

# DL User Interfaces



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# Delos work on DL interfaces

## Delos **Cluster 4**: User interfaces and visualization

Cluster's goals:

- To elaborate a **common understanding** of the role and scope of user interface research in the DL area
- To develop a **theoretical framework** for DL user interface design
- To develop methodologies, techniques, and tools to enable future DL designers and developers to meet not only the **technological**, but also the **user-oriented** requirements
- Focus on real users
  - End users
  - Stakeholders (maintainers, librarians, and archivists)

# Related activities (1)

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- Systematic analysis of user requirements
  - Provision of an empirical basis (from on-going projects)
  - Identify and characterize the DL users and stakeholders
  - Identify user needs, goals, and requirements
  - Support for all phases of DL lifecycle
- User interface and visualization design
  - Study on interface and visualization principles
  - Theoretical framework for DL user interface design
  - Data and metadata visualization

# Related activities (2)

- Novel interaction and design strategies

- Multimedia interfaces

- Video streaming on mobile interfaces
- Multimedia content searching



- User requirements-driven support for a DL design framework

- Novel navigation techniques (vs. querying)

- Natural language to access knowledge repositories

- Stakeholders oriented

- Design, implementation, and evaluation of multimedia annotations for users' collaboration



# Deliverables

- 4.1.1: Report on functional and non-functional digital library requirements  
([http://delos.dis.uniroma1.it/docs/Delos\\_D4.1.1\\_v1.7.pdf](http://delos.dis.uniroma1.it/docs/Delos_D4.1.1_v1.7.pdf))
  - Analysis of existing projects/case studies
  - Design and dissemination of a questionnaire on user requirements
  - Complete analysis of raw data
- 4.0.1: *Report on Tasks 4.5-4.10* (draft status)
  - Relevance feedback
  - Multimedia interfaces for mobile application
  - User requirements driven support for a DL design framework
  - Natural language and speech interfaces to knowledge repositories
  - Design, Implementation and Evaluation of Multimedia Annotations for Users' Collaboration

# Main issues/results

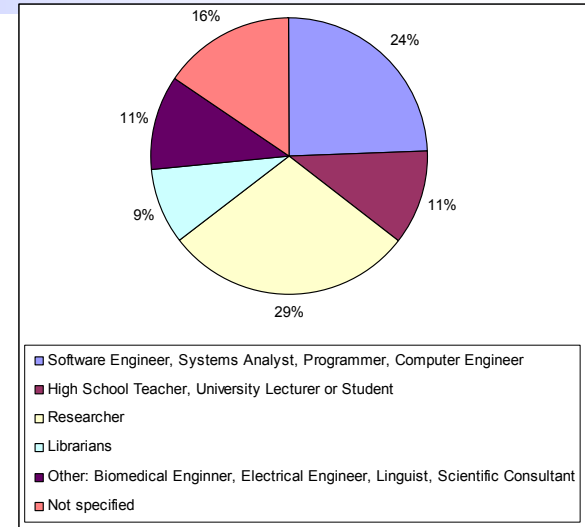
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1. User, task, and service analysis
  - 45 users involved in the survey
  - User interest w.r.t. tasks
2. Novel interaction strategies
  - Smart browsing vs searching
3. Information visualization
  - Data and metadata visualization

# User, task, and service analysis (1)

## User taxonomy

- Experts in knowledge distribution
  - Knowledge mediators
  - Knowledge managers
- Experts in knowledge content
  - Researchers/'value'-adders
  - Knowledge creators
- End-users
  - Purpose
  - Frequency
  - Patterns of use



**Crosstab**

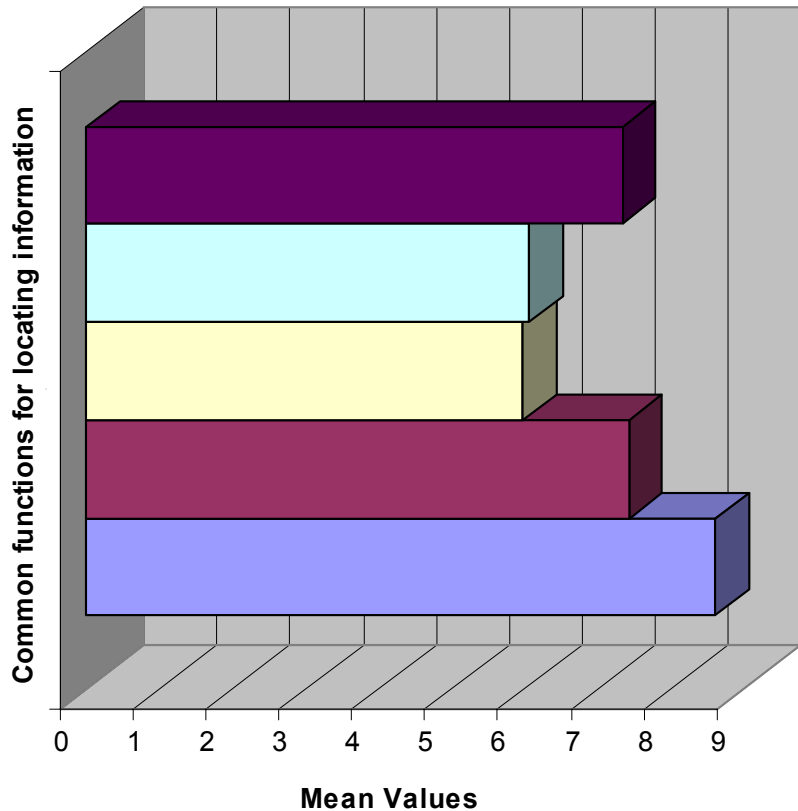
			Education Level		Total
			University	Post Graduate	
DL Frequency of Use	Daily	Count	3	6	9
		% within DL Frequency of Use	33.3%	66.7%	100.0%
		% within Education Level	25.0%	24.0%	24.3%
	Twice a Week	Count	2	8	10
		% within DL Frequency of Use	20.0%	80.0%	100.0%
		% within Education Level	16.7%	32.0%	27.0%
	Weekly	Count	3	4	7
		% within DL Frequency of Use	42.9%	57.1%	100.0%
		% within Education Level	25.0%	16.0%	18.9%
	Monthly	Count	1	4	5
		% within DL Frequency of Use	20.0%	80.0%	100.0%
		% within Education Level	8.3%	16.0%	13.5%
	Seldom	Count	3	3	6
		% within DL Frequency of Use	50.0%	50.0%	100.0%
		% within Education Level	25.0%	12.0%	16.2%
	Total	Count	12	25	37
		% within DL Frequency of Use	32.4%	67.6%	100.0%
		% within Education Level	100.0%	100.0%	100.0%
% of Total		32.4%	67.6%	100.0%	

# User, **task**, and service analysis (2)

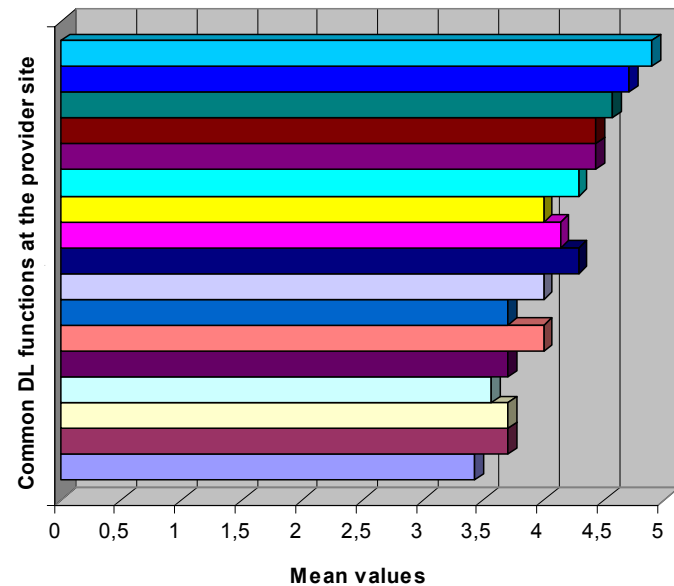
- Access to data (end users)
  - Search
  - Browsing
  - Social navigation
- Tool creation and management (end users)
  - Personalization of access (profiles)
  - Etc.
- Integration of knowledge (expert end user and stakeholders)
  - Classification
  - Indexing
  - Cataloguing
  - Annotation
  - Design of classificatory systems/ontology
- Content administration (stakeholders)
  - Metadata management
  - Management of classificatory systems/ontologies
  - Etc.



# User, task, and service analysis (3)



- Index facility
- "See also" items (e.g., similar to the one at hand)
- Filtering search/browsing results (e.g., according to personal profile(s))
- Navigation (e.g., browsing predefined catalogues)
- Search (e.g., keywords search, parametric search)



- Locating resources
- Creating cross – reference links among similar resources
- Storing metadata about resources (creator, content, technical requirements, etc.)
- Archiving resources
- Organizing resources
- Checking for inconsistencies
- Glossaries, Thesaurus, and Dictionaries
- Updating end-users on new / refined contents
- Retrieving content/services usage statistics
- Creating new resources
- Index facilities
- Creating new / modifying existing classification schemes
- Editing existing resources
- Bookmarks facility (i.e., Favorites)
- Deleting resources
- Multilingual support
- History facility

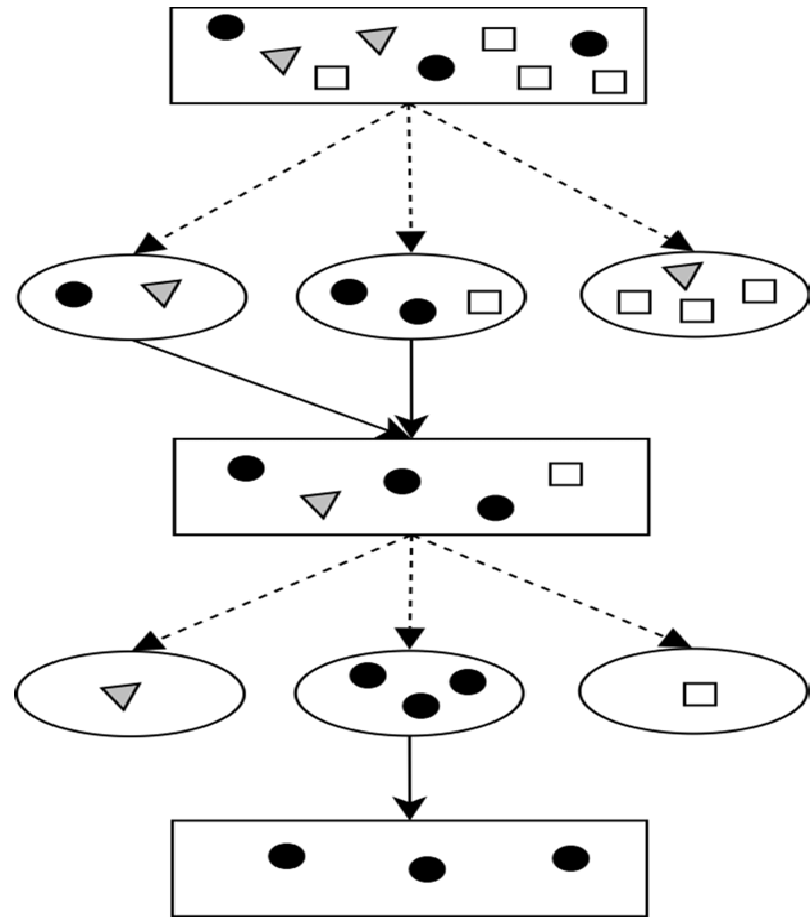
# Novel interaction strategies (1)

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- Typical problems with searching
  - Novice user/new collection
  - Vague/ill-defined information need
  - Vocabulary problem
- Typical problems with traditional browsing
  - Too many items
  - End users do not like it very much (for large data sets)
- Content driven browsing! E.g.:
  - Cluster based browsing
  - Catalogue browsing

# Cluster based browsing (1)

- Elements are clustered in topically-coherent groups
- Summaries are presented to the user (list of keywords)
- Samples are provided
- Users select one or more cluster
- The process is repeated, reaching the useful items



# Cluster based browsing (2)

The screenshot displays the Multi-Level-Hypertext Browser (MLHT Browser) interface. The main window shows a list of document clusters, each with a title, a brief description, and a count of documents. The clusters are:

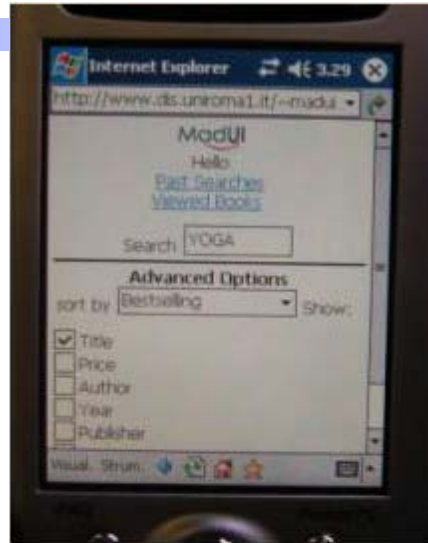
- Cluster**
  - *Sperry Rand's Third-Generation Computers 1964-1980*
  - *A View from 20 Years as a Historian of Computing*
  - products, call, develop, adelle, city, entrant, computers, objectivity, foundation, relevant,...
  - number of documents (38)
- Calculators**
  - Schwartzlander, Earl E. (2001)*
  - calculators
  - number of terms (1)
- Cluster**
  - *Erwin Tomash: His Life and Work*
  - *SuperPaint: An Early Frame Buffer Graphics System*
  - danger, accessibility, chromium, digital, developed, time, adelle, initiatives, origins, computing,...
  - number of documents (13)
- Cluster**
  - *Analyzing Software Measurement Data with Clustering Techniques*
  - *Ontology-Based Search for Interactive Digital Maps*
  - crawler, called, developed, digital, visualization, crucial, original, comparing, computer, based,...
  - number of documents (15)
- Cluster**
  - *The 'Question of Professionalism' in the Computer Fields*
  - *Parameter Tuning for Induction-Algorithm-Oriented Feature Elimination*
  - top, development, attitudes, preparation, elimination, varied, technology, algorithm, ongoing, computer
  - number of documents (5)
- Cluster**
  - *Artificial Intelligence and Grids: Workflow Planning and Beyond*
  - *AnnoTerra: Building an Integrated Earth Science Resource Using Semantic Web Technologies*
  - access, planning, nasa, discovery, appointed, concepts, performs, technologies, focused, computer,...
  - number of documents (15)

The right-hand panel, titled "Details", provides summary statistics and example documents/terms for the selected cluster:

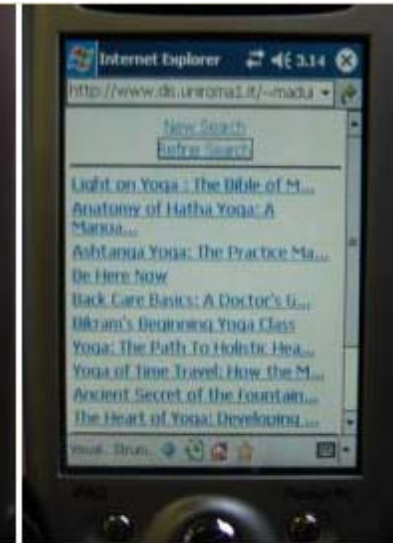
- number of documents: 53
- number of terms: 351
- example-documents**
  - [Sperry Rand's Third-Generation Computers 1964-1980](#)
  - [A View from 20 Years as a Historian of Computing](#)
  - [The Rise and Fall of the Committee on Mathematical Tables and Other Aids to Computation](#)
- example-terms**
  - access**
    - number of documents (1)
  - products**
    - number of documents (1)
  - call**
    - number of documents (1)
- develop, adelle, city, entrant, computer, based, objectivity, foundation, relevant, chicago, portals, tools, essay, calvin, committee, reversed, simple, market, nature, posts, failed, chief, facilitate, rapid, contemporary, history, reflect, exhibits, inspired, inventions, realm, naval, suitable, relationships, discussing, intelligently, affects...

# Catalogue browsing

- Not only **finding** and **collocating** items but...
- Organizing access to content
  - Content-driven
    - directory-like
  - User-driven
  - Task-driven



(1)



(2)

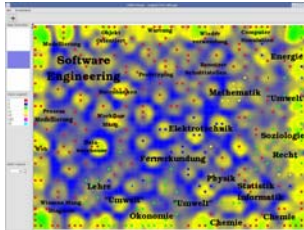


(3)

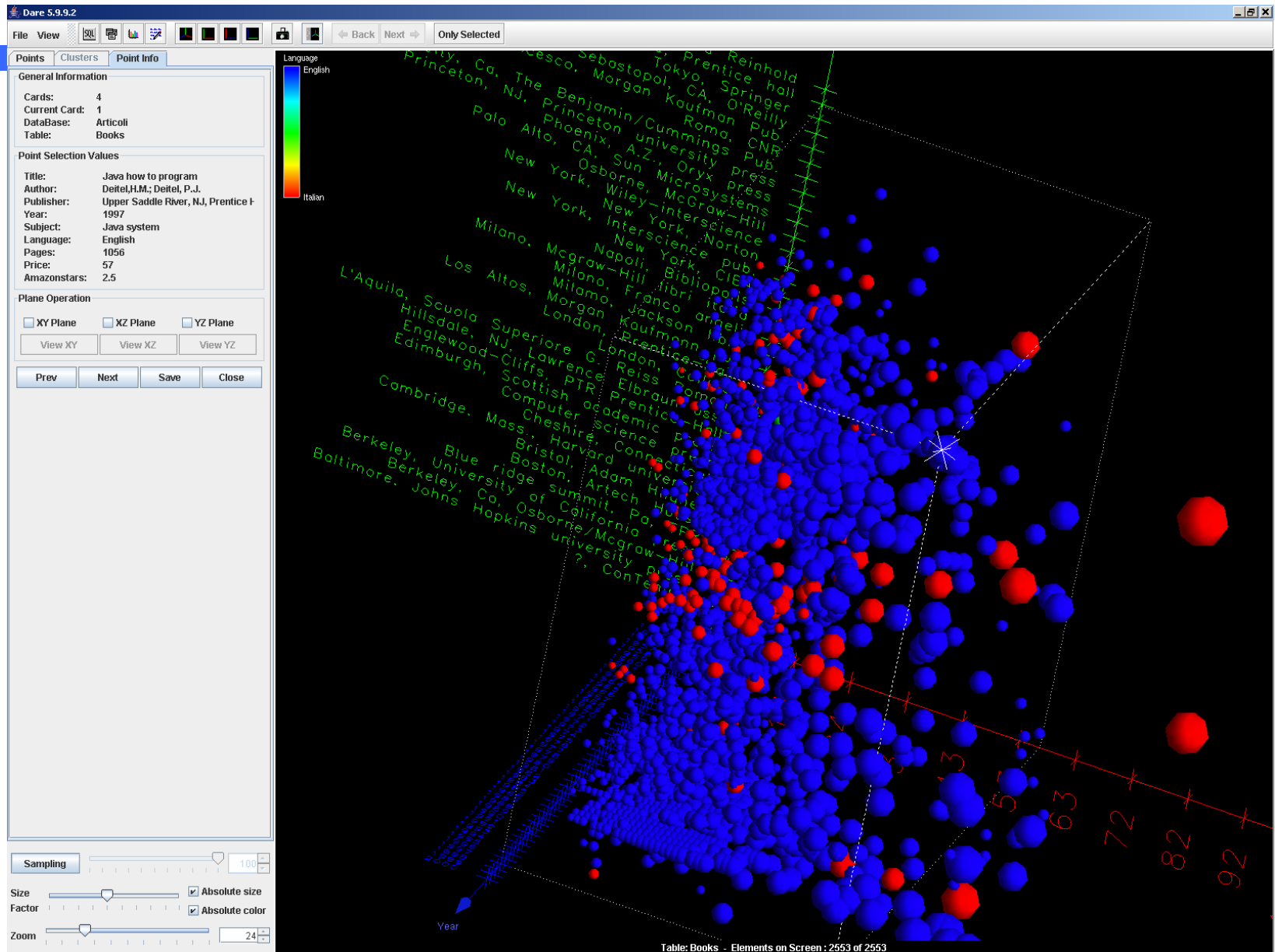


(4)

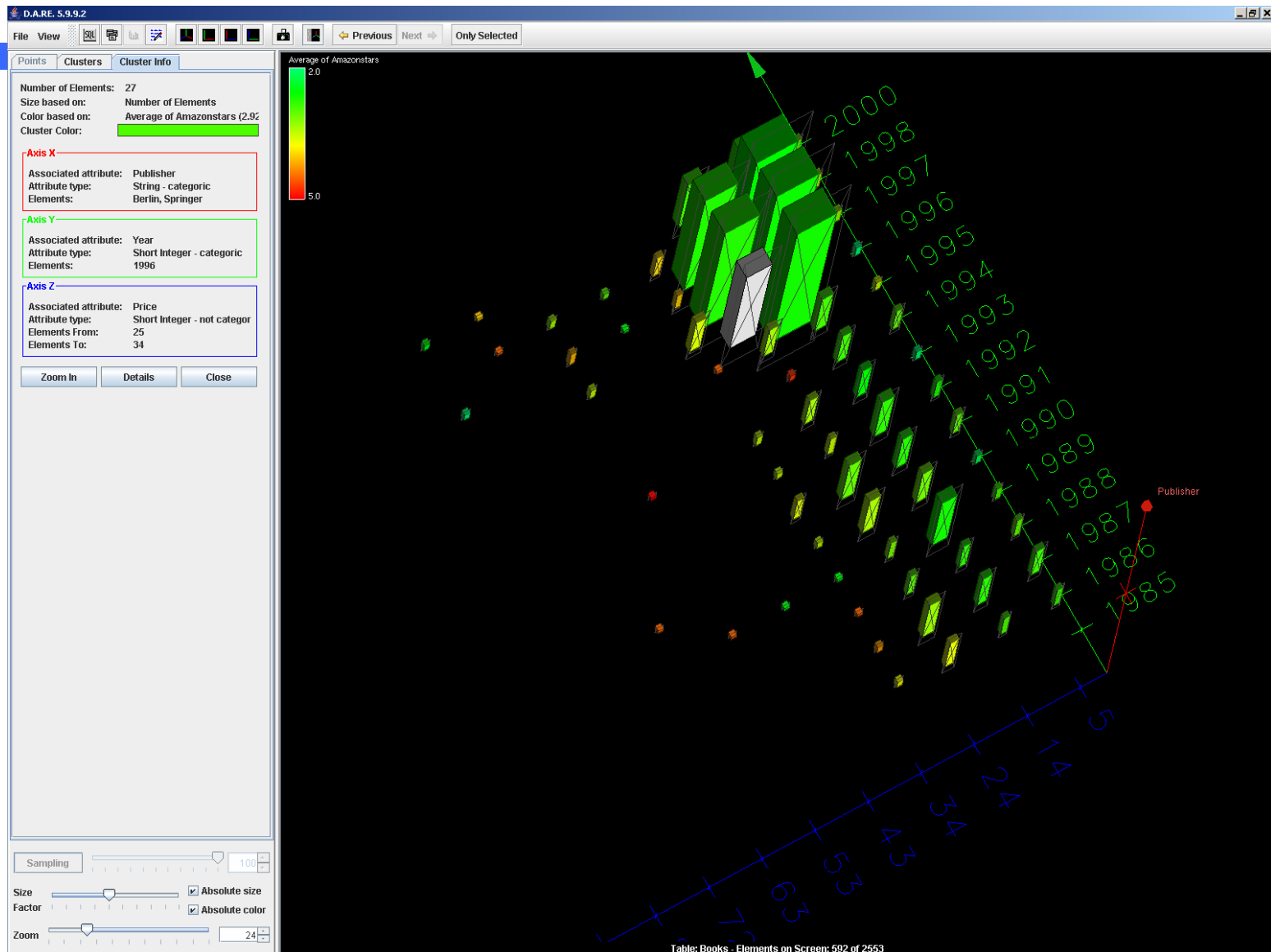
# Visualization

- Information visualization techniques can be integrated with textual techniques for:
  - Exploration activities
  - Visual browsing of the results
  - Aggregate data analysis
- E.g.,
  - SOMlib  for visual browsing the result
  - Dare for overview and aggregate data analysis

# Dare: 2500 books visual overview



# Dare: visual Olap analysis





# Concluding

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- Careful analysis of users and tasks
  - User centered design methodologies
  - Consider what already exists !!! (e.g., the Library of Congress Online Catalogue <http://catalog.loc.gov> uses a technique very close to catalogue browsing)
- Take into account well known visualization and interface design guidelines
- Introduce novel interaction techniques as a **support** for traditional ones