

IEEE Transactions on Image Processing

Special Issue on

Distributed Camera Networks: Sensing, Processing, Communication and Computing

Description of Topic:

Distributed camera networks have applications in diverse areas, including urban surveillance, environmental monitoring, healthcare, and battlefield visualization. Although distributed camera networks have been increasing in numbers, effective methods for dissemination, processing and understanding of video data collected by distributed camera networks are lacking. There is a strong need for developing distributed algorithms for compression and dissemination of video data, detection and tracking of moving objects, motion capture and higher level tasks such as visualization, recognition of objects and the activities they are involved in. Most of the existing algorithms for these tasks operate in a centralized manner---imagery or other information such as location and identity are transmitted to a server that performs necessary processing. Such server-oriented architectures do not scale for the problems mentioned above. Another feature of distributed camera networks is that the use of distributed algorithms adds network bandwidth and power to the mix of constraints; those constraints are particularly tight for wireless networks. Algorithms may need to be redesigned to meet these requirements---simple mapping onto embedded platforms is often not sufficient.

Manuscripts are solicited to address a wide range of topics in distributed camera networks, including but not limited to the following

List of Specific Topics Covered:

Sensing

- Collaborative (in-network) processing
- Compressive sensing and sparse representation
- Adaptive sensing (e.g., using different spatial/time resolutions, bit depths, etc.)

Processing

- Distributed camera calibration
- Distributed video compression
- Efficient video transmission
- Detection and tracking of objects
- Recognition of identity and events
- Visualization

Communication

- Network architectures
- Efficient protocols
- Secure transmission
- Camera scheduling
- Cross-layer protocols

Computing

- Embedded systems
- Low-power computing
- Software protocols
- Privacy protection

Timeline for Submission, Review, and Publication:

Manuscript submission:	30, August	2009
Preliminary results:	15, November	2009
Revised version:	15, January	2010
Notification:	15, February	2010
Final manuscripts due:	15, March	2010
Anticipated publication:	01, June	2010

List of Guest Editors:

Prof. Rama Chellappa, University of Maryland
Prof. Wendi Heinzelman, University of Rochester
Prof. Janusz Konrad, Boston University
Prof. Wayne Wolf, Georgia Institute of Technology

Biographies of Guest Editors:

Prof. Rama Chellappa

Prof. Rama Chellappa received the B.E. (Hons.) degree from the University of Madras, India, in 1975 and the M.E. (Distinction) degree from the Indian Institute of Science, Bangalore, in 1977. He received the M.S.E.E. and Ph.D. Degrees in Electrical Engineering from Purdue University, West Lafayette, IN, in 1978 and 1981 respectively. Since 1991, he has been a Professor of Electrical Engineering and an affiliate Professor of Computer Science at University of Maryland, College Park. He is also affiliated with the Center for Automation Research (Director) and the Institute for Advanced Computer Studies (Permanent Member). In 2005, he was named a Minta Martin Professor of Engineering. Prior to joining the University of Maryland, he was an Assistant (1981-1986) and Associate Professor (1986-1991) and Director of the Signal and Image Processing Institute (1988-1990) at University of Southern California, Los Angeles. Over the last 28 years, he has published numerous book chapters, peer-reviewed journal and conference papers. He has co-authored and edited many books in visual surveillance, biometrics, MRFs and image processing. His current research interests are face and gait analysis, 3D modeling from video, image and video-based recognition and exploitation and hyper spectral processing. Prof. Chellappa served as the associate editor of many IEEE Transactions, as a Co-Editor-in-Chief of Graphical Models and Image Processing and as the Editor-in-Chief of IEEE Transactions on Pattern Analysis and Machine Intelligence. He served as a member of the IEEE Signal Processing Society Board of Governors and as its Vice President of Awards and Membership. He is serving a two-year term as the President of IEEE Biometrics Council. He has received several awards, including an NSF Presidential Young Investigator Award, four IBM Faculty Development Awards, an Excellence in Teaching Award from the School of Engineering at USC, two paper awards from the International Association of Pattern Recognition, the Technical Achievement and Meritorious Service Awards from the IEEE Signal Processing Society and the IEEE Computer Society. At University of Maryland, he was elected as a Distinguished Faculty Research Fellow, as a Distinguished Scholar-Teacher, received the Outstanding Faculty Research Award from the College of Engineering and an Outstanding Innovator Award from the Office of Technology Commercialization. He is a Fellow of IEEE, the International Association for Pattern Recognition and the Optical Society of America. He has served as a General the Technical Program Chair for several IEEE international and national conferences and workshops. He is a Golden Core Member of IEEE Computer Society and serving a two-year term as a Distinguished Lecturer of the IEEE Signal Processing Society.

Prof. Wendi Heinzelman

Wendi B. Heinzelman is an associate professor in the Department of Electrical and Computer Engineering at the University of Rochester, and she holds a secondary appointment as an associate professor in the Department of Computer Science. Dr. Heinzelman also currently serves as Dean of Graduate Studies for Arts, Sciences and

Engineering at the University of Rochester. Dr. Heinzelman received a B.S. degree in Electrical Engineering from Cornell University in 1995 and M.S. and Ph.D. degrees in Electrical Engineering and Computer Science from MIT in 1997 and 2000, respectively. Her current research interests lie in the areas of wireless communications and networking, mobile computing, and multimedia communication. Dr. Heinzelman received the NSF CAREER award in 2005 for her research on cross-layer architectures for wireless sensor networks, and she received the ONR Young Investigator Award in 2005 for her work on balancing resource utilization in wireless sensor networks. She is an Associate Editor for the IEEE Transactions on Mobile Computing, an Associate Editor for the ACM Transactions on Sensor Networks, and an Area Editor for ACM Mobile Computing and Communications Review (MC2R). Dr. Heinzelman is currently the Vice Chair for the Systems and Applications track for DCOSS 2009. She is a member of Sigma Xi and the ACM, she is a senior member of the IEEE, and she is co-founder of the N² Women (Networking Networking Women) group.

Prof. Janusz Konrad (IEEE Member since 1993, Senior Member since 1998, Fellow since 2008)

Prof. Janusz Konrad received the M.Eng. degree from the Technical University of Szczecin, Poland in 1980, and the Ph.D. degree from McGill University, Montreal, Canada in 1989. From 1989 to 2000 he was with INRS-Telecommunications, Montreal. Since 2000 he has been with Boston University, first as Associate Professor and from 2008 as Professor of Electrical and Computer Engineering. He is an Associate Technical Editor for the IEEE Communications Magazine and Associate Editor for the EURASIP International Journal on Image and Video Processing. He was an Associate Editor for the IEEE Transactions on Image Processing and Signal Processing Letters, member of the IMDSP Technical Committee of the IEEE Signal Processing Society, as well as the Technical Program Co-Chair of ICIP-2000 and Tutorials Co-Chair of ICASSP-2004. He is a co-recipient of the 2001 Signal Processing Magazine award for a paper co-authored with Dr. Ch. Stiller and the 2004-05 EURASIP Image Communications Best Paper Award for paper co-authored with Dr. N. Bozinovic. His interests include visual sensor networks, video analytics, digital image/video processing and compression, computer vision, stereoscopic and multiview (3-D) imaging and visualization, and M-D digital signal processing.

Prof. Wayne Wolf

Prof. Wolf is the Rhesa "Ray" P. Farmer Distinguished Chair of Embedded Computing Systems and Georgia Research Alliance Eminent Scholar at the Georgia Institute of Technology. Before joining Georgia Tech, Prof. Wolf was with Princeton University from 1989 to 2007 and with AT&T Bell Laboratories from 1984 to 1989. He received his B. S., M. S., and Ph.D. degrees from Stanford University in 1980, 1981, and 1984, respectively. He co-founded Verificon Corporation in 2003. He has been elected to Phi Beta Kappa and Tau Beta Pi. He received the ASEE/CSE and HP Frederick E. Terman Award in 2003 and the IEEE Circuits and Systems Society Education Award in 2006. He is a Fellow of the IEEE and ACM.