



Image Processing: Machine Vision Applications V

Philip R. Bingham

Edmund Y. Lam

Editors

25 January 2012

Burlingame, California, United States

Sponsored and Published by

IS&T—The Society for Imaging Science and Technology

SPIE

Volume 8300

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 *Image Processing: Machine Vision Applications V*, edited by Philip R. Bingham, Edmund Y. Lam, Proceedings of SPIE-IS&T Electronic Imaging, SPIE Vol. 8300, Article CID Number (2012).

ISSN 0277-786X
ISBN 9780819489470

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 © 2012, 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 the publishers 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/12/\$18.00.

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

vii Conference Committee

SESSION 1 SYSTEMS

- 8300 03 **Sensor placement optimization in buildings** [8300-02]
S. Bianco, F. Tisato, Univ. degli Studi di Milano-Bicocca (Italy)
- 8300 04 **Optical feature extraction with illumination-encoded linear functions** [8300-03]
R. Gruna, Karlsruher Institut für Technologie (Germany); J. Beyerer, Fraunhofer-Institut für Optik, Systemtechnik und Bildauswertung (Germany)

SESSION 2 ALGORITHMS

- 8300 05 **An illumination-invariant phase-shifting algorithm for three-dimensional profilometry** [8300-04]
F. Deng, The Univ. of Hong Kong (Hong Kong, China) and ASM Assembly Automation Ltd. (Hong Kong, China); C. Liu, W. Sze, J. Deng, K. S. M. Fung, W. H. Leung, ASM Assembly Automation Ltd. (Hong Kong, China); E. Y. Lam, The Univ. of Hong Kong (Hong Kong, China)
- 8300 06 **Fusing shape and texture features for pose-robust face recognition** [8300-05]
T. Gernoth, R.-R. Grigat, Technische Univ. Hamburg-Harburg (Germany)
- 8300 07 **Automated inspection of tubular material based on magnetic particle inspection** [8300-06]
A. Mahendra, Lab. d'Electronique, d'Informatique et d'Image, CNRS, Univ. de Bourgogne (France) and Vallourec S.A. (France); C. Stolz, F. Meriaudeau, Lab. d'Electronique, d'Informatique et d'Image, CNRS, Univ. de Bourgogne (France); S. Petit, A. Noel, F. Degoutin, Vallourec S.A. (France)

SESSION 3 DETECTION AND TRACKING

- 8300 09 **Runway hazard detection in poor visibility conditions** [8300-08]
B. Jiang, National Institute of Aerospace (United States); Z. Rahman, Old Dominion Univ. (United States)
- 8300 0A **Application of image processing to track twin boundary motion in magnetic shape memory alloys** [8300-09]
A. Rothenbuhler, E. H. Barney Smith, P. Müllner, Boise State Univ. (United States)
- 8300 0B **A new point process model for trajectory-based events annotation** [8300-10]
N. Ballas, CEA LIST (France) and Mines ParisTech (France); B. Delezoide, CEA LIST (France); F. Prêteux, Mines ParisTech (France)
- 8300 0C **Face detection and eyeglasses detection for thermal face recognition** [8300-11]
Y. Zheng, Alcorn State Univ. (United States)

SESSION 4 APPLICATIONS

- 8300 0D **Strain analysis by regularized non-rigid registration** [8300-25]
A. Badshah, P. O'Leary, M. Harker, Montan Univ. Leoben (Austria); D. Tscharnuter, Polymer Competence Ctr. Leoben GmbH (Austria)
- 8300 0E **Combining spatial and spectral information to improve crop/weed discrimination algorithms** [8300-12]
L. Yan, G. Jones, S. Villette, J. N. Paoli, C. Gée, AgroSup Dijon (France)
- 8300 0F **Automated parasites detection in clams by transillumination imaging and pattern classification** [8300-13]
M. Soto, P. Coelho, J. Soto, S. Torres, D. Sbarbaro, Univ. de Concepción (Chile)
- 8300 0G **Vision-based in-line fabric defect detection using yarn-specific shape features** [8300-14]
D. Schneider, T. Aach, RWTH Aachen (Germany)
- 8300 0H **3D temperature mapping of turboshaft components using thermal paints and color recognition** [8300-15]
S. Guérin, ONERA (France) and Turbomeca SA (France); C. Lempereur, ONERA (France); P. Brevet, Turbomeca SA (France)

INTERACTIVE PAPER SESSION

- 8300 0I **Efficient local approximation of perceptual color differences for color inspection** [8300-16]
R. Huber-Mörk, Austrian Institute of Technology (Austria)
- 8300 0J **Modified fuzzy c-means applied to a Bragg grating-based spectral imager for material clustering** [8300-17]
A. Rodríguez, J. L. Nieves, E. Valero, Univ. de Granada (Spain); E. Garrote, TECNALIA (Spain); J. Hernández-Andrés, J. Romero, Univ. de Granada (Spain)
- 8300 0K **Robust recognition of 1D barcodes using Hough transform** [8300-18]
J. Dwinell, SICK, Inc. (United States); P. Bian, Microsoft Corp. (China); L. X. Bian, SICK, Inc. (United States)
- 8300 0L **Estimating the coordinates of pillars and posts in the parking lots for intelligent parking assist system** [8300-19]
J. H. Choi, J. G. Kuk, Seoul National Univ. (Korea, Republic of); Y. I. Kim, Mando Corp. (Korea, Republic of); N. I. Cho, Seoul National Univ. (Korea, Republic of)
- 8300 0M **Recognizing human gestures using a novel SVM tree** [8300-21]
H. Jain, A. Chatterjee, S. Kumar, B. Raman, Indian Institute of Technology Roorkee (India)
- 8300 0N **Fabric defect detection using the wavelet transform in an ARM processor** [8300-22]
J. A. Fernández, Antonio Nariño Univ. (Colombia); S. A. Orjuela, Univ. Gent (Belgium); J. Álvarez, Antonio Nariño Univ. (Colombia); W. Philips, Univ. Gent (Belgium)

8300 0O **Orthophotoplan segmentation based on region merging for roof detection** [8300-23]
Y. El Merabet, Univ. de Technologie de Belfort-Montbéliard (France) and Univ. Ibn Tofail
(Morocco); C. Meurie, Y. Ruichek, Univ. de Technologie de Belfort-Montbéliard (France);
A. Sbihi, Univ. Abdelmalek Essadi (Morocco); R. Touahni, Univ. Ibn Tofail (Morocco)

Author Index

Conference Committee

Symposium Chairs

Majid Rabbani, Eastman Kodak Company (United States)
Gaurav Sharma, University of Rochester (United States)

Conference Chairs

Philip R. Bingham, Oak Ridge National Laboratory (United States)
Edmund Y. Lam, The University of Hong Kong (Hong Kong, China)

Program Committee

Pierrick T. Bourgeat, Australian e-Health Research Center (Australia)
Jun Cheng, Chinese Academy of Sciences (China)
Michael J. Cree, The University of Waikato (New Zealand)
Laurent C. Duval, IFP (France)
Ewald Fauster, Montanuniversitaet Leoben (Austria)
Steven P. Floeder, 3M Company (United States)
David Fofi, Université de Bourgogne (France)
Luciano F. Fontoura Da Costa, Universidade de São Paulo (Brazil)
Shaun Scott Gleason, Oak Ridge National Laboratory (United States)
Olivier Laligant, Université de Bourgogne (France)
Fabrice Meriaudeau, Université de Bourgogne (France)
Dinesh Nair, National Instruments Corporation (United States)
Kurt S. Niel, Fachhochschule Wels (Austria)
Arnau Oliver, Universidad de Girona (Spain)
Vincent C. Paquit, Oak Ridge National Laboratory (United States)
Jeffery R. Price, Aldis, Inc. (United States)
A. Ravishankar Rao, IBM Thomas J. Watson Research Center (United States)
Hamed Sari-Saraf, Texas Tech University (United States)
Peter Schelkens, Vrije Universiteit Brussel (Belgium)
Ivan W. Selesnick, Polytechnic Institute of New York University (United States)
Ralph Seulin, Université de Bourgogne (France)
Christophe Stoltz, Université de Bourgogne (France)
Yvon Voisin, Université de Bourgogne (France)
Gerald Zauner, Fachhochschule Wels (Austria)

Session Chairs

1 Systems
Edmund Y. Lam, The University of Hong Kong (Hong Kong, China)

- 2 Algorithms
Philip R. Bingham, Oak Ridge National Laboratory (United States)
- 3 Detection and Tracking
David Fofi, Université de Bourgogne (France)
- 4 Applications
Kurt S. Niel, Fachhochschule Wels (Austria)