

Multimedia Computer- Supported Cooperative Work

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Future multimedia computer-supported cooperative work (CSCW) systems aim to support and provide a wide range of cooperation, coordination, and communication services for collaborative and mobile work. This requires integrating multimedia technologies with CSCW technologies such as groupware, workflow, and coordination systems. This special issue presents original research that addresses issues in designing, implementing, and evaluating multimedia CSCW systems. You'll find a variety of research streams in this special issue ranging from synchronous (videoconferencing, meeting rooms, group editors) to asynchronous (workflow) group support. Multimedia CSCW is in the beginning stages of establishing itself as a research track inside the separate CSCW and multimedia communities. This special issue provides an introduction to this exciting new domain by presenting articles from both research communities.

Gemmell et al.'s article on software-enabled gaze-aware videoconferencing deals with one of the most important problems in synchronous collaboration—the issue of gaze awareness in videoconferencing. Current videoconferencing systems without gaze awareness present images that lack valuable social and/or communication informa-

tion. Such video streams quickly become uninteresting and users often ignore them. In contrast, it's almost impossible to ignore eye contact. The authors argue that restoring gaze awareness to video (along with low latency, high-quality audio, and easy call setup) will result in a videoconferencing system that finally has a chance to succeed. The authors describe a software-only approach that tracks a participant's head and eyes in a video using computer-vision techniques. The tracking data is then transmitted along with the video stream. Receivers take this data corresponding to the video and graphically place the participant's head and eyes in a virtual 3D space. The results of their work to date appear promising. Given that accurate vision data can be extracted from each video frame regarding head pose, eye segmentation, and gaze direction, the authors can arbitrarily position and pose the head in a virtual 3D space and synthesize the eyes to set the gaze direction. The resulting videoconferencing system supports a sense of space and gaze awareness.

Takahashi and Yana discuss a hypermedia environment for global collaboration with knowledge workers consisting of hardware (InterPOD) and software (TeamSmart). The InterPOD system creates a multimedia meeting room environment for participants to access and share multimedia information from various sources. A hypermedia tool, TeamSmart supports collaboration on document production by globally dispersed teams. This article discusses the design and implementation of the environment. It also describes lessons learned from using the environment for product development projects conducted collaboratively by team members in Japan and the US.

Chiu et al. present a "room with a rear view"—a multimedia conference room that the authors developed and used at FX Palo Alto Laboratory. The room is equipped for meeting capture with room cameras and microphones, videoconference cameras, and a large-display rear-video projector. The authors believe that since implementing high-quality multimedia recording requires a substantial infrastructure, together with the fact that meetings take place inside a room, it makes sense to integrate the system into a conference room. In other words, the room itself becomes a computing environment that supports the recording of its own activities and content for documentation, communication, and collaboration. Meetings span a range of informational and group activities. Examples include staff meetings, design discussions, project reviews, videoconferences, presen-

tations, and classes. Often, it's important to maintain a record of the meeting so that people can review what transpired. Assigning someone to take handwritten notes, augmented with presentation material obtained from the speaker, accomplishes this. However, some cases require more detail, so participants record the meeting on audio or video. Reviewing the meeting may entail retrieving facts and details, or more involved activities such as studying, preparing reports, and creating meeting summaries.

Li et al. discuss problems with synchronous or real-time group editors—a process that lets a group of users view and edit the same document simultaneously from geographically dispersed sites. Traditionally, a text editor edits textual documents. A graphics editor or whiteboard draws graphic objects such as lines, boxes, and freehands. Document types edited with modern editors have recently extended to images, multimedia data, hypertext, hypermedia, 3D worlds, and so forth. This category of groupware contains not only useful tools for collaborative work, but also excellent vehicles for exploring a range of fundamental and challenging issues facing the designers of real-time groupware systems. Similar to editing documents with single-user editors such as Microsoft Word, a user in a collaborative setting expects the group editor to respond quickly. Real-time group editors typically adopt a replicated architecture in which an editing process runs at each site and the shared document is replicated at each site.

Ludwig and Whittingham present “VEC—Gateways for Cross-Organizational Document Flow.” This article deals with the interesection of asynchronous collaboration using workflow technologies and multimedia documents. Outsourcing services require a rich flow of information between service-providing and service-requesting organizations to ensure the interconnection of all business processes. Today, document management systems and workflow management systems support asynchronous processes within organiza-

tions. The advent of the Internet permits exploiting these management-systems technologies for processes that span organizational boundaries. In this article, the authors describe how the Virtual Enterprise Coordinator (VEC) uses gateways and formal agreements to let business processes work across multiple organizations. VEC's gateways control the way in which outside organizations access a company's internal business processes and automate the mapping of internal structures to their agreed equivalents. Using VEC, organizations can connect their business processes to external partners in a controlled way while retaining the freedom to change the internal process definitions and document structures.

I hope you'll enjoy this special issue. I believe these articles provide an interesting overview of applications and technologies of research in multimedia CSCW. **MM**



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