DELOS Task 4.7 (JPA2)

User Requirements-driven Support for a DL Design Framework

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Motivation

- Growing need for **accessibility requirements**
  - In general sense
    - Capturing complex and ill-defined user needs
    - Going beyond query-based access paradigms
  - In technical sense
    - Addressing accessibility requirements of user with disabilities
    - Proposing viable design solutions
- Improving existing applications through methodological support in these directions
  - key issues, requirements, processes, design techniques, best practices, …

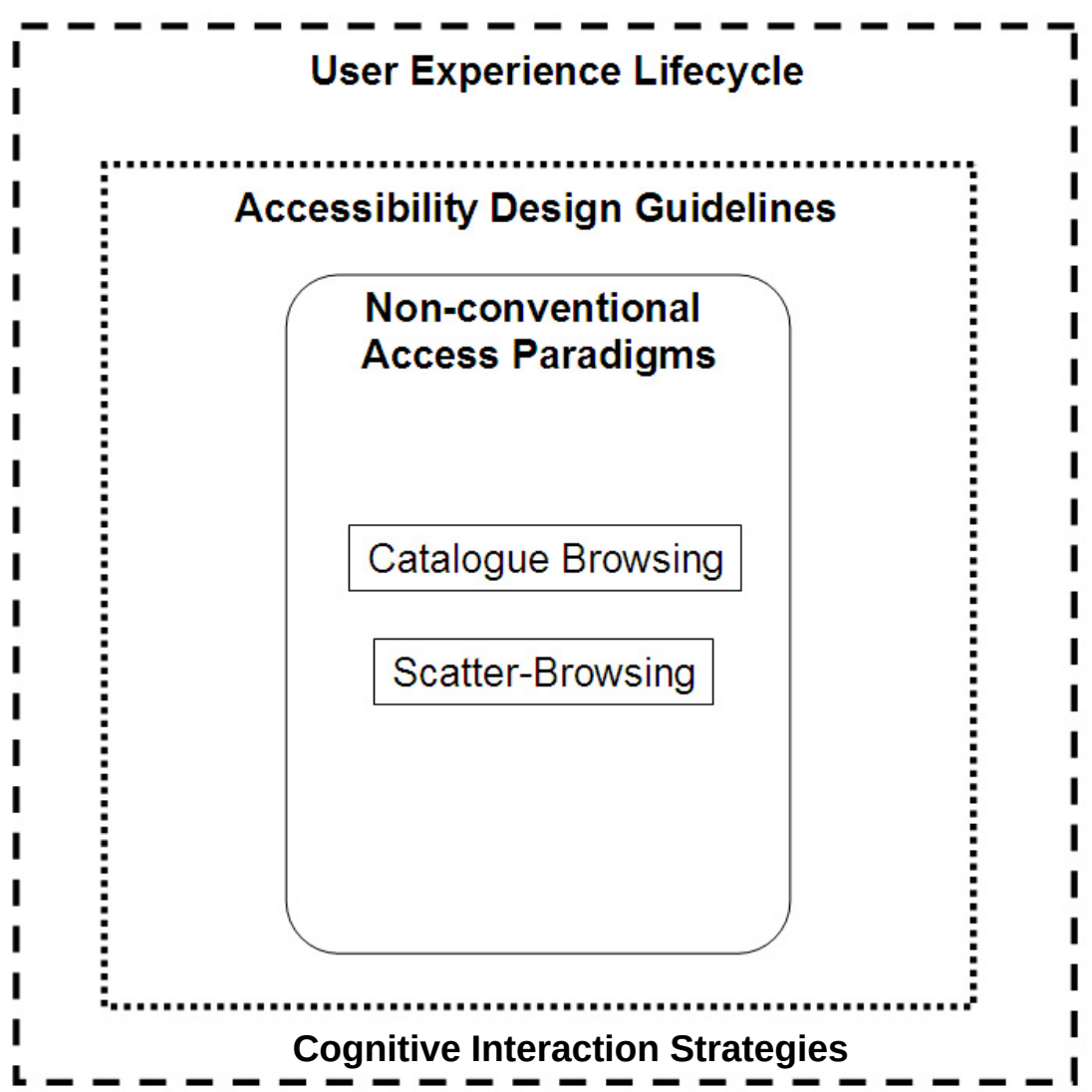
Task Objectives

1. Extend empirical analysis of user requirements (from JPA1) and refine a **user experience lifecycle model**

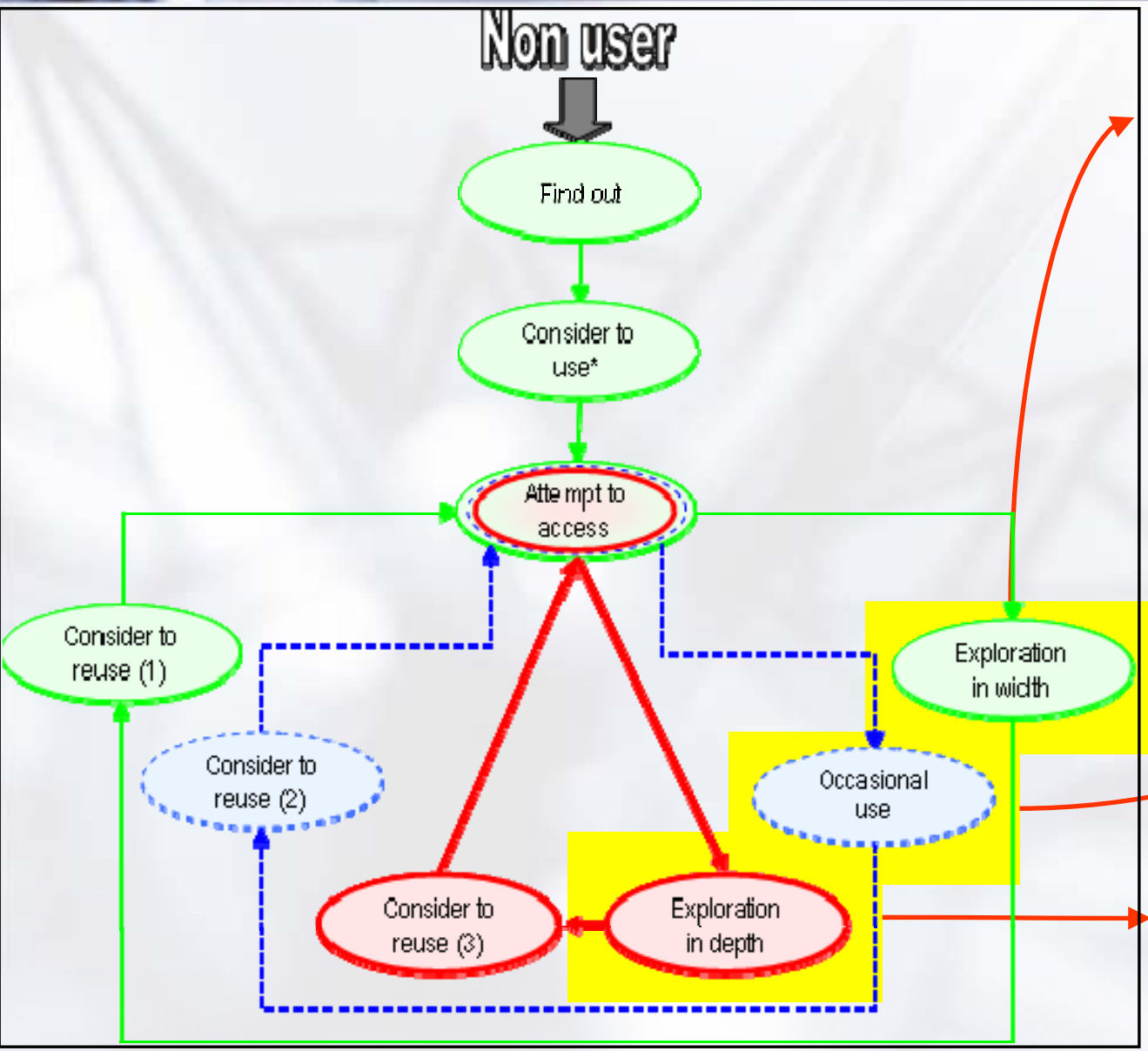
2. Define **non conventional access paradigms** for DLs

3. Develop demonstrative **prototypes** demonstrating the new concepts and mechanisms.

Achievements - Synopsis



User Experience Lifecycle



Addressing open-ended user goals
E.g. need for:
browsing support, overviews, highlights, …

Addressing memorability and learnability
E.g. need for:
navigational interfaces, guided tours, pathways, …

Addressing specific tasks
E.g. need for:
Search, navigation, advanced mechanisms,

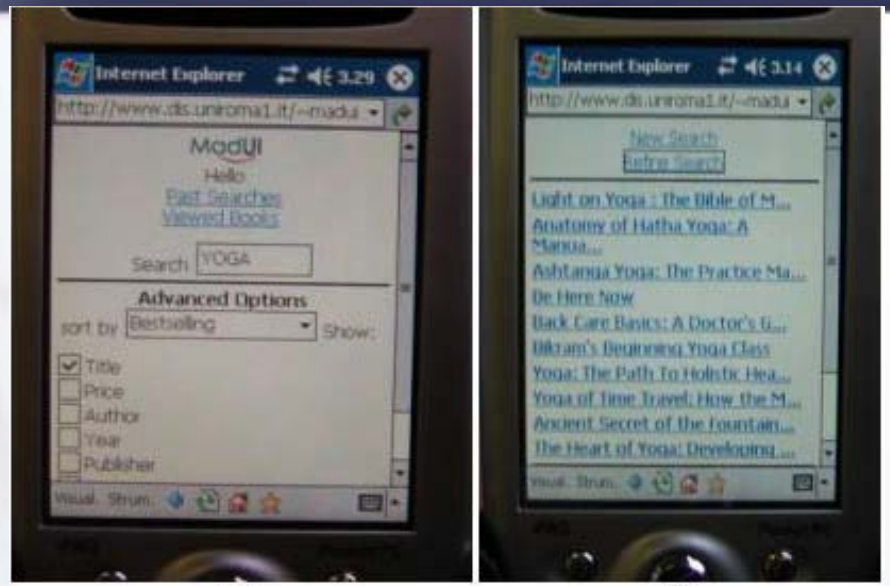
User scenarios to support

- **Novice User/New Collection**
  - If a user is having no experience using any information access system, it would be very hard for him to formulate the queries.
- **Ill-Defined/Vague Information Need**
  - The information need may be ill-defined or too vague to formulate the query, for example if someone is new to a domain.
- **Vocabulary Problem**
  - Users may know what they are looking for, but lack the knowledge needed to formulate the query. An innate problem is that people use a surprisingly diverse set of terms to refer to the same object, such that the probability for choosing the same term for a familiar object is less than 15 percent
- **Exploratory Learning**
  - Users may want to **browse – learn – look around - get an idea - decide if interesting** in the system instead of working on some specific task

„Catalogue browsing“ paradigm

- Organizing access to content
  - Content-driven
    - directory-like
  - User-driven
    - Explicitely addressing user profiles
  - Task-driven
    - Explicitely addressing specfic activities
  - Highlights
    - Design decisions about what to advertise primarily
  - Overviews
    - Additional content (over objects) to help support user decisions/browsing

„Catalogue browsing“ paradigm



(1)

(2)

(3)

(4)

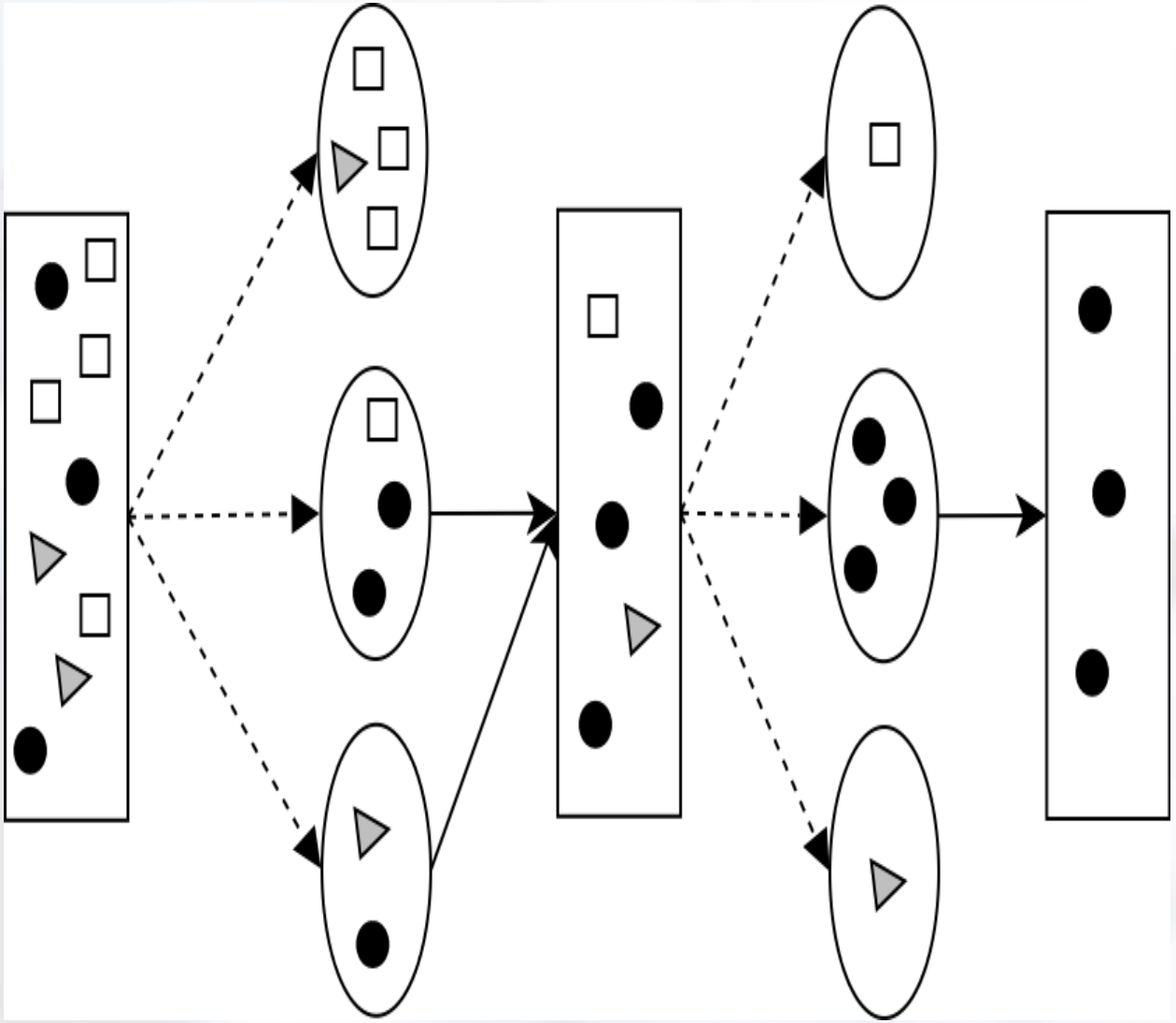
„Catalogue browsing“ paradigm

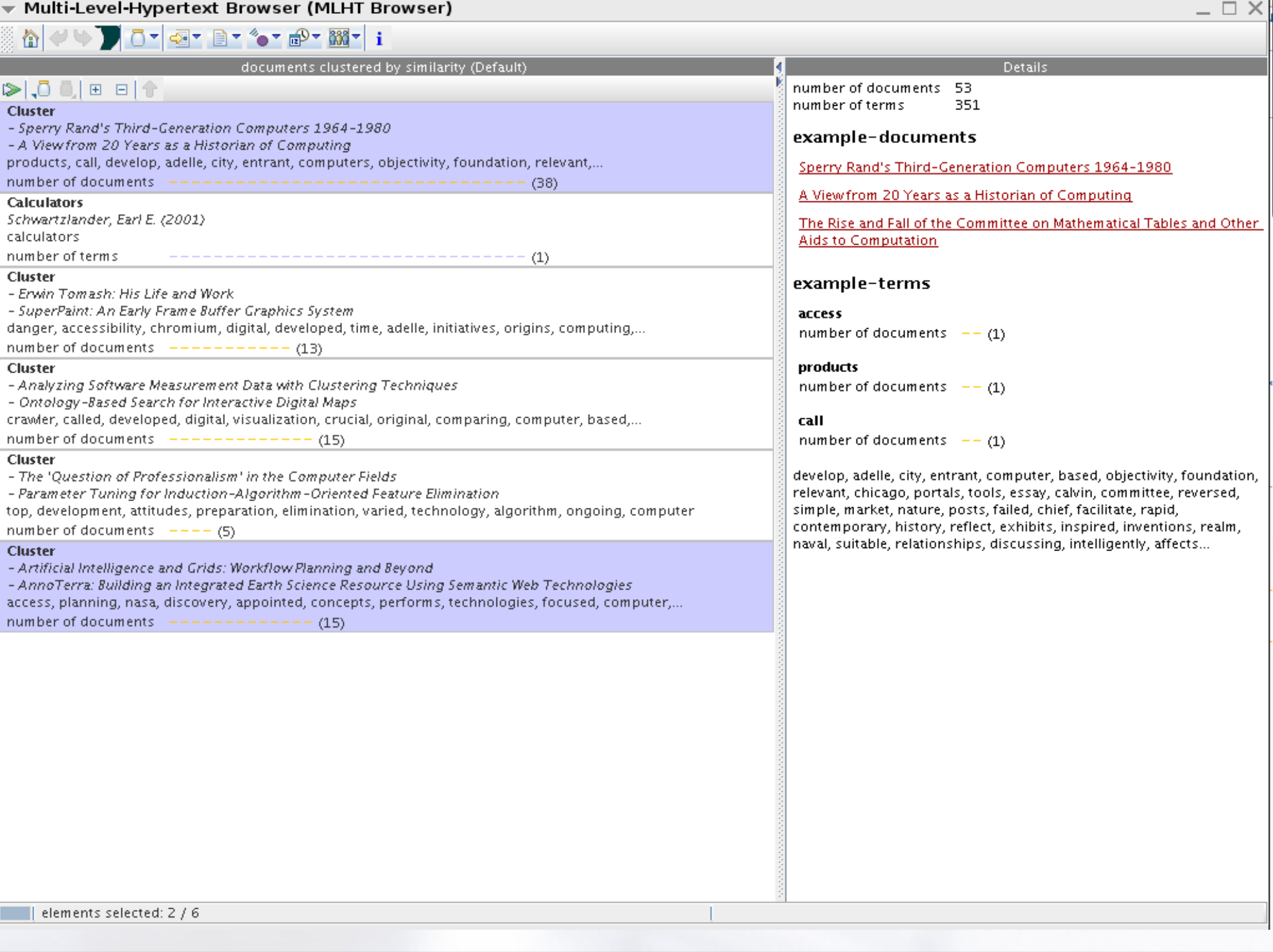
- Browsing supports **user needs which are usually vaguely defined**
  - The user **intuitively explores** the knowledge domain for good ideas and spontaneous recognition of rel-evant concepts.
  - The user is open to “serendipitous” experiences

- The information processes involved is an intuitive process of **scanning the environment**.
  - This strategy is appropriate in unfamiliar domains, when there is no possibility for explicit characterization of specific information to be retrieved
  - Or when the user wants to explore and learn about new knowledge domains.

- Interaction Strategy **by Analogy**
  - The strategy by analogy is based on a typical, previously successful document example from the user's reading repertoire, which triggers associations to patterns of similar document attributes (hypertext reasoning).

„Scatter-Gather“ paradigm




Multi-Level-Hypertext Browser (MLHT Browser)
documents clustered by similarity (Default)
Cluster
- Sperry Rand's Third-Generation Computers 1964-1980
- A Viewfrom 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)
Details
number of documents 53
number of terms 351
example-documents
Sperry Rand's Third-Generation Computers 1964-1980
A Viewfrom 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...
elements selected: 2 / 6

Accessibility-driven paradigms

- Open accessibility to users with disabilities
  - W3C effort
  - User with visual disabilities are among the most obstacled in using traditional interfaces
- Paradigm shift
  - from visual interfaces to „aural“ interfaces
  - Applications to be „listened to“ and not *only* „looked at“ (relying on *existing* technologies, screen readers, …)

Accessibility-driven paradigms

- Visual communication should have an „aural“ counterpart (without making a „new“ application from scratch)
  - Visual content
  - Navigation/interaction capabilities
  - Graphics-based messages
    - orientation, application structure, page structure, priorities of elements on the page, grouping of elements, ...
  - I/O mechanisms

Accessibility-driven paradigms

- Screen readers do not solve all the problems
  - Designers should conceive aurally-sound & meaningful interfaces
  - … thinking to how human dialogues work
  - To improve existing interfaces to be more affordable by screen readers, we developed:
    - Accessible navigation design guidelines
      - **Page schema: offering a reading strategy**
      - **Anaphoric strategies („how to go back“)**
        - » **Semantic backward navigation**
      - **www.munchundberlin.org**
  - These guidelines rely on a dialogue-based design technique (IDM: Interactive Dialogue Model)

Dissemination

World Usability Day

2005 • Making It Easy!

Ongoing results presented or to be presented at:

- HCI International 2005/2007
- User Modeling 2005
- 2nd Italian Research Conference on Digital Libraries
- INEX interactive track
- . . .

Future Plans

- Long-term research actions
  - Refinement of access paradigms and accessibility-driven application („page reader“)
  - Development of integrated prototypes
  - User experience validation

- Mid-term: on existing applications (e.g. TEL, ENA)
  - Make thorough usability-accessibility analysis (through inspection and user testing)
  - Identify lack of proper access paradigms
  - Integrate more suitable paradigms
  - Verify the benefits (on the user experience) of the introduced improvements