PROCEEDINGS
IS&T / SPIE
Electronic Imaging
SCIENCE AND TECHNOLOGY

Real-Time Image and Video Processing 2013

Nasser Kehtarnavaz
Matthias F. Carlsohn
Editors

6–7 February 2013
Burlingame, California, United States

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

Cosponsored by
Qualcomm Inc. (United States)

Published by
SPIE

Volume 8656

Proceedings of SPIE 0277-786X, V.8656

Real-Time Image and Video Processing 2013, edited by Nasser Kehtarnavaz, Matthias F. Carlsohn,
Proc. of SPIE-IS&T Electronic Imaging, SPIE Vol. 8656, 865601 · © 2013 · SPIE-IS&T
CCC code: 0277-786X/13/$18 · doi: 10.1117/12.2024901

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 *Real-Time Image and Video Processing 2013*, edited by Nasser Kehtarnavaz, Matthias F. Carlsohn, Proceedings of SPIE-IS&T Electronic Imaging, SPIE Vol. 8656. Article CID Number (2013)

ISSN: 0277-786X
ISBN: 9780819494290

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

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 as 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

Conference Committee

Symposium Chair

Gaurav Sharma, University of Rochester (United States)

Symposium Cochair

Sergio R. Goma, Qualcomm Inc. (United States)

Conference Chairs

Nasser Kehtarnavaz, The University of Texas at Dallas (United States)
Matthias F. Carlsohn, Computer Vision and Image Communication at Bremen (Germany)

Conference Program Committee

Mohamed Akil, École Supérieure d'Ingénieurs en Electronique et Electrotechnique (France)
Ahmed Bouridane, Northumbria University (United Kingdom)
Emre Celebi, Louisiana State University (United States)
Chang Y. Choo, San José State University (United States)
Philip P. Dang, Intel Corporation (United States)
Barak Fishbain, Israel Institute of Technology (Israel)
Sergio Goma, Qualcomm Inc. (United States)
Christos Grecos, University of the West of Scotland (United Kingdom)
Reinhard Koch, Christian-Albrechts-Universität zu Kiel (Germany)
Rastislav Lukac, Foveon, Inc. (United States)
Mehrube Mehrübeoglu, Texas A&M University Corpus Christi (United States)
Antonio J. Plaza, Universidad de Extremadura (Spain)
Volodymyr Ponomaryov, Instituto Politécnico Nacional (Mexico)
Fatih Porikli, Mitsubishi Electric Research Laboratories (United States)
Luis Salgado, Universidad Politécnica de Madrid (Spain)
Sergio Saponara, Universitá degli Studi di Pisa (Italy)
Vinay Sharma, Texas Instruments Inc. (United States)
Mukul V. Shirvaikar, The University of Texas at Tyler (United States)
Athanassios N. Skodras, Hellenic Open University (Greece)
Stephan C. Stilkerich, EADS Deutschland GmbH (Germany)
Juan P. Wachs, Purdue University (United States)
Leonid P. Yaroslavsky, Tel Aviv University (Israel)

Session Chairs

1 Real-Time Algorithms
Nasser Kehtarnavaz, The University of Texas at Dallas (United States)

2 Real-Time Hardware
Matthias F. Carlsohn, Computer Vision and Image Communication at Bremen (Germany)

3 Real-Time Systems
Chang Y. Choo, San José State University (United States)

4 Real-Time Video Coding
Sergio Saponara, Universitá degli Studi di Pisa (Italy)