

CPSC 533C Information Visualization Project Update

# Exploratory Browsing in Music Space

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

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# Two Scenarios at a Record Store

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

	<b>Specified Target</b>	<b>Uncertain Target</b>
<b>Specified Location</b>	<i>Navigate/Explore</i>  File explorer Web browser	<i>Navigate/Explore</i>  File explorer Web browser
<b>Uncertain Location</b>	<i>Find/Search</i>  File searcher Internet search engine	<i>Browse</i>  Internet search engine?

# The Ideal InfoVis Solution

To better support exploratory browsing, the interface should ...

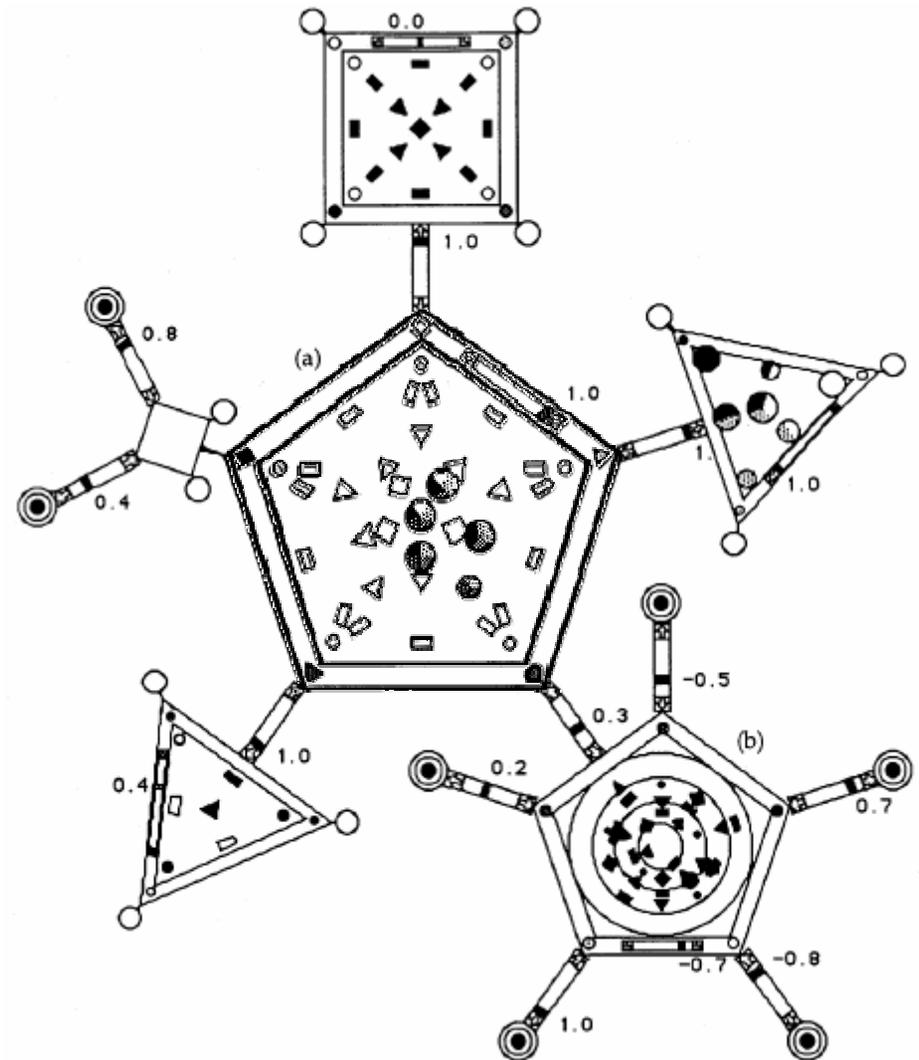
1. **Provide context:** to allow users to interpret the query results based on their input terms  
à where am I? what am I looking at?
2. **Guide navigation:** going from the familiar to the unfamiliar  
à where did I come from? where should I go next?
3. **Assist refinement of target:** based on retrieved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

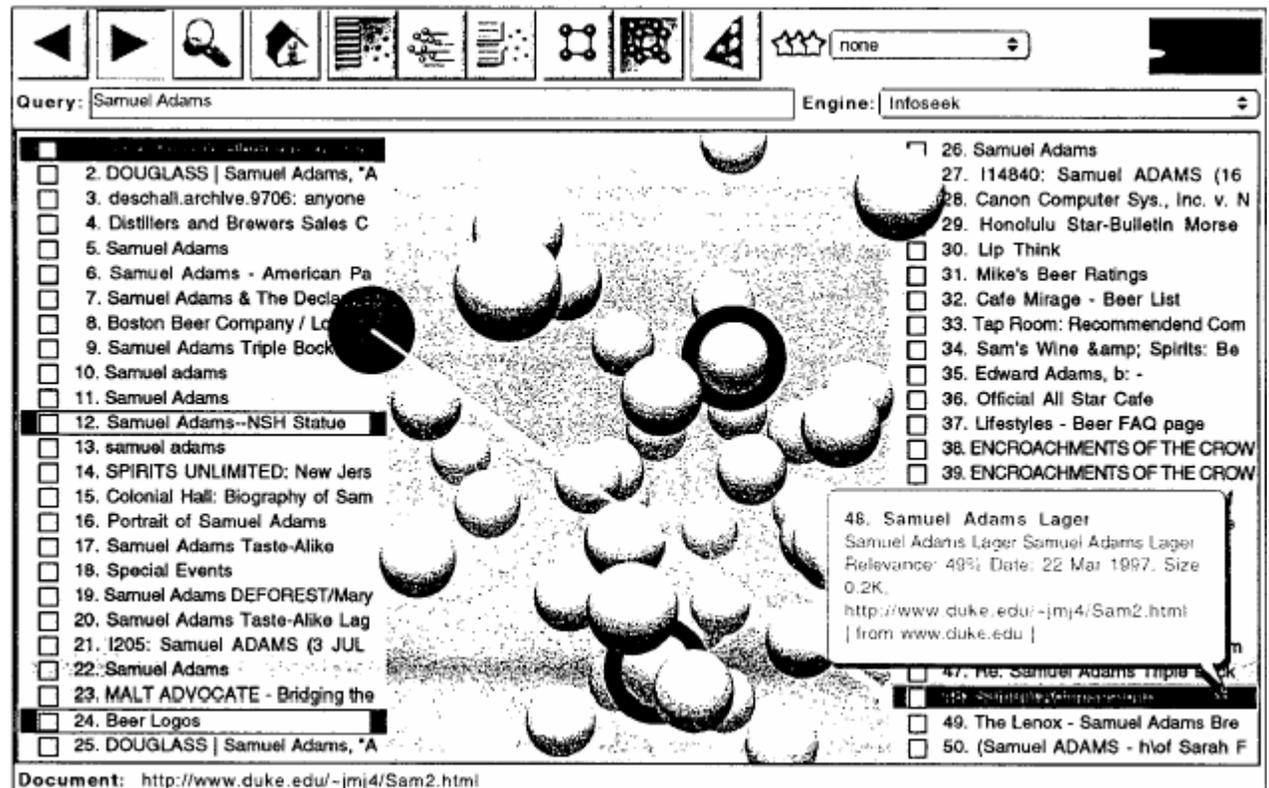
# Related Work: Spatial

1. Show relationship between keywords—  
InfoCrystal (1993)



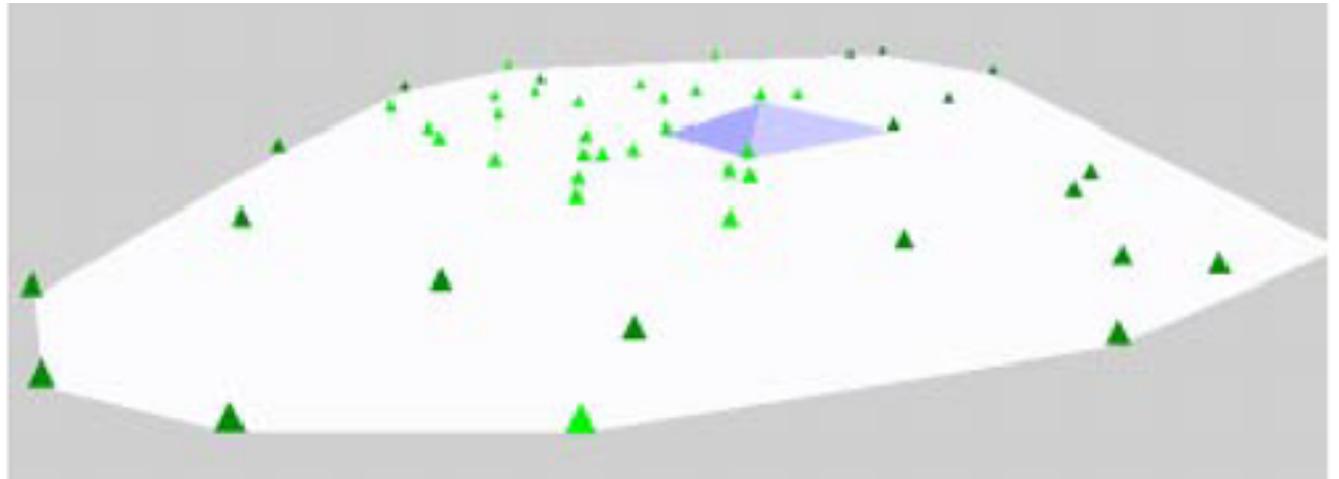
# Related Work: Spatial

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



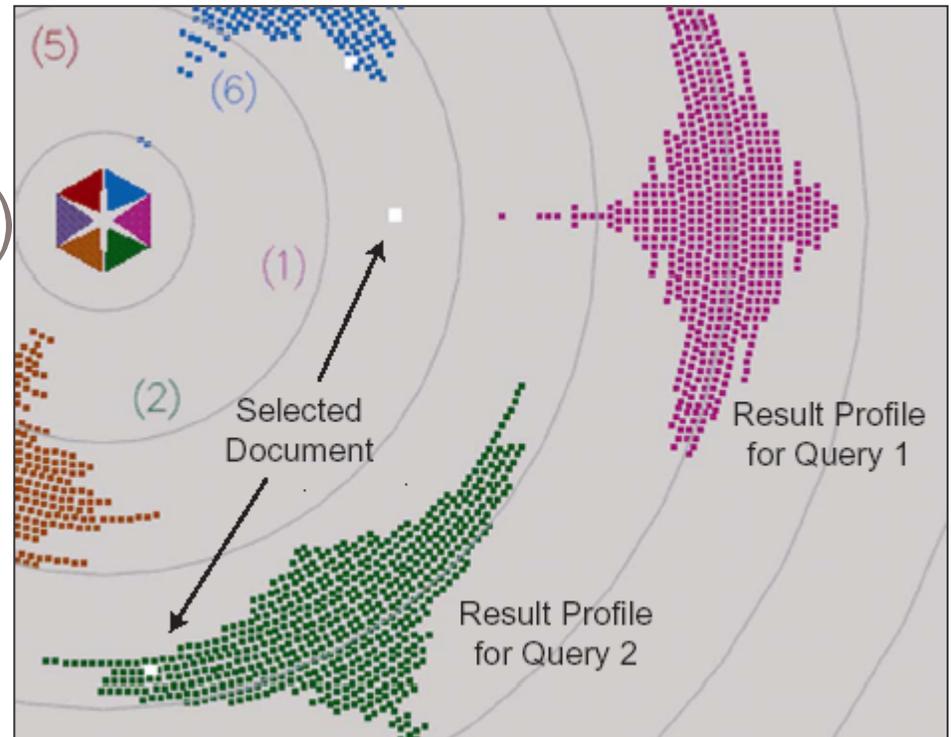
# Related Work: Spatial

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)

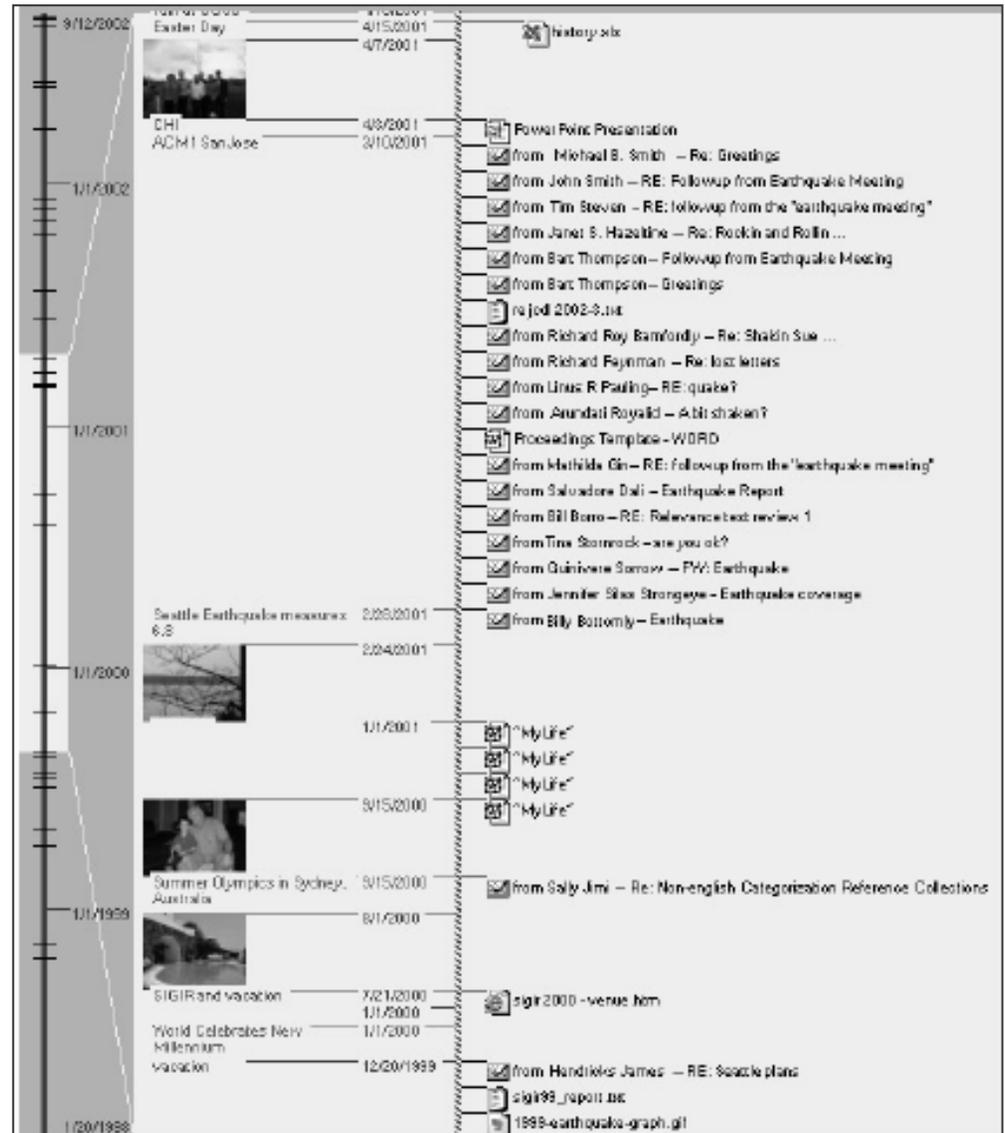
The screenshot shows a web browser window titled "Stuff I've Seen" with a search bar containing "perception". The search results are displayed in a table with columns for Document, Date, Rank, Author, and Mail To. The results are grouped by date: Today, Last 7 days, and Last 30 days.

Document	Date	Rank	Author	Mail To
<b>Today</b>				
gestalt psychology	9/22/2002 4:42 PM	890	Irving Rock	
<i>As a charter member, the gestalt psychologist Max Wertheimer recognized the centrality of psychology to the Graduate Faculty and quickly built Department with a world-wide reputation for excellence, focusing on empirical approaches to the study of psychology. The addition of a</i>				
Visual Perception	9/22/2002 4:27 PM	934	Wolfgang Köhler	
<i>Visual Perception: Gestalt Laws TO SEE IS... TO THINK (S. Dali). Gestalt psychology is a movement in experimental psychology prior to World War I. It made important contributions to the study of visual perception and</i>				
<b>Last 7 days</b>				
CogSci/CogEng position	9/20/2002 5:24 AM	645	Tyrone Slothrop	CHI-ANNOUNCEMEN...
<i>The Cognitive Science Department of Rensselaer Polytechnic Institute anticipates one or more openings beginning in Fall 2003, rank open. We candidates who have a Ph.D. in Cognitive Science or one of its contributing disciplines (i.e., AI/Computer Science, Psychology,</i>				
TOC of Perception, Volume 31, SU...	9/19/2002 9:25 PM	910	articles@eonline.c...	Mucho Maas
<i>the Microsoft Library Table of Contents Service PERCEPTION Volume 31, SUPP, 2002 The electronic alerting service is provided by the I library customers for business use only. Questions? Email to service@eonline.com. (363)</i>				
rademach	9/19/2002 4:32 PM	879	Tyrone Slothrop	
<i>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</i>				
<b>Last 30 days</b>				
RE: Indexing usability studies	9/13/2002 9:55 AM	760	Oedipa Maas	Christine Toblerone
<i>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</i>				
lwCsubmission.doc	9/12/2002 6:21 PM	591	First Mate Gilligan	
<i>Paper submitted to the International Journal 'Interacting with Computers' Interface design based on user's attention. BASED ON USER'S ATTENTION</i>				

# Related Work: Temporal

- Milestones in Time (2003)

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



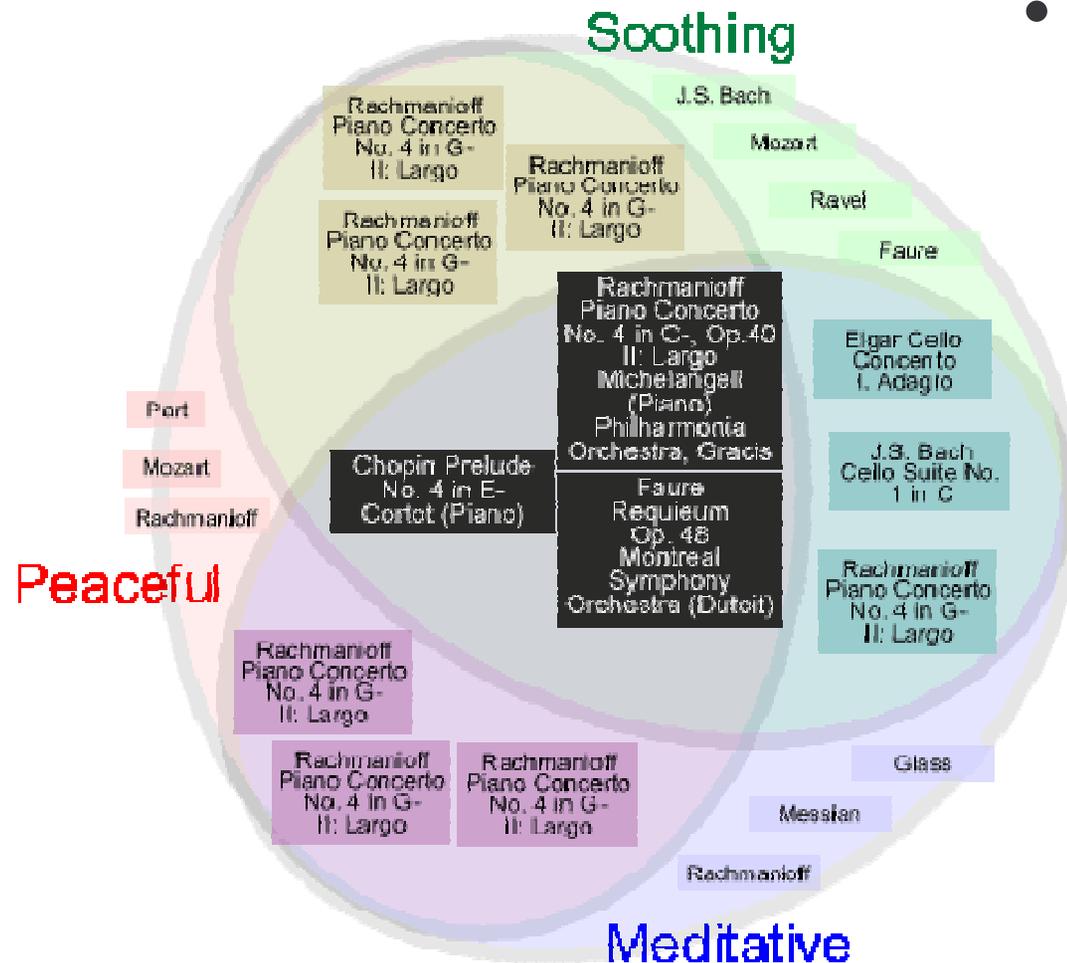
# Related Work: Integrated

- InfoSpace (2003): spatial + temporal

The screenshot displays the InfoSpace interface, which is divided into three main sections:

- Control Panel (Left):** This section contains several interactive elements:
  - General Summary:** Context: Custom statistics
  - Current context:** Doctorands (1)
  - Belongs to:** Alexis' belongs to:
    - Doctorands (ETH, People)
    - Friends (People)
    - Assistants (ETH, People)
  - Buttons:** "Apply now" and "Cancel"
  - Linked with:** perfect\_program (Books)
- Spatial Map (Top Right):** Labeled (B), this area shows a 2D map with a series of overlapping rectangular cards representing documents. The cards are labeled with dates from Dec18 to Dec28, along with other terms like "Action", "UI", "test", "perfect\_program", "Cash", "Web", and "More".
- Network Diagram (Bottom):** Labeled (A), this is a graph showing relationships between nodes. The nodes include "ETH", "People", "Friends", "Doctorands", "Assistants", "Web", "Paper", and "Code". A prominent arrow labeled "Works on" points from the "Doctorands" node to the "Web" node.

# Prototype I

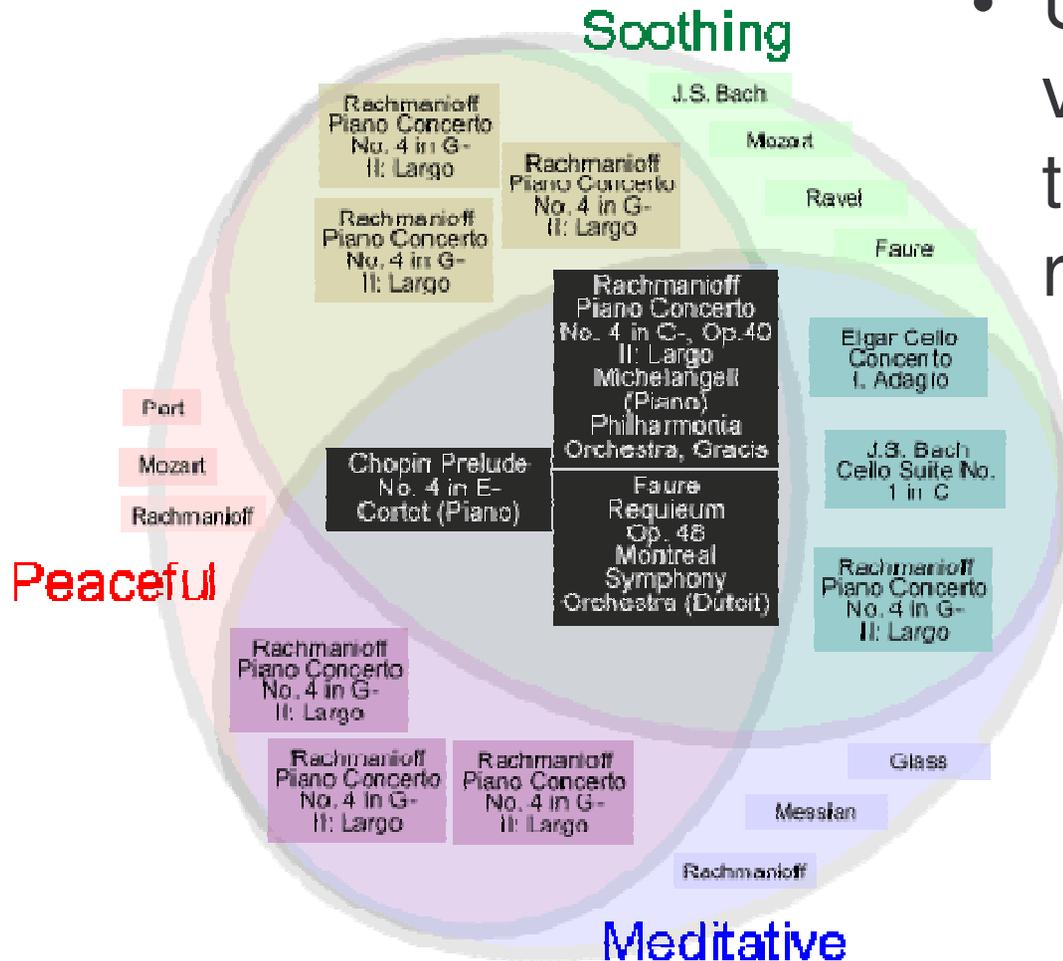


- Arranges query results as a **Venn diagram**

– to put results in context of query terms

– to relate neighbouring 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

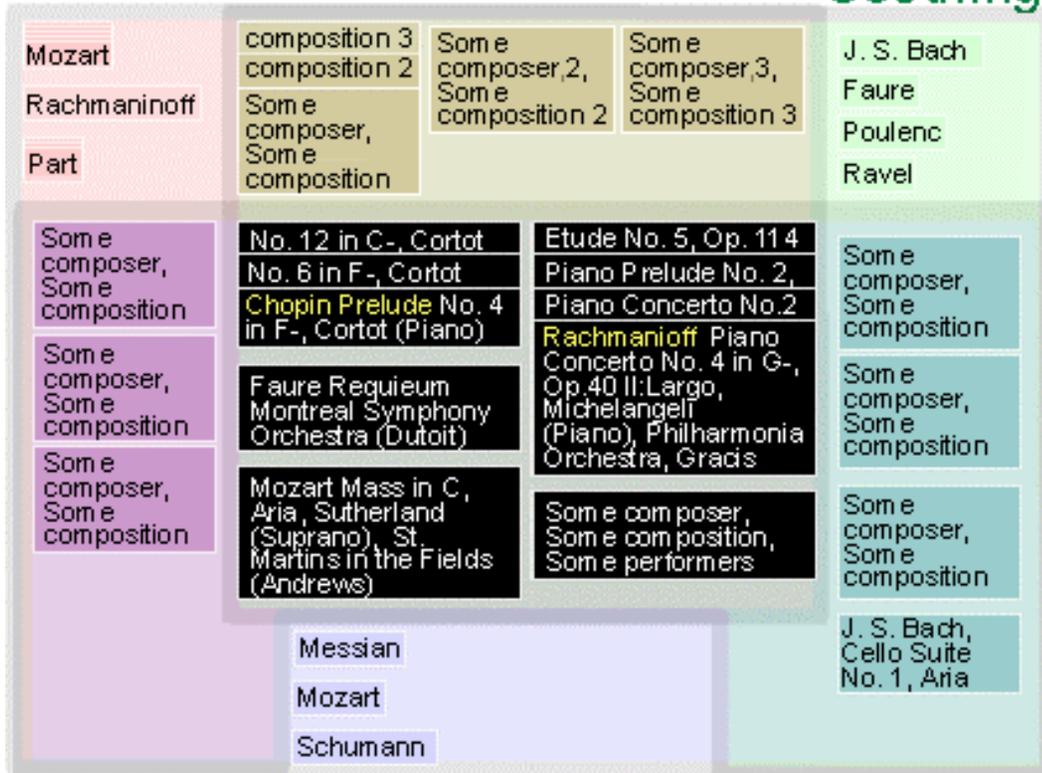
- Perceptual Layering to indicate the relative importance of each result region



# Prototype II

Peaceful

Soothing



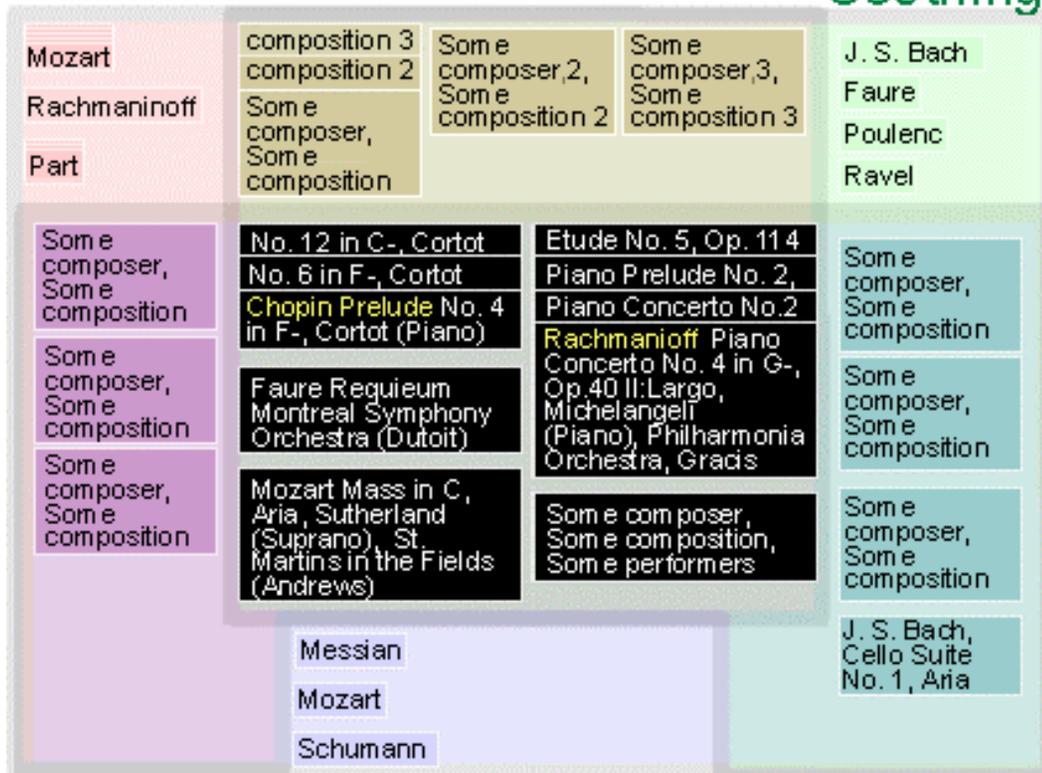
Meditative

- 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

Peaceful

Soothing

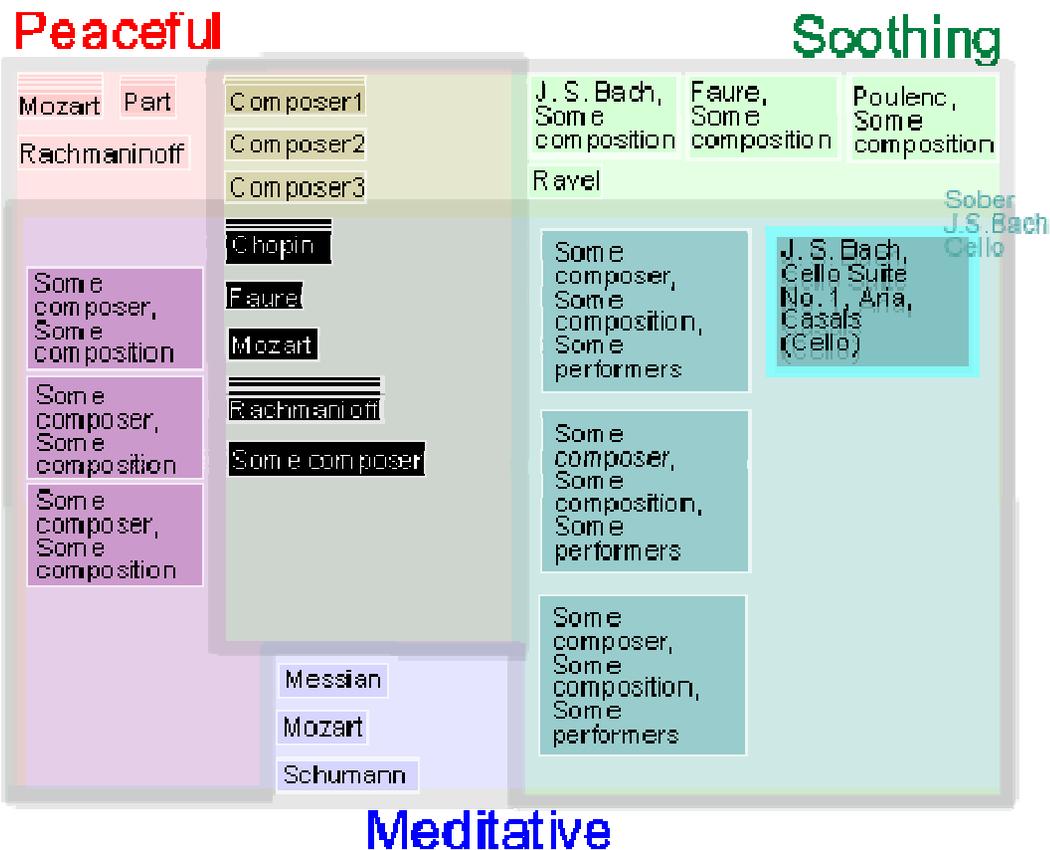


Meditative

• Semantic zooming

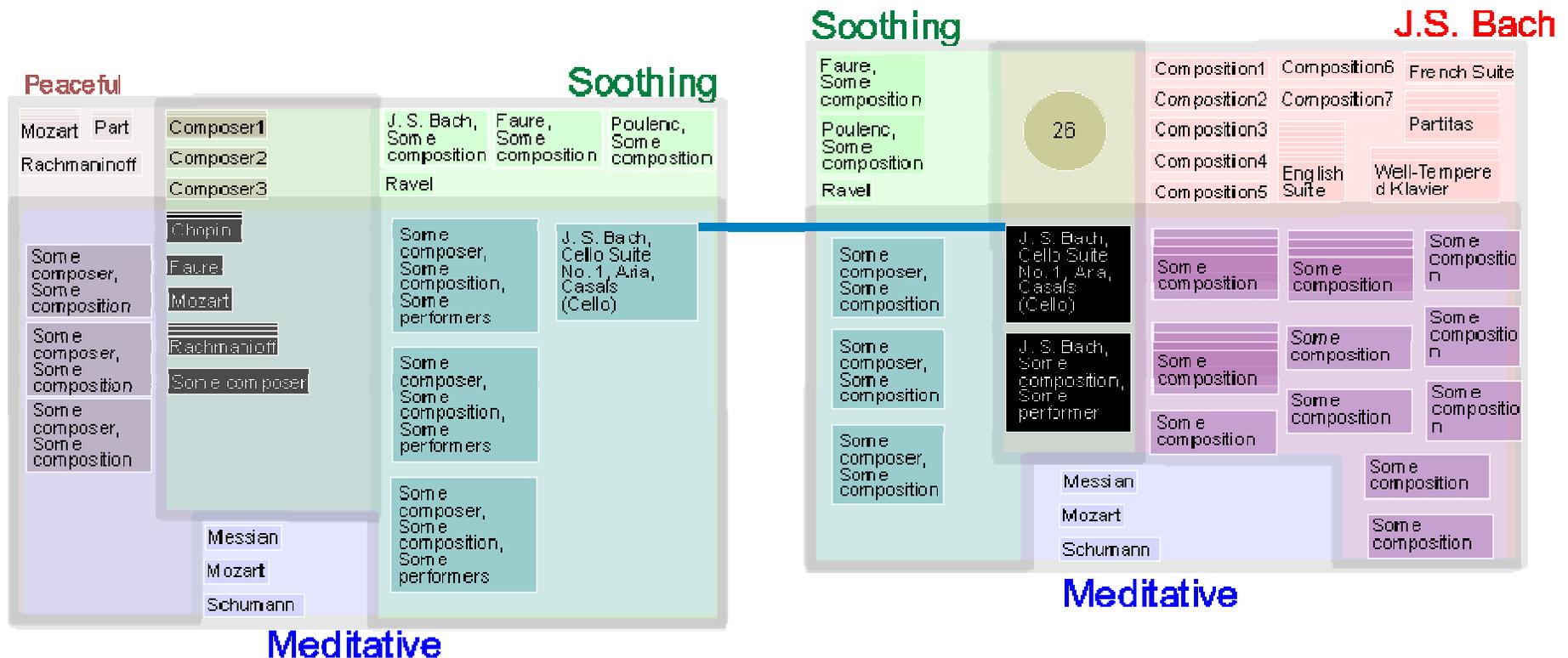
1. Full display  
(composer, title,  
performer)
2. Partial display  
(composer, title)
3. Minimal display  
(composer)
4. No display: number  
of results

# Prototype II



- 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: 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)

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

# 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
<i>Familiarize with database structure, refine prototype design</i>						
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**