CPSC 533C Information Visualization Project Update

Exploratory Browsing in Music Space

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November 17, 2004

Agenda

- Motivation: Exploratory browsing?
- The ideal infovis solution: what should it be?
- Related work: displaying query-based results
- Prototypes: my proposed solution
- Dataset and implementation
- List of ongoing and future work

Project Idea

- How can computer tools/interfaces better support exploratory browsing?
- What is exploratory browsing?

Query Taxonomy

	Specified Target	Uncertain Target
Specified Location	**Navigation:** if a map of the space is present **Exploration:** if not Redundant encoding (target and location) to evaluate if the target is found	**Navigation:** if a map of the space is present **Exploration:** if not Single encoding (location) to evaluate if the target is found
Uncertain Location	**Search/find** with static evaluation (i.e., looking for something defined)	**Browsing** with potentially dynamic evaluation (i.e., target is ill-defined, and its properties may change/be refined along the process).

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Two Scenarios at a Record Store

1. Looking for Ray Charles' "Come Rain or Come Shine"
   - Navigate: Go to "Jazz" à Search under "C" à Find "Ray Charles" à Search among his albums
   - Find/Search: "Do you have Ray Charles' "Come rain or come shine"?
2. Browsing at the "Classical" section à Came across a Jazzified version of Bach à Go to the "Jazz" section à Ray Charles' album is on display

Two Scenarios at a Record Store

The goals of these scenarios are different:

- With find/search/navigation: want to find the target as quickly as possible
- With exploratory browsing: getting there is half of the fun/work?

Project Motivation

- Exploratory browsing is not well-supported by current tools

	Specified Target	Uncertain Target
Specified Location	*Navigate/Explore* File explorer Web browser	*Navigate/Explore* File explorer Web browser
Uncertain Location	*Find/Search* File searcher Internet search engine	*Browse* Internet search engine?

The Ideal InfoVis Solution

To better support exploratory browsing, the interface should …

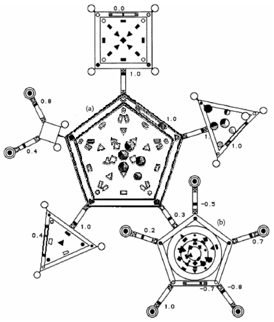
1. Provide context: to allow users to interpret the query results based on their input terms à where am I? what am I looking at?
2. Guide navigation: going from the familiar to the unfamiliar à where did I come from? where should I go next?
3. Assist refinement of target: based on retrieved results and query terms à what am I looking for?

Related Work: Overview

- Focus on query-criteria based from a single search mechanism
- 4 approaches:
  1. Spatial: retrieved results are clusters into groups based on query terms, and displayed spatially
  2. List: retrieved results are displayed as a linear list
  3. Temporal: retrieved results in the context of timelines
  4. Integrated: multi-view with combinations of the above approaches

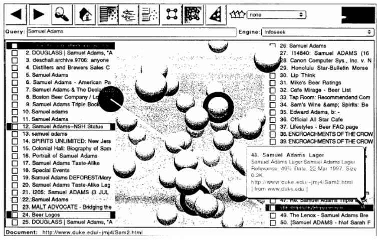
Related Work: Spatial

1. Show relationship between keywords—InfoCrystal (1993)



Related Work: Spatial

1. Show relationship between keywords—InfoCrystal (1993)
2. Show clusters only—Lighthouse (2000)



Query: Samuel Adams

Engine: Infoseek

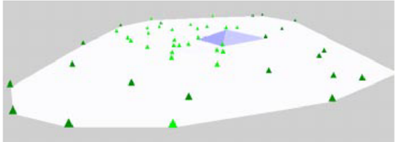
2. DOUGLASS | Samuel Adams, "A
3. deschall.archive.9706: anyone
4. Distillers and Brewers Sales C
5. Samuel Adams
6. Samuel Adams - American Pa
7. Samuel Adams & The Decla
8. Boston Beer Company / Lo
9. Samuel Adams Triple Bock
10. Samuel adams
11. Samuel Adams
12. Samuel Adams--NSH Statue
13. samuel adams
14. SPIRITS UNLIMITED: New Jers
15. Colonial Hall: Biography of Sam
16. Portrait of Samuel Adams
17. Samuel Adams Taste-Alike
18. Special Events
19. Samuel Adams DEFOREST/Mary
20. Samuel Adams Taste-Alike Lag
21. I205: Samuel ADAMS (3 JUL
22. Samuel Adams
23. MALT ADVOCATE - Bridging the
24. Beer Logos
25. DOUGLASS | Samuel Adams, "A
26. Samuel Adams
27. I14840: Samuel ADAMS (16
28. Canon Computer Sys., Inc. v. N
29. Honolulu Star-Bulletin Morse
30. Lip Think
31. Mike's Beer Ratings
32. Cafe Mirage - Beer List
33. Tap Room: Recommendend Com
34. Sam's Wine & Spirits: Be
35. Edward Adams, b: -
36. Official All Star Cafe
37. Lifestyles - Beer FAQ page
38. ENCROACHMENTS OF THE CROW
39. ENCROACHMENTS OF THE CROW
49. The Lenox - Samuel Adams Bre
50. (Samuel ADAMS - h\of Sarah F

48. Samuel Adams Lager
Samuel Adams Lager Samuel Adams Lager
Relevance: 49%; Date: 22 Mar 1997. Size 0.2K.
http://www.duke.edu/~jmj4/Sam2.html
[from www.duke.edu]

Document: http://www.duke.edu/~jmj4/Sam2.html

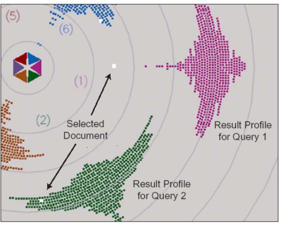
Related Work: Spatial

1. Show relationship between keywords—InfoCrystal (1993)
2. Show clusters only—Lighthouse (2000)
3. 3D terrain—BEAD (1993)



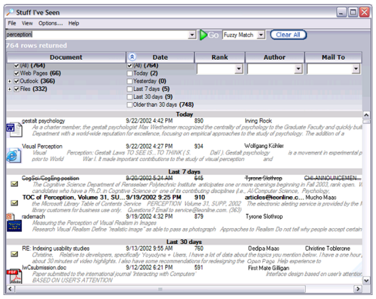
Related Work: Spatial

1. Show relationship between keywords—InfoCrystal (1993)
2. Show clusters only—Lighthouse (2000)
3. 3D terrain—BEAD (1993)
4. Arrange multiple query results spatially —Sparkler (2001)



Related Work: List

- Google
- Stuff I've Seen (2003)



perception

764 rows returned

Document	Date	Rank	Author	Mail To
☑ (All) (764) ☑ Web Pages (66) ☑ Outlook (366) ☑ Files (332)	☑ (All) (764) ☐ Today (2) ☐ Yesterday (0) ☐ Last 7 days (5) ☐ Last 30 days (9) ☐ Older than 30 days (748)			
Today				
gestalt psychology	9/22/2002 4:42 PM	890	Irving Rock	
Visual Perception	9/22/2002 4:27 PM	934	Wolfgang Köhler	
Last 7 days				
~~CogSci/CogEng position~~	~~9/20/2002 5:24 AM~~	~~645~~	~~Tyrone Slothrop~~	~~CHI-ANNOUNCEMEN...~~
TOC of Perception, Volume 31, SU...	**9/19/2002 9:25 PM**	**910**	**articles@ieonline.c...**	Mucho Maas
rademach	9/19/2002 4:32 PM	879	Tyrone Slothrop	
Last 30 days				
RE: Indexing usability studies	9/13/2002 9:55 AM	760	Oedipa Maas	Christine Toblerone
IwCsubmission.doc	9/12/2002 6:21 PM	591	First Mate Gilligan	

gestalt psychology: *As a charter member, the gestalt psychologist Max Wertheimer recognized the centrality of psychology to the Graduate Faculty and quickly buil Department with a world-wide reputation for excellence, focusing on empirical approaches to the study of psychology. The addition of a*

Visual Perception: *Visual Perception: Gestalt Laws TO SEE IS...TO THINK (S. Dalí). Gestalt psychology is a movement in experimental p prior to World War I. It made important contributions to the study of visual perception and*

CogSci/CogEng position: *The Cognitive Science Department of Rensselaer Polytechnic Institute anticipates one or more openings beginning in Fall 2003, rank open. W candidates who have a Ph.D. in Cognitive Science or one of its contributing disciplines (i.e., AI/Computer Science, Psychology,*

TOC of Perception: *the Microsoft Library Table of Contents Service PERCEPTION Volume 31, SUPP, 2002 The electronic alerting service is provided by the l library customers for business use only. Questions? Email to service@ieonline.com. (363)*

rademach: *Measuring the Perception of Visual Realism in Images Research Visual Realism Define "realistic image" as able to pass as photograph Approaches to Realism Do not tell why people accept certain*

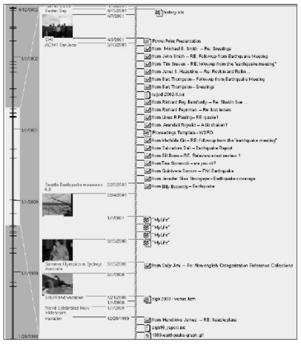
RE: Indexing usability studies: *Christine, Relative to developers, specifically Yoyodyne + Users, I have a lot of data about the topics you mention below. I have a one hour about 30 minutes of video highlights. I also have some recommendations for redesigning the Open Page Help experience to*

IwCsubmission.doc: *Paper submitted to the international journal 'Interacting with Computers' Interface design based on user's attentio BASED ON USER'S ATTENTION*

Related Work: Temporal

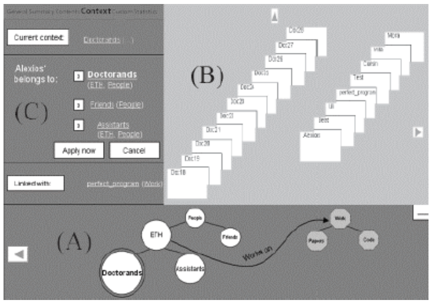
- Milestones in Time (2003)

à provides personal events as landmarks on the time line for the retrieved results

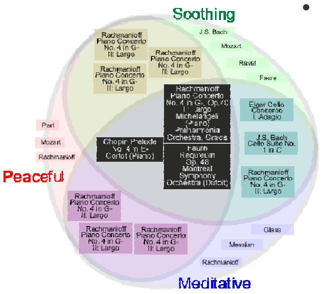


Related Work: Integrated

- InfoSpace (2003): spatial + temporal

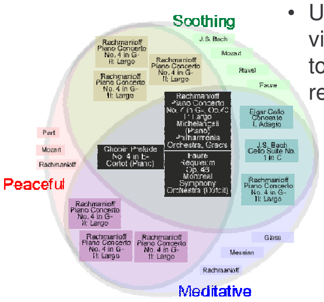


Prototype I



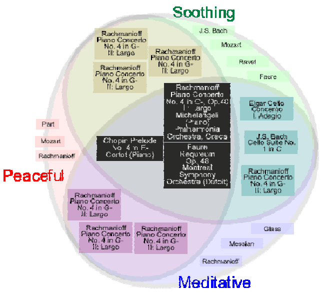
- Arranges query results as a Venn diagram
  - – to put results in context of query terms
  - – to relate neigbouring regions by a query term

Prototype I



- Uses a number of visualization techniques to convey these relationships
  - Colour-coding the search word with primary colours, and the cross-area with a mix of those colours
  - Perceptual Layering to indicate the relative importance of each result region

Prototype I

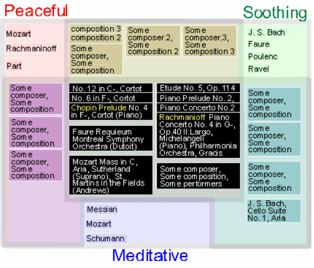


- Difficult to pack squares into non-rectangular containers

  à Limits max display capacity

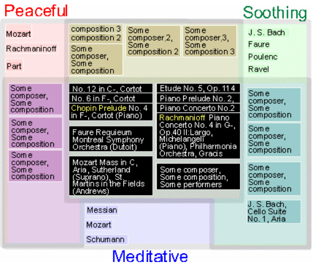
- Can further cluster music record displays

Prototype II



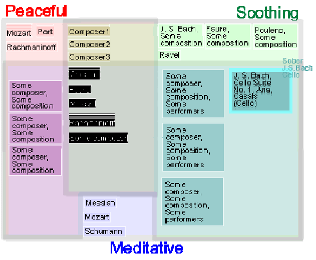
- Uses rectangular containers
  - – Harder to see “Venn” relationships, but still relates neighbours with a single query term
- “Piles” music by composer (or artist, genre, style)

Prototype II



- Semantic zooming
  1. Full display (composer, title, performer)
  2. Partial display (composer, title)
  3. Minimal display (composer)
  4. No display: number of results

Prototype II



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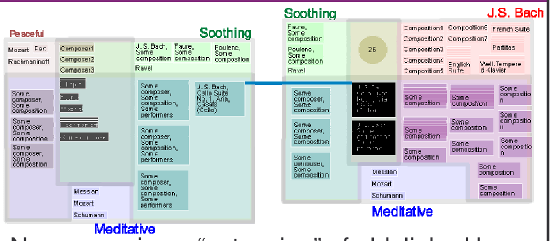
Prototype II: New Query



- New query is an “extension” of old, linked by line, colour, and position
- Old queries fade and shrink with time

Dataset

- 8556 mp3 files extracted from 714 albums by 315 different artists
- Rock/pop and electronica
- Labeled with English terms (by Eric Brochu)

ALB	Fever to Tell
ART	Yeah Yeah Yeahs
REL	Apr 29, 2003
GEN	Rock
STY	Indie Rock, Garage Punk
TON	Cathartic, Exuberant, Boisterous, Passionate, Brittle
PAT	/cs/beta/SCRATCH/music/mp3library/Yeah Yeah Yeahs/Fever to Tell

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Implementation

- Architecture
  - Flat (at the moment): since the amount of data processing required is not extensive
- Platform and language:
  - Java using Eclipse IDE on Windows
- Libraries
  - swt.jar
  - No other graphics library used (yet…)

Current status & Next steps

7	8	9	10	11	12	13
Familiarize with database structure, refine prototype design						
14	15	16	⑰	18	19	20
Implement basic layout and individual element selection						
21	22	23	24	25	26	27
Implement semantic zooming, F+C with animation						
28	29	30	1	2	3	4
Implement new keyword query (spatial layout)						
5	6	7	8	9	10	11
Implement new keyword query (animation)						
12	13	14	**15**			
Preparation of report and presentation						

Demo