HyperLINK: Visualization of WWW Navigation

HyperText '96 Demonstration

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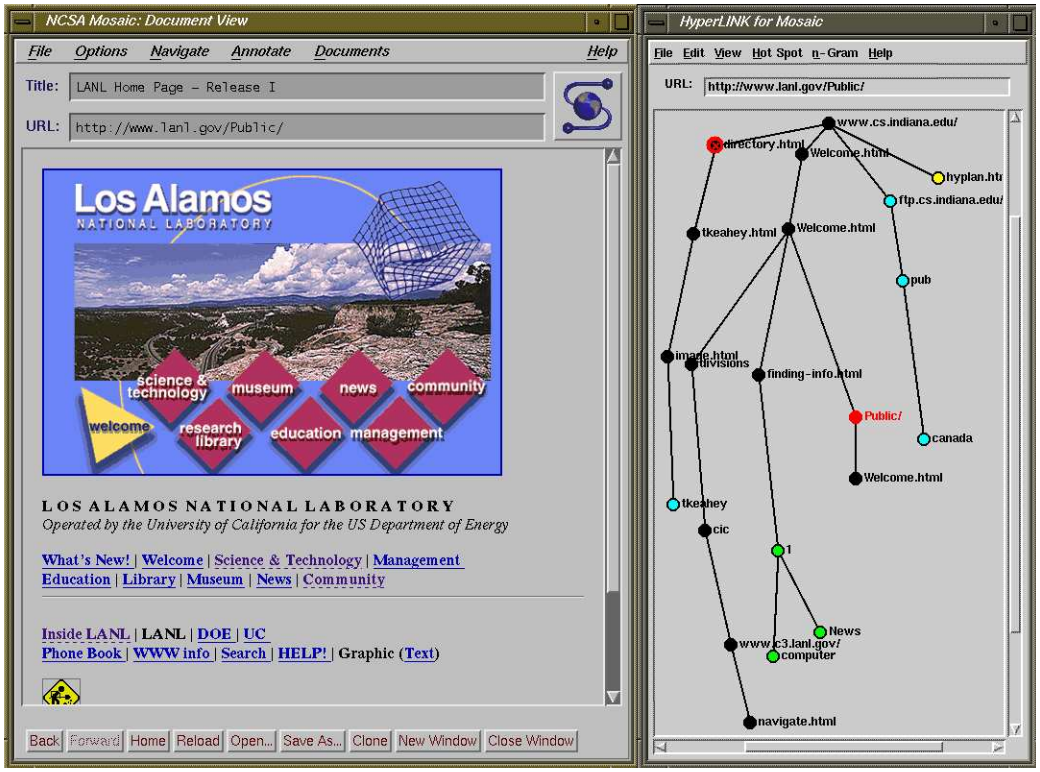
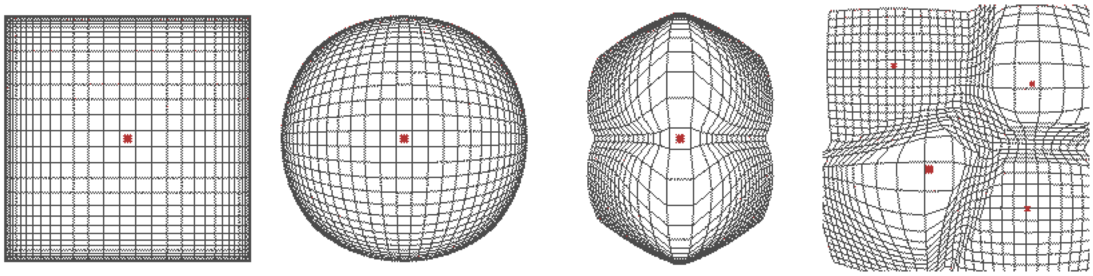


HyperLINK is a program developed at Los Alamos National Lab that implements a visualization of World Wide Web navigation. By representing traversal through links of a hypermedia environment as links between nodes of a graph, it is possible to construct a directed graph. The user can then interact with a visual representation of this graph to navigate among nodes. As part of a design philosophy to keep the display of and interaction with this graph as simple as possible, *HyperLINK* eliminates all cycles from the visual representation.

HyperLINK is a stand-alone program which communicates with an "off-the-shelf" version of NCSA's Mosiac via the *Common Client Interface* (CCI). The internal representation of the graph is facilitated through the *LINK* library, a combinatorics package developed at Los Alamos National Laboratory. In addition, non-linear (aka *hyperbolic* or *fisheye*) magnification techniques are employed to enhance visualization of the graph. Such techniques allow for enhanced resolution of areas of interest, without sacrificing the global view of the entire graph (unlike normal in-place magnification techniques, which by necessity incur occlusion of neighboring areas).

A screen shot of the program in action is on the front page of this handout. The *HyperLINK* window is on the right, and linked (via CCI) to the Mosaic program on the left. The graph is automatically updated when the user selects a link within Mosaic: if the linked page has been visited before then the associated node in the graph becomes the current node, if the page has not been visited before then a new node is created in the graph, along with an appropriate link. Additionally, the user can click on nodes in the graph, and the associated web page will be loaded into Mosaic. The user is also able to prune branches or individual nodes from the tree to reduce the graph complexity.

Several different non-linear magnification techniques have been developed and incorporated into the *HyperLINK* interface. To help understand the effects of these magnifications, the figures below show the effect of performing some of the possible transformations on a regular grid.



The user is able to manipulate a pseudo-stack of *hotspots* (areas of maximum magnification) which allow him/her to easily pop back to previous nodes of interest. In addition, each hotspot enables hyperbolic magnification over some or all of the nodes in the graph, so that each hotspot has it's own degree of magnification. The effects of these hotspots can be combined to produce composite transformations such as the one shown in the above rightmost figure.

The Presenters:

Alan Keahey is a Ph.D. student in Computer Science at Indiana University, working on problems of information visualization. The *HyperLINK* project is the result of a summer Graduate Research Assistantship at Los Alamos National Laboratory.

Reid Rivenburgh works in the Applied Software and Information Technologies Team at Los Alamos National Laboratory.

More Information:

More information about the *HyperLINK* system can be found at *http://www.c3.lanl.gov/~keahey/navigate.html.*