Exploring gardens of information, culture and language

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Introduction

The theme of exploration is central to this paper. Not of a garden, per se, but of information spaces, other cultures and other languages. in the following sections we shall describe three different pieces of that all use exploration as a means for conveying information rather than focussed searches for specific information. Firstly, we shall talk about collaborative information visualisation in which people are considered as being part of the environment rather than observers of it and in which their actions are in principle as informative as the information being displayed. Secondly, we describe a system that attempts to bridge the culture gap between tourists and the inhabitants of the cities they visit. Thirdly, we describe some technology that could be employed by the first two examples to aid comprehension and learning of foreign languages by a process of exploration while using a foreign language.

Finally, we shall attempt to show how these pieces of work could be combined to provide a multi-cultural garden of information.

Populated Information Terrains

The field of Populated Information Terrains (PITs) combines 3D information visualisation with Collaborative Virtual Environments (CVEs) to produce information spaces in which the actions of others are just as much part of the space as the information represented therein. We observe that people often have the need to work together with information and that who is doing what with a given piece of information may be just as important as the information itself. To this end we explicitly represent the users of our information visualisations in the 3D space so that as people search, browse and explore the information display, their actions are available to others.

In addition we see these spaces as supporting the exploration of information rather than providing answers to specific queries. In our model the user does not pose a question and retrieve information as, for example, with a web-based search engine. Instead, the users can explore the space and the information it provides and we provide tools for adapting the space to suit the users needs. The space therefore evolves as a result of the user's actions until it reaches a state in which it can satisfy the information needs of the user.

We have developed two prototype systems, in-line with this philosophy VR-VIBE [Benford et al 1995]- a visualisation of a document collection and WWW3D [Benford et al 1997a] a 3D collaborative web browser (shown below).
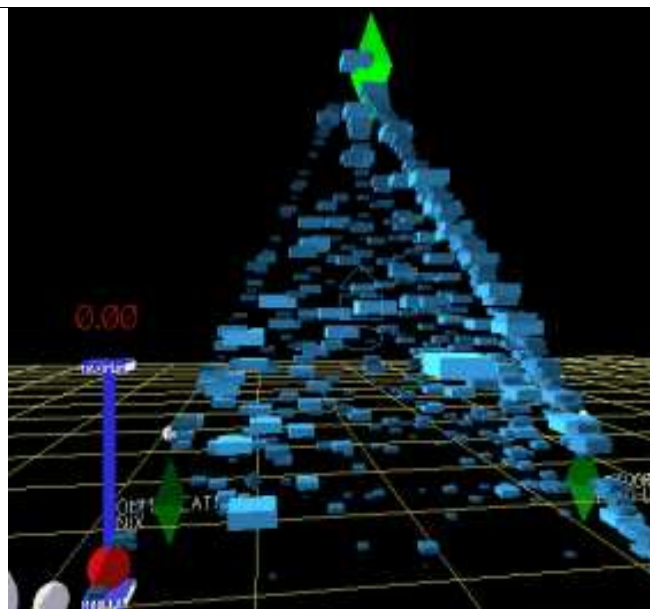

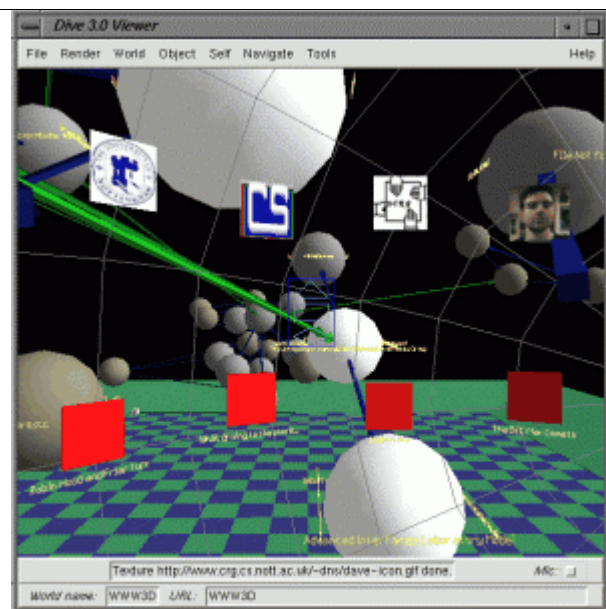|	
Figure 1: A VR-VIBE document visualisation.	**Figure 2: A WWW3D view of a portion of web space**

Bridging gaps between cultures

Go to a large city with a rich cultural heritage, such as Venice, and you might be able to observe or see the actions of at least three groups of people:

- the local inhabitants of the city
- the tourists visiting the city
- the "cultural managers" who stage events to attract tourists and show of the city's cultural heritage

Unfortunately, the interaction between these groups of people is often unsatisfactory, leading to a lack of empathy, communication and perhaps generating frustration. The tourists may arrive in the city see some of the "sights" attend a few events and leave without ever really appreciating what it is that makes the city truly special. The locals rarely interact with the tourists unless they are involved in the tourist trade and may perceive the tourists as invaders disturbing their city without ever really seeing it. Furthermore, perceiving that the traditional "cultural events" are increasingly being staged to attract and for the benefit of tourists they may feel that their very culture is being taken from them and that they are becoming strangers in their own home. Finally, the cultural managers may not receive a lot of feedback from either the tourists or the locals and will thereby find it hard to gauge whether they are communicating the culture of their city in the most effective way.

Campiello [Grasso et al 1998] is an EU funded project in the I3 framework which aims to address some of these issues. Rather than acting as a traditional tourist information system, providing schedules and suggested itineraries, Campiello aims to bridge the gap between these three groups of people via the exchange of "warm" data[1]. Campiello provides novel user interfaces based on the use of paper and large screens that allow people to share warm data as they explore the city and which make this information available in a form in which others can see it.

Figure 3: A form used by the Campiello paper user interface
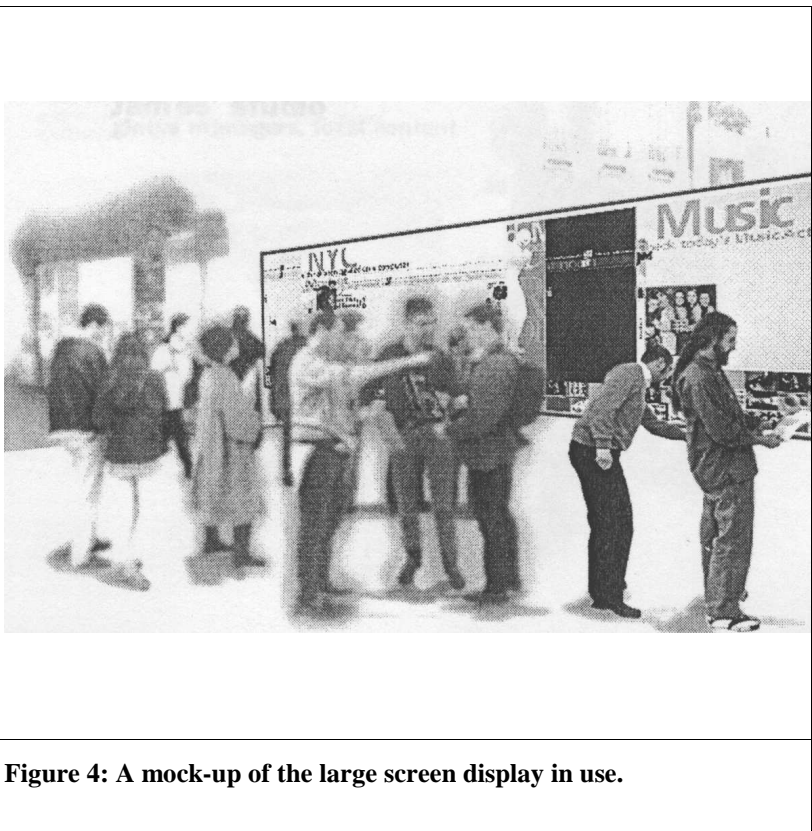

Figure 4: A mock-up of the large screen display in use.

Paper has several advantages, it is cheap, light, requires no special skills to use, can be folded and faxed. Paper can be distributed cheaply, can be carried around by users and "interacted with" at leisure with no dependence on special hardware. The first example of paper based user interface has been described in (Johnson *et al.*), where they presented the Xerox DataGlyph[2] technology as a bridge between the paper and digital world. Using DataGlyph™ technology we can construct paper forms that both present information (in the same way as ordinary leaflets which advertise anything from rock concerts to museums) and solicit for information.

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[1] We define *warm* data to be information directly concerned with people, what they think, their opinions and what they are doing. In contrast, *cold* data is purely factual and objective in nature.

[2] DataGlyph™ is a Xerox technology to store digital data on paper. See (Hecht 1994) for more information.

The aim of the large screen display is to select the topics that are most representative of the community at the current time and to display information about these topics in such a way that onlookers can see which are the items of current interest to the community. This topics are displayed together with the comments of the people who have commented on that topic via the paper user interface.

Battling Babel

Automatic machine translation of natural language has long been a goal of the AI community. Unfortunately, except in restricted domains it has yet to be achieved. However, work in at the XRCE Grenoble laboratory has taken the approach of providing *comprehension aids*, rather than automatic translation tools. The aim of these tools is to support people who have a basic knowledge of a foreign language to understand text written in that language and to interact using it. For example, if a user selects a word in a sentence the tools can give the meaning of that word in context rather than just performing a simple dictionary lookup. Also if the word forms part of an expression or idiomatic phrase then the tools return the translation of the complete phrase rather than the isolated word.

These tools can therefore be seen as supporting language learning by as process of exploration rather than focussed study. As a person uses a language, whether to read a text or for text-based communication the tools are ready to be called upon as needed but do not obstruct the user from trying their existing knowledge.

The Multicultural Augmented Museum

The above three sections have briefly described software for supporting the exploration of information, culture and language. In this section we describe a hypothetical situation which integrates all three. Here we use the example of a museum although other possibilities surely exist.

Many years ago, museums were perceived much like libraries - places of serious study dedicated to the transmission of facts. In more recent years museums have been changing their image in order to provide environments more sympathetic to a wider range of visitors with or without academic backgrounds and to reverse falling attendance figures. To this end museums have been adopting a more exploratory approach encouraging visitors to play with some exhibits to try things out and to learns by doing. However, even given this new more accessible approach traditional museums are still restricted in availability by their fixed physical location and by the difficulty of supporting a wide range of foreign languages.

We imagine taking all or part of a collection of a museum and making representations of it available in an on-line 3D virtual museum. Visitors would be explicitly embodied in this virtual space and the language comprehension aids would be available to support reading of text and communication with other visitors. Our aim here would not be to replace the physical museum but to allow people to explore parts of it on-line an encourage them to visit the real thing. In accordance with this philosophy rather than adopting the normal approach of providing translations of texts in a small number of the more common languages the language comprehension tools could be used to aid visitors read texts in the original language. Finally, we take ideas from Campiello and allow people to attach notes and comments to items in the museums which will then be available for others.

In the real museum we can use a Campiello-style paper user interface to add the capability to use leaflets provided throughout the museum in order to request more information or to register comments and opinions. These could be attached to items in the same way as the comments left by the visitors of the virtual space.

In order to reinforce the connection between the real and virtual museum we can use large screens situated in the physical museum to give an indication of what is happening in the virtual museum and to display current items which are generating interest and associated comments. The virtual museum could also contain virtual large screens which also contained this information and real-time video feeds from the physical museum. The end effect, then, would not be two disconnected spaces but a combined mixed reality [Benford et al, 1997b]] with physical and virtual components.

Conclusion

Inspired by the metaphor of exploring a real-world garden or landscape we have presented three pieces of work that all replace the focussed provision of information with encouragement to experiment and to explore.

We concluded with a combined example of an augmented museum. We hope that these ideas will result in systems that are both easier to use and which also empower their users by providing support when needed but encouraging them to explore and learn by doing.

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