PROCEEDINGS
IS&T / SPIE
Electronic
Imaging
SCIENCE AND TECHNOLOGY

Visual Information Processing and Communication IV

Amir Said
Onur G. Guleryuz
Robert L. Stevenson
Editors

6–7 February 2013
Burlingame, California, United States

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

Volume 8666

Proceedings of SPIE 0277-786X, V. 8666

Visual Information Processing and Communication IV, edited by Amir Said, Onur G. Guleryuz, Robert L. Stevenson,
Proc. of SPIE-IS&T Electronic Imaging, SPIE Vol. 8666, 86660M · © 2013 SPIE-IS&T
CCC code: 0277-786X/13/$18 · doi: 10.1117/12.2021285

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 *Visual Information Processing and Communication IV*, edited by Amir Said, Onur G. Guleryuz, Robert L. Stevenson, Proceedings of SPIE-IS&T Electronic Imaging, SPIE Vol. 8666. Article CID Number (2013)

ISSN: 0277-786X
ISBN: 9780819494399

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

Amir Said, Hewlett-Packard Labs (United States)
Onur G. Guleryuz, FutureWei Technologies, Inc. (United States)
Robert L. Stevenson, University of Notre Dame (United States)

Conference Program Committee

John G. Apostolopoulos, Hewlett-Packard Labs (United States)
Vasudev Bhaskaran, Qualcomm Inc. (United States)
Mireille Boutin, Purdue University (United States)
Chang Wen Chen, University at Buffalo (United States)
Gerard de Haan, Philips Research Nederland B.V. (Netherlands)
Edward J. Delp III, Purdue University (United States)
Eric Dubois, University of Ottawa (Canada)
Frederic Dufaux, Telecom ParisTech (France)
Touradj Ebrahimi, Ecole Polytechnique Fédérale de Lausanne (Switzerland)
Keigo Hirakawa, University of Dayton (United States)
Marta Karczewicz, Qualcomm Inc. (United States)
Lisimachos Paul Kondi, University of Ioannina (Greece)
Janusz Konrad, Boston University (United States)
C. C. Jay Kuo, The University of Southern California (United States)
Robert Paul Loce, Xerox Corporation (United States)
Ligang Lu, IBM Thomas J. Watson Research Center (United States)
Peyman Milanfar, University of California, Santa Cruz (United States)
Antonio Ortega, The University of Southern California (United States)
Thrasyvoulos N. Pappas, Northwestern University (United States)
William A. Pearlman, Rensselaer Polytechnic Institute (United States)
Fernando Pereira, Instituto de Telecomunicações (Portugal)
Béatrice Pesquet-Popescu, Telecom ParisTech (France)
Majid Rabbani, Eastman Kodak Company (United States)
Eli Saber, Rochester Institute of Technology (United States)
Dan Schonfeld, University of Illinois at Chicago (United States)
Andrew Segall, Sharp Laboratories of America, Inc. (United States)

Gaurav Sharma, University of Rochester (United States)
Andrew G. Tescher, AGT Associates (United States)
Anthony Vetro, Mitsubishi Electric Research Laboratories (United States)
John W. Woods, Rensselaer Polytechnic Institute (United States)
Xiaolin Wu, McMaster University (Canada)
Wenwu Zhu, Tsinghua University (China)

Session Chairs

Session 1
Lisimachos Paul Kondi, University of Ioannina (Greece)

Session 2
Amir Said, Hewlett-Packard Labs (United States)

Session 3
Amir Said, Hewlett-Packard Labs (United States)

Session 4
Robert L. Stevenson, University of Notre Dame (United States)

Session 5
Gregory W. Cook, Hewlett-Packard Labs (United States)