Supporting Multimedia Collaboration On The Web

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1. Introduction

The World Wide Web (WWW or Web) is undoubtedly the most popular service on the Internet. It offers a great reservoir of information to an ever growing number of users. Many of these users are researchers and scientists who use the Web to publish and exchange their latest research results. The Web mainly facilitates information exchange in an asynchronous manner, i.e. one user puts information on the Web which can later be retrieved by others. Users are usually not aware of others interested in the same subject or accessing the same information. There is also no way for them to meet and discuss a topic of common interest. The proposed paper gives a brief insight into a new model which allows users of the Web to get in touch with each other *and* to communicate in an interactive manner using audio and video tools.

2. Collaborative Browsing

Research is currently being undertaken at between Lancaster University, the University of Ulm in Germany and ETH Zürich, Switzerland, in which a system is developed that makes users aware of other users with similar interests and allows them to communicate. This is part of the European funded *CoBrow* project (short for collaborative browsing). In contrast to 'normal' Web users, who usually browse in seclusion, a user of this system also has the ability to see, communicate and "meet" with other users interested in the same topic. These users are brought together by using the *neighbourhood* and *group* facilities provided by the system - the system currently being composed of normal *HTML* files and some *CGI* scripts. This paper reports on one particular approach being pursued within the project.

A *neighbourhood* is a designated area within the system allocated to a topic of interest, which can normally be broken into a handful of smaller, specific areas. These smaller sections of the *neighbourhood* can have their own parameters, tools (such as video and audio conferencing tools, which are freely available) and group pages accessible only to those in the group.

This approach allows users to view information provided on the Web through common browsing tools (*Netscape Navigator* and *Microsoft's Internet Explorer*, for example), which can be shared between participants. This and other issues can be discussed actively employing a range of the conferencing tools. The use of common software also, to some extent, ensures functionality on several platforms.

3. An Integrated and Practical System

Freely available conferencing tools are currently used in conjunction with the standard Web browsers to provide an integrated platform for collaborative browsing and conferencing. These allow video, audio and other shared facilities. At present, the conferencing is supported using MBone video, audio and other whiteboard tools. Conferencing over MBone allows us to utilise Internet Multicast capabilities and hence to support variable sized and dynamic groups. To integrate the MBone tools into the Web environment a *content-type* was defined for each of them within the Web browser, denoting how the type should be dealt with. This is provided as standard by most browser software, thus allowing operation of our system on all common systems.

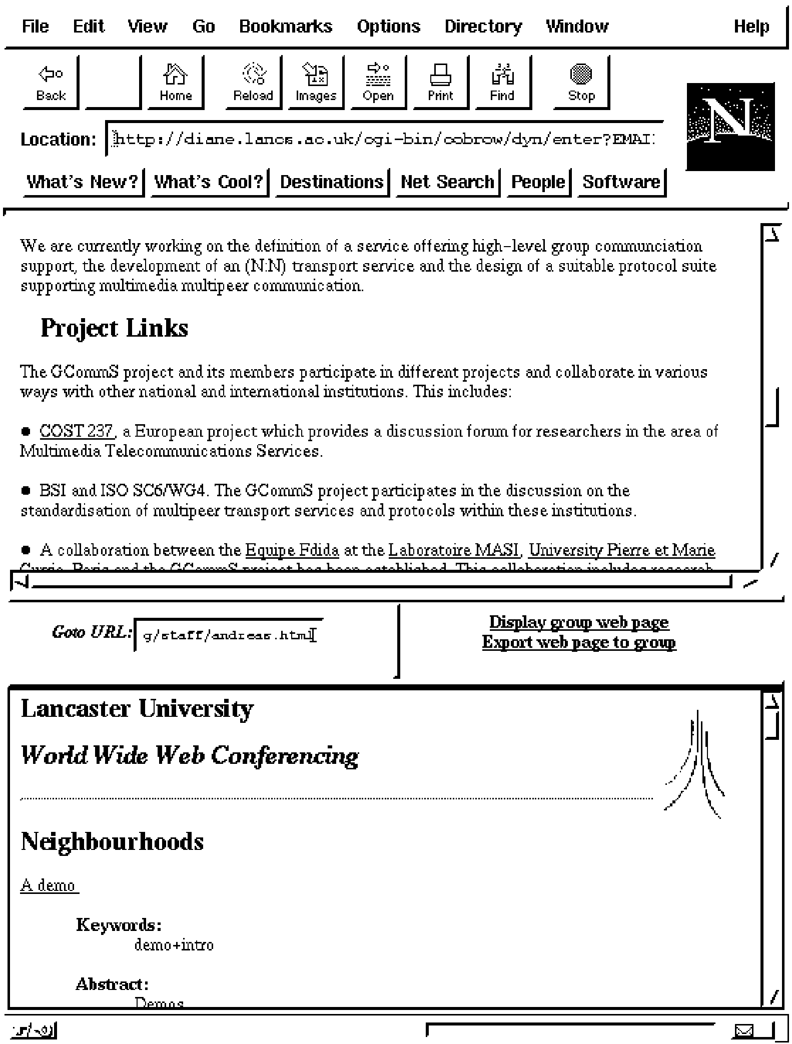

Fig. 1: User Created Neighbourhood Web Page

Video aspects of the system are represented by the MBone conferencing tools *vic* and *nv*. These programs utilise a camera attached to the computer to obtain video information, if available. We use *Connectix QuickCams* which are an economic and satisfactory solution for this purpose.

Audio aspects of the project are provided, by the MBone utilities *vat* and *rat* - *rat* is a development of the University College London, which was especially designed to cope with a major problem of today's Internet, i.e. packet loss and data corruption. Forward error correction is used to deal with the problem. Microphones are connected via the sound cards located in the host computer to allow the users to talk.

Other aspects fall into an area of shared information whereby all users can easily participate (unlike audio which allows one speaker at a time). Such facilities are a white-board drawing package, such as *wb*, and a text program allowing shared text, such as the network text application *nt*.

Figure 1 shows the browser window, using standard HTML tags, split into three sections which display the currently chosen document page, the *group* page controls and the *neighbourhood* and *conference* facilities

The currently active page is displayed at the top, in the larger of the three sections. This is the page selected with the *URL selector* in the centre section. This page may be exported to become the group page, if required, using the group facilities provided, again, in the centre section.

The control section includes a form by which *URL*s are specified. This must be used in favour over the browser provided selector, as it keeps the selected page within the confines of the system, unlike the browser provided selector, which will leave the scope of the system. The *group* facilities allow users to export selected pages out to the group, so that other users in the same area may also see this page.

The *neighbourhood* and *conference* window displays the controls for the creating of *neighbourhoods* and related *conferences* by means of HTML forms.

4. Conclusion

A prototype system has been constructed within the past few months which allows a general look and feel to the proposed system and the overall impressions are promising. The system does not heavily rely on custom hardware or software, and thus allows portability to almost all platforms. The final paper will present a full description of the collaborative Web-browsing and conferencing tools, discuss integration aspects and give a detailed outline of our prototype implementation.

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