Visual User Interfaces to Information Spaces

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- "Semantic road maps", Doyle (1961).
- Spatial metaphor is a powerful one in human information processing.
- Maps of information spaces help in information space navigation.
- They provide interactive, responsive person-machine interaction.
- They lend themselves to self-organization in distributed processing environments.

Literature Maps

- Responsive user interfaces to main astronomical journals - 20,000+ scientific articles accessible in this way.
- Catalogs relating to tens of millions of astronomical objects similarly accessible via interactive visual user interface.

Kohonen self-organizing feature map:
one visual user interface building approach.

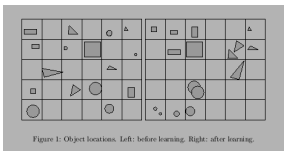
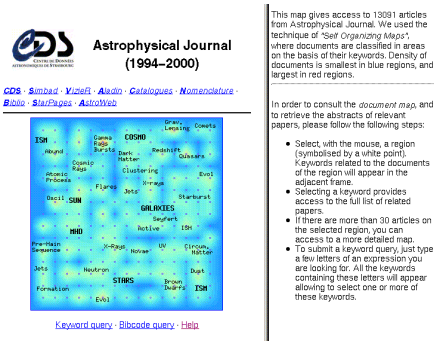
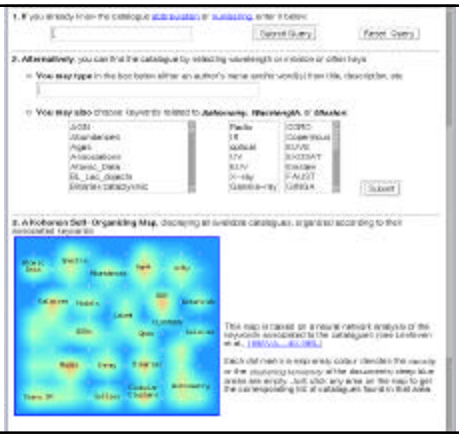


Figure 1: Object locations. Left: before learning. Right: after learning.





Server- vs. Client-side

- Foregoing were CGI-based.
- Next: Java client-side implementations.
- Multigraph established in real time between following objects: author names; object names; article titles.
- Based on XML. (AML = astronomical markup language).
- Different types of link - different weights.
- Clusters determined using compactness criterion.

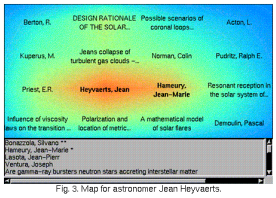


Fig. 3. Map for astronomer Jean Heyvaerts.

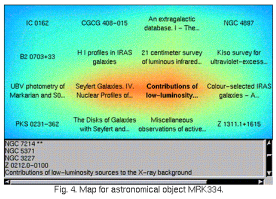
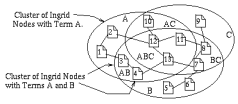


Fig. 4. Map for astronomical object MRK 334.

Ingrid - a self-configuring information grid
(P. Francis, NTT Software Labs, Tokyo, 1995)
Distributed, scalable architecture based on information self-organization.



Comparative assessment - recall and precision plots, based on (i) Kohonen visual user interface, and (ii) free-text keyword query system.

Reference:
"Maps of information spaces: assessments from astronomy", Poincot, Lesteven and Murtagh,
JASIS, 2000, in press.

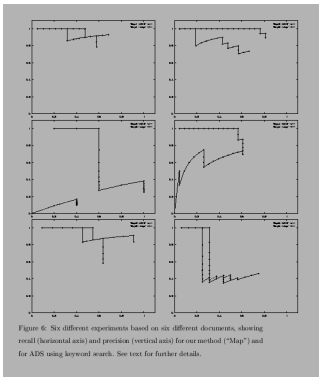


Figure 6. Six different experiments based on six different documents, showing recall (horizontal axis) and precision (vertical axis) for our method ("Map") and for ADS using keyword search. See text for further details.

One current focus of activity, of relevance for visual user interfaces:

IRAIA - Getting Information in Complex Information Spaces as an Emergent Behavior of Autonomous Information Agents,

5th Framework IST project, 2000-2002.

Planned work by us in this project:

• Client-side 3-way "cube" presentation of database contents - interactive, responsive. "Glasnost for databases".
• Advanced analysis of (web, database) log files, for user profiling.

Long-term issue:

What do information maps say when they talk to one another…?