USING AGENTS IN SOCIAL NAVIGATION

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Introduction

The issue of how users can navigate their way through large information spaces is crucial to the ever expanding and interlinking of computer systems. Computer users live in a world of information spaces. One of the most critical activities which users need to undertake is to retrieve information from such spaces and thus the problem of how to help the user to navigate, explore and identify the objects of interest is critical to the success of the system (Benyon and Höök, 1997).

The PERSONA project is a collaborative long-term research project between the Swedish Institute of Computer Science and Napier University. It is funded by the EU's fourth framework programme, task LTR4.4, and is investigating a new approach to navigation based on a personalised and social navigational paradigm. Most information retrieval in the 'real' world is accomplished through communication between people. We trust certain individuals to possess the information we are looking for. In addition, we expect them to be able to express the information so that it becomes personalised to our needs, understanding and abilities. Often the information seeking is done through talking to several persons, comparing the advice given, reformulating the original need for information, and only sometimes turning to other information sources such as books or on-line databases. One way in which this project seeks to develop our understanding of human activities in information spaces is by looking at the concept of social navigation.

Social navigation

When searching for information and when navigating in various different spaces such as cities, on sea, on the WWW, etc., people often rely on the advice of other people rather than more abstract tools such as maps, search engines, etc. Social interaction is (of course) basic to human behaviour, and therefore well-learnt and efficient. In order to design navigational tools, it is important to isolate those characteristics of social navigation that are crucial in this context. Our current view is that some crucial ingredients of social interaction are:

- the information obtained is personalised to the needs of the information seeker (*adaptivity, personalised*)
- the information is often enclosed in a narrative which promotes the learning of it (*narratives*)
- navigation in information spaces is a process where the information is obtained from several different persons and the seeker's trust in the information obtained will be determined by their trust in the agent(s) giving the instructions (*trust*)
- information seekers are aware of who might have the kind of navigational information that they are looking for and of interesting activities occurring elsewhere in the information space(*awareness*)
- navigational instructions are often given verbally, something which corresponds to different cognitive abilities in users: low-ability users often make more use of verbal instructions while high-ability users are able to use more abstract tools such as maps, etc. (choice of *modality*).

In this project we aim to take some of these characteristics and design and implement a social navigation environment. Several different interface features will be explored. One is the development of agents that potentially provide navigational instructions. Alternatively agents may teleport the user to some place in the information space or filter out the most relevant information. In some cases the software agent will just allow the user to talk to a human agent.

We do not believe that an agent has to be realised as an advanced graphical entity with a face, lip movements, speech, etc. It may well use a text-based interface and achieve the same or better results in terms of the users' trust in the system. Alternatively the agent may be realised through graphical techniques such as changing the colour of links followed by individuals or groups of people, automatically highlighting areas of potential interest, or providing pop-up windows to alert users to the presence of others.

Narrative and awareness

We see agents as contributing to two important aspects of social navigation; narrative and awareness. Narrative captures some prior real or imagined social interaction, allowing users to explore and understand an information space from the perspective of someone they have got to know. In narrative comprehension, readers (users) develop situation models not just of spatial layout but of temporal, causal and personal characteristics of the space (Zwaan, et al., 1995). There is an ecological side to narrative understanding as users pick up local knowledge which supplements any global view which they may have formed. For example, a localised clue can signal changes in the narrative, some detail of the scenery might suggest a new perspective on the plot or a

chance line of conversation may indicate an aspect of character not previously seen. Narrative can be very effectively supplemented by sound and visual effects enabling us to produce rich soundscapes and visual imagery which themselves tell a story or which provide a context for the narrative.

Although the take-up of narrative in interface design has been limited (Don, 1991 is one of the few examples) taken in its broadest sense narrative seems to offer an important step forward particularly for navigation in information spaces. Local interface agents may have knowledge of where information is located, or of alternative links between information sources. For example, if your child develops some red spots on her neck, you are likely to turn to friends for an explanation before turning to the medical dictionary. Your friend will elaborate on the possible conditions with stories of others, things read in the paper and so on. It is these stories which we see as helping users to identify which parts of the information space are important and which can be left aside. Narrative is an important aspect of our make-up as social beings. Indeed Gergen (1994) argues that we give meaning to our lives and relationships by 'storying' our experience. Narrative renders events socially visible and helps us to establish likely future events.

The concept of 'awareness' is also important in real world navigation. We see a group of people gathered and infer that something interesting is happening, or follow a crowd in order to find our way to a large event. We use everyday sounds to keep us informed of peripheral activities and to monitor background tasks. Users can be made aware of where other users are, or where they have been. It would be nice to know that a colleague of mine has navigated through this part of the Web before. Agents can also be used to facilitate information exchange between people. Auralisation, individualised interactions and the ability to be aware of, and interact with, other people are also necessary to provide the advanced interaction which modern day systems require.

Software agents can be employed both to personalise information and to maintain contact between people. Fischer and Thomas (1997) discuss the concept of using agents to assist users in sharing their personalized information spaces and Dieberger (1997) describes a number of ways in which information can be tailored to provide localised awareness.

Conclusion

In pursing the notion of social navigation, the aim is not to throw away all that has been learned from a 'geographical' view of navigation. The aim is to utilise maps, landmarks and so on where they are useful, but to augment this with a socially-grounded approach. To pursue the navigation metaphor; when walking the streets of Paris as a tourist, the choice is not between either using a map or asking people for help. We do both. We might point to the map as we try to determine where we are. We will use the map to discuss interesting routes through the city and to discover stories about who lived where and what there is to see. The claim is, however, that the map-based navigation takes place within the larger context of social interaction. Unless we recognise this the information space will always provide an impoverished interaction.

Agents have the potential to personalize information to the preferences, interests and habits of individuals. They also have the potential to monitor interactions and to provide relevant and timely information about activities which are outside the users immediate concerns. Agents also provide an opportunity for users to communicate directly with other people who are, or have been, navigating the same information space

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