

Virtual Environments and Knowledge Sharing

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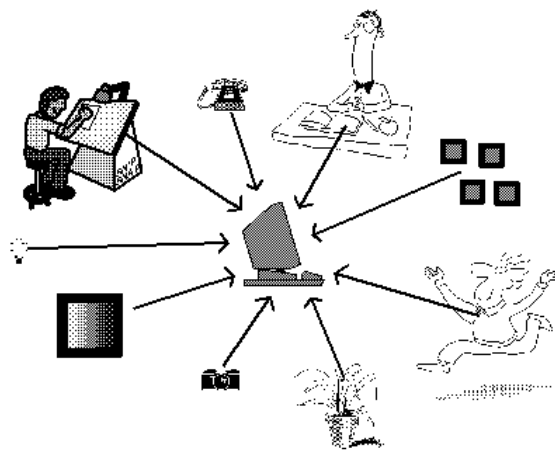
Abstract

- virtual environments, defined as 3D spaces allow information, objects and people representation within the same digital platform
- virtual environments also allow for the virtualisation and support of interaction
- human interaction delivers knowledge and seems to be a huge opportunity to take advantage of virtual environments for a potential high number of different applications concerning interaction

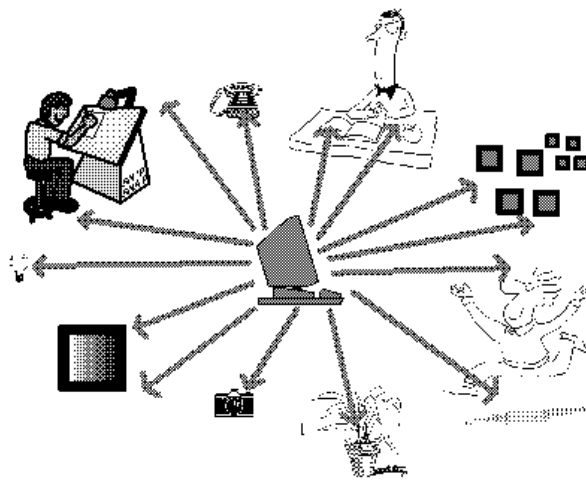
Knowledge sharing (how?)

- *knowledge sharing* is supported by a concept space structure, which can be individually or collaboratively built and refined
- the proposed system uses a 3D interactive visualisation interface to support user exploration and enhancement of the concept space
- the concept space is somewhat a 3D concept network, allowing users to define concepts by listing associated keywords

Way One: virtual reality

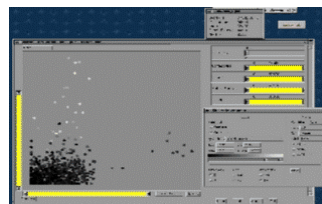
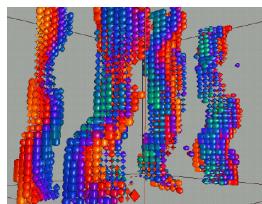
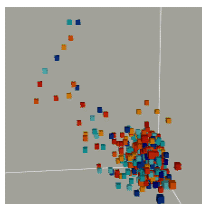


Way two: ubiquitous computing



“Two way” integration: visualisation

- definition: use of images and animations to convey information
- goal :effectively convey information to the user
 - transforms the abstract and symbolic into the geometric
 - harnesses the human perception system (visual?)



Visualisation (why?)

- 3D visualisation can offer a more convenient and natural way for people to interact with information spaces (as distinct from environments that are naturally 3D) [Tuft, 1990] and [Benedikt, 1992].
- to date, there is not much evidence to support it, other than in cases where the information has a natural spatial component [Hubbold et al., 1995]
- many problems still exist, as user sense of position that can be lost if the layout changes [Ingram and Benford, 1995]

Visualisation (task approach)

- an application for testing the visualisation design:
 - information discovery: support user efforts to find relevant information within a given knowledge domain [Li-Jen and Gaines, 1998]
 - setting up a context, a query generation tool and an Information Visualisation [Card et al., 1999]; providing context and information about a particular data source for analysis and comparison.
- based on a given context shared as a 3D interactive visualisation, users can be assisted to retrieve information and analyse it information discovery [Baeza-Yates and Ribeiro-Neto, 1990]

Goals for a virtual environment prototype

- convey information about a structure for knowledge sharing
- test how this could support knowledge sharing by proposing a particular system to give support to users in information discovery
- help users to build their own queries by using a textual search engine based on information from the structure for knowledge sharing
- allows the visualisation of data source information within the visualisation design and displaying of results using an HTML browser

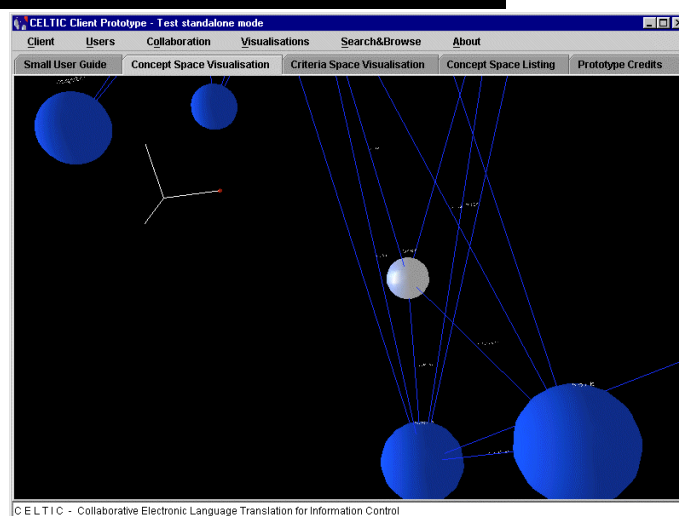
Rationale for using the virtual environment

- advantages are greater when data sources do not have an underlying structure and a query returns a vast amount of results as is the case of the Web
 - information overload occurs...
- based on a shared interactive representation of a knowledge theme that can be used to construct queries and compare a data source with the domain representation
 - allow user individual application of shared context
- basic *support for collaboration* is implemented to share the knowledge domain representation and to enhance it
 - using a voting system

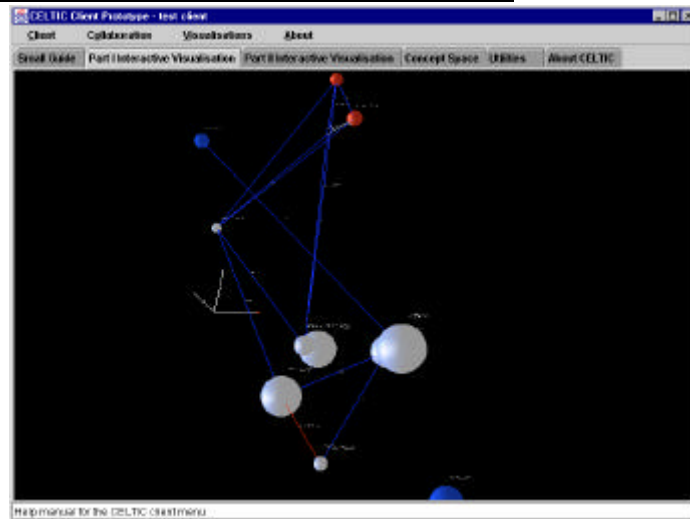
The prototype

- a *concept space* as a 3D interactive visualisation;
- a visualisation design composed by two distinct visualisations: a *concept space*, representing the structure, and a *criteria space* that allows spatial positioning by specifying up to three criteria;
- data source integration by using an *Information Visualisation* within the criteria space visualisation;
- displaying of results using a *search engine* (the *AltaVista Search Personal eXtension 97*).

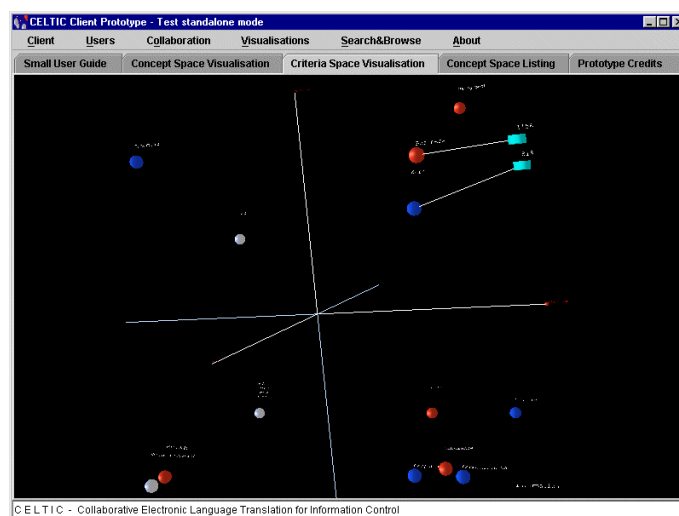
Concept space visualisation



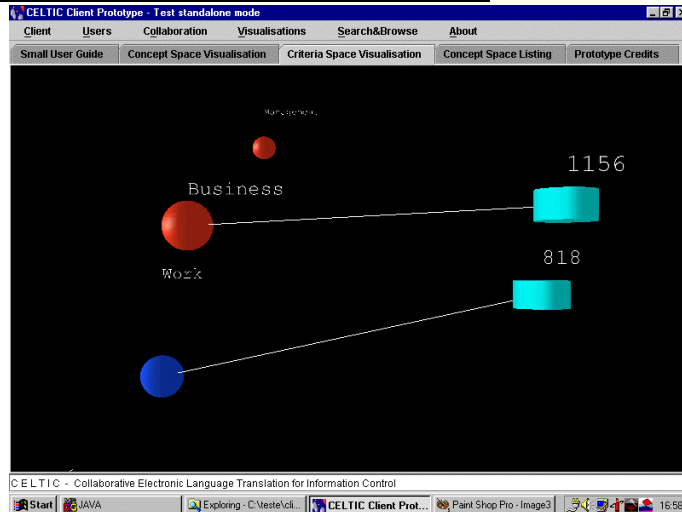
Concept space visualisation



Mapping concepts in criteria space octants



Information Visualisation in criteria space



Accessing results

Altavista Search

Search **My Computer All** and Display the Results **in Standard Form**

Tip To find a phrase, use double quotes: "Santa Claus", or use punctuation with no space between the words: deja-vu.

Word count: retrieval:103, decision:219, cost:291, structure:567, time:2560, value:5441, information:7837

Documents 1-7 of 7 matching the query, best matches first

[ccs98.html](#)
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- End of First Year Report Luis Manuel Borges Gouveialuis@comp.lancs.ac.uk lmbg@ufp.pt CSEG
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Concluding remarks

- use of visualisation techniques can improve the interface by supporting familiar cues to user perception and thus convey information for knowledge sharing
- people were able to use the proposed virtual environment
- further research need to done with other applications beyond the sharing of knowledge in education settings