Supporting Knowledge Sharing within an organisation

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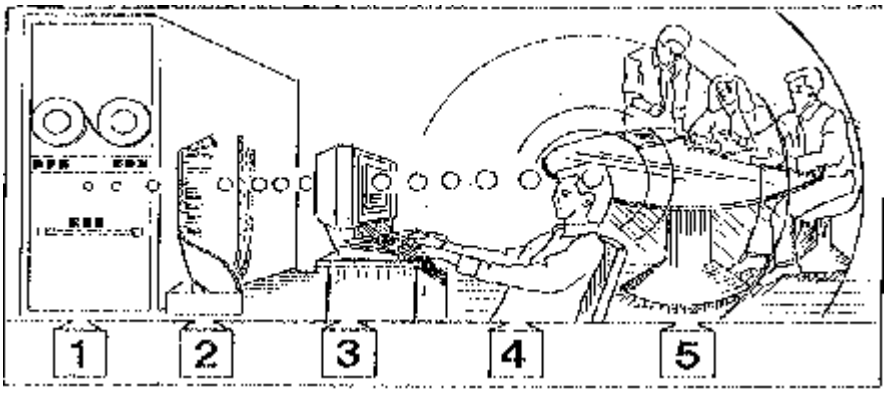
Abstract

- virtual environments, defined as 3D spaces allow information, objects and people representation within the same digital platform
- virtual environments 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 *as the case for knowledge sharing within an organisation*

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

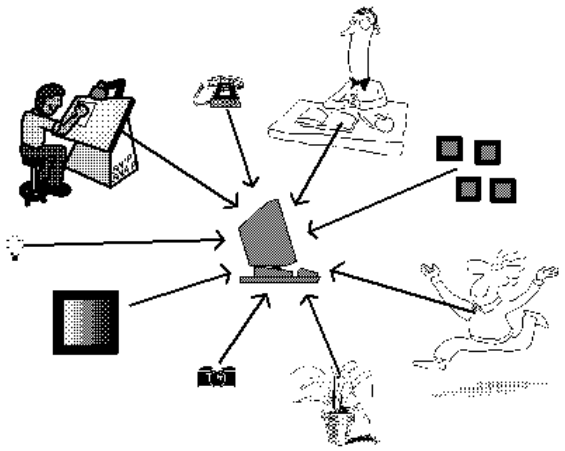
CSCW systems emerging



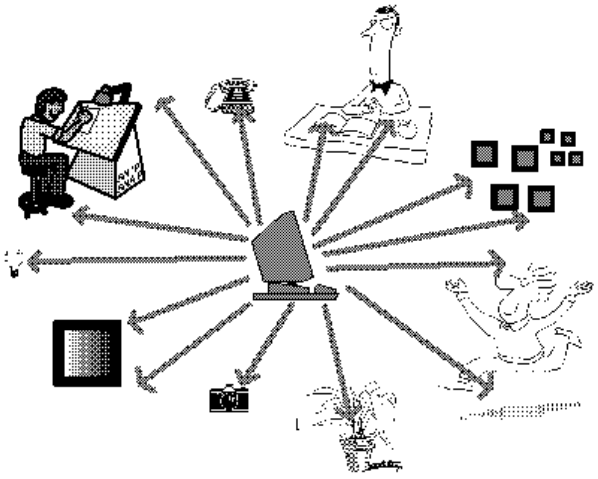
The machine (1) **The terminal (3)** **The group (5)**

Data output (2) **The user (4)**

Way One: virtual reality

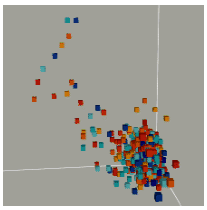
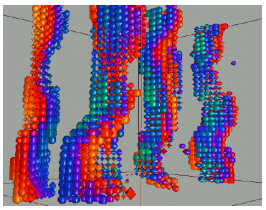
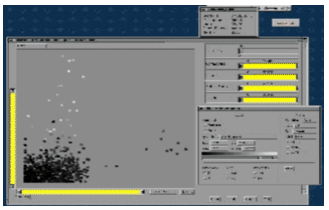


Way two: ubiquitous computing



“Two way” integration: visualisation

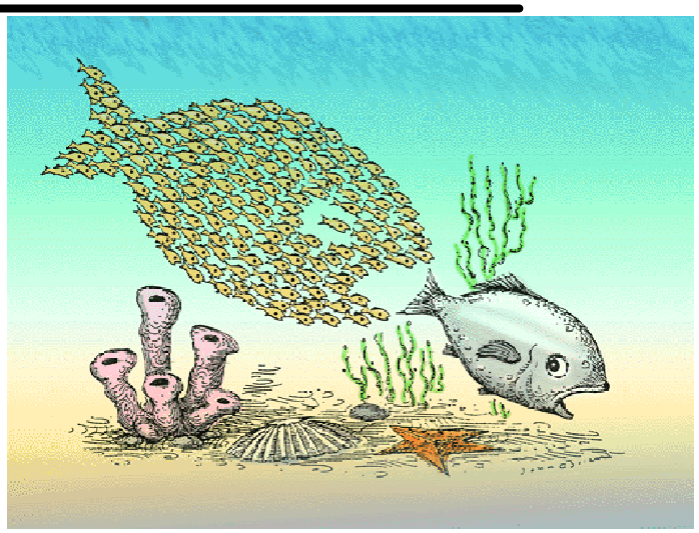
- definition: use of images and animations to convey information
- goal :effectively convey information to the user
  - transforms the abstract and symbolic into the geometric
  - harnesses the human perception system (visual?)

Motivation

- different representations can enhance the understanding level of a particular problem [Tufte].
- the form of representation makes a dramatic difference in the ease of the task [Norman].
- Norman proposes that external representations, that can be part of a workspace shared with others, require some sort of constructed device to support them: an artefact.
- is proposed an interface that tries to remove the computer as an object of perception, allowing the user to interact directly with the generated environment as discussed by [Hubbold et al].

Collaboration allows better performance



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) [Tufte, 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

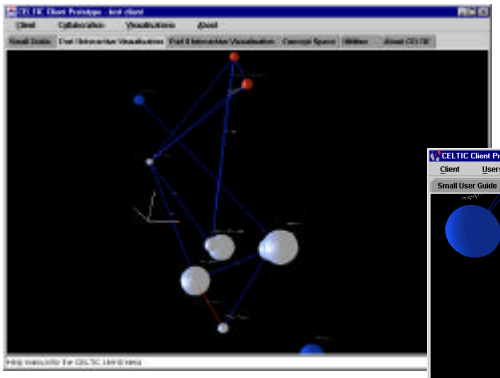
? a *concept space* as a 3D interactive visualisation;

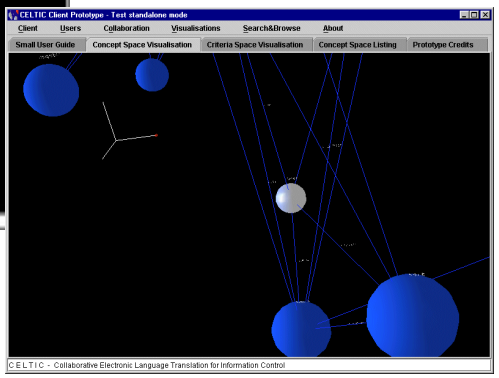
? a visualisation design composed by two distinct visualisations: a *concept space*, representing the structure, and a *criteria space* that allows spatial positioning by specifying up to three criteria;

? 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*).

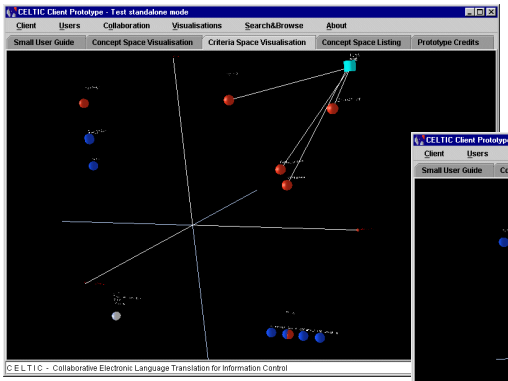
Concept space visualisation (navigate within)

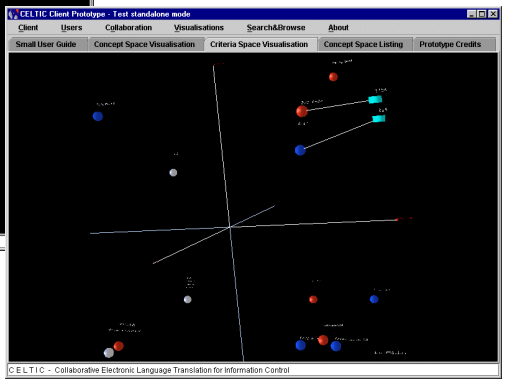




the shared concept space is unique but can be explored as a 6 dof virtual world

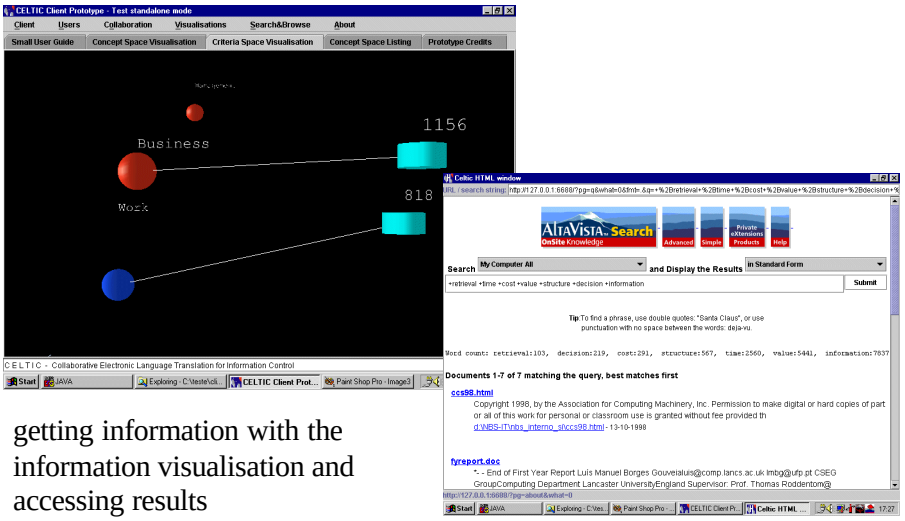
Mapping concepts in criteria space octants





possible to customise as many criteria spaces as wanted, based on keywords specification

Information Visualisation in criteria space



getting information with the information visualisation and accessing results

Concluding remarks

- the 3D interactive visualisation provides the means for integration between the services needed to allow collaboration for enhancing the structure, and group interaction
  - provides a visual interface for semantic access to information as an independent layer regarding a data source
  - any data source can be used, and explored using the concept space and the criteria space as it can support web search engines integration

Concluding remarks

- criteria space visualisation allow users' exploration of the shared concept space by rearranging its concepts based on given criteria
  - it provides a context to support reasoning and even decision processes based on shared knowledge

Concluding remarks

- criteria space visualisation allows integration of the structure for knowledge sharing with data source information.
  - in ill-structured or complex domains, this visualisation offers the possibility of discovering relations between given concepts, which define, in a sense, an information context, which can be used for several applications within an organisation such as *content management*, *workflow systems* and *knowledge management*