IDEA GROUP PUBLISHING
701 E. Chocolate Avenue, Hershey PA 17033-1117, USA ITB7307
Tel: 717/533-8845; Fax 717/533-8661; URL-http://www.idea-group.com

Chapter VI

A CSCW with Reduced Bandwidth Requirements Based on a Distributed Processing Discipline Enhanced for Medical Purposes

Iraklis Kamilatos and Michael G. Strintzis
Informatics and Telematics Institute, Greece

Copyright Idea Group Inc.

Medical teleconsultation with modern high power workstations can be implemented using distributed computing systems. This chapter presents an open telecooperation architecture for such a system. The resulting medical Computer Supported Cooperative Work (CSCW) tool is evaluated experimentally.

INTRODUCTION

A meeting of scientists from various disciplines sharing a common interest in "how people work" was organized in 1985 by Paul Cashman and Irene Grief. The objective of the meeting was to understand how technology could support them. During the meeting the term "Computer Supported Cooperative Work" (CSCW) was defined for the first time. Following this meeting a number of researchers and developers have shown interest in the subject. This acronym has been accused of being too long and may be confused with CSC, which stands for Computer-Supported Collaboration. Another criticism was that it states an aim and not

This chapter appears in the book, Multimedia Networking: Technology, Management and Applications by Syed Mahbubur Rahman.
Copyright © 2002, Idea Group Publishing.

the reality by the term "cooperative." Alternative names are used such as workgroup computing and groupware; these terms are moving the focus from the group activity to the technical approach and are restricted to the description of small organisational units.

The new systems needed to be tuned to the way that people work, interact in a group or in an organization and the effects that technology could have in these interactions. Although these ideas were seen as new at the time, they were not brand new as they are echoed by engineers and people that worked in the Management Information Systems field for some time and their attempts to improve the success rates of large systems development.

However, CSCW has started from the opposite end from that of the "Office Automation," by looking at the needs of the system users based on the knowledge that social psychologist, anthropologists, organisational theorists, educators, economists and any one else that could provide on the understanding of the group activities. The applications that could be contained in the category of CSCW are desktop conferencing systems, collaborative authorship applications, electronic mail with its refinements and extensions, and electronic meeting rooms or group support systems. Other applications include distance learning, workflow management, concurrent engineering, Computer-Assisted Software Engineering (CASE), Computer-Assisted Design/Computer-Assisted Manufacturing (CAD/CAM), real-time network conferences and medical teleconferencing.

Medical teleconferencing requires the electronic transmission of medical images from one location to another for the purposes of interpretation and/or consultation. Users in different locations may simultaneously view the images. This allows more timely interpretation of the medical images and gives greater access to secondary consultations and improves continuing education. Appropriately utilized, medical teleconferencing can improve access to quality medical interpretations and thus significantly improve patient care.

There are a number of commercially available packages for CSCW such as the Intel® ProShare™ and the SGI® InPerson™. However, these packages cannot use 12-bit images and they do not support image files according to the ACR/NEMA and DICOM standards for medical image processing. Also, their image processing functionality is limited while a teleradiological package should have a wide selection of image processing tools. Ideally, the CSCW program should be directly connected to the medical modality in order to acquire directly the data without operator intervention. This would improve the accuracy, the security and the integrity of the data.

Medical telecooperation or teleconsultation software packages often assume that all necessary bandwidth can be allocated to each session according to its needs. In this chapter, we present a telecooperation package that reduces drastically the bandwidth demand for message exchange between stations by minimizing the volume of messages exchanged based on the design proposed in Singh, Gupta and Levoy (1994).

The telecooperation system can be viewed as a distributed computing system, in which a collection of processors functions as a single unit feeding information to the visualization and interaction systems. This approach takes advantage of the local resources at the end points and is in line with the current trend of the virtual parallel systems based on multiprocessor systems. The developed program acts as a manager between the two end stations and based on the message passing model, exchanges the minimum number of message primitives required for the systems to remain synchronized.

An internal platform users memory and process replication to minimize the volume of messages exchanged. Process replication also permits the use of local resources such as scanners and graphics cards, and may further be used to parallelize the operation on a local level.

Copyright Idea Group Inc.

15 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/chapter/cscw-reduced-bandwidth-requirements-based/27030

Related Content

Multimodal Information Integration and Fusion for Histology Image Classification
Tao Meng, Mei-Ling Shyuand Lin Lin (2011). *International Journal of Multimedia Data Engineering and Management (pp. 54-70).*
www.irma-international.org/article/multimodal-information-integration-fusion-histology/54462

Multimedia Interactivity on the Internet
O. El-Gayar, K. Chenand Kanchana Tandekar (2008). *Multimedia Technologies: Concepts, Methodologies, Tools, and Applications (pp. 77-84).*
www.irma-international.org/chapter/multimedia-interactivity-internet/27074

Representing Symbolic Pictures Using Iconic Indexing
Chin-Chen Chang, Yung-Kuan Chan, Annie Y.H. Chouand Wei-Pang Yang (2001). *Design and Management of Multimedia Information Systems: Opportunities and Challenges (pp. 64-79).*
www.irma-international.org/chapter/representing-symbolic-pictures-using-iconic/8116

Video Segmentation and Structuring for Indexing Applications
Ruxandra Tapuand Titus Zaharia (2011). *International Journal of Multimedia Data Engineering and Management (pp. 38-58).*
www.irma-international.org/article/video-segmentation-structuring-indexing-applications/61311

MPEG - 4 Facial Animation and its Application to a Videophone System for the Deaf
Nikolaos Sarrisand Michael G. Strintzis (2002). *Multimedia Networking: Technology, Management and Applications (pp. 102-125).*
www.irma-international.org/chapter/mpeg-facial-animation-its-application/27028