

Multimedia Systems

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Multimedia has become the computer buzzword of the 1990s. This seemingly sudden emergence, however, has resulted from steady progress in digital image/video capture, storage, and display technologies during the past 30 years and from the availability of fast and inexpensive hardware and software systems. Multimedia systems take on many forms, from the isolated PC with a CD-ROM drive to the millions of interconnected workstations containing the distributed data sets that make up the World Wide Web. Multimedia systems are utilized for fun, education, research, and business.

This special section on multimedia systems contains eight papers that address several of the technological issues dealing with image/video data sets in multimedia systems. The following aspects of multimedia systems are addressed:

1. special-purpose image/video codec design
2. video on asynchronous transfer mode (ATM) networks
3. temporal video segmentation
4. transform domain processing of image data
5. software architecture issues.

Application-specific image/video codec design can achieve improved storage/transmission times for many

data sets. The paper "Progressive technique for human face image archiving and retrieval" by Bell and Maeder proposes an image codec specifically for databases of human faces. Barnett and Bovik, in the paper "Motion-compensated visual pattern image sequence coding for full-motion multisession vide Conferencing on multimedia workstations," develop a video codec that has a real-time software-only implementation on a PC. The paper "Image scalability using wavelet vector quantization" by Panchanathan, Gamaz, and Jain introduces an image codec for progressive image transmission applications based on a scalable VQ system and a wavelet decomposition.

Two papers in this special section study video on ATM networks. The paper "Characterizing highly correlated video traffic in high-speed asynchronous transfer mode networks" by Shroff and Schwartz forms a statistical characterization of the network load generated by video. Dagiuklas and Ghanbari, in the paper "On the improvement of the quality of service of video services in an asynchronous transfer mode network using forced frame refreshment," examine how to limit the temporal effect of ATM cell loss through feedback information.

The paper "Comparison of video

shot boundary detection techniques" by Boreczky and Rowe studies and compares the algorithms that have been developed for scene change detection in video sequences. Shen and Sethi, in the paper "Scanline algorithms in the JPEG discrete cosine transform compressed domain," attempt to develop algorithms for processing compressed images that are equivalent to common spatial domain processing without forming the spatial domain image. Finally, the paper "Design and development issues for multimedia information systems" by Day et al. examines software architecture issues for multimedia systems.

In closing, we would like to acknowledge the valuable efforts of all the authors who submitted papers and made it possible to produce this special section. We hope you will find the articles featured in this special section of interest and useful.



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received the BSEE (cum laude) and MS degrees from the University of Cincinnati and the PhD degree from Purdue University. From 1980 to 1984, he was with the Department of Electrical and Computer Engi-

neering at the University of Michigan, Ann Arbor. Since 1984, he has been with the School of Electrical Engineering at Purdue University, West Lafayette, Indiana, where he is a professor of electrical engineering. His research interests include image and video compression, medical imaging, parallel processing, multimedia systems, ill-posed inverse problems in computational vision, nonlinear filtering using mathematical morphology, and communication and information theory. Dr. Delp has consulted for various companies and government agencies in the areas of signal and image processing, robot vision, pattern recognition, and secure communications. He has published and presented more than 160 papers and is also co-editor of the book *Digital Cardiac Imaging* published by Martinus Nijhoff. He is a member of Tau Beta Pi, Eta Kappa Nu, Phi Kappa Phi, Sigma Xi, OSA, the Pattern Recognition Society, SPIE, and IS&T and is a senior member of IEEE. In 1995 he was elected vice chair of the IMDSP Technical Committee of the IEEE Signal Processing Society. In 1994 he was elected vice president for publications of IS&T. Dr. Delp is the general co-chair of the 1997 Visual Communications and Image Processing Conference (VCIP) to be held in San Jose. He was program chair of the IEEE Signal Processing Society Ninth IMDSP Workshop held in Belize in March 1996. He was general co-chairman of the 1993 SPIE/IS&T Symposium on Electronic Imaging.

From 1984 to 1991 he was a member of the editorial board of the *International Journal of Cardiac Imaging*. From 1991 to 1993, he was an associate editor of the *IEEE Transactions on Pattern Analysis and Machine Intelligence*. Since 1992 he has been a member of the editorial board of the journal *Pattern Recognition*. In 1994, Dr. Delp was appointed an associate editor of the *Journal of Electronic Imaging*. In January 1996, he was appointed associate editor of the *IEEE Transactions on Image Processing*. In 1990 he received the Honeywell Award and in 1992 the D. D. Ewing Award for excellence in teaching. In 1990 he received a Fulbright Fellowship to teach and perform research at the Universitat Politecnica de Catalunya in Barcelona, Spain. Dr. Delp is a registered professional engineer.



Robert L. Stevenson received the BEE degree (summa cum laude) from the University of Delaware in 1986 and the PhD in electrical engineering from Purdue University in 1990. While at Purdue he was supported by graduate fellowships from the National Science Foundation, DuPont Corporation, Phi Kappa Phi,

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