

JoDL special issue on information visualization interfaces for retrieval and analysis – Guest editor’s introduction

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The steadily increasing volume and complexity of information stored in digital libraries (DLs) demand powerful support of information access and sense making. Advances in information visualization point to new possibilities for developing enhanced interfaces for improving retrieval, manipulation, and management of data stored in DLs.

The idea for this special issue originated with a workshop, held at the Joint Conference on Digital Libraries in Houston, TX on 31 May 2003 (<http://vw.indiana.edu/ivira03>), that explored the intersection of information visualization and retrieval. Subsequent to the workshop a new solicitation was sent out for extended papers on the topic. Five papers were accepted for the JoDL Special Issue on “Information Visualization Interfaces for Retrieval and Analysis.” Below a brief summary of each paper is presented.

Holger Meuss, Klaus U. Schulz, Felix Weigel, Simone Leonardi, and Francois Bry present a paper entitled “Visual Exploration and Retrieval of XML Document Collections with the Generic System X².” It describes the X² system that provides visual access to XML documents, schemata, queries, and retrieval results. An innovative aspect of this research is the fact that it combines techniques from IR (i.e., content based) with relational DB (i.e., structure based) to support retrieval in an integrated way.

Tamara Sumner, Faisal Ahmad, Sonal Bhushan, Qianyi Gu, Francis Molina, Stedman Willard, Michael Wright, and Lynne Davis contributed a paper on “Linking Learning Goals and Educational Resources through Interactive Concept Map Visualizations.” The paper presents details of a concept-browsing interface that aims to help educators and learners to locate and use educational resources that best fit their needs and objectives. The interface components are generated in a programmatic manner, thus ensuring consistency across users, by

employing a Web services protocol. Evaluation results are included that demonstrate the effectiveness of the interface in reducing interaction burden.

Harald Reiterer, Gabriela Tullius, and Thomas M. Mann present “INSYDER: A Content-Based Visual-Information-Seeking System for the Web.” This is one of the most comprehensive and wide-ranging efforts among those reported in this special volume. The researchers demonstrate how a large number of visualization techniques (e.g., ResultTable, BarGraph, and ScatterPlot) can be combined with different types of retrieval approaches (e.g., NLP, content classification, and relevance feedback). The research demonstrates how knowledge of the corpus domain can be exploited to create improved visually rich interfaces. The authors also discuss different levels of searching, ranging from a user-driven interactive modality (search) to a system-driven autonomous modality (watch).

Paul Janecek and Pearl Pu present “An Evaluation of Semantic Fisheye Views for Opportunistic Search in an Annotated Image Collection.” The paper focuses on a thorough and systematic comparison of different semantic fisheye views. Two main approaches, namely, keyword content similarity and semantic relationships derived from WordNet, are discussed for conducting complex opportunistic search tasks. The calculation of similarity is based on a general degree of interest (DOI) equation that can be adapted for different contextual similarity situations (e.g., keyword versus conceptual). The DOI calculation also permits assigning different degrees of interest to contextual factors by incorporating a weighting factor. The paper presents results demonstrating why the semantic-based approach is superior for browsing and searching.

Linn Marks, Jeremy A.T. Hussell, Tamara M. McMahon, and Richard E. Luce present “ActiveGraph: A Digital Library Visualization Tool.” ActiveGraph provides

a scatterplot-based visual interface that can be used to view and customize the contents of a library. It was used in LibGraph, a collaborative library interface, and Cite-Graph, a visualization of citation statistics. The authors discuss several innovative techniques, including filters and logarithmic transformations, which add interactivity to visualizations and enhance user control over interface functions.

Taken together, the papers cover both theoretical and experimental research on the development, usage, and evaluation of effective interfaces to digital libraries. They review, compare, and propose novel approaches to visualization in support of improved browsing, retrieval, analysis, and understanding of data stored in digital libraries.

It is our hope that this special issue succeeds in

- Increasing the awareness of the area of visual interfaces to DLs,
- Educating readers about new tools, techniques, and design methodologies for visual interfaces to DLs,
- Teaching design approaches that support rich visualization functions in diverse systems ranging from desktops to mobile devices,
- Reviewing and presenting novel frameworks, models, and theories of data access and management, and

- Inspiring new directions in research and development on effective visual interfaces for retrieval and analysis.

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