

The Virtual Mail System

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1. Introduction

Companies conduct world-wide collaborations which often involve asynchronous work with group members in different time-zones. In asynchronous work, the participants can easily waste days just clarifying questions because feedback is slow. For efficient collaborations, accurate “handing-off” of work between participants is crucial. Therefore, messages exchanged between collaborators should not contain ambiguities. One cause for ambiguity may be in the mismatch between the content domain and the medium used to convey the message regarding that domain. For example, if the task is to design buildings, the explanation of ideas usually involves the description of objects and features in a spatial context. This is difficult to accomplish even with advanced e-mail systems that allow the inclusion of pictures, animation and audio as attachments. In these systems, the e-mail messages are still detached from the environment in which they were initially recorded. In VR we have the opportunity to bridge this by allowing the same environment to be the medium over which a recording was originally created and played back. When a play-back involves the recording of the remote participant’s virtual presence (an avatar) and actions, the avatar can be regarded as a surrogate of the original recorder of the message.

2. The Virtual Mail System

V-mail is designed to be used in the CAVE virtual environment. The participants’ mail messages and the ongoing modifications of the VE are maintained by a central server. V-mail’s user-interface is embodied in a virtual friend or pet that follows the participant as he/she interacts with the VE. Touching the pet pops up an interface for recording and reviewing messages. The user’s voice is picked up by a wireless microphone worn by the user and a sound server stores the digitized data in an audio file. At the same time, tracked head and wand data, consisting of position and orientation information, coupled with time-stamp data are

stored in a gesture file. This time-stamp information is used to synchronize the audio with the re-animation of the gestures. The client applications use XP(eXtended Performer) which provides basic modules for handling user-interaction in VE. CAVERNsoft[1] is used to facilitate the construction of the persistent collaborative virtual environment. When a user starts a client process, an initialization message is sent to a server. Then, the user’s avatar is switched on at all the currently participating clients and mail messages stored in the server are downloaded. The user sends a v-mail message by sending a ‘mailing message’ to the server which consists of the sender’s name, audio and gesture data. The server delivers the message to the receiver’s mail box on the server.

3. User Testing and Result

To evaluate V-mail, a qualitative user test was conducted. In the test, two people collaborate asynchronously. One person designs a virtual museum and the other person implements the design. Since the idea of recording messages in VEs, using both voice and gesture, is relatively new, some users were not immediately aware of their ability to use gesture. However, once they learned how to use their virtual hand to gesture, they pointed at objects often rather than engaging in lengthy verbal explanations. When a user replayed the v-mail, a messenger avatar talked and moved to re-intact the message. The users treated the avatars as if their collaborators were actually present in the collaboration. Inadvertently collaborators would find themselves talking to the avatar. This might suggest that v-mail can have a significant impact in bridging time-zone differences. Further studies are now underway.

References

- [1] J. Leigh, A. E. Johnson, and T. A. DeFanti. *CAVERN*: A distributed architecture for supporting scalable persistence and interoperability in collaborative virtual environments. *Journal of Virtual Reality Research*, 2.2:217–237, December 1997.