Future Search User Interfaces for Multimedia

IS&T/SPIE Electric Imaging Keynote
Marti A. Hearst
UC Berkeley
1967 VS 2007
1997 vs 2007
Web Image Search
Which New Search UI Techniques Survived?
Faceted Navigation
Why Does This Succeed?

- Reduces mental work
  - Recognition over recall
  - Suggests alternatives
- People don’t feel lost (provides scent)
  - Previews what is next
  - Shows where you’ve been
- **Meaningful organization**
Why Does This Succeed?

- Well structured, meaningful facets
- Chess metaphor
  - opening, middle game, end game
- Tightly integrated search
- Small details really matter
- No empty results
Getty Images: Faceted Navigation + Similarity Search (more like this)
Faceted Navigation

Refine this search

- People
  - Number of people
    - No People (3,308,690)
    - One Person (1,992,085)
    - Two People (767,530)
    - Group Of People (377,000)
    - Three People (172,054)
  - Age
    - Adults Only (2,322,053)
    - Adult (1,911,423)
    - Young Adult (1,044,658)
    - Child (532,450)
    - 25-29 Years (506,178)
  - Gender
  - Ethnicity

- Keywords
  - Concept
    - Togetherness (618,961)
    - Relaxation (483,932)
    - Childhood (411,940)
    - Tranquil Scene (377,785)
    - Freshness (332,414)

- Style
  - Composition
    - Horizontal (4,220,110)
    - Vertical (2,856,480)
    - Close-up (1,380,850)
    - Looking At Camera

More like this: 📌 (7,442,987 results)
The Problem with Relevance Feedback

- Text:
  - Hard for humans
  - Easy for computers

- Images:
  - Easy for humans
  - Hard for computers

Maybe the time is right for:

r.f. on u.g. tags + CBR
Updating relevance feedback on image search

• The challenge: requires meaningful labels
• Today’s solution: crowdsourcing

Idea:
  • Crowdsource multidimensional labels
  • Crowdsource organizing into facets
  • Then apply faceting + similarity search
Another UI That Works:

Real-time Auto-Suggest
Real-time Auto-Suggest
Trend: Longer, more natural queries

- Research suggests people prefer natural language over “keywordese”
- But in the early days, full sentences 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 (Experian Hitwise)
Trend: Longer, more natural queries

- Social question answering sites
- Information worded as questions increasingly available
- with the questions that the audience really wants the answers to, and
- written in the language the audience wants to use.
Long Queries Aided by Advances in UI Design
A recent example: keywords failed
A recent example: ask a question instead

how do I connect wii and dvd to my tv

About 1,650,000 results (0.22 seconds)

<table>
<thead>
<tr>
<th>Nintendo - Customer Service</th>
<th>Wii - Connecting to the TV or VCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>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 ... <a href="http://www.nintendo.com/consumer/systems/wii/en/.../setupAV.jsp">www.nintendo.com/consumer/systems/wii/en/.../setupAV.jsp</a> - Cached - Similar</td>
<td></td>
</tr>
</tbody>
</table>

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
A recent example: get an answer

Resolved Question

How can I connect both my Wii and a DVD player to my TV?

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 does the DVD player work...?

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

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 into 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”
“time graz”
“what time is it in graz”
“graz time now”
Sloppy Commands + Visual Feedback

- Quicksilver in Apple

- Inky by Miller et al.
Sloppy Commands + Rich Data

2 slices of pizza with pepperoni

Input interpretation:

<table>
<thead>
<tr>
<th></th>
<th>amount</th>
<th>type</th>
</tr>
</thead>
<tbody>
<tr>
<td>pizza</td>
<td>2</td>
<td>with pepperoni</td>
</tr>
</tbody>
</table>

Daily value ranking:

<table>
<thead>
<tr>
<th></th>
<th>value</th>
<th>% daily value</th>
</tr>
</thead>
<tbody>
<tr>
<td>sodium</td>
<td>1.8 g</td>
<td>73%</td>
</tr>
<tr>
<td>saturated fat</td>
<td>14 g</td>
<td>66%</td>
</tr>
<tr>
<td>total fat</td>
<td>43 g</td>
<td>67%</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>

WolframAlpha computational knowledge engine
Sloppy Commands + Rich Data + Limited Tasks

National parks my friends have been to
How to Apply to Multimedia?

- Idea: integrate auto-suggest with faceted metadata, then add similarity calculations:
  - “Images of beaches with two people that look like this”
  - “Videos of surfers wearing board shorts on waves with this kind of curve.”
Solve Specialized but High-Value Search Problems
Example

Illustrate my slide presentation
Example: Search Without Requiring Expertise

“Find the right replacement windshield for my car”
Example: Legal Search

Given similar images, detect the important differences
Example: Legal Search

Find a component from one image that is seen on another.
Example: Equation Search

What We Don’t See in Adopted Search UIs
What we don’t see.
What we don’t see.
What we don’t see.
What we don’t see.
What we don’t see.
What we don’t see.
Nonetheless, Some Promising Approaches
Mediamill: Fast and effective video search using the ForkBrowser, de Rooj et al., ICIVR 2008
iMap: A stable layout for navigating large image collections with embedded search, Wang et al., IS&T/SPIE 2013
iMap: A stable layout for navigating large image collections with embedded search, Wang et al., IS&T/SPIE 2013
Summary of Multimedia Search UI Recommendations

- Given the limitations of content analysis:
  - Combine the best of interactivity with (human-generated) text & content analysis
  - Solve specialized but high-value problems
  - Don’t succumb to the easy or the cool.
Thank you!

Check out my book (free online!)
searchuserinterfaces.com