

Multimedia Computing and Networking 2009

Reza Rejaie Ketan D. Mayer-Patel *Editors*

19 January 2009 San Jose, California, USA

Sponsored and Published by IS&T—The Society for Imaging Science and Technology SPIE

Volume 7253

Proceedings of SPIE, 0277-786X, v. 7253

The papers included in this volume were part of the technical conference cited on the cover and title page. Papers were selected and subject to review by the editors and conference program committee. Some conference presentations may not be available for publication. The papers published in these proceedings reflect the work and thoughts of the authors and are published herein as submitted. The publishers are not responsible for the validity of the information or for any outcomes resulting from reliance thereon.

Please use the following format to cite material from this book:

Author(s), "Title of Paper," in *Multimedia Computing and Networking 2009*, edited by Reza Rejaie, Ketan D. Mayer-Patel, Proceedings of SPIE-IS&T Electronic Imaging, SPIE Vol. 7253, Article CID Number (2009).

ISSN 0277-786X ISBN 9780819475039

Copublished by SPIE P.O. Box 10, Bellingham, Washington 98227-0010 USA Telephone +1 360 676 3290 (Pacific Time) · Fax +1 360 647 1445 SPIE.org and IS&T—The Society for Imaging Science and Technology 7003 Kilworth Lane, Springfield, Virginia, 22151 USA Telephone +1 703 642 9090 (Eastern Time) · Fax +1 703 642 9094

imaging.org

Copyright © 2009, Society of Photo-Optical Instrumentation Engineers and The Society for Imaging Science and Technology.

Copying of material in this book for internal or personal use, or for the internal or personal use of specific clients, beyond the fair use provisions granted by the U.S. Copyright Law is authorized by the publishers subject to payment of copying fees. The Transactional Reporting Service base fee for this volume is \$18.00 per article (or portion thereof), which should be paid directly to the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923. Payment may also be made electronically through CCC Online at copyright.com. Other copying for republication, resale, advertising or promotion, or any form of systematic or multiple reproduction of any material in this book is prohibited except with permission in writing from the publisher. The CCC fee code is 0277-786X/09/\$18.00.

Printed in the United States of America.

Paper Numbering: Proceedings of SPIE follow an e-First publication model, with papers published first online and then in print and on CD-ROM. Papers are published as they are submitted and meet publication criteria. A unique, consistent, permanent citation identifier (CID) number is assigned to each article at the time of the first publication. Utilization of CIDs allows articles to be fully citable as soon they are published online, and connects the same identifier to all online, print, and electronic versions of the publication. SPIE uses a six-digit CID article numbering system in which:

- The first four digits correspond to the SPIE volume number.
- The last two digits indicate publication order within the volume using a Base 36 numbering system employing both numerals and letters. These two-number sets start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B ... 0Z, followed by 10-1Z, 20-2Z, etc.

The CID number appears on each page of the manuscript. The complete citation is used on the first page, and an abbreviated version on subsequent pages. Numbers in the index correspond to the last two digits of the six-digit CID number.

Contents

- v Conference Committee
- vii Introduction

SESSION 1 CODING

- Visibility of individual packet loss on H.264 encoded video stream: a user study on the impact of packet loss on perceived video quality [7253-09]
 M. Mu, R. Gostner, A. Mauthe, G. Tyson, Lancaster Univ. (United Kingdom); F. Garcia, Agilent Labs. (United Kingdom)
- 7253 03 Optimal FEC code concatenation for unequal error protection in video streaming applications [7253-10]
 L. Kondrad, Tampere Univ. of Technology (Finland); I. Bouazizi, V. K. Malamal Vadakital, Nokia Research Ctr. (Finland); M. Gabbouj, Tampere Univ. of Technology (Finland)
- 7253 04 Cross-layer optimization of video streaming in single-hop wireless networks [7253-07] C.-H. Hsu, M. Hefeeda, Simon Fraser Univ. (Canada)

SESSION 2 LATENCY/BANDWIDTH MANAGEMENT

- A two-tiered on-line server-side bandwidth reservation framework for the real-time delivery of multiple video streams [7253-13]
 J. M. Londoño, A. Bestavros, Boston Univ. (United States)
- 7253 06 Layer thickness in congestion-controlled scalable video [7253-17] J.-P. Wagner, P. Frossard, École Polytechnique Fédérale de Lausanne (Switzerland)
- 7253 07 On the influence of latency estimation on dynamic group communication using overlays [7253-15]

K.-H. Vik, C. Griwodz, P. Halvorsen, Simula Research Lab. (Norway)

7253 08 Corelli: a peer-to-peer dynamic replication service for supporting latency-dependent content in community networks [7253-12]
 G. Tyson, A. Mauthe, Lancaster Univ. (United Kingdom); S. Kaune, Darmstadt Univ. of Technology (Germany); M. Mu, Lancaster Univ. (United Kingdom); T. Plagemann, Univ. of Oslo (Norway)

SESSION 3 MOBILE/WIRELESS/SENSOR NET

7253 09 Multimedia application performance on a WiMAX network [7253-11] E. Halepovic, M. Ghaderi, C. Williamson, Univ. of Calgary (Canada)

- 7253 0A **Bounding switching delay in mobile TV broadcast networks** [7253-08] C.- H. Hsu, M. Hefeeda, Simon Fraser Univ. (Canada)
- 7253 OB **Exploiting semantics for scheduling real-time data collection from sensors to maximize** event detection [7253-18] R. Vaisenberg, S. Mehrotra, D. Ramanan, Univ. of California, Irvine (United States)

SESSION 4 MISCELLANEOUS

- 7253 0C Anatomy of a ubiquitous media center [7253-14] M. Serrano, Inria Sophia Antipolis (France)
- 7253 0D **Time-triggered static schedulable dataflows for multimedia systems** [7253-16] P. Arumí, Univ. Pompeu Fabra (Spain); X. Amatriain, Telefonica Research (Spain)
- 7253 OE **Characterization of social video** [7253-06] J. R. Ostrowski, N. J. Sarhan, Wayne State Univ. (United States)

Author Index

Conference Committee

Symposium Chairs

Nitin Sampat, Rochester Institute of Technology (United States) Jan P. Allebach, Purdue University (United States)

Conference Chairs

 Reza Rejaie, University of Oregon (United States)
 Ketan D. Mayer-Patel, The University of North Carolina at Chapel Hill (United States)

Program Committee

Tarek F. Abdelzaher, University of Illinois at Urbana-Champaign (United States)

Kevin C. Almeroth, University of California, Santa Barbara (United States)

Scott A. Brandt, University of California, Santa Cruz (United States) Surendar Chandra, University of Notre Dame (United States) Mark Claypool, Worcester Polytechnic Institute (United States) David Hung-Chang Du, University of Minnesota (United States) Wu-chi Feng, Portland State University (United States)

Pascal Frossard, École Polytechnique Fédérale de Lausanne (Switzerland)

Christos Gkantsidis, Microsoft Ltd. (United States) Carsten Griwodz, Simula Research Laboratory (Norway) Yang Guo, Thomson Laboratory (United States)

Pål Halvorsen, Simula Research Laboratory (Norway)

Seon Ho Kim, University of Denver (United States)

Baochun Li, University of Toronto (Canada)

Kang Li, The University of Georgia (United States)

Andreas U. Mauthe, Lancaster University (United Kingdom)

Klara Nahrstedt, University of Illinois at Urbana-Champaign (United States)

Wei-Tsang Ooi, National University of Singapore (Singapore)
Karsten Schwan, Georgia Institute of Technology (United States)
Subhabrata Sen, University of Massachusetts, Amherst (United States)
Nalini Venkatasubramanian, University of California, Irvine (United States)

Dongyan Xu, Purdue University (United States)

Zhi-Li Zhang, University of Minnesota (United States)

Roger Zimmermann, National University of Singapore (Singapore)

Michael H. Zink, University of Massachusetts, Amherst (United States)

Session Chairs

- Coding Ketan D. Mayer-Patel, The University of North Carolina at Chapel Hill (United States)
- 2 Latency/Bandwidth Management Mohamed M. Hefeeda, Simon Fraser University (Canada)
- Mobile/Wireless/Sensor Net
 Nabil J. Sarhan, Wayne State University (United States)
- 4 Miscellaneous Andreas U. Mauthe, Lancaster University (United Kingdom)

Introduction

We would like to warmly welcome you to the Multimedia Computing and Networking Conference (MMCN) 2009 at Electronic Imaging!

For 16 years, MMCN has served as an exciting venue for researchers and practitioners to share their perspectives with others interested in the various aspects of multimedia systems and networks. This year, the program committee received 34 submissions. Each original submission was reviewed by three members of the program committee. All conflicting reviews were resolved through extensive online discussions among reviewers and TPC chairs. We would like to thank Ghulam Memon, who diligently maintained the online review system and enabled us to effectively conduct the online review process. We accepted only 13 papers that were of sufficiently high quality.

MMCN 2009 would not be possible without a dedicated group of people who invested their time and expertise. First of all, we would like to thank the authors for their submissions and for choosing MMCN to highlight their work. Our thanks also go to the program committee members for their excellent job in evaluating the submissions. We also thank SPIE staff for their great effort that made MMCN possible this year.

The program addresses multimedia systems aspects under the topics of coding, latency and bandwidth management, as well as wireless networking. We hope that you will find the program interesting and thought-provoking and that the conference will provide you with a valuable opportunity to share ideas with colleagues from industry and research institutions all across the globe!

> Reza Rejaie Ketan D. Mayer-Patel