Rule-Based Multi-Media Communication Systems

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The attached proposal to the SIGGRAPH '89 Conference Committee describes a software project that I intend to use as the basis for my dissertation research. I have received a grant from Digital to create a Unix version of the Information Lens, a rule-based system for filtering semi-structured electronic mail messages (see Malone et. al., 1987). Users fill out templates that are similar to mail messages and specify actions, such as move a message to a folder or run a calendar program in response to a meeting announcement. A key idea is the notion of semi-structured messages, which take advantage of additional fields in a message (such as date or time) to enhance the receiver's ability to automatically process the message. The first version of the software has been completed and has been fully instrumented to facilitate collection of usage data. Initial user testing is currently under way.

I have also developed software that permits a researcher to analyze video data (see Mackay (1988), panel session at CHI '88). The researcher can link live video and audio with other related data, such as keystroke logs, and use a variety of techniques to identify important events. Prior to a session, the researcher can create software "buttons" to tag particular events for later analysis, such as successful interactions or serious misunderstandings. During the session, the output from the video camera is channeled through the workstation and appears in a window on the researcher's screen. The researcher can take on-line notes and tag events as they occur by pressing the appropriate button. After the session, the researcher can watch the whole session at any speed or view just the tagged events.

During the data analysis phase, the researcher can modify old tags or create new ones based on symbolic labels that describe events, recorded patterns of keystrokes, visual images (single-frame snapshots from the video), patterns of text (from a transcription of the audio track), clock times or frame numbers. The result is a random-access database of visual, auditory, and screen information from the session.

Presentation of the information is very flexible, especially if the video has been transferred to a write-once videodisc. Edit lists, composed of any combination of tags, can display the data in any order. Transcribed text can appear below the the video window in synchronized subtitle boxes, one for each participant in the study.

The latter software provides a mechanism for creating semi-structured multi-media messages, which can then be processed by the same kinds of rules developed for the Information Lens system. I plan to iteratively design and build a prototype of this system at MIT and then use SIGGRAPH as a major test site. SIGGRAPH '89 will provide a potential subject pool of over 30,000 people. I have obtained permission to send participants a questionnaire and to record usage information during the conference. Potential issues to explore include: know-how trading (Von-Hippel 1987) in the computer industry and an analysis of the ways in which researchers and engineers communicate. Because of the large subject pool, it will be possible to run several controlled field studies in additional to observation of how the system works in general.