

Real-Time Image and Video Processing 2011

**Nasser Kehtarnavaz
Matthias F. Carlsohn**
Editors

**24–25 January 2011
San Francisco, California, United States**

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

Volume 7871

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 publisher is 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 2011*, edited by Nasser Kehtarnavaz, Matthias F. Carlsohn, SPIE-IS&T Electronic Imaging, Vol. 7871 (SPIE, Bellingham, WA, 2011) Article CID Number.

ISSN 0277-786X
ISBN 9780819484086

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 © 2011, 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 SPIE 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/11/\$18.00.

Printed in the United States of America.

Publication of record for individual papers is online in the SPIE Digital Library.

SPIE 
Digital Library

SPIDigitalLibrary.org

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

vii *Conference Committee*

SESSION 1 REAL-TIME ALGORITHMS/SYSTEMS I

- 7871 02 **Towards real-time image quality assessment (Invited Paper)** [7871-01]
B. Geary, C. Grecos, Univ. of the West of Scotland (United Kingdom)
- 7871 03 **2000 fps real-time target tracking vision system based on color histogram** [7871-02]
I. Ishii, T. Tatebe, Q. Gu, T. Takaki, Hiroshima Univ. (Japan)
- 7871 04 **Real-time iris tracking with a smart camera** [7871-03]
M. Mehrübeoglu, H. T. Bui, Texas A&M Univ. Corpus Christi (United States); L. McLauchlan, Texas A&M Univ. Kingsville (United States)
- 7871 05 **Optimization of image processing algorithms on mobile platforms (Invited Paper)** [7871-05]
P. Poudel, M. Shirvaikar, The Univ. of Texas at Tyler (United States)

SESSION 2 REAL-TIME IMPLEMENTATION/HARDWARE

- 7871 06 **Scalable software architecture for on-line multi-camera video processing (Invited Paper)** [7871-06]
M. Camplani, L. Salgado, Univ. Politécnica de Madrid (Spain)
- 7871 07 **Real-time implementation of logo detection on open source BeagleBoard** [7871-07]
M. George, N. Kehtarnavaz, The Univ. of Texas at Dallas (United States); L. Estevez, Texas Instruments Inc. (United States)
- 7871 08 **Low complexity orientation detection algorithm for real-time implementation** [7871-08]
V. V. Appia, Georgia Institute of Technology (United States); R. Narasimha, Texas Instruments Inc. (United States)
- 7871 09 **Real-time topological image smoothing on shared memory parallel machines** [7871-09]
R. Mahmoudi, M. Akil, Unité Mixte UMLV-ESIEE, CNRS, Univ. Paris-Est (France)
- 7871 0A **Multithreaded real-time 3D image processing software architecture and implementation (Invited Paper)** [7871-10]
V. Ramachandra, K. Atanassov, M. Aleksic, S. R. Goma, Qualcomm Inc. (United States)

SESSION 3 REAL-TIME VIDEO

- 7871 0B **Real-time video streaming using H.264 scalable video coding (SVC) in multihomed mobile networks: a testbed approach (Invited Paper)** [7871-11]
J. Nightingale, Q. Wang, C. Grecos, Univ. of the West of Scotland (United Kingdom)

- 7871 0C **A new bitstream structure for parallel CAVLC decoding** [7871-12]
Y. G. Lee, K. H. Cho, Samsung Electronics Co., Ltd. (Korea, Republic of)
- 7871 0D **3D video sequence reconstruction algorithms implemented on a DSP** [7871-13]
V. I. Ponomaryov, E. Ramos-Diaz, National Polytechnic Institute of Mexico (Mexico)
- 7871 0E **Real-time patch sweeping for high-quality depth estimation in 3D video conferencing applications (Invited Paper)** [7871-14]
W. Waizenegger, I. Feldmann, O. Schreer, Fraunhofer-Institut für Nachrichtentechnik Heinrich-Hertz-Institut (Germany)

SESSION 4 REAL-TIME ALGORITHMS/SYSTEMS II

- 7871 0F **Real-time scene change detection assisted with camera 3A: auto exposure, auto white balance, and auto focus (Invited Paper)** [7871-15]
L. Liang, B. Hung, Y. Noyes, R. Velarde, Qualcomm Inc. (United States)
- 7871 0G **Fast approximate 4D:3D discrete radon transform, from light field to focal stack with $O(N^4)$ sums** [7871-16]
J. G. Marichal-Hernández, J. P. Lüke, F. L. Rosa, J. M. Rodríguez-Ramos, Univ. de La Laguna (Spain)
- 7871 0H **A cross-based filter for fast edge-preserving smoothing** [7871-17]
K. Zhang, IMEC (Belgium) and Katholieke Univ. Leuven (Belgium); J. Lu, Advanced Digital Sciences Ctr. (Singapore); G. Lafruit, IMEC (Belgium); R. Lauwereins, IMEC (Belgium) and Katholieke Univ. Leuven (Belgium); L. Van Gool, Katholieke Univ. Leuven (Belgium) and ETH Zurich (Switzerland)
- 7871 0I **Human action recognition in a wide and complex environment** [7871-18]
S. Kumar, S. Kumar, B. Raman, N. Sukavanam, Indian Institute of Technology Roorkee (India)

INTERACTIVE PAPER SESSION

- 7871 0L **Efficient object tracking in WAAS data streams** [7871-22]
T. R. H. Clarke, Ball Aerospace & Technologies Corp. (United States); R. Canosa, Rochester Institute of Technology (United States)
- 7871 0M **How fast can one numerically reconstruct digitally recorded holograms?** [7871-23]
L. Bilevich, L. Yaroslavsky, Tel Aviv Univ. (Israel)
- 7871 0N **Tracking flow of leukocytes in blood for drug analysis** [7871-24]
A. Basharat, W. Turner, Kitware, Inc. (United States); G. Stephens, B. Badillo, R. Lumpkin, P. Andre, Portola Pharmaceuticals Inc. (United States); A. Perera, Kitware, Inc. (United States)
- 7871 0O **Phase correlation based adaptive mode decision for the H.264/AVC** [7871-25]
A. Abdelazim, S. J. Mein, M. R. Varley, Univ. of Central Lancashire (United Kingdom); C. Grecos, Univ. of the West of Scotland (United Kingdom); D. Ait-Boudaoud, Univ. of Portsmouth (United Kingdom)

- 7871 0P **Fast multi-layered prediction algorithm for group of pictures in H.264/SVC** [7871-26]
A. Abdelazim, S. J. Mein, M. R. Varley, Univ. of Central Lancashire (United Kingdom);
C. Grecos, Univ. of the West of Scotland (United Kingdom); D. Ait-Boudaoud, Univ. of
Portsmouth (United Kingdom)
- 7871 0Q **X-Eye: a novel wearable vision system** [7871-27]
Y.-K. Wang, C.-T. Fan, S.-A. Chen, H.-Y. Chen, Fu Jen Catholic Univ. (Taiwan)
- 7871 0R **Real-time vehicle matching for multi-camera tunnel surveillance** [7871-28]
V. Jelača, J. O. Niño Castañeda, A. Frías-Velázquez, A. Pižurica, W. Philips, Ghent Univ.
(Belgium)

Author Index

Conference Committee

Symposium Chair

Sabine Süsstrunk, École Polytechnique Fédérale de Lausanne
(Switzerland)

Symposium Cochair

Majid Rabbani, Eastman Kodak Company (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)

Program Committee

Mohamed Akil, École Supérieure d'Ingénieurs en Electronique et
Electrotechnique (France)
Philip P. Dang, STMicroelectronics (United States)
Barak Fishbain, University of California, Berkeley (United States)
Mark N. Gamadia, Texas Instruments Inc. (United States)
Pierre Graebling, Ecole Nationale Supérieure de Physique de
Strasbourg (France)
Christos Grecos, University of the West of Scotland (United Kingdom)
Sergio R. Goma, Qualcomm Inc. (United States)
Rastislav Lukac, Epson Canada Ltd. (Canada)
Lindsay William MacDonald, London College of Communication
(United Kingdom)
Mehrube Mehrübeoglu, Texas A&M University Corpus Christi (United
States)
Volodymyr I. Ponomaryov, Instituto Politécnico Nacional (Mexico)
Fatih Porikli, Mitsubishi Electric Research Laboratories (United States)
Luis Salgado, Universidad Politécnica de Madrid (Spain)
Jorge Santos, European Commission (Belgium)
Mukul V. Shirvaikar, The University of Texas at Tyler (United States)
Stephan C. Stilkerich, EADS Deutschland GmbH (Germany)
Shan Suthakaran, University of North Carolina at Greensboro (United
States)
Leonid Yaroslavsky, Tel Aviv University (Israel)

Session Chairs

- 1 Real-Time Algorithms/Systems I
Nasser Kehtarnavaz, The University of Texas at Dallas (United States)
- 2 Real-Time Implementation/Hardware
Christos Grecos, University of the West of Scotland (United Kingdom)
- 3 Real-Time Video
Mohamed Akil, École Supérieure d'Ingénieurs en Electronique et
Electrotechnique (France)
- 4 Real-Time Algorithms/Systems II
Matthias F. Carlsohn, Computer Vision and Image Communication at
Bremen (Germany)