Do Information Visualization Systems Improve Users' Understandings of Data?

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Rationale

A common goal of interactive information visualization systems is to help users understand complex data better or with less effort than other presentation methods. Despite the importance of usability and usefulness in the software development process, there are relatively few evaluations of information visualization systems where real users try to complete realistic tasks. Do information visualization systems achieve their goal?

Method

The current project asks participants to use an interactive **knowledge domain visualization (KDV)** system, read a related review article, or both, and measures how their understanding of the domain is affected. The KDV presents important articles and terms in the domain by displaying a network of nodes and relationships among the nodes. The users complete several tasks that require them to read the article or interact with the visualization.

The users' understanding of the domain is measured by asking them to organize important articles and terms in the domain during three card sorts. The first two card sorts ask participants to rank terms or articles according to their importance. The second asks them to group terms and articles according to their similarity.

The card sort data is then compared to corresponding card sorts made by domain experts. The more similar the users' card sorts are to those provided by experts, the more complex and sophisticated the users' understanding of the knowledge domain is assumed to be. Multidimensional scaling is one method to represent the users' mental models of the knowledge domain.

Sample Tasks

Identify 2 prominent authors in the area of knowledge representation.

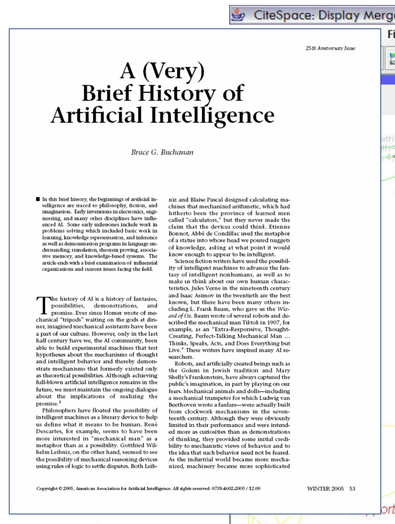
Identify 2 authors whose work in the 1960s and early 1970s constituted a turning point in AI toward the study of knowledge-based or expert systems.

Identify a research topic, associated with R. F. Simmons, R. Lindsay, and R. Schank, that was very active in the 1960s, but had basically ended by the 1980s?

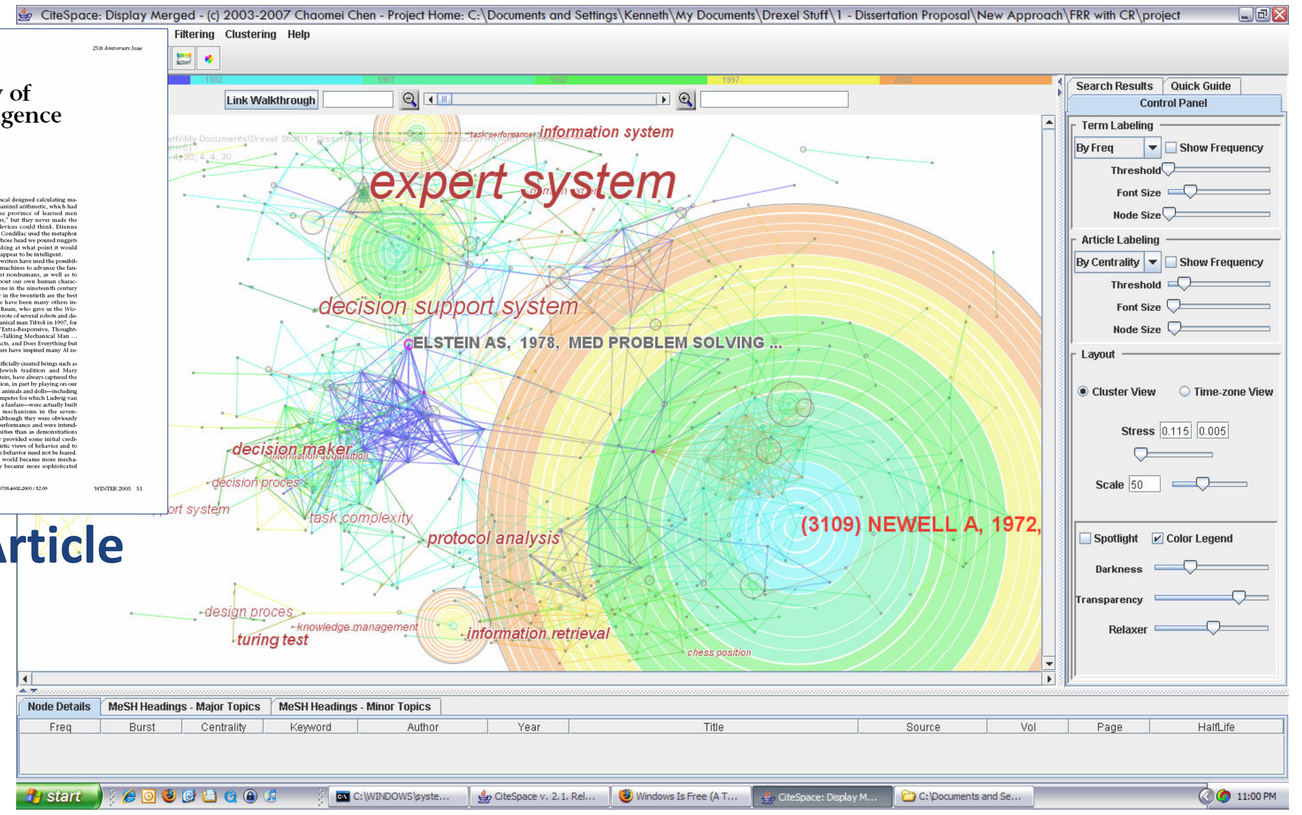
Pilot Study Results

Based on data collected so far, using the visualization has mixed results when compared to reading the review article. The visualization seems to have improved participants' understanding of the relationships among articles and terms in the domain. However, it does not seem to improve users' ability to judge the importance of terms or articles.

Expansion of the research will allow me to examine the reasons for this discrepancy and propose possible improvements to the KDV technology.

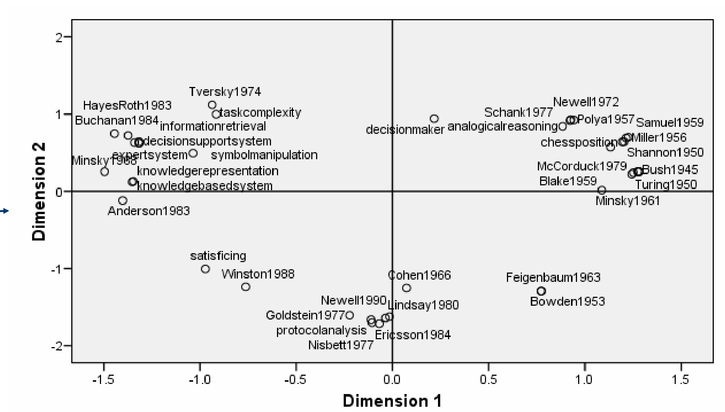

A (Very)
Brief History of
Artificial Intelligence

Bruce G. Buchanan

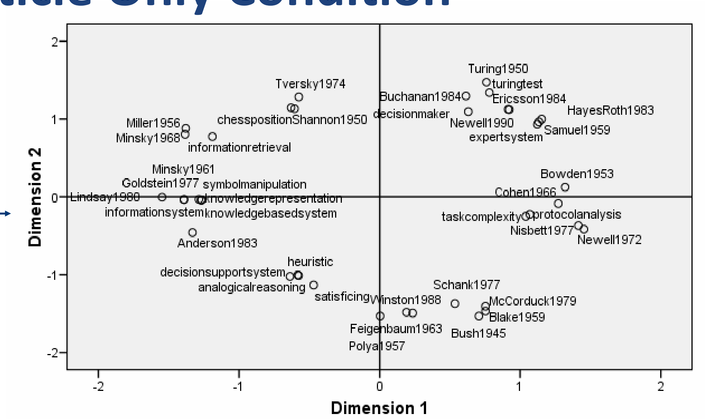


Review Article

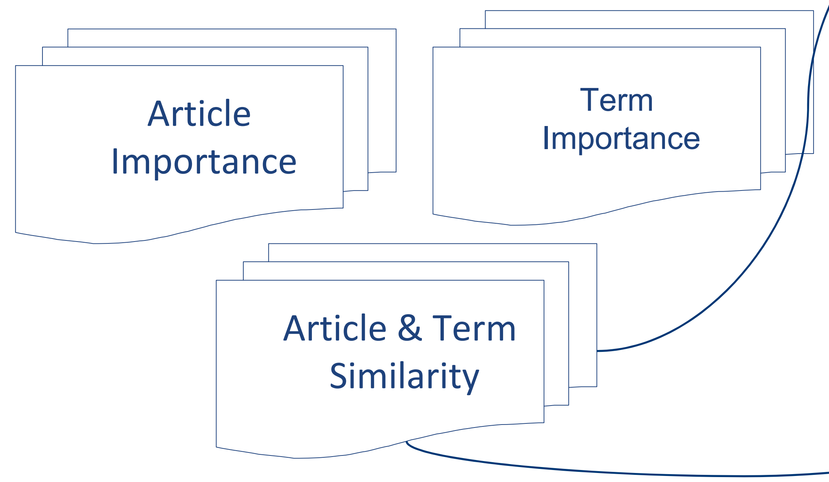
CiteSpace Knowledge Domain Visualization of the field of Artificial Intelligence



Similarity Card Sort-Article Only Condition



Similarity Card Sort-Article & Visualization Condition



Card Sorts