# Future Trends in Search User Interfaces

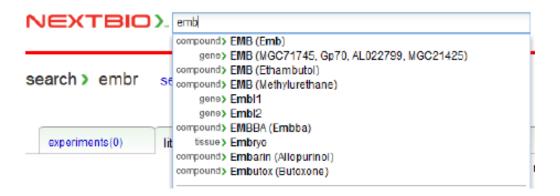


Marti Hearst 1202 Guest Lecture November 14, 2013



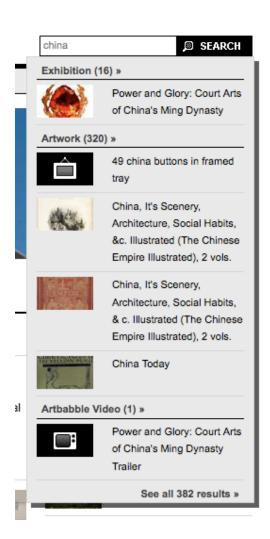
# Exercise: What UIs work well in search now?

# Real-Time Suggestions









http://www.imamuseum.org/

### **Faceted Navigation**

### Flamenco Fine Arts Search

Images from the Collections of the Fine Arts Museums of San Francisco; Legion of Honor and de Young Museums, http://www.thinker.org

Save Search

These terms define your current search. Click the  $|\mathbf{x}|$  to remove a term.

History and Settings Return to Search

401

New Search

Powered by Flamenco

search • all items • in current results

Refine your search within these categories:

Items 1 to 40 of 538 results

121

LOCATION: Asia > Japan | >

Group by: Location

MEDIA (group results)

Objects (8) Ceramic (1) Print (508) Drawing (22)

LOCATION: all > Asia > Japan

**OBJECTS** (group results)

Clothing (112) Musical

Instruments (11) Containers (48) Food and Meals (64) Vehicles (105)

Weapons (47) Fuel (1)

Lighting (22) Writing Tools (93)

Hakone, no. 11 f... 1804



201

241

Kneeling Woman Sho... circa 1794 - 1796



The Courtesan Tsum... circa 1815 - 1825



The New Yosihiwara... 1815 - 1825

BUILT\_PLACES (group results)

Bridge (17) Dwelling (42) Building (82)

Built Open Space (14) Road (21)

f Building Subcategories:

cottage house

castle

palace

residence.

ANIMALS AND PLANTS (group results) Mammals, Ho Birds (61)

Mammals, Oth villa Creatures and Parts of Plants (24) Beasts m





Woman Writing a Le... circa 1810 - 1815



Women in Boats nea... circa 1790



Children's Pastime... circa 1820

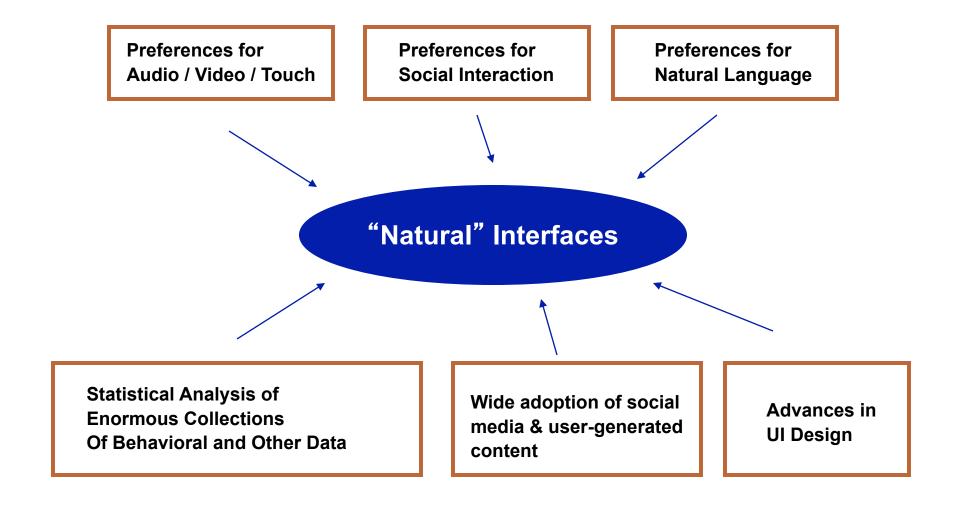
## Where are Search UIs headed?

# Forecasting the Future

First: What are the larger trends?

In technology?
In society?

Next: Project out from these.





# **Trend: More Natural Queries**



### Trend: Longer, more natural queries

- The research suggests people prefer to state their information need rather than use keywords.
  - But after first using a search engine they quickly learned that full questions resulted in failure.



### Trend: Longer, more natural queries

- The research suggests people prefer to state their information need rather than use keywords.
  - But after first using a search engine they quickly learned that full questions resulted in failure.
- Average query length continues to increase
  - In 2010 vs 2009, searches of 5-8 words were up 10%, while 1-2 word searches were down.



Subject	9/5/2009	9/4/2010	Year-over-Year percent change
1 word	24.21%	22.72%	-6%
2 words	23.77%	23.83%	0%
3 words	20.76%	20.24%	-3%
4 words	13.76%	13.97%	2%
5 words	7.88%	8.40%	7%
6 words	4.20%	4.60%	10%
7 words	2.25%	2.56%	14%
8+ words	3.16%	3.68%	16%
5 to 8+ words	4.37%	4.81%	10%
1 to 4 words	20.63%	20.19%	-2%

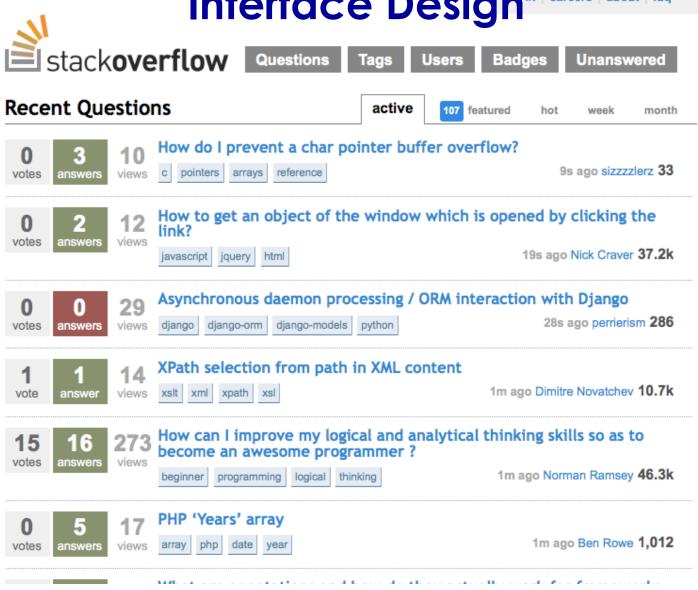
Note: data is based on all searches conducted on all search engines on a four week rolling period from the Experian Hitwise sample of 10 million US Internet users.

Source: Experian Hitwise

### Trend: Longer, more natural queries

- Social Question Answering Sites:
  - Information worded as questions increasing available
    - with the questions that the audience really wants the answers to, and
    - written in the language the audience wants to use.
  - AND with advanced user interface design.

# Long Queries Aided by Advanced User Interface Designin careers about faq



# An example: keywords failed

#### rca-3 male two female

Search

About 649,000 results (0.25 seconds)

Advanced search

### Amazon.com: "2 x RCA Male / 1 x 3.5mm Stereo Female, Y-Cable, 6 ...

2 x RCA "Y" Audio Cable connects PC Sound Cards, portable CD players, MP-3 players or any mini-home stereo audio source with 3.5mm jacks to a stereo ...

www.amazon.com > ... > Cables > Cables & Interconnects - Cached - Similar

### Amazon.com: RiteAV - 3.5mm to RCA Stereo Female Cable - 6 inch ...

Splits a 3.5mm jack into **two RCA** jacks; Connectors: 3.5mm Stereo **Male** to 2-**RCA Female** .... I use it to listen to my Playstation 3 through my speakers. ... www.amazon.com > ... > Audio Cables > RCA Cables - Cached - Similar

♣ Show more results from www.amazon.com

### Shopping results for rca-3 male two female



Rca 3" Rca Y-adapter - Male To Female

\$6.99 new - eBay

RCA 3"" RCA Y-Adapter - Male To Female

\$6.99 new - mysavingshop.com

Rca Rca 3" Mini Stereo Headphone Adapter (ah202) (ah202)

\$7.69 new - CompUPlus.com

#### Audio Cables - RCA / 3.5mm

Product image for PREMIUM 3.5mm Stereo **Male** to (2) 3.5mm Stereo **Female** · Product ID: 5614 .... Product image for **RCA** Plug/2 **RCA** Jack cable - 6 inches ... www.monoprice.com › CABLES - Cached - Similar

### 3.5mm Male to 2 RCA Jacks

... 3.5mm Male Stereo Audio to 2 Female RCA Connect two stereo audio cables to the ... Connect the adapter to our "3 RCA to 3 RCA" cable - see link below. ... www.svideo.com/rcastereoplug.html - Cached - Similar

### Reworded as I would have said it:

### how do I connect wii and dvd to my tv

Search

About 1,650,000 results (0.22 seconds)

Advanced search

### Nintendo - Customer Service | Wii - Connecting to the TV or VCR

**Connecting** to a VCR, **DVD**-R, Cable Box, etc. In order to **connect** a video game ... Once the cables are inserted and the **Wii** is powered on, put your **TV** on the ... www.nintendo.com/consumer/systems/wii/en.../setupAV.jsp - Cached - Similar

### How do you **Connect** your **Wii** to HDMI Input on LCD **TV**?

Jul 16, 2010 ... A Review of **My DVDs**. Related Links ... I too wanted to **connect my Wii** to **my** HD **TV** with somthing better than the standard cable. ... www.brighthub.com/electronics/home-theater/.../35555.aspx - Cached - Similar

### How can I connect my DirecTv, DVD player & WII to the same flat TV ...

Mar 16, 2009 ... that did not work. It has several holes for me to **connect**, yet it does not read. It can either do the **DVD** or the **Wii**. Hence I need to keep moving ... www.answerbag.com/q\_view/1124602 - Cached - Similar

### Zolved - Connecting the Wii console to a TV or VCR

You are supplied with an AV Multi Out plug with the **Wii** console. This cable allows you to **connect** to a **TV**/VCR/Cable Box/**DVD** player etc. ... www.zolved.com/synapse/view content/19706 - Cached

### Nintendo Wii: Connecting to a TV, VCR, HiFi

Connecting to a Television. Insert the AV Multi Out plug on the Wii AV ... to connect a video game system through a device such as a VCR, DVD recorder, ...

wii.nintendo-europe com/57.html - Cached - Similar

### How can i connect both my wii and a dvd player to my tv? - Yahoo ...

May 1, 2010 ... the comcast cable box. i finally got the **dvd** player to work by ... While we are doing this, let's learn some of the right terminology. ... answers.yahoo.com/guestion/index?qid... - Cached

### Got an answer!



#### **Resolved Question**

Show me another »

### How can i connect both my wii and a dvd player to my tv?

the comcast cable box.

i finally got the dvd player to work by putting it into the tv holes and setting the tv to aux. where can i put the wii to make that work too (i really don't want to switch the wii with the dvd player every time i wanna use it)? can i plug it into the cable box? and then what would i set the cable box to? or the dvd player...?

4 months ago

#### Additional Details

sorry the first part is supposed to say:

i have the three holes (red white and yellow) on the tv, the dvd player, and the comcast cable box

4 months ago





Stephen M

#### Best Answer - Chosen by Asker

While we are doing this, let's learn some of the right terminology. The yellow, red, and white colored jacks are called composite video. On the back of your TV they would be composite video inputs while on the back of your DVD player, Wii, and cable box, they would be outputs.

So, no, you can not plug the Wii into the cable box because the cable box has the same color "holes" because what you would be doing is plugging the Wii output into a cable box output.

What you need to plug everything in to your TV is a composite video switch... one with at least 3 inputs. You then take the output of the switch to the TV's input.

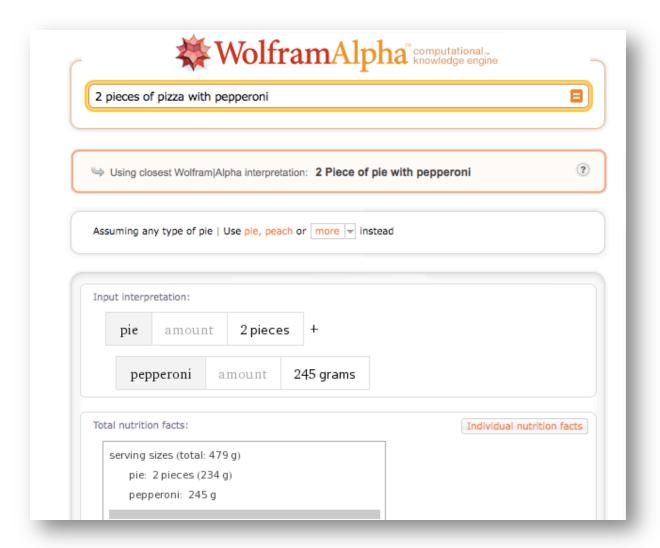
### **Trend: More Natural Queries**

- Blend two ideas:
  - "sloppy commands"
  - predictions based on user behavior data
- This is subtly and steadily increasing in sophistication across many interfaces

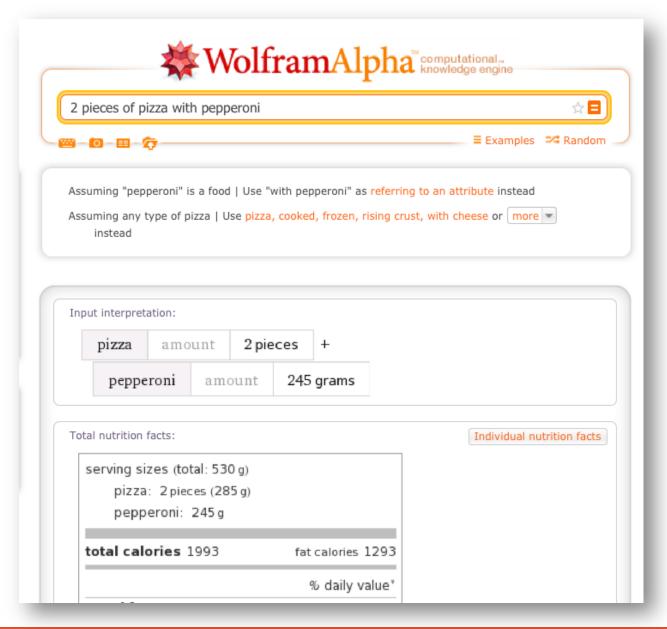
# Sloppy Commands + Rich Data



# Sloppy Commands + Rich Data



# Sloppy Commands + Rich Data





# Trend: Spoken Input

# Why Spoken Input?

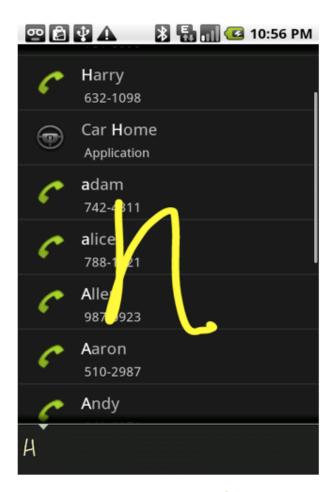
- Phone-based devices widely used
  - Naturally accepts spoken input
  - Difficult to type on
- Touch screen interaction increasingly popular
  - Also difficult to type on
- Speech recognition technology is improving
  - Huge volumes of training data is now available
- What are the impediments?

## We need a "cone of silence"



## Alternative text entry





Search as your write.



# 1500 # 1500 # 1500 # 1500

swype.com

Gesture search, Li 2010

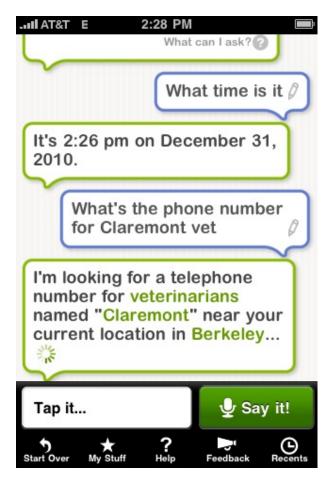
# Speaking leads to conversation

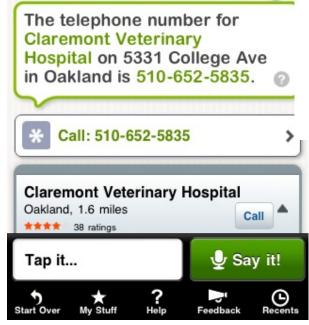
- Dialogue is a long-time dream of Al
- We're getting closer with a combination of
  - Massive behavioral data
  - Intense machine learning research
  - Advanced user interface design
  - Real-time contextual information

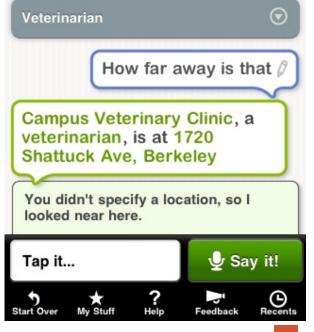
# No Longer a Future Trend: Dialogue

 SIRI came out of the DARPA CALO project





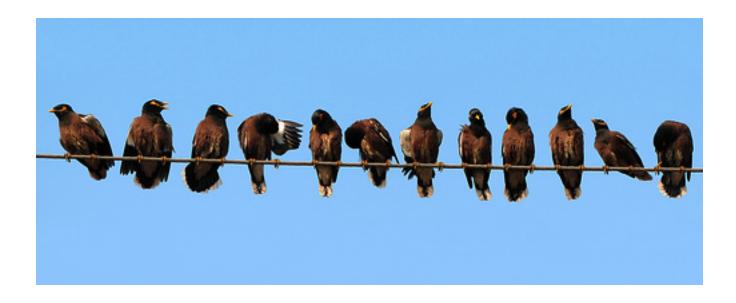




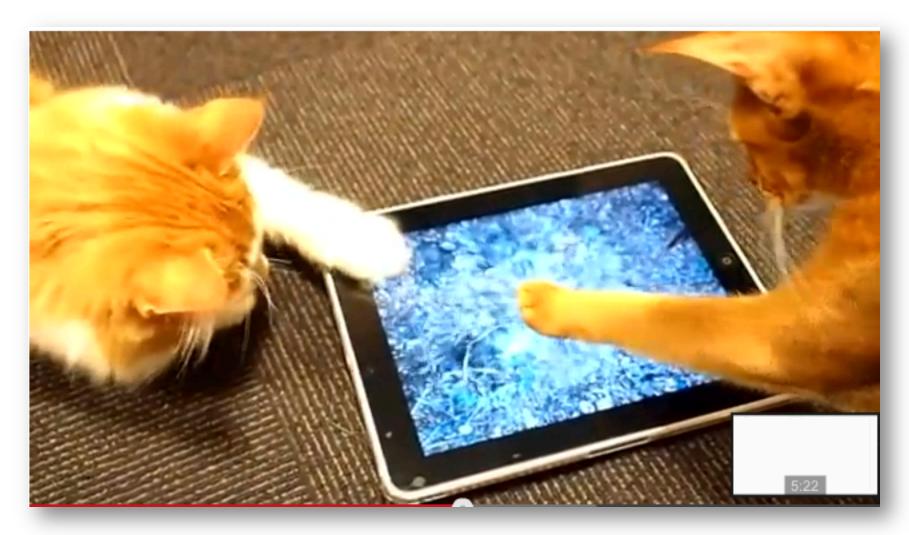
# Exercise (pairs)

 Name two general conditions in which spoken input would be better for search.

# Trend: Social Search



People are Social; Computers are Lonely. Don't Personalize Search, Socialize it!



http://www.youtube.com/watch?v=r8yKDO-dGcE 2:40

### Social Search

**Implicit**: Suggestions generated as a side-effect of search activity.

**Explicit**: knowledge accumulating via the deliberate contributions of many.

**Collaborative**: Working with other people on a search task.

**Asking**: Communicating directly with others.

### **Exercise: Social Search**

- Consider the dimensions of social search and classify each of the following:
  - Clicking on a search result
  - Voting on Reddit
  - Showing an answer to a friend on your cellphone.
  - Posing a question on twitter.

**Explicit**: knowledge accumulating via the deliberate contributions of many.

**Implicit**: Suggestions generated as a side-effect of user activity.

**Asking**: Communicating directly with others.

**Collaborative**: Working with other people on a search task.

### Social Search: Explicit Recommendations

- "Crowdsourcing" for explicit recommendations
  - Previous generation
    - Digg, StumbleUpon, Slashdot
    - Delicious, Furl
    - Google's SearchWiki (now defunct)
    - Open Directory
  - Current happenings
    - Blekko
    - Google+
    - LinkedIn recommendations
    - Reddit
    - Etc.



dog pacing

search Q

filter by slashtags

/likes 🔣

/reviews

/movie-reviews

/videogames

/shop

/date

/flickr

/youtube

find slashtags



🍖 create a slashtag



### bring blekko with you



file bugs here

Did you mean dog racing?

1 to 20 of 315K web results for dog pacing

/relevance | /date

Establishment of a canine model of cardiac memory using endocardial

like I seo links cache ip info I spam

Establishment of a canine model of cardiac memory using endocardial pacing via internal jugular vein. Other articles by authors. Li Yue-chun, Ge Li-sha, Guang Xue-Qiang, Chen biomedcentral.com/1471-2261/10/30/abstract Jun 2010

### Left ventricular septal and apex pacing for optimal pump function in canine

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Sign in free and see. Sign-in for full Details. Sign-in free and Explore the Exciting World of BiomedExperts. More than 3,500 Organizations worldwide. State of the Art Network blomedexperts.com/.../Left\_ventricular\_septal\_and\_apex\_pacin...

### **Bloat Article**

like I seo links cache ip I spam

Helpful hints in deciding the bloat phase of a dog (Practice the following three actions on a well **dog** beforehand). To do this, stand over the **dog** facing the same direction as the **dog**. canadasquidetodogs.com/health/healtharticle6.htm Nov 2003

### BEHAVIOR PROBLEMS IN GERIATRIC DOGS by Wayne Hunthausen

like I seo links cache ip I spam

Physical and Physiological Changes in the Older Dog. Behavior Problems of the Geriatric Dog. Pacing - seizures - restlessness - decreased mental alertness - geriatric onset westwoodanimalhospital.com/BhvArticles/GeriatDogBhvProb.htm

### Understanding Canine Dementia

like I see links cache in I snam

# Social Search: Seeing what people you know have seen

Yahoo MyWeb, circa 2006



### Google's Social Search, 2012



### obama daily show

Search

About 49,400,000 results (0.66 seconds)

Advanced search

### Everything











### Any time

Latest Past 24 hours

- ast 24 Hour

Past week

Past month

Past year

Custom range...

### All results

Social

More search tools

### October 27, 2010 - Barack Obama - The Daily Show With Jon Stewart ... 🕸 🔍

Oct 27, 2010 ... Barack **Obama** talks about the recovering economy, health care reform, and bringing change to Washington.

www.thedailyshow.com/full.../wed-october-27-2010-barack-obama - Cached

Nundu Janakiram shared this on Twitter - Oct 29, 2010

### The Daily Show with Jon Stewart Official Website | Current Events ... :

Feb 8, 2011 ... Jon Stewart and The **Daily Show** writers present the ... www.thedailyshow.com/ - Cached - Similar

♣ Show more results from thedailyshow.com

### On the Daily Show, Obama is the last laugh :

Oct 27, 2010 ... On Comedy Central, the joke was on President **Obama** Wednesday night. www.washingtonpost.com > Opinions

### Videos for obama daily show



Obama On 'Daily Show':
Stewart Presses ...
Oct 28, 2010
huffingtonpost.com



The Daily Show - 10/27/2010 Barack Obama Pt ... 4 min - Oct 27, 2010
thedailyshow.com

### Barack Obama's dumb 'Daily Show' Jon Stewart appearance and the ... c

Oct 27, 2010 ... President **Obama's** handlers have been indiscriminate, carpet-bombing Americans with the man they elected rather than launching communications ... www.nydailynews.com/.../2010-10-27\_obamas\_dumb\_daily\_show\_appearance and the presidents diminishing brand.html

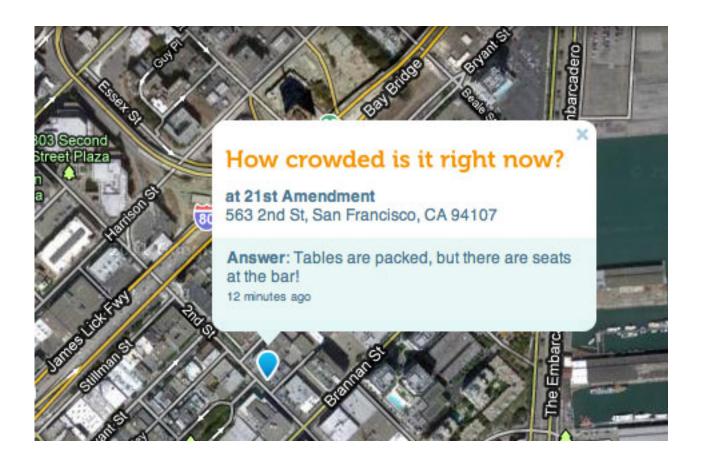
# Social Search: Asking for Answers

### What do people ask of their social networks?

Туре	%	Example
Recommendation	29%	Building a new playlist – any ideas for good running songs?
Opinion	22%	I am wondering if I should buy the Kitchen-Aid ice cream maker?
Factual	17%	Anyone know a way to put Excel charts into LaTeX?
Rhetorical	14%	Why are men so stupid?
Invitation	9%	Who wants to go to Navya Lounge this evening?
Favor	4%	Need a babysitter in a big way tonight anyone??
Social connection	3%	I am hiring in my team. Do you know anyone who would be interested?
Offer	1%	Could any of my friends use boys size 4 jeans?

Morris et al., CHI 2010

### **Context-Aware Mobile Search**



http://www.localmind.com/

# Social Search: People Collaborating



Pickens et al., SIGIR 2008

http://www.dlife.com/dLife/do/recipe/RecipeMain

#### Diabetes Self Management: Recipes

Click on the links to the left to browse a selection of recipes from Diabetes Self-Management magazine. Our diabetes-friendly recipes are generally low in fat and sodium, and each one lists the amount .

http://www.diabetesselfmanagement.com/recipemain.cfm



#### Children's Diabetes Foundation - Recipes

Children's Diabetes Foundation at Denver ... Send us your favorite diabetes -friendly recipes!!

http://www.childrensdiabetesfdn.org/recipes.html

#### Diabetes-Friendly Holiday Recipes

Prepare these 3 delicious recipes for a satisfying and seasonal holiday meal. ... Lower your blood sugar, lose weight, and live healthier with the program designed especially for

ttp://www.rd.com/content/openContent.do?contentId=31174





#### Diabetes Friendly Holiday Cookie Recipes

Baking cookies is a large part of the traditions of this holiday season, but when you have diabetes ... Baking cookies is a large part of the traditions of this holiday season, but when you have .

http://diabetes.about.com/od/holidaycookies/Diabetes\_Friendly\_Holiday\_Co okie Recipes htm

#### AARP - Segunda Juventud - Diabetes-Friendly Recipes

The following recipes were created for people with diabetes (and their families) who want to enjoy their favorite Latino dishes-and good blood glucose control, too.

http://www.segundajuventud.org/english/food/2005-FM/05FM diabetes recipes.html

#### AARP - Segunda Juventud - Diabetes-Friendly Recipes

The following recipes were created for people with diabetes (and their families) who want to enjoy their favorite Latino dishes-and good blood glucose control, too.

http://www.aarpsegundajuventud.org/english/health/2005-FM/05FM diabetes recipes.html

Book Review: Diabetes Friendly Recipes I Caremark Health



have Type 1 diabetes, you will still h take some injected insulin in addit EXUBERA. Some, but not all, patient Type 2 diabetes will also need to ome injected insulin in addition

Subscribe Customer Care

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RD.com home page >



### Ho-Ho-Holiday Help!

### **Diabetes-Friendly Holiday Recipes**

**Healthy Living** 

- Fitness
- Healthy Eating
- Everyday Concerns
- Family Health
- . Mind & Body
- Natural Remedies
- Prevention
- Weight Loss

#### Condition Centers

- Cancer
- Cholesterol
- Diabetes
- Heart
- · Men's Health
- Mental Health
- Pain
- · Women's Health

#### **Health Tools**

- Activity Calorie Calculator
- BANI Calculator
- · Find a Therapist
- Medical Tests by Age
- Recipe Finder
- . Vitamins, Minerals & Herbs Finder

Prepare these three delicious recipes for a satisfying holiday meal.

From ChangeOne for Diabetes

EMAIL ▲ PRINT ♥ SUBSCRIBE to RD FONT A A A A

The savory smell of lean baked ham filling the air is just part of what makes this meat a perfect centerpiece for all your Christmas homecomings. Both lean and succulent, ham has an abundance of flavor but can be sliced thin to keep taste satisfaction high and calories low. Side dishes are dominated by vegetables that you can keep replenishing as you linger around the table with laughter and conversation.

Add 6 ounces of lean ham to your plate and build a 550-calorie entrée with a serving of each of the following dishes.

#### SCALLOPED POTATOES

#### You Will Need

4 onions, thinly sliced 1/2-3/4 cup chicken broth 1 can fat-free evaporated milk

1 1/2 pounds potatoes, peeled and sliced Salt and fresh-ground black pepper, to taste Pinch of paprika

#### What to Do

 Preheat the oven to 425°F. Lightly spray a shallow 2-guart baking dish with cooking spray.

Bring the onions and 1/2 cup of the broth to a boil in a non-stick skillet over medium heat. Reduce the heat and simmer, stirring occasionally, until



INTERACTIVE FEATURES

Quiz: What's Your Diabetes IQ?

#### RELATED LINKS

- · Exercise: The Diabetes Secret Weapon
- . Tips for Exercising in the Cold
- Should You Skip Breakfast?
- · Meet Your Diabetes Support Team.

MESSAGE BOARDS

What are your shortcuts for holiday

cooking? . Join this discussion

TAKE OUR POLL





Leam I

help lo



you

to yo

Important

addition to **EXURERA** 

You shoul Inhalation start smol less than c **EXUBERA** function, y breathing

treatment time, as a



ecommendations:

# Social Search: People Collaborating

### Search Results from george using Windows Live Search



### Diabetic-Lifestyle: Recipes and Practical Information for Managing ...

Diabetic-Lifestyle Cooking Tips features useful ways to cook with more flavor, using less fat ... Diabetes and Cooking with Alcohol: Herbs - The Natural, delicious way to replace salt

http://www.diabetic-lifestyle.com/cookingtips.htm

### Diabetes > Healthy Cooking Tips for Persons With Diabetes

Methodist Hospital System ... Healthy cooking and diabetes management: A healthy diet is critical to proper diabetes management by ...

http://www.methodisthealth.com/cgi-bin/hmdim/home/basic.do?channelld=1073830214&programId=1073769640&contentId=1073791149&contentType=HEALTHTOPIC CONTENT TYPE



### Healthy Cooking Tips for Persons With Diabetes - New York Presbyterian ...

NewYork-Presbyterian. The University Hospital of Columbia and Cornell. One Hospital affilitated with two Ivy League Medical Schools: Columbia University College of Physicians & Surgeons and Weill ...

http://www.nyp.org/health/diabetes\_cooking.html

### WebMD Diabetes Health Center - Information on Type 1 and Type 2 ...

Diabetes Health Center Diabetes affects an estimated 18.2 million ... Plus, find daily support and nutritional tips in our online ... Healthy Cooking & Special Needs: Elaine Magee, RD Need some recipes ...

http://www.webmd.com/diseases and conditions/diabetes.htm

### Diabetes Control for Life - Healthy Eating

Tips on Keeping a Journal. Cooking With Less Fat ... Free Weight Loss Plan Specifically for People With Diabetes

http://diabetescontrolforlife.com/healthy\_eating/



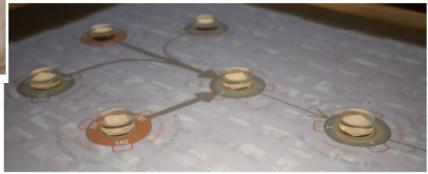
Current Results Summary Search Results from george using Wil Diabetes mellitus type 2 - Wikipedia, the free encyclopedia http://en.wikipedia.org/wiki/Type II diabetes This site has good general-pupose background info, a overly technical. MedlinePlus Medical Encyclopedia: Type 2 diabetes http://www.nlm.nih.gov/medlineplus/ency/article/000313.htm This information is from the NIH, so it's very trustworth Insulin and Diabetes Medications by Lifeclinic http://www.lifeclinic.com/focus/diabetes/medications.asp Betty, you should ask your doctor if this brand of insul covered by your insurance! Will do. Thanks! Guide to Diabetes Medications http://www.diabetes.ca/section about/diabetes meds 2006.asp You should print out a copy of this medication guide. Diabetes Control for Life - Healthy Eating http://diabetescontrolforlife.com/healthy\_eating/ The article on vitamins looks interesting. I should ask about that. ADA Virtual Grocery Store - Recipes: Cooking Tips http://vgs.diabetes.org/recipe/cookingtips.jsp

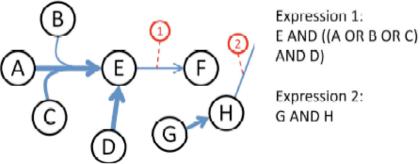
Figure 3. Automatically-generated summ

Figure 2. Split search results appear in a separate

# Social Search: People Collaborating



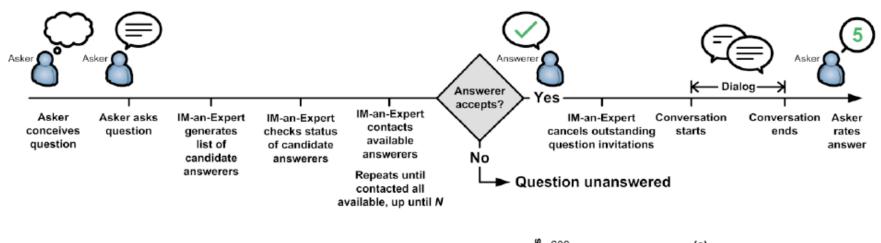


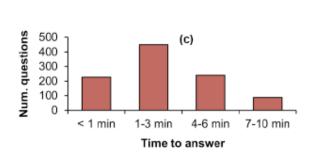


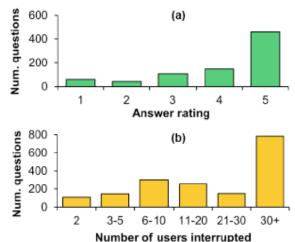
Jetter et al., CHI 2011

# Social Search: Asking for Answers

### Asking experts in a social network







### Collaborative Search Exercise

### Round robin:

- In a pair, come up with the two best scenarios you can for collaborative search.
  - Write them down.
  - Rank from 1-5 in terms of how successful you think this idea could be.
- Exchange your results with another pair.
  - Rank the new ideas.
- Report out the best of the four for each group.

# Summary

- As CS gets more sophisticated, we can build search interfaces that allow people to interact more naturally:
  - More language-like queries
  - Speaking & viewing rather than typing & reading
  - More able to interact with other people while doing search tasks
  - More able to use the knowledge in peoples' heads.