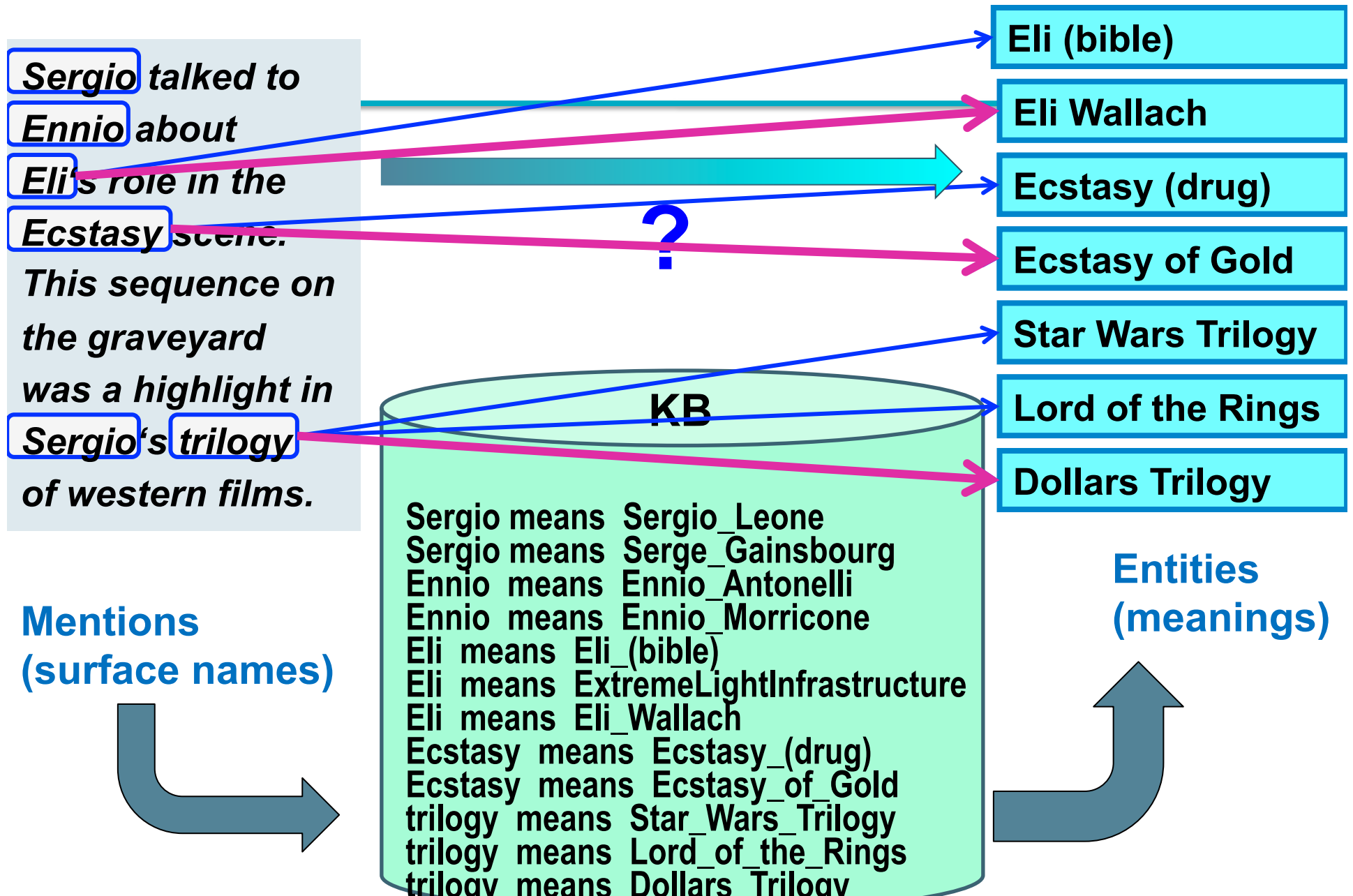
The search results include links to the Disney Channel's "Hannah Montana Forever" home page, various games, photos, and downloads, as well as news articles about Billy Ray Cyrus and Miley Cyrus. The bottom of the page features links to "Hannah Montana Wigs" and "Hannah Montana Soundtrack".

Entity disambiguation and linking

- Key requirement is that entities get identified
 - Named entity recognition (e.g., Stanford NER!)
- and disambiguated
 - Entity linking (or sometimes “Wikification”)
 - e.g., Michael Jordan the basketballer or the ML guy



Mentions, Meanings, Mappings [G. Weikum]

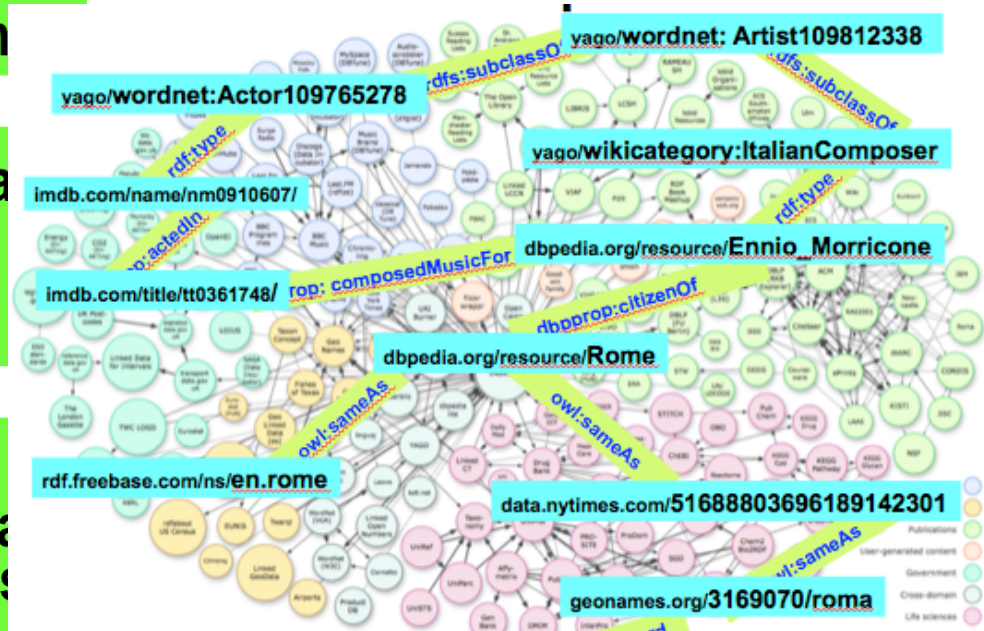


- and linked to a canonical reference
 - Freebase, dbPedia, Yago2, (WordNet)


http://.../wiki/Dollars_Trilogy
http://.../wiki/The_Good,_the_Bad,
http://.../wiki/Clint_Eastwood
http://.../wiki/Honorary_Academ







http://.../wiki/The_Good,_the_Ba
http://.../wiki/Metallica
http://.../wiki/Bellagio_(casino)
http://.../wiki/Ennio_Morricone

http://.../wiki/Sergio_Leone
http://.../wiki/The_Good,_the_Ba
http://.../wiki/For_a_Few_Dollars
http://.../wiki/Ennio_Morricone










Facebook Graph Search


 Search for people, places and things

-  My friends
-  Photos of my friends
-  Restaurants nearby
-  Games my friends play
-  Music my friends like
-  Photos I have liked


 places


-  Cities visited by my family
-  Restaurants in **San Francisco, California**
-  Indian restaurants liked by my friends from **India**
-  Tourist attractions in **Italy** visited by my friends
-  Restaurants in **New York** liked by Chefs
-  Countries my friends have visited

 Music I may like   Christopher Home    



Get more music recommendations from your friends
255 of your friends can recommend music for you



 Select Friends to Ask




Johnny Cash ✓
Musician/Band

Released **June Carter and Johnny Cash: Duets, American VI: Ain't No...**
12,512,930 like this

People also like **Bob Dylan, June Carter Cash** and other musicians
Serafim Batzoglou, Sef Kloninger and 6 other friends like this



 Like 

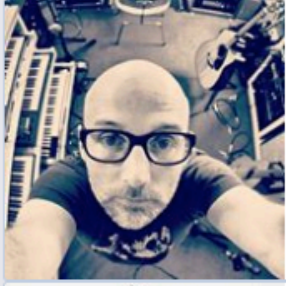


Hank Williams Jr. ✓
Musician/Band

Released **Whiskey Bent and Hell Bound, Three Hanks: Men with Brok...**
2,561,252 like this

People also like **The Charlie Daniels Band, George Jones - The Possu...**
Jenny Finkel likes this



 Like 




Moby ✓
Musician/Band

Released **Ambient, Last Night (Moby album)** and 25 other albums
2,432,329 like this

People also like **Everything but the Girl, Massive Attack** and other mu...
Serafim Batzoglou likes this

 Like 




Robyn Adele Anderson
Musician/Band

People also like **Scott Bradlee, Puddles Pity Party** and other musicians
28,633 like this
Eleni Mitsakaki likes this

More

Social search/QA

Recommended for  **Add**

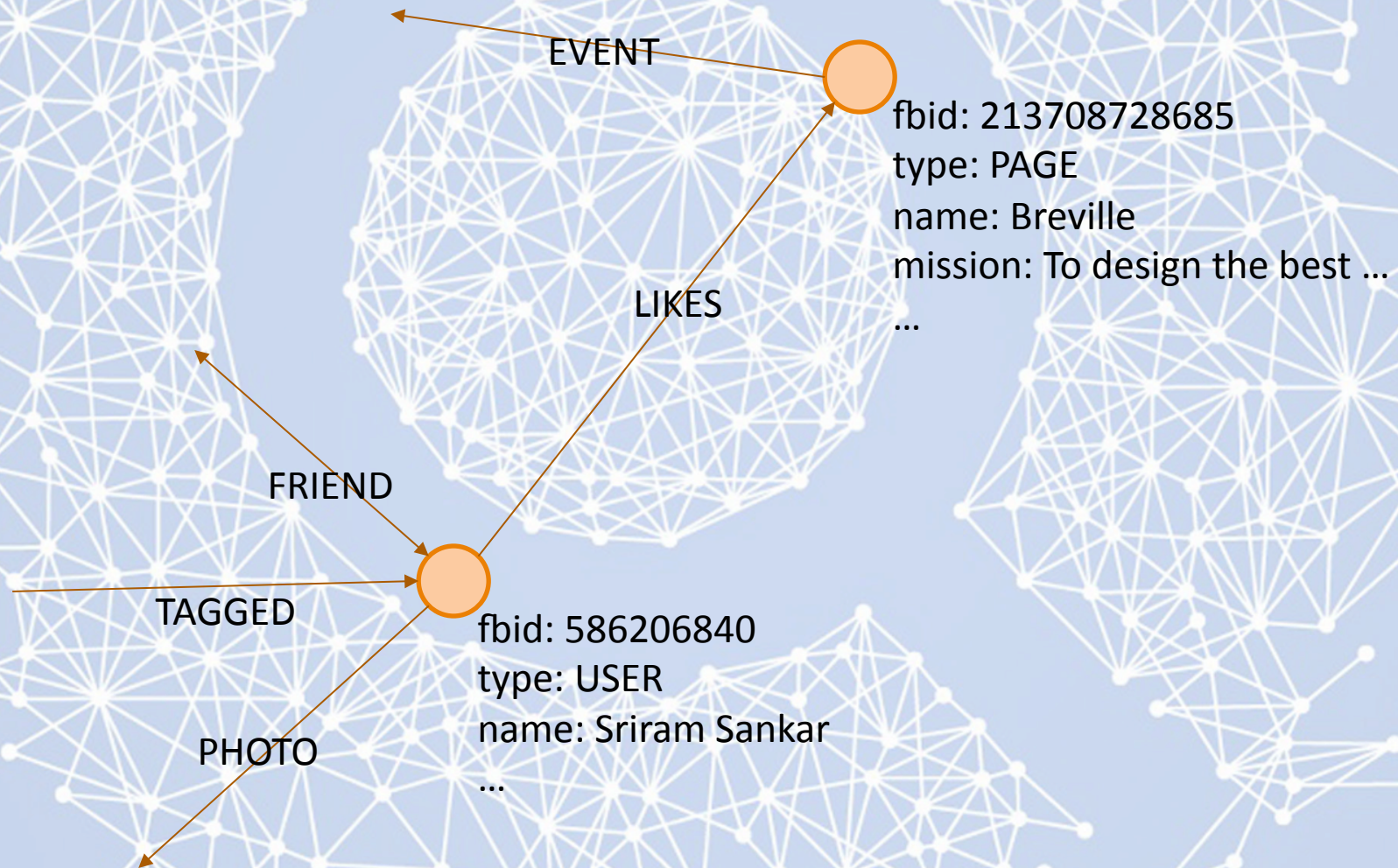
[Give Feedback](#)

The background of the slide features a complex, light blue network graph pattern. It consists of numerous small white dots (nodes) connected by thin white lines (edges), forming a dense, interconnected web that fills the entire background.

The Facebook Graph

- Collection of entities and their relationships
- Entities (users, pages, photos, etc.) are *nodes*
- Relationships (friendship, checkins, tagging, etc.) are *edges*
- Nodes and edges have metadata
- Nodes have a unique id – the *fbid*

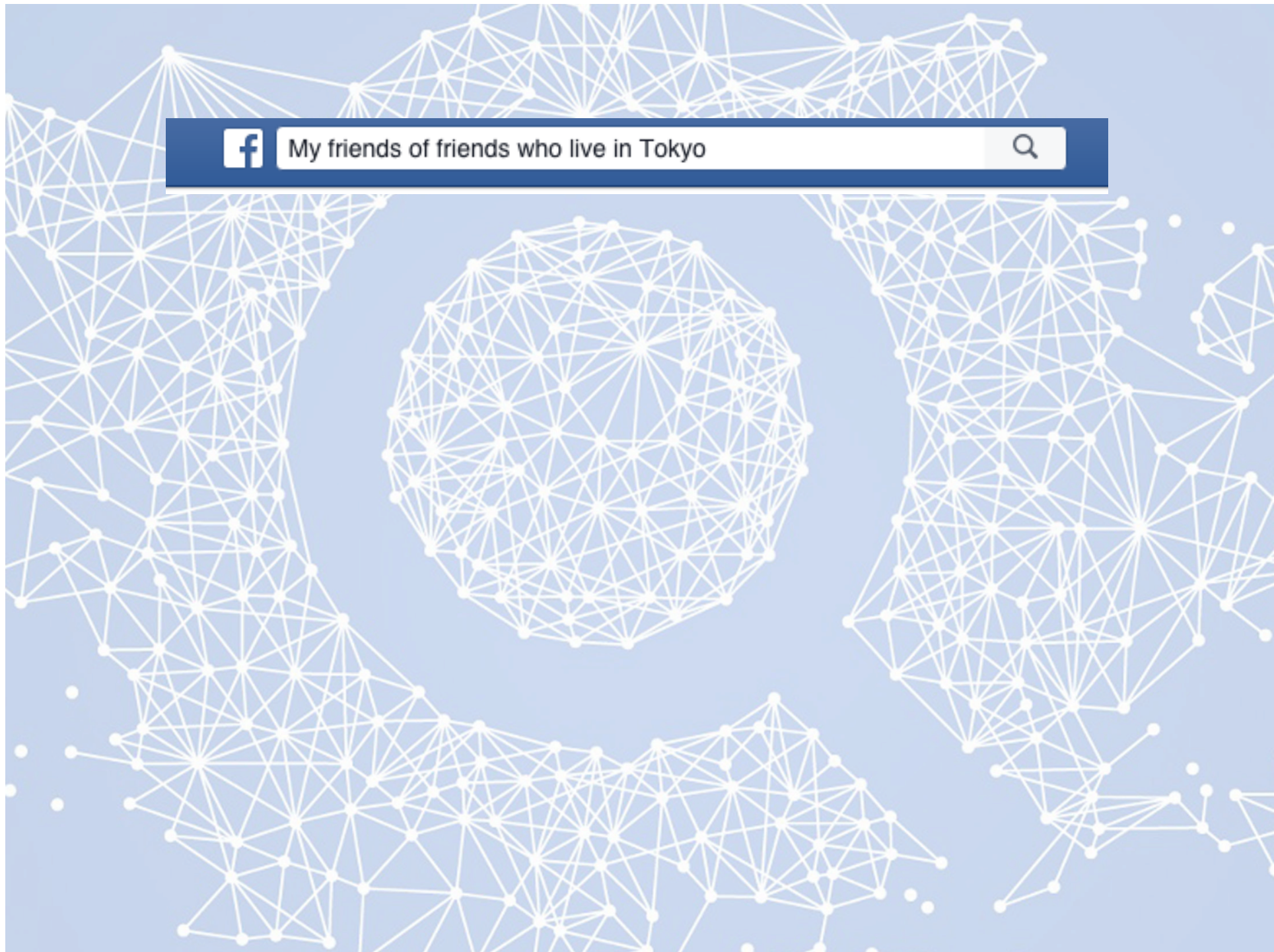
Facebook Graph Snippet





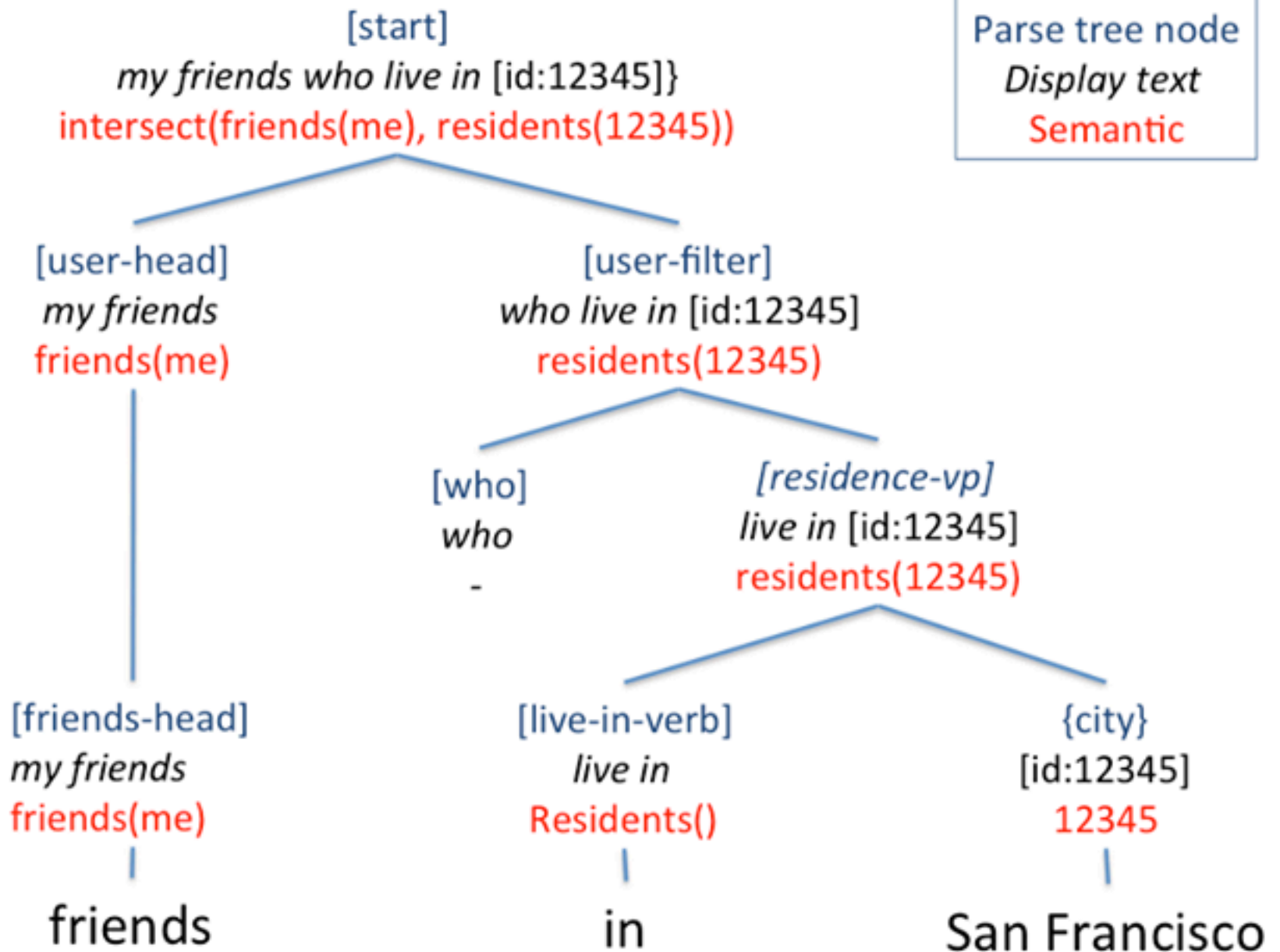
people named "Donald Patterson" who work at Westmont College





Facebook Graph Search

- Uses a weighted context free grammar (WCFG) to represent the Graph Search query language:
- [start] => [users] \$1
- [users] => my friend friends(me)
- [users] => friends of [users] friends(\$1)
- [users] => {user} \$1
- [start] => [photos] \$1
- [photos] => photos of [users] photos(\$1)
- A terminal symbol can be an entity, e.g., {user}, {city}, {employer}, {group}; it can also be a word/phrase, e.g., friends, live in, work at, members, etc. A parse tree is produced by starting from [start] and expanding the production rules until it reaches terminal symbols.



The parse tree, semantic and entity ID used in the above example are for illustration only; they do not represent real information used in Graph Search Beta

third prime minister of Australia

Australia's third prime minister

Australia's 3rd prime minister

3 approaches to question answering:

Knowledge-based approaches (Siri)

- Build a semantic representation of the query
 - Times, dates, locations, entities, numeric quantities
- Map from this semantics to query structured data or resources
 - Geospatial databases
 - Ontologies (Wikipedia infoboxes, dbPedia, WordNet, Yago)
 - Restaurant review sources and reservation services
 - Scientific databases
 - Wolfram Alpha

Text-based (mainly factoid) QA

- QUESTION PROCESSING
 - Detect question type, answer type, focus, relations
 - Formulate queries to send to a search engine
- PASSAGE RETRIEVAL
 - Retrieve ranked documents
 - Break into suitable passages and rerank
- ANSWER PROCESSING
 - Extract candidate answers (as named entities)
 - Rank candidates
 - using evidence from relations in the text and external sources

Hybrid approaches (IBM Watson)

- Build a shallow semantic representation of the query
- Generate answer candidates using IR methods
 - Augmented with ontologies and semi-structured data
- Score each candidate using richer knowledge sources
 - Geospatial databases
 - Temporal reasoning
 - Taxonomical classification