DELOS WP7: Evaluation

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WP Objectives

Digital Library Evaluation (DLE):

- Enable communication between evaluation experts and DL researchers/developers
- Continue existing evaluation initiatives relevant for the DL area
- Develop new evaluation models, methods and testbeds

WP7 Activities

I. DLE Infrastructure

II. DLE research and development

I. DLE Infrastructure

Testbed Metalibrary

- Developed in 1st DELOS NoE
  http://www.sztaki.hu/delos_wg21/metalibrary
- Describes 62 testbeds by the following groups of criteria:
  - general data
  - users and usage
  - applied technologies
  - data collection

Testbed Metalibray

Metalibrary contains mainly collections

→Development of new testbeds in current DELOS NoE

DLE Infrastructure in current DELOS NoE

- Collection of DLE resources (literature, testbeds and toolkits)
  http://dlib.ionio.gr/WP7
- Communication forum
  http://dlib.ionio.gr/delosforum
- Support prototype evaluations
- Organization of evaluation campaigns: CLEF, INEX

Cross-Language Evaluation Forum

Objectives of CLEF

Promote research and stimulate development of multilingual IR systems for European languages, through

- Creation of evaluation infrastructure and organisation of regular evaluation campaigns for system testing
- Building of an MLIA/CLIR research community
- Construction of publicly available test-suites

CLEF 2004 has seen shift in focus from cross-language document retrieval to include information extraction in multilingual multimedia context

CLEF 2004: Evaluation Tracks

CLEF 2004 offered six tracks designed to evaluate the performance of systems for:

- mono-, bi- and multilingual document retrieval on news collections (Ad-hoc)
- mono- and cross-language domain-specific retrieval (GIRT)
- interactive cross-language retrieval (iCLEF)
- multiple language question answering (QA@CLEF)
- cross-language retrieval on image collections (ImageCLEF)
- cross-language spoken document retrieval (CL-SDR)

CLEF 2004: Results

- Participation is up: 55 groups in 2004 (42 in 2003)
- Expansion of test-suite
- Great success of QA@CLEF and ImageCLEF
- Synergy of diverse expertise partly consequence of new tracks – IR, NLP, Image Processing, Medical Informatics..

INEX
Initiative for the **E**valuation of **X**ML Retrieval

- **Background:**
  - Increased use of XML as document format on the Web and in digital libraries
  - Development of retrieval systems to store and access XML documents
- **Objectives:**
  - Creation of evaluation infrastructure and organisation of regular evaluation campaigns for system testing
  - Building of an XML-IR research community
  - Construction of test beds + appropriate scoring methods for evaluating content-oriented XML retrieval

INEX - 4 main tasks

- Evaluation of **retrieval effectiveness**, especially by refining the evaluation criteria, in order to consider how XML elements satisfy information needs in the context of digital libraries.
- Evaluation of **efficiency**, taking into account the larger number of possible answers (XML elements) and their possible overlap.
- Prototype evaluation of **usability**, considering various types of information-seeking activities in an interactive setting.
- Investigation of **new testbeds** for heterogeneous and multimedia documents in the context of XML.

Effectiveness

Evaluation of retrieval effectiveness:

- Develop/refine evaluation criteria: how do XML elements satisfy information needs in the context of digital libraries.
- Ad hoc retrieval + 4 tracks
  - Relevance feedback track
  - Heterogeneous data track
  - Natural language track
  - Interactive track
- Development of evaluation methodologies including metrics

Usability

Prototype evaluation of usability, considering various types of information-seeking activities in an interactive setting.

- Done as part of the interactive track
  - Investigate user behaviour when interacting with XML documents
  - Develop and investigate retrieval approaches that are effective in interactive settings

INEX 2004

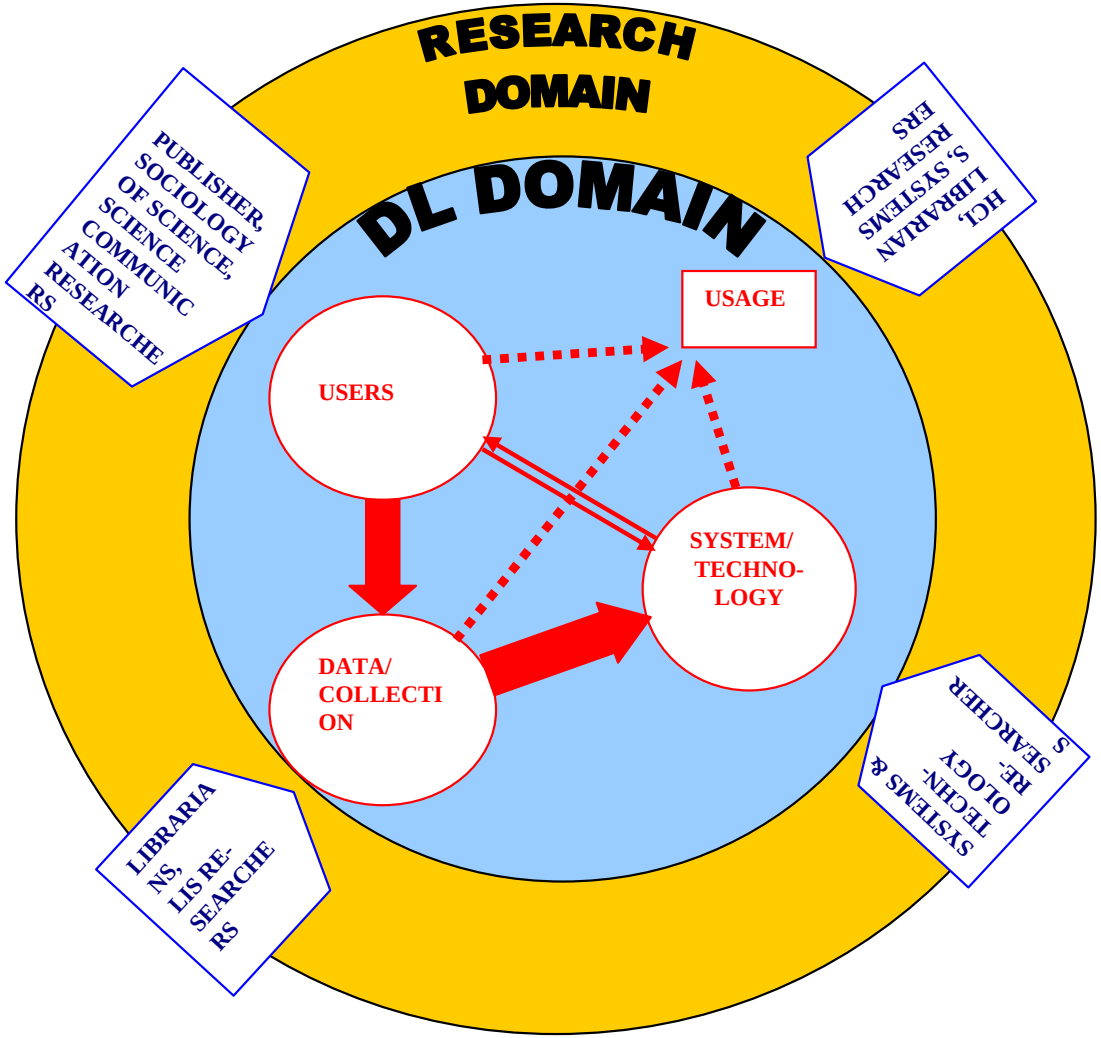
- 57 participants:
  - 55% Europe
  - 22% USA
  - 13% Asia + Australia/Oceania
- Strong involvement of the participants in the various tasks and evaluation methodologies
- INEX 2004 workshop: December 6-8 in Dagstuhl/Germany

II. DLE research and development

- A conceptual model for Digital libraries and their evaluation
- Evaluation approaches, models and methods
- DLE testbeds

II.1 Conceptual model

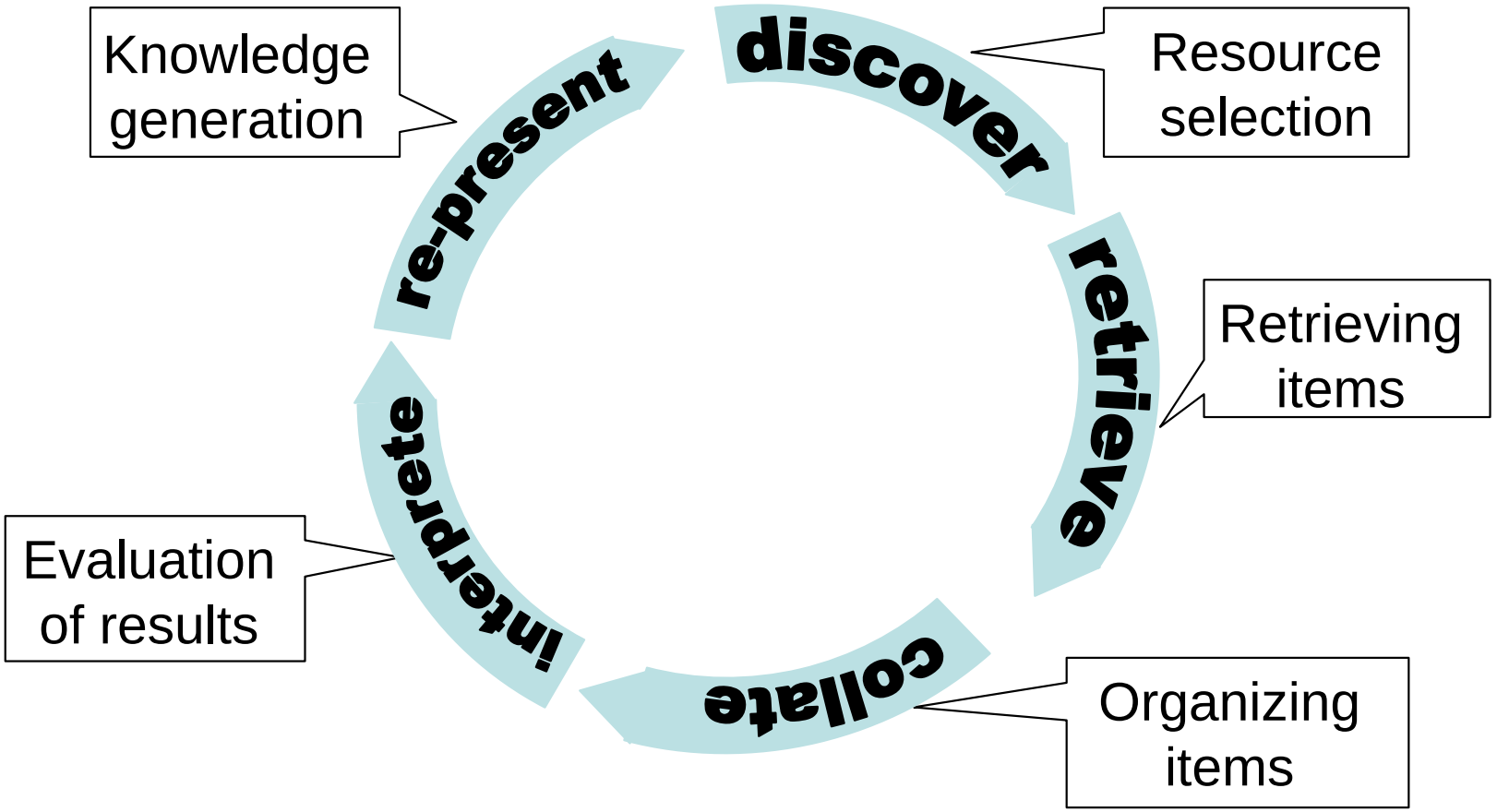
Conceptual DL Model developed in 1st DELOS NoE



DL usage

- DL life cycle
- Levels of search activities

Usage: DL life cycle



Many evaluations restricted to discover+retrieve stages!

Usage: Levels of search activities

(Bates 1990):

1. Move: Low-level search function
   (e.g. type in search term, view retrieved document)
2. Tactic: several moves to further a search
   (e.g. broaden/narrow a query)
3. Stratagem: set of actions on a single domain
   (citation database, tables of contents of journals)
4. Strategy: complete plan for satisfying an information need
   (e.g. subject search, browse relevant journals, find referenced articles)

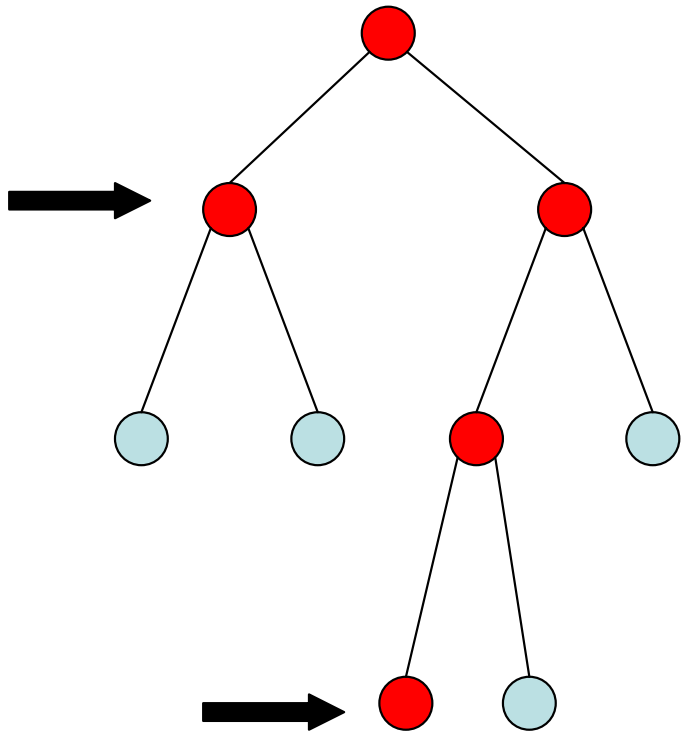
Little support for higher levels in current systems!

II.2 Evaluation approaches, models and methods

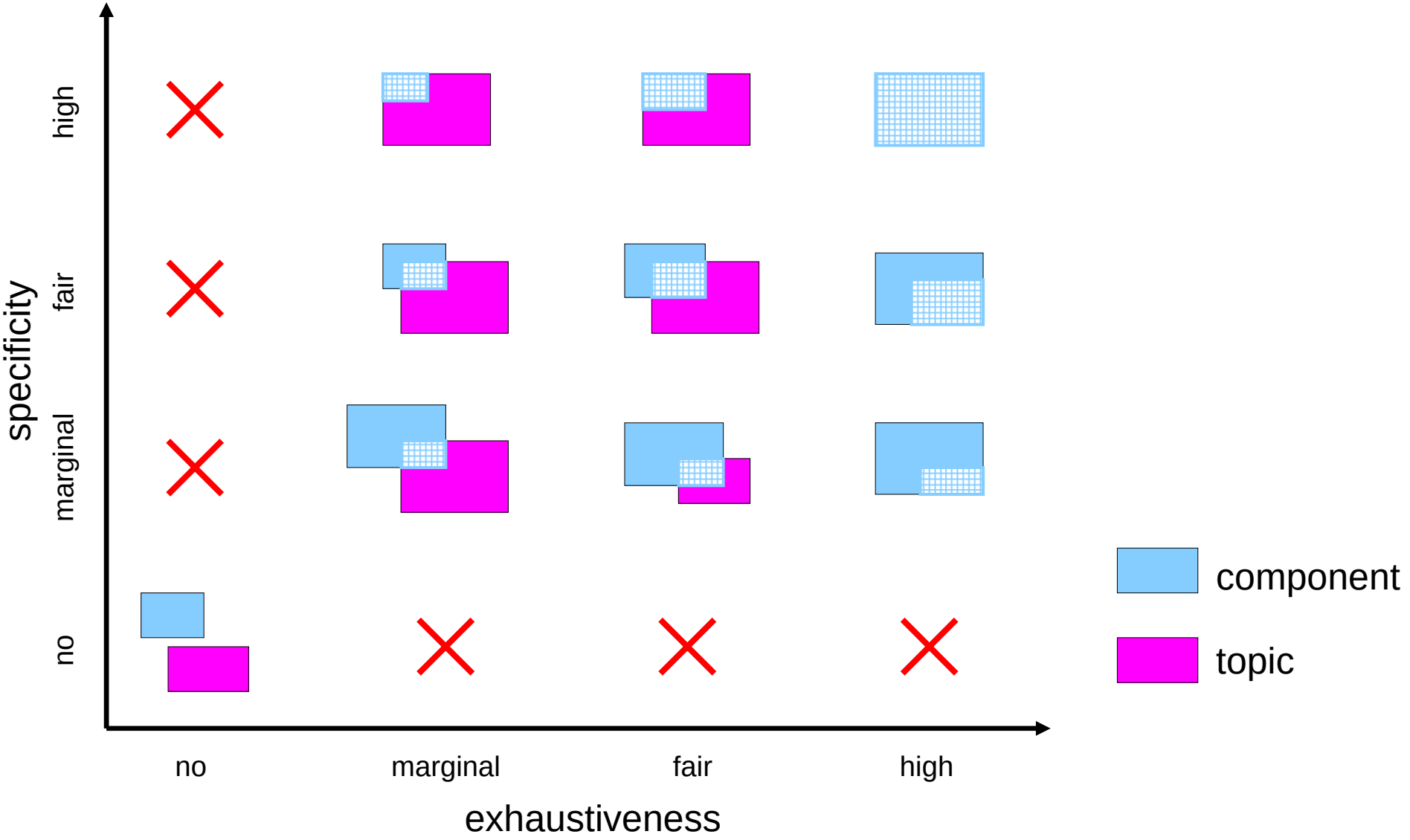
- Participation of users in the evaluation cycle
- Meta-analysis of existing evaluation studies
- Comparison and evaluation of DLE techniques
- Development of new DLE approaches, models and methods

Example: INEX metrics

- Content-oriented retrieval of XML elements
- Retrieval strategy: retrieve most specific elements satisfying the query



INEX relevance scale

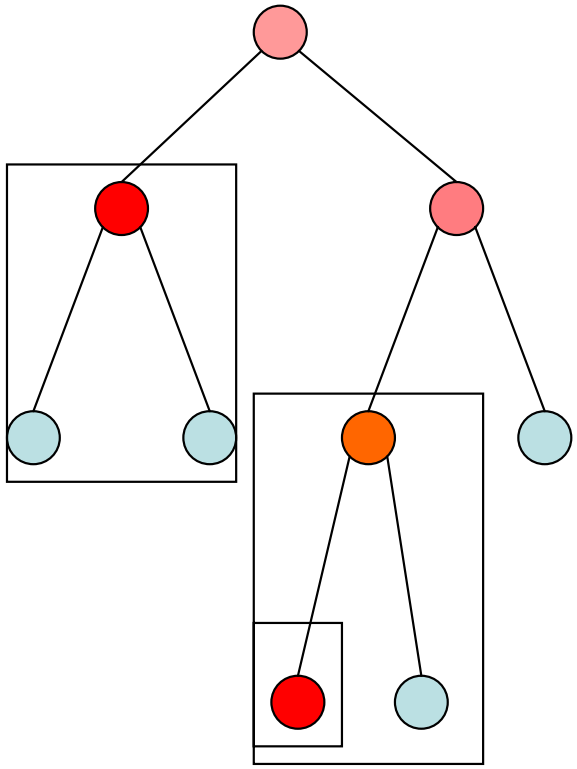


Multiple answers in a document

Recall/precision metrics must consider:

- Relevance scale
- Overlap of elements
- Size of elements

- Assumptions about user behaviour?
  -> INEX interactive track



II.3 Testbeds

Characteristics of existing testbeds:

- **Collection** properties
  - media
  - structure
  - heterogeneity
- **Usage**
- Research groups apply their own **systems**

Information Media

- Text
- Facts
- 2D: graphics, images
- Speech
- Video
- 3D

TREC

TREC

TREC

Information structure

- Unstructured

TREC

- Semi-structured (XML)

- Fully structured (standard databases)
- Hyperlinked (Web)

TREC

Heterogeneity

- Language: multilingual
- Media: multimedia
- Heterogeneous structures
- Heterogeneous services

TREC

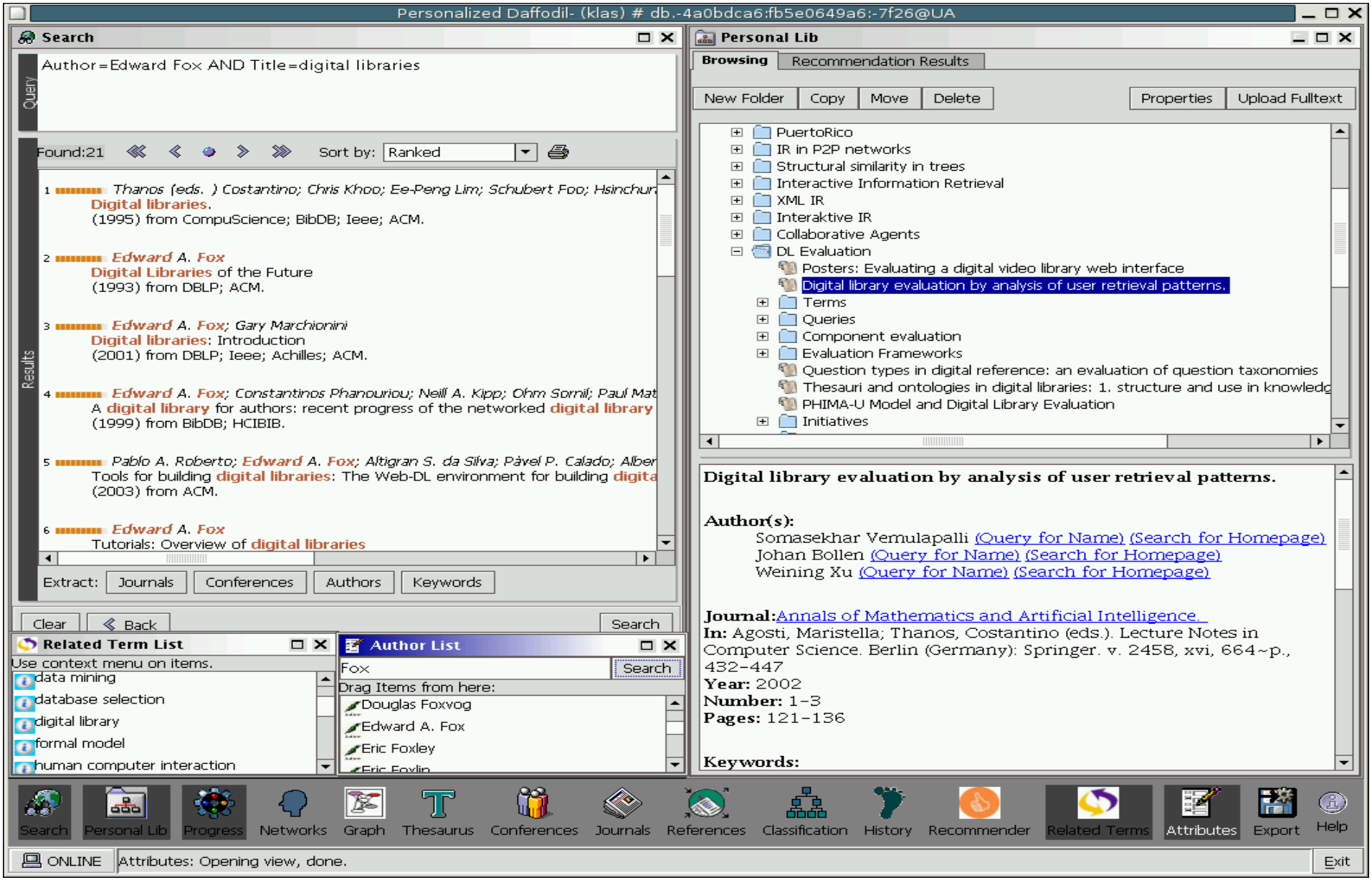
Usage

- ad-hoc (batch retrieval) — INEX, CLEF, TREC
- filtering (relevance feedback) — INEX, TREC
- interactive retrieval — INEX, CLEF, TREC
- question answering — CLEF, TREC

New Testbeds

- Multimedia
  - MPEG-7 collection?
  - Images in the INEX collection?
- Usage-oriented
  - Test-bed of user interactions with DLs?
  - Test-bed framework:
    Daffodil

The Daffodil framework



Conclusion

- Started activities:
  - DLE infrastructure
  - DLE testbeds and evaluation campaigns
- Workshop as starting point for
  - Survey on existing DL approaches
  - Development of new evaluation model and methods