

Emerging Trends in Search User Interfaces

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Hypertext 2011 Keynote Talk
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Book full text freely available at:
<http://searchuserinterfaces.com>



What works well in search now?

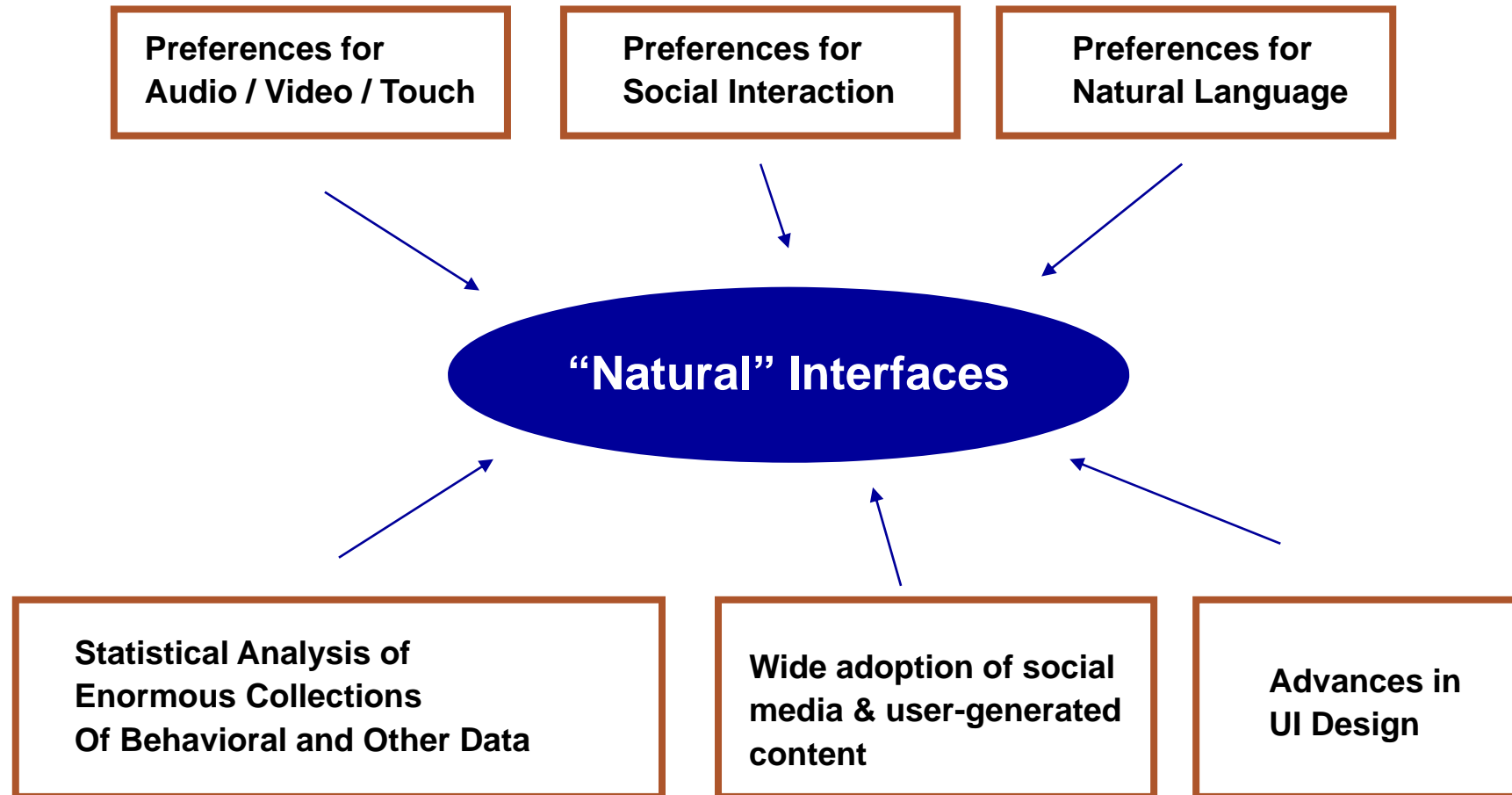
Forecasting the Future

First: What are the larger trends?

In technology?

In society?

Next: Project out from these.





Trend: Spoken Input



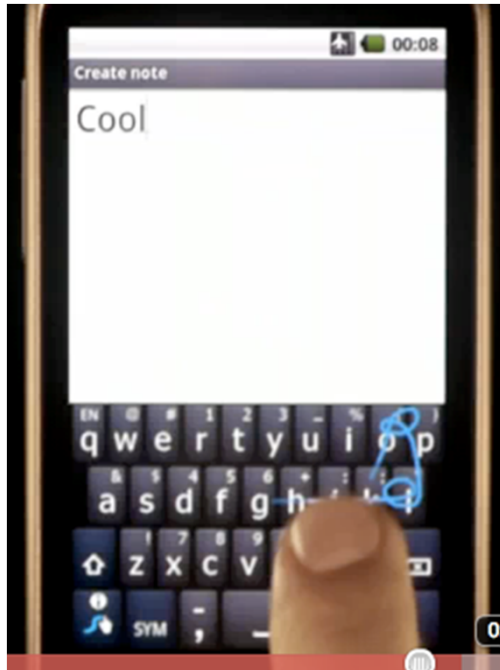
Why Spoken Input?

- 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?

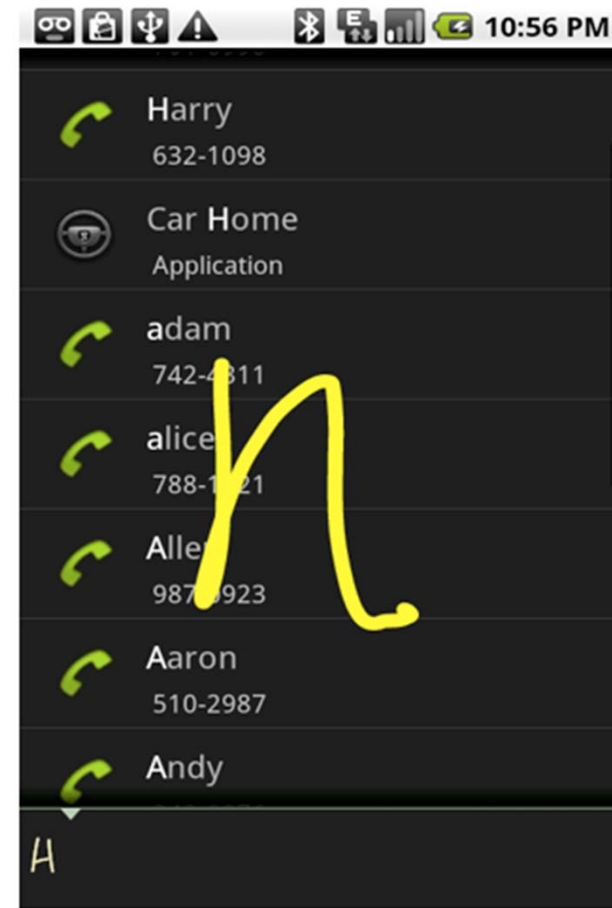
We need a “cone of silence”



Alternative text entry



swype.com



Search as your write.



Gesture search, Li 2010

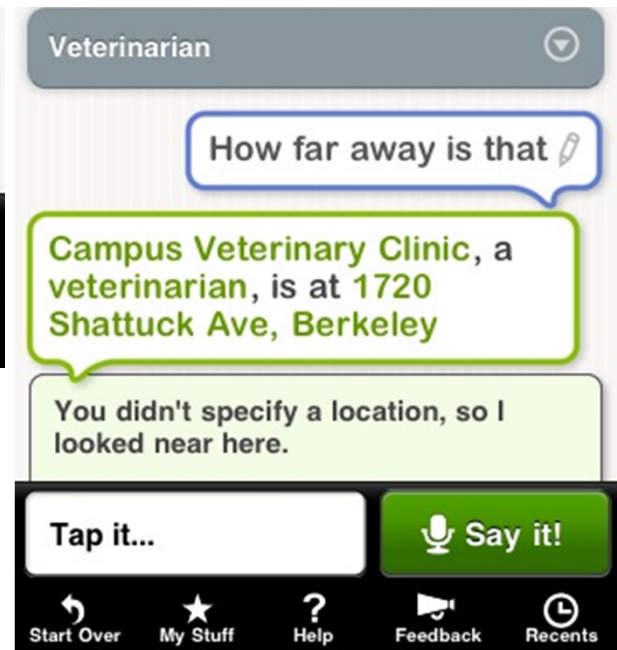
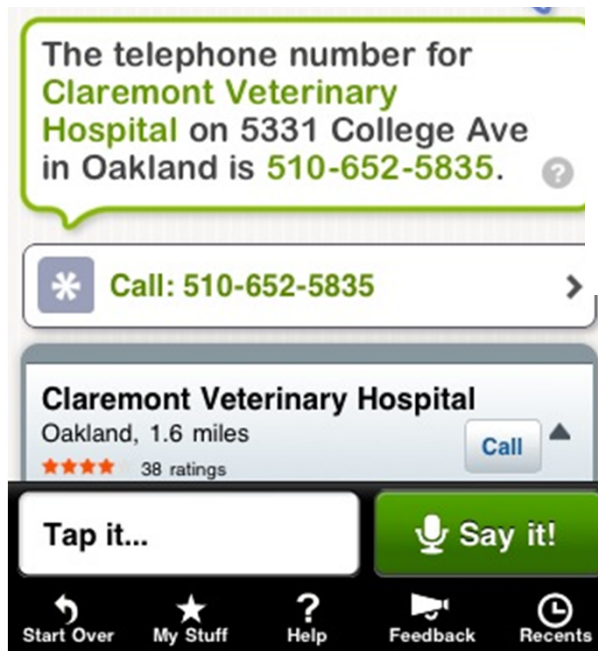
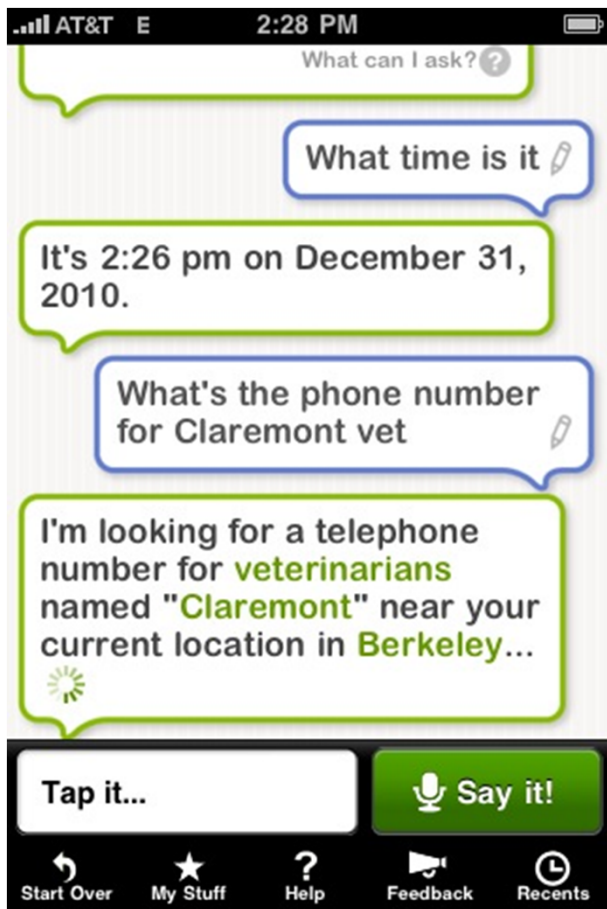
Speaking leads to conversation

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

Far Future Trend: Dialogue

- SIRI came out of the DARPA CALO project





Trend: Social Search



Social Search

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

Explicit: knowledge accumulating via the deliberate contributions of many.

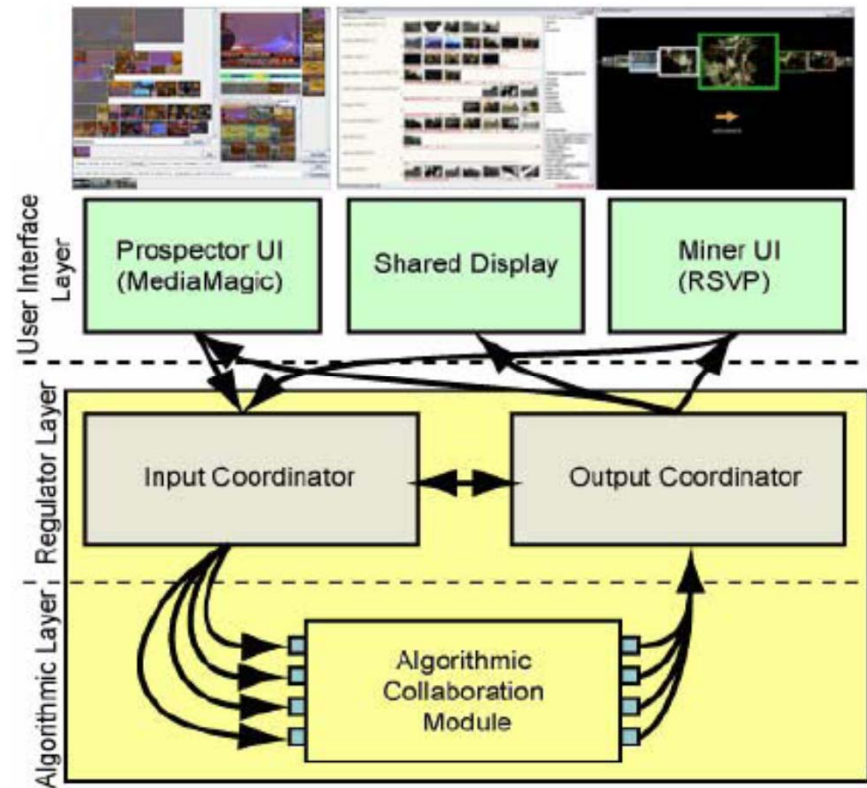
Collaborative: Working with other people on a search task.

Asking: Communicating directly with others.

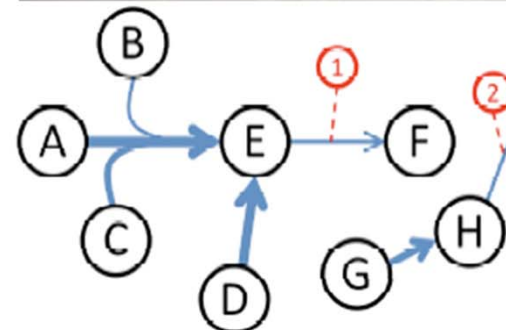
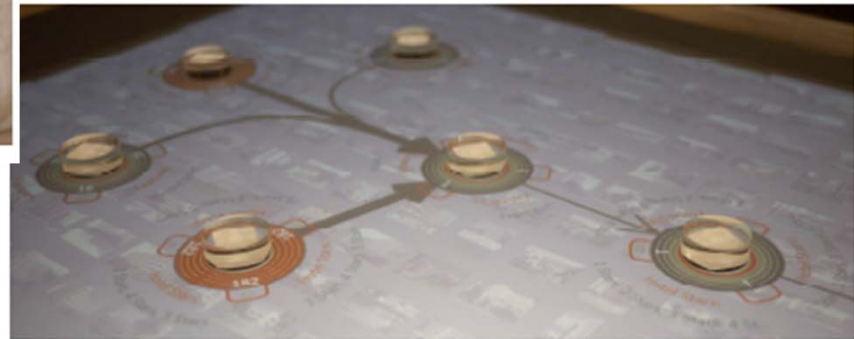
Social Search: People Collaborating



Social Search: People Collaborating



Social Search: People Collaborating



Expression 1:
E AND ((A OR B OR C)
AND D)

Expression 2:
G AND H

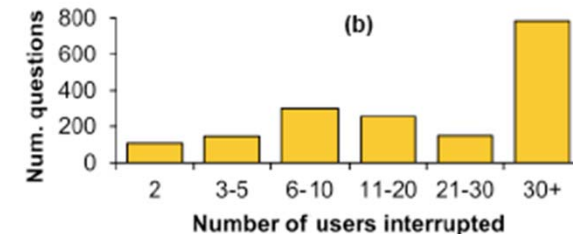
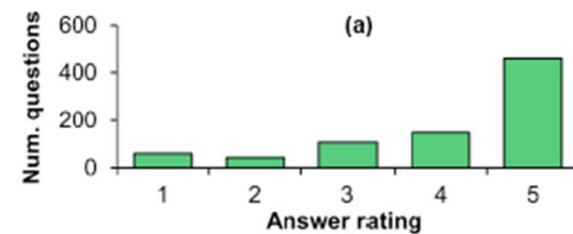
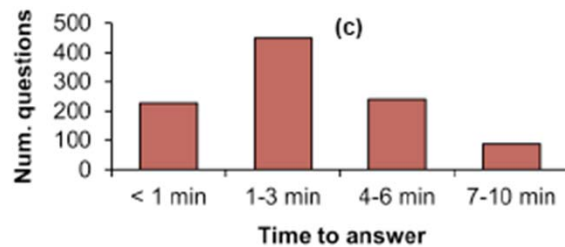
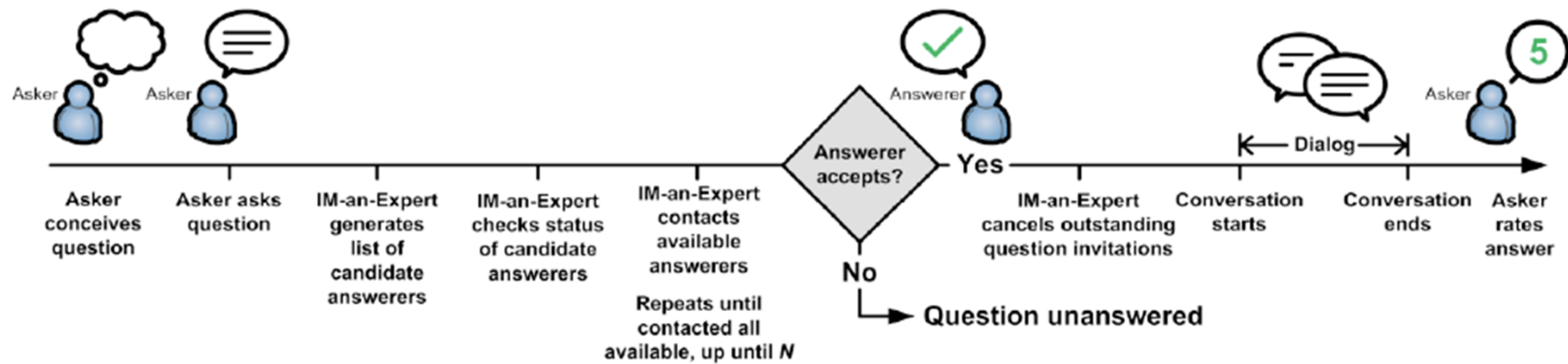
Social Search: Asking for Answers

What do people ask of their social networks?

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

Social Search: Asking for Answers

Asking experts in a social network



Social Search: Explicit Help via Question-Answering Sites

- Content is produced in a manner amenable to searching for answers to questions.
- Search tends to work well on these sites and on the internet leading to these sites
 - Like an FAQ but
 - with many authors, and
 - with the questions that the audience really wants the answers to, and
 - written in the language the audience wants to use.

Advanced user interface design

The screenshot displays the Stack Overflow homepage with the following elements:

- Navigation:** "log in", "careers", "about", "faq" links in the top right.
- Stack Overflow Logo:** Located at the top left.
- Main Navigation:** "Questions", "Tags", "Users", "Badges", "Unanswered" buttons.
- Recent Questions Section:**
 - Filters:** "active" (selected), "107 featured", "hot", "week", "month".
 - Question 1:** "How do I prevent a char pointer buffer overflow?" (0 votes, 3 answers, 10 views). Tags: c, pointers, arrays, reference. Author: sizzzlerz (33). Time: 9s ago.
 - Question 2:** "How to get an object of the window which is opened by clicking the link?" (0 votes, 2 answers, 12 views). Tags: javascript, jquery, html. Author: Nick Craver (37.2k). Time: 19s ago.
 - Question 3:** "Asynchronous daemon processing / ORM interaction with Django" (0 votes, 0 answers, 29 views). Tags: django, django-orm, django-models, python. Author: perrierism (286). Time: 28s ago.
 - Question 4:** "XPath selection from path in XML content" (1 vote, 1 answer, 14 views). Tags: xslt, xml, xpath, xsl. Author: Dimitre Novatchev (10.7k). Time: 1m ago.
 - Question 5:** "How can I improve my logical and analytical thinking skills so as to become an awesome programmer?" (15 votes, 16 answers, 273 views). Tags: beginner, programming, logical, thinking. Author: Norman Ramsey (46.3k). Time: 1m ago.
 - Question 6:** "PHP 'Years' array" (0 votes, 5 answers, 17 views). Tags: array, php, date, year. Author: Ben Rowe (1,012). Time: 1m ago.

Social Search: Implicit Suggestions

- Implicit human-generated suggestions still beat purely machine-generated ones
 - Spelling suggestions
 - Query term suggestions (“search as you type”)
 - Recommendations (books, movies, etc)
 - Ranking (using clickthrough statistics)

Social Search: Explicit Rec'dations

- “Crowdsourcing” for explicit recommendations
 - Digg, StumbleUpon
 - Delicious, Furl
 - Google’s SearchWiki (now defunct)
 - Open Directory
 - Blekko

filter by slashtags

/likes 

/reviews

/movie-reviews

/videogames

/shop

/date

/flickr

/youtube

find slashtags

 create a slashtag

slashtag of the day

 /health

search "tuberculosis"

bring blekko with you



slash the web
from your phone

 learn more

file bugs here

search 

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](#) | [seo](#) | [links](#) | [cache](#) | [ip](#) | [info](#) | [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**

[like](#) | [seo](#) | [links](#) | [cache](#) | [ip](#) | [adsense](#) | [info](#) | [spam](#)

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
biomedexperts.com/.../Left_ventricular_septal_and_apex_pacin...

Bloat Article

[like](#) | [seo](#) | [links](#) | [cache](#) | [ip](#) | [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**.
canadaguidetodogs.com/health/healtharticle6.htm **Nov 2003**

BEHAVIOR PROBLEMS IN GERIATRIC **DOGS** by Wayne Hunthausen

[like](#) | [seo](#) | [links](#) | [cache](#) | [ip](#) | [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](#) | [seo](#) | [links](#) | [cache](#) | [ip](#) | [spam](#)

Social Search: Seeing what people you know have seen

- Yahoo MyWeb, Google Social Search

The screenshot shows the Yahoo MyWeb interface. At the top, there's a navigation bar with 'Home - My Bookmarks - Invite Contacts -'. The 'MyWeb' logo is on the left, and a search box contains the word 'visualization'. Below the search box, there are tabs for 'See', 'All Results', 'My Results', 'My Contacts' Results', and 'Everyone's Results'. The main content area shows search results for 'My Contacts' Bookmarks' (40 Results). Three results are visible:

- [ahhhhhh visualization](#) Save this!
A dot plot **visualization** that conveys the number of results obtained from Google search queries for words of the form $a\{n\}h\{m\}$.
Tags: [infoviz](#), [language](#), [search](#), [statistics](#), [technology](#), [more...](#)
Saved by: [Ryan Shaw](#) on 7/11/2006 at 8:34 AM - [Details](#)
http://infosthetics.com/archives/2006/07/ah_ahhhhhh_dot_plot_data_visualization.html
- [SIMS 247: Information Visualization and Presentation](#) Save this!
Tags: [visualization](#), [imported delicious](#)
Saved by: [zephoria](#) on 7/26/2005 at 1:58 PM - [Details](#)
<http://www.sims.berkeley.edu/courses/is247/s04/projects.html>
- [surreal penguin visualization of LJ](#) Save this!
Tags: [blogging](#), [livejournal](#), [visualization](#), [imported delicious](#)
Saved by: [zephoria](#) on 7/26/2005 at 1:58 PM - [Details](#)
<http://surrealpenguin.com/projects/ljnet/>

Social Search: Explicit Suggestions Building Knowledge

- Social knowledge management tools seem promising
- Utilize the best of social networks, tagging, blogging, web page creation, wikis, and search.

The screenshot shows a web interface for a user named Jack Russell. The top navigation bar includes links for 'All', 'Popular', 'My Bookmarks', 'My Subscriptions', 'Settings', 'Help', 'Feedback', and 'Logout'. Below this is a search bar and a dropdown menu set to 'All Bookmarks'. The main content area is titled 'Jack Russell's design and css Bookmarks' and features a 'Subscribe' button. The interface displays a list of four bookmarked items, each with a date, author, and associated tags. The left sidebar contains a 'dogear' logo, navigation tabs for 'TAGS', 'PEOPLE', and 'SUBS', and a list of tags including 'design' and 'css'. At the bottom, there are pagination controls and feed options like 'XBEL', 'RSS', 'ATOM', and 'BLOGROLL'.

Item	Date	Author	Tags
Hello, world!	02 APR 2005	JACK RUSSELL	blog, css, design
Jeffrey Zeldman Presents The Daily Report	15 DEC 2004	JACK RUSSELL	blog, css, design
Stylegala ??? the finest CSS and web standards resource	16 SEP 2004	JACK RUSSELL	css, design
SimpleBits	15 SEP 2004	JACK RUSSELL	blog, css, design



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.
- 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.

U.S. keyword breakdown by percentage of clicks (4-week rolling period)			
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

- Information worded as questions is increasing on the web.
 - From social question-answering sites and forums.
 - Maps colloquial expression into technical.

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](#)

Example: ask as a question

how do I connect wii and dvd to my tv

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 something 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/question/index?qid...](#) - [Cached](#)

Example: get an answer



Michael

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

[Report Abuse](#)



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

- Like command languages, but
 - the user has a lot of flexibility in expression
 - so memorization is not required
 - “time graz” “what time is it in graz” “graz time now”

what time is it in graz

Search

About 5,480,000 results (0.27 seconds)

[Advanced search](#)



3:13pm Thursday (CEST) - Time in **Graz**, Austria

graz time now

Search

About 287,000 results (0.27 seconds)

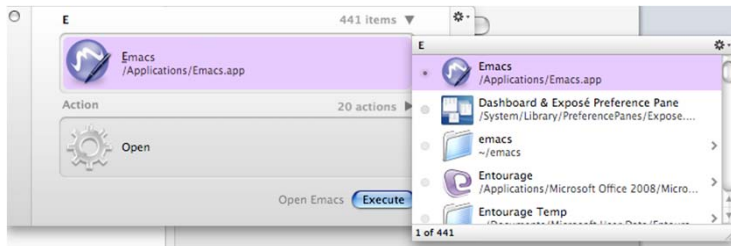
[Advanced search](#)



3:17pm Thursday (CEST) - Time in **Graz**, Austria

Sloppy Commands + Visual Feedback

- Can include rich visual feedback
 - Quicksilver in Apple



- Inky by Miller et al.

```
> email
✉ view email Go
✉ email email address* about subject line* (attach file) Send Email Go
```



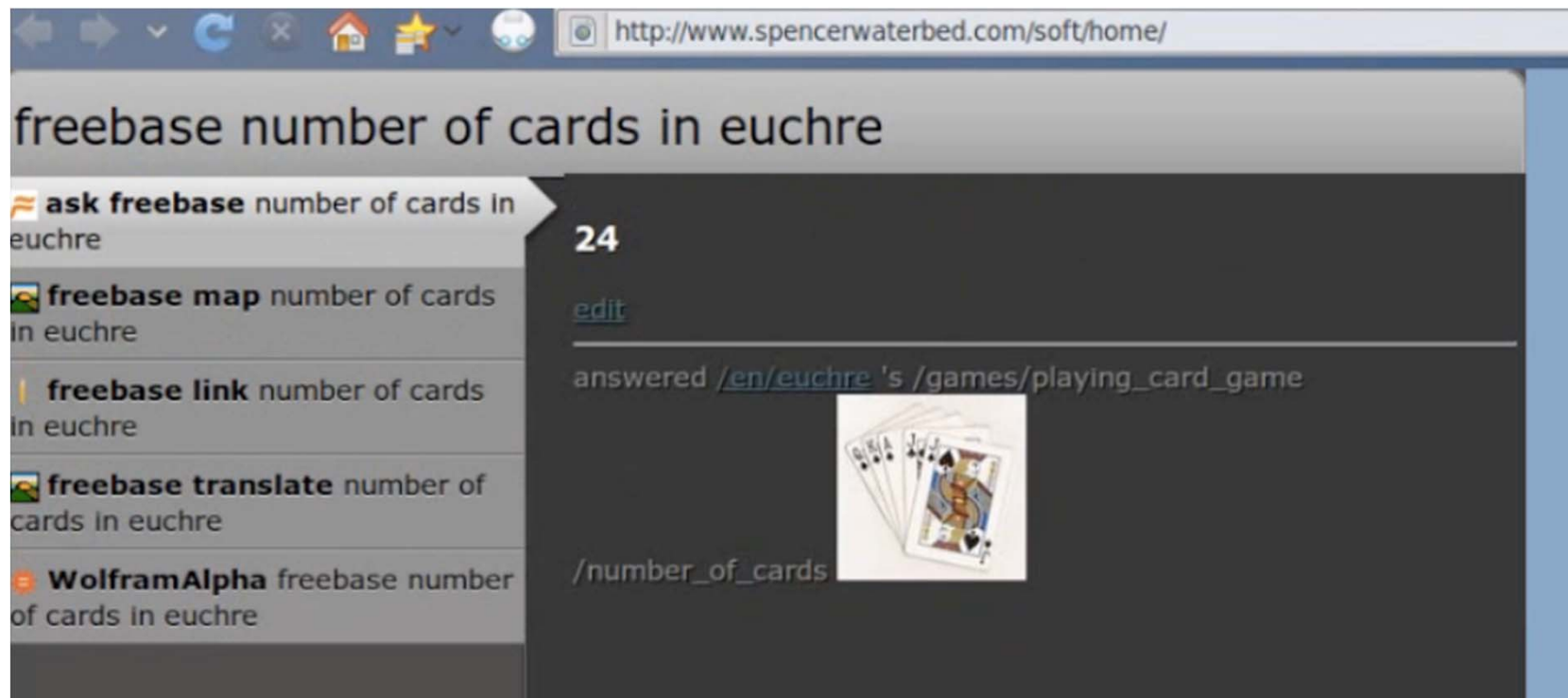
```
> email vikki@mit.edu
✉ email vikki@mit.edu about subject line* (attach file) Send Email Go
```



```
> email vikki@mit.edu movie at 3pm today
✉ email vikki@mit.edu about "movie at 3pm today" (attach file) Send Email Go
```

Sloppy Commands + Rich Data

- Combine Mozilla's Ubiquity and Freebase to make a flexible predictive query engine
 - By spencerwaterbed: <http://vimeo.com/13992710>



Sloppy Commands + Rich Data

The screenshot shows the WolframAlpha interface. At the top, the logo reads "WolframAlpha™ computational... knowledge engine". Below the logo is a search bar containing the text "2 slices of pizza with pepperoni".

Below the search bar, the "Input interpretation:" section shows a table with the following data:

pizza	amount	2 slices
	type	with pepperoni

Below this is a horizontal separator line. The "Daily value ranking:" section contains a table with the following data:

	value	% daily value
sodium	1.8 g	73%
saturated fat	14 g	68%
total fat	43 g	67%
	⋮	

A "More" button is visible to the right of the "Daily value ranking:" section.

Sloppy Commands + Rich Data

The screenshot shows the WolframAlpha interface. At the top is the logo with the text 'WolframAlpha™ computational... knowledge engine'. Below it is a search bar containing the text '2 pieces of pizza with pepperoni'. A message below the search bar says 'Using closest Wolfram|Alpha interpretation: 2 Piece of pie with pepperoni'. A note below that says 'Assuming any type of pie | Use pie, peach or more instead'. The main content area is titled 'Input Interpretation:' and shows a visual breakdown of the input into two parts: 'pie amount 2 pieces +' and 'pepperoni amount 245 grams'. Below this is a section titled 'Total nutrition facts:' with a link for 'Individual nutrition facts'. The nutrition facts are listed as follows:

Total nutrition facts:	
servicing sizes (total: 479 g)	
pie: 2 pieces (234 g)	
pepperoni: 245 g	



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



To the future!