PROCEEDINGS OF SPIE

Visual Information Processing XVI

Zia-ur Rahman
Stephen E. Reichenbach
Mark A. Neifeld
Editors

10 April 2007
Orlando, Forida, USA

Sponsored and Published by
SPIE—The International Society for Optical Engineering

Volume 6575

The International Society for Optical Engineering

Proceedings of SPIE—The International Society for Optical Engineering, 9780819466976, v. 6575

SPIE is an international technical society dedicated to advancing engineering and scientific applications of optical, photonic, imaging, electronic, and optoelectronic technologies.

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 *Visual Information Processing XVI*, edited by Zia-ur Rahman, Stephen E. Reichenbach, Mark Allen Neifeld, Proceedings of SPIE Vol. 6575 (SPIE, Bellingham, WA, 2007) Article CID Number.

ISSN 0277-786X
ISBN 9780819466976

Published by
SPIE—The International Society for Optical Engineering
P.O. Box 10, Bellingham, Washington 98227-0010 USA
Telephone 1 360/676-3290 (Pacific Time) · Fax 1 360/647-1445
http://www.spie.org

Copyright © 2007, The 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 http://www.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/07/$18.00.

Printed in the United States of America.

Contents

vii *Conference Committee*

SESSION 1 APPLICATIONS OF IMAGE PROCESSING

657502 **A system to automatically track humans and vehicles with a PTZ camera** [6575-01]
M. Lalonde, S. Foucher, L. Gagnon, CRIM (Canada); E. Pronovost, M. Derenne, A. Janelle, VideoStream Technologies, Inc. (Canada)

657503 **Visual signal processing using fly-eye-based algorithm to detect the road edge** [6575-02]
N. Truong, U.S. Army RDECOM-TARDEC (USA); W. Agassounon, Physical Sciences, Inc. (USA)

657504 **A progressive de-skewing technique for document image analysis** [6575-03]
J. Haralambides, Barry Univ. (USA); D. Charalampidis, Univ. of New Orleans (USA)

657505 **Applications of adaptive feature-specific imaging** [6575-04]
J. Ke, P. K. Baheti, The Univ. of Arizona (USA); M. A. Neifeld, The Univ. of Arizona (USA) and College of Optical Sciences, The Univ. of Arizona (USA)

SESSION 2 IMAGE PROCESSING METHODS I

657506 **Steganalysis feature improvement using expectation maximization** [6575-30]
B. M. Rodriguez, G. L. Peterson, Air Force Institute of Technology (USA); S. S. Agaian, The Univ. of Texas at San Antonio (USA)

657507 **Power spectrum weighted edge analysis for straight edge detection in images** [6575-07]
H. V. Karvir, J. A. Skipper, Wright State Univ. (USA)

657508 **Local statistics based filtering method for enhancement in super-resolution image reconstruction** [6575-08]
N. Unaldi, Old Dominion Univ. (USA) and Aeronautics and Space Technologies Institute (Turkey); V. K. Asari, Old Dominion Univ. (USA)

Pagination: 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.

657509 **All source adaptive fusion for aided navigation in non-GPS environment** [6575-29]
O. Aboutalib, B. Awalt, A. Fung, B. Thai, J. Leibs, Northrop Grumman, Integrated Systems (USA); T. J. Klausutis, R. Wehling, M. Iames, Air Force Research Lab. (USA)

65750A **Local adaptive contrast enhancement for color images** [6575-10]
J. Dijk, R. J. M. den Hollander, J. G. M. Schavemaker, K. Schutte, TNO Defence, Security and Safety (Netherlands)

SESSION 3 IMAGE PROCESSING METHODS II

65750B **Image data representation for efficient optimization of objective criterion** [6575-11]
R. Sundaram, Gannon Univ. (USA)

65750D **Wavelet priors for multiframe image restoration** [6575-14]
P. Shankar, The Univ. of Arizona (USA); M. Neifeld, The Univ. of Arizona (USA) and College of Optical Sciences, The Univ. of Arizona (USA)

65750E **Elastic image registration using subspace constraints** [6575-15]
A. Elsafi, R. Zewail, N. Durdle, Univ. of Alberta (Canada)

65750F **Data mining within digital images** [6575-27]
T. P. Donovan, Midwestern State Univ. (USA)

SESSION 4 IMAGE PROCESSING TOOLS

65750G **Task-specific information: an imaging system analysis tool** [6575-16]
A. Ashok, P. K. Baheti, The Univ. of Arizona (USA); M. A. Neifeld, The Univ. of Arizona (USA) and College of Optical Sciences, The Univ. of Arizona (USA)

65750H **Application of particle analysis to transmission electron microscopy (TEM)** [6575-17]
J. DaPonte, T. Sadowski, C. C. Broadbridge, D. Day, A. H. Lehman, D. Krishna, L. Marinella, P. Munhutu, M. Sawicki, Southern Connecticut State Univ. (USA)

65750I **An architecture for the efficient implementation of compressive sampling reconstruction algorithms in reconfigurable hardware** [6575-18]
F. E. Ortiz, E. J. Kelmelis, EM Photonics, Inc. (USA); G. R. Arce, Univ. of Delaware (USA)

POSTER SESSION

65750L **Comparison of thresholding techniques on nanoparticle images** [6575-21]
J. DaPonte, T. Sadowski, C. C. Broadbridge, D. Day, A. Lehman, D. Krishna, L. Marinella, P. Munhutu, M. Sawicki, Southern Connecticut State Univ. (USA)

65750P **Image denoising in complex wavelet domain using a mixture of bivariate Laplacian distributions with local parameters** [6575-28]
H. Rabbani, M. Vafadust, Amirkabir Univ. of Technology (Iran)

65750Q **Objectively assessing underwater image quality for the purpose of automated restoration** [6575-06]
W. Hou, A. D. Weidemann, Naval Research Lab. (USA)

65750R **Image quality measure via a quadtree homogeneity analysis** [6575-12]
E. P. Lam, Thales Raytheon Systems (USA)

Author Index

Conference Committee

Symposium Chair

John C. Carrano, Luminex Corporation (USA)

Symposium Cochair

Larry B. Stotts, DARPA (USA)

Program Track Chair

Andrew R. Pirich, Air Force Research Laboratory (USA)

Conference Chairs

Zia-ur Rahman, Old Dominion University (USA)
Stephen E. Reichenbach, University of Nebraska, Lincoln (USA)
Mark A. Neifeld, The University of Arizona (USA) and College of Optical Sciences, The University of Arizona (USA)

Program Committee

Gary W. Euliss, The MITRE Corporation (USA)
Richard D. Juday, NASA Johnson Space Center (USA)
Ram M. Narayanan, The Pennsylvania State University (USA)
John M. Pellegrino, Army Research Laboratory (USA)
Robert A. Schowengerdt, The University of Arizona (USA)
Joseph van der Gracht, HoloSpex, Inc. (USA)

Session Chairs

1 Applications of Image Processing
Zia-ur Rahman, Old Dominion University (USA)

2 Image Processing Methods I
Stephen E. Reichenbach, University of Nebraska, Lincoln (USA)

3 Image Processing Methods II
Mark A. Neifeld, The University of Arizona (USA) and College of Optical Sciences, The University of Arizona (USA)

4 Image Processing Tools
Zia-ur Rahman, Old Dominion University (USA)