

# ConceptLab: An Information Structures Spatial Hypermedia Environment

*Rosemary Michelle Simpson*

Brown University, USA

E-mail: rms@cs.brown.edu

## **ABSTRACT**

ConceptLab is a spatial hypermedia environment for the representation, exploration, and manipulation of complex information spaces. It has the notion of a small knowledge base surrounded by a "semi-permeable membrane" through which access to the world of the Internet and other computing resources, both local and distributed, is possible.

**KEYWORDS:** spatial hypertext, knowledge representation, interactive information visualization

## **BACKGROUND**

Current research in spatial hypertext has focused on handling emergent structure in a textual or multimedia content authoring environment [1, 3, 4], or in providing limited gather (agents)/scatter (list explode) and spatial structure identifiers (neighborhoods) in a URL-management environment [5].

ConceptLab, the system I will demo, differs from previous spatial hypertext work, such as VIKI [1], CAOS [3], and VKB [4], in that it is not a text or multimedia authoring system that has associated link structures; it is a link structure authoring and exploration environment that may have associated text and multimedia data. In a way, it flips the traditional view of hypertext use on its head: the links are the content, the relationship is the semantics. It differs from Web Squirrel [5] in that it provides an underlying knowledge model that is separate from the spatial hypertext representation, and the user interface provides a full set of display design tools and workspace design and behavior strategies for manipulation of that representation.

## **CONCEPTLAB**

Building on my experience with Web Squirrel [5] and with the design and implementation of the LMI Gateway hypertext project in the early 1980s [6], ConceptLab is a spatially-oriented development and user environment for the representation, exploration, and manipulation of multi-level and multi-dimensional information structures. It has the notion of a small, well-defined knowledge base surrounded by a "semi-permeable membrane" through which access to the world of the Internet and other computing resources, both local and distributed, is possible. The ConceptLab information structures may be modeled as graphs, sets, expert systems, constraint-based systems, etc. Their screen

representation must correctly reflect the underlying knowledge model and yet be flexible enough to allow users to visually manipulate the space to reflect their purposes.

By "correctly reflect the underlying knowledge model" I mean that visual representations generated by the system from the model must not contain factual untruths, such as showing a person as author of a document that according to the knowledge model she did not author. Visual representations generated by the user in the process of exploration and manipulation, however, may contradict the underlying knowledge model. Reconciliation of these disparate versions occurs when the model is updated, and these changes are kept in a changes file until the model update occurs.

By 'user manipulation flexibility' I mean that, in addition to model correctness, the spatial representation must both reflect a serious concern with user-centered design tools and the ability to simultaneously display multiple points-of-view (POV) and levels-of-detail (LOD) with a visible language that clearly delineates the different domain dimensions.

## **Initial Prototype and Demo Description**

The initial prototype implementation is a 2D desktop environment in which users may explore and manipulate information taken from the databases used to build the Memex and Beyond website[2], whose goal is to present the people, institutions, publications, projects, and concepts reported on in the ACM Hypertext conferences from 1987 through 2001.

This demo will provide an interactive visualization of the knowledge base relationships among the people, institutions, publications, projects, and concepts in the material covering the years 1987 - 1996. Users will be able to explore the information space around each object by querying the knowledge base, accessing the Internet (if such access is available), adding data retrieved from the Internet to the workspace, and by playing with arrangements of the information space.

While the knowledge base will be read-only, so users will not be able to add new data to the knowledge base, they will, however, be able to print (if facilities are available) and save files with things they have selected.

Among the visualization facilities will be several different ways to see multiple points-of-view and levels-of-detail, using a variety of focus & context strategies, on the screen at the same time.

Among the manipulation facilities will be the ability to create new views, selectively choose elements from the view, and save or print those selections.

#### **ACKNOWLEDGMENTS**

Thanks to Mark Bernstein, Jean Laleuf, Catherine Marshall, Peter Nürnberg, Frank Shipman, and Andy van Dam, for shoulders to build on, support, and encouragement through the years, and to Alan Kay and his team, for Squeak, which has given me back the programming environment I had with the LISP Machine plus wonderful multimedia programming resources.

#### **REFERENCES**

1. Catherine C. Marshall, Frank M. Shipmann III, and James H. Coombs. "VIKI: Spatial Hypertext Supporting Emergent Structure", in Proceedings of ACM ECHT '94, 1994.
2. Memex&Beyond 1996.  
<http://www.cs.brown.edu/memex/>.
3. Olav Reinert, Dirk Bucka-Lassen, Claus Aagaard Pedersen and Peter J. Nürnberg. "CAOS: a collaborative and open spatial structure service component with incremental spatial parsing" in Proceedings of ACM Hypertext '99, 1999.
4. Frank M. Shipman III, Haowei Hsieh, Preetam Maloor, J. Michael Moore. "The Visual Knowledge Builder: A Second Generation Spatial Hypertext" in Proceedings of ACM Hypertext 2001.
5. Rosemary Michelle Simpson. "Experiences with Web Squirrel: My Life on the Information Farm" in Proceedings of ACM Hypertext 2001., Aarhus, Denmark, 2001.
6. Rosemary Simpson, John Mann, and JoAnn Brooks. "LMI-Gateway: A Syntactic Tool for Organizing Heterogeneous Data Sets." Submitted to AAAI '86., 1986.