

PROCEEDINGS OF SPIE

Mobile Multimedia/Image Processing, Security, and Applications 2014

**Sos S. Agaian
Sabah A. Jassim
Eliza Yingzi Du**
Editors

**5–6 May 2014
Baltimore, Maryland, United States**

Sponsored and Published by
SPIE

Volume 9120

Proceedings of SPIE 0277-786X, V. 9120

SPIE is an international society advancing an interdisciplinary approach to the science and application of light.

Mobile Multimedia/Image Processing, Security, and Applications 2014, edited by Sos S. Agaian,
Sabah A. Jassim, Eliza Yingzi Du, Proc. of SPIE Vol. 9120, 912001 · © 2014 SPIE
CCC code: 0277-786X/14/\$18 · doi: 10.1117/12.2072216

Proc. of SPIE Vol. 9120 912001-1

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 *Mobile Multimedia/Image Processing, Security, and Applications 2014*, edited by Sos S. Aghaian, Sabah A. Jassim, Eliza Yingzi Du, Proceedings of SPIE Vol. 9120 (SPIE, Bellingham, WA, 2014) Article CID Number.

ISSN: 0277-786X

ISBN: 9781628410570

Published 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

Copyright © 2014, Society of Photo-Optical Instrumentation Engineers.

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/14/\$18.00.

Printed in the United States of America.

Publication of record for individual papers is online in the 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 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

vii	<i>Conference Committee</i>
ix	<i>Introduction</i>

SESSION 1 STEGANOGRAPHY AND DATA HIDING

- 9120 02 **An enhancement technique for stereoscopic images using salient features and wavelet transform** [9120-1]
Y. Qiu, Wuhan Univ. (China); J. Tang, Michigan Technological Univ. (United States)
- 9120 03 **Detecting 2LSB steganography using extended pairs of values analysis** [9120-2]
O. Khalind, B. Aziz, Univ. of Portsmouth (United Kingdom)
- 9120 05 **Steganography based on pixel intensity value decomposition** [9120-4]
A. A. Abdulla, H. Sellahewa, S. A. Jassim, The Univ. of Buckingham (United Kingdom)
- 9120 06 **Taxonomy for spatial domain LSB steganography techniques** [9120-5]
J. C. Collins, S. S. Agaian, The Univ. of Texas at San Antonio (United States)

SESSION 2 IMAGING TECHNIQUES, REQUIREMENTS, AND EMERGING APPLICATIONS

- 9120 07 **Power centroid radar and its rise from the universal cybernetics duality (Invited Paper)** [9120-6]
E. H. Fera, College of Staten Island (United States)
- 9120 08 **Effectiveness of image features and similarity measures in cluster-based approaches for content-based image retrieval (Invited Paper)** [9120-7]
H. Du, H. Al-Jubouri, H. Sellahewa, The Univ. of Buckingham (United Kingdom)
- 9120 09 **A mobile system for skin cancer diagnosis and monitoring** [9120-8]
Y. Gu, J. Tang, Michigan Technological Univ. (United States)
- 9120 0A **Automatic segmentation and classification of gestational sac based on mean sac diameter using medical ultrasound image** [9120-10]
S. Khazendar, The Univ. of Buckingham (United Kingdom); J. Farren, Imperial College Healthcare NHS Trust (United Kingdom); H. Al-Assam, The Univ. of Buckingham (United Kingdom); A. Sayasneh, Imperial College Healthcare NHS Trust (United Kingdom); H. Du, The Univ. of Buckingham (United Kingdom); T. Bourne, Imperial College Healthcare NHS Trust (United Kingdom); S. A. Jassim, The Univ. of Buckingham (United Kingdom)
- 9120 0B **A color and texture based multi-level fusion scheme for ethnicity identification** [9120-11]
H. Du, The Univ. of Buckingham (United Kingdom); S. H. Salah, Koya Univ. (Iraq);
H. O. Ahmed, Univ. of Sulaimani (Iraq)

SESSION 3 PATTERN DETECTION AND RECOGNITION

- 9120 0C **Search algorithm complexity modeling with application to image alignment and matching (Invited Paper)** [9120-12]
S. DelMarco, BAE Systems (United States)
- 9120 0D **A novel RANSAC-based Kalman filter algorithm for object characterization and tracking** [9120-13]
S. Chakravarty, New York Institute of Technology (China); C. Dong, New York Institute of Technology (China) and Nanjing Univ. of Posts and Telecommunications (China); B. Wang, Nanjing Univ. of Posts and Telecommunications (China); M. Banerjee, Georgia Gwinnett College (United States)
- 9120 0G **Decision-level fusion approach to face recognition with multiple cameras** [9120-16]
S. Yeom, Daegu Univ. (Korea, Republic of)

SESSION 4 SECURITY AND PRIVACY FOR MEDIA TRANSMISSION

- 9120 0I **Analytic sequential methods for detecting network intrusions** [9120-18]
X. Chen, E. Walker, Southern Univ. and A&M College (United States)
- 9120 0J **Simultaneous compression and encryption for secure real-time secure transmission of sensitive video transmission** [9120-19]
N. Al-Hayani, N. Al-Jawad, S. A. Jassim, The Univ. of Buckingham (United Kingdom)
- 9120 0K **Develop a solution for protecting and securing enterprise networks from malicious attacks** [9120-20]
H. Kamuru, M. Nijim, Texas A&M Univ.-Kingsville (United States)
- 9120 0L **NES++: number system for encryption based privacy preserving speaker verification** [9120-21]
L. Xu, T. Feng, X. Zhao, W. Shi, Univ. of Houston (United States)

SESSION 5 INNOVATIVE IMAGE ENHANCEMENTS TECHNIQUES

- 9120 0N **A new omni-directional multi-camera system for high resolution surveillance** [9120-23]
O. Cogal, A. Akin, K. Seyid, V. Popovic, A. Schmid, Ecole Polytechnique Fédérale de Lausanne (Switzerland); B. Ott, P. Wellig, armasuisse (Switzerland); Y. Leblebici, Ecole Polytechnique Fédérale de Lausanne (Switzerland)
- 9120 0O **Robust digital image inpainting algorithm in the wireless environment** [9120-24]
G. Karapetyan, H. G. Sarukhanyan, Institute for Informatics and Automation Problems (Armenia); S. S. Agaian, The Univ. of Texas at San Antonio (United States)
- 9120 0P **Implementation of wireless 3D stereo image capture system and synthesizing the depth of region of interest** [9120-26]
W. Ham, C. Song, H. Kwon, L. Badarch, Chonbuk National Univ. (Korea, Republic of)

- 9120 0Q **Color image enhancement of low-resolution images captured in extreme lighting conditions** [9120-27]
E. Krieger, V. K. Asari, S. Arigela, Univ. of Dayton (United States)
- 9120 0R **Using DNS amplification DDoS attack for hiding data** [9120-29]
M. Mehić, M. Voznak, J. Safarik, P. Partila, M. Mikulec, VŠB-Technical Univ. of Ostrava (Czech Republic)
- 9120 0S **Machine learning approach for objective inpainting quality assessment** [9120-33]
V. A. Frantc, V. V. Voronin, V. I. Marchuk, A. I. Sherstobitov, Don State Technical Univ. (Russian Federation); S. Agaian, The Univ. of Texas at San Antonio (United States); K. Egiazarian, Tampere Univ. of Technology (Finland)

POSTER SESSION

- 9120 0T **Color image attribute and quality measurements** [9120-25]
C. Gao, K. Panetta, Tufts Univ. (United States); S. Agaian, The Univ. of Texas at San Antonio (United States)
- 9120 0U **Interactive video audio system: communication server for INDECT portal** [9120-30]
M. Mikulec, M. Voznak, J. Safarik, P. Partila, J. Rozhon, M. Mehic, VŠB-Technical Univ. of Ostrava (Czech Republic)
- 9120 0V **Texture descriptor based on local approximations** [9120-34]
A. I. Sherstobitov, V. I. Marchuk, D. V. Timofeev, V. V. Voronin, Don State Technical Univ. (Russian Federation); K. O. Egiazarian, Tampere Univ. of Technology (Finland); S. S. Agaian, The Univ. of Texas at San Antonio (United States)
- 9120 0W **Image extrapolation for photo stitching using nonlocal patch-based inpainting** [9120-35]
V. V. Voronin, V. I. Marchuk, A. I. Sherstobitov, E. A. Semenischev, Don State Technical Univ. (Russian Federation); S. Agaian, The Univ. of Texas at San Antonio (United States); K. Egiazarian, Tampere Univ. of Technology (Finland)

Author Index

Conference Committee

Symposium Chair

David A. Whelan, Boeing Defense, Space, and Security (United States)

Symposium Co-chair

Wolfgang Schade, Technische Universität Clausthal (Germany) and
Fraunhofer Heinrich-Hertz-Institut (Germany)

Conference Chair

Sos S. Agaian, The University of Texas at San Antonio (United States)
Sabah A. Jassim, The University of Buckingham (United Kingdom)
Eliza Yingzi Du, Qualcomm Inc. (United States)

Conference Program Committee

David Akopian, The University of Texas at San Antonio (United States)

Salim Alsharif, University of South Alabama (United States)

Vijayan K. Asari, University of Dayton (United States)

Cesar Bandera, BanDeMar Networks (United States)

Chang Wen Chen, University at Buffalo (United States)

Reiner Creutzburg, Fachhochschule Brandenburg (Germany)

Stephen P. DeMarco, BAE Systems (United States)

Frederic Dufaux, Telecom ParisTech (France)

Touradj Ebrahimi, Ecole Polytechnique Fédérale de Lausanne
(Switzerland)

Erlan H. FERIA, College of Staten Island (United States)

Phalguni Gupta, Indian Institute of Technology Kanpur (India)

Yo-Ping Huang, National Taipei University of Technology (Taiwan)

Jacques Koreman, Norwegian University of Science and Technology
(Norway)

Maryline Maknavicius, TELECOM & Management SudParis (France)

Alessandro Neri, Università degli Studi di Roma Tre (Italy)

Cheryl L. Resch, Johns Hopkins University Applied Physics Laboratory
(United States)

Haleh Safavi, NASA Goddard Space Flight Center (United States)

Harin Sellahewa, The University of Buckingham (United Kingdom)

Yuri Shukuryan, National Academy of Sciences of Armenia (Armenia)

Yue Wu, Tufts University (United States)

Yicong Zhou, University of Macau (Macao, China)

Session Chairs

- 1 Steganography and Data Hiding
Sabah A. Jassim, The University of Buckingham (United Kingdom)
- 2 Imaging Techniques, Requirements, and Emerging Applications
James C. Collins, The University of Texas at San Antonio
(United States)
- 3 Pattern Detection and Recognition
Eliza Yingzi Du, Qualcomm Inc. (United States)
- 4 Security and Privacy for Media Transmission
Hongbo Du, The University of Buckingham (United Kingdom)
- 5 Innovative Image Enhancements Techniques
Sabah A. Jassim, The University of Buckingham (United Kingdom)