

PROCEEDINGS OF SPIE

[SPIDigitalLibrary.org/conference-proceedings-of-spie](https://spiedigitallibrary.org/conference-proceedings-of-spie)

Front Matter: Volume 8005

, "Front Matter: Volume 8005," Proc. SPIE 8005, MIPPR 2011: Parallel Processing of Images and Optimization and Medical Imaging Processing, 800501 (21 July 2015); doi: 10.1117/12.2208350

SPIE.

Event: Seventh International Symposium on Multispectral Image Processing and Pattern Recognition (MIPPR2011), 2011, Guilin, China

PROCEEDINGS OF SPIE

MIPPR 2011

Parallel Processing of Images and Optimization and Medical Imaging Processing

**Jianguo Liu
Mingyue Ding
Zhong Chen**
Editors

**4–6 November 2011
Guilin, China**

Organized by
Huazhong University of Science and Technology (China)

Sponsored by
National Key Laboratory of Science and Technology on Multi-spectral Information
Processing (China)
Huazhong University of Science and Technology (China)
Guilin University of Electronic Technology (China)

Technical Cosponsor and Publisher
SPIE

Volume 8005

Proceedings of SPIE, 0277-786X, v. 8005

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

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 *MIPPR 2011: Parallel Processing of Images and Optimization and Medical Imaging Processing*, edited by Jianguo Liu, Mingyue Ding, Zhong Chen, Proceedings of SPIE Vol. 8005 (SPIE, Bellingham, WA, 2011) Article CID Number.

ISSN 0277-786X
ISBN 9780819485793

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 © 2011, 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/11/\$18.00.

Printed in the United States of America.

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

The logo for SPIE Digital Library features the word "SPIE" in a bold, sans-serif font above the words "Digital Library" in a smaller, similar font. To the right of the text is a stylized graphic consisting of three vertical bars of varying heights, resembling a barcode or a digital signal.

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>
xi	<i>Introduction</i>

PARALLEL PROCESSING OF IMAGES AND OPTIMIZATION

8005 02	Further optimization of SeDDaRA blind image deconvolution algorithm and its DSP implementation [8005A-08] B. Wen, Institute of Optics and Electronics (China) and Graduate School of Chinese Academy of Sciences (China); Q. Zhang, J. Zhang, Institute of Optics and Electronics (China)
8005 03	Adaptive edge detection in a global optimal observation scale [8005A-01] Z. Zheng, T. Zhang, Huazhong Univ. of Science and Technology (China)
8005 04	Automatic mosaicking method for large block of orthophotos [8005A-02] H. Ai, L. Zhang, L. Wang, Chinese Academy of Surveying and Mapping (China)
8005 05	Fast discrete W transforms via computation of first-order moments [8005A-03] J. G. Liu, X. Hua, J. L. Wu, Huazhong Univ. of Science and Technology (China)
8005 06	A co-design method for parallel image processing accelerator based on DSP and FPGA [8005A-04] Z. Wang, K. Weng, Huazhong Univ. of Science and Technology (China); Z. Cheng, Institute of Manned Space System Engineering (China); L. Yan, J. Guan, Huazhong Univ. of Science and Technology (China)
8005 07	Novel MDCT using first-order moments [8005A-07] J. Liu, D. Xu, Huazhong Univ. of Science and Technology (China)
8005 08	An improved implementation of infrared focal plane image enhancement algorithm based on FPGA [8005A-11] S. Zhong, D. Shi, B. Wang, K. Li, Huazhong Univ. of Science and Technology (China)
8005 09	An improved membrane algorithm for solving time-consuming water quality retrieval [8005A-14] L. Zhong, Guangdong Technical College of Water Resources and Electric Engineering (China); W. Luo, South China Normal Univ. (China)
8005 0A	VLSI implementation of multiple large template-based image matching for automatic target recognition [8005A-15] H. Sang, D. Liao, Y. Yuan, Huazhong Univ. of Science and Technology (China)
8005 0B	Design and implementation of an embedded software system for ATR [8005A-17] Y. Wang, S. Li, Huazhong Univ. of Science and Technology (China)

- 8005 0C **A novel algorithm and its VLSI architecture for connected component labeling** [8005A-19]
H. Zhao, H. Sang, T. Zhang, Huazhong Univ. of Science and Technology (China)
- 8005 0D **A method of COA based on multi-agent co-evolutionary algorithm** [8005A-20]
X. Yu, S. Dong, H. Wang, Xidian Univ. (China)
- 8005 0E **Study of disaster relief goods dispatching model and its intelligent solution approach for state reserve system of rescue goods and materials** [8005A-22]
W. Tian, Hefei Univ. of Technology (China) and Institute of Intelligent Machines (China);
H. Zhou, L. Zhao, Y. Lu, Hefei Univ. of Technology (China)
- 8005 0F **Research of location method for billet recognition in complex production line scene** [8005A-23]
H. Hong, Wuhan Institute of Technology (China) and Huazhong Univ. of Science and Technology (China); Z. Yu, X. Zhang, Wuhan Institute of Technology (China)
- 8005 0K **Segmentation of white rat sperm image** [8005A-100]
W. Bai, J. Liu, G. Chen, Huazhong Univ. of Science and Technology (China)
- 8005 0M **An efficient template matching between rotated mono- or multi-sensor images** [8005A-102]
Y. Yan, X. Huang, Y. Zheng, W. Xu, National Univ. of Defense Technology (China)
- 8005 0N **Image super-resolution based on image adaptive decomposition** [8005A-103]
Q. Xie, Jiangsu Province Institute of Quality and Safety Engineering (China) and Institute of Automation (China); H. Wang, Jiangsu Province Institute of Quality and Safety Engineering (China); L. Shen, X. Chen, H. Han, Institute of Automation (China)

MEDICAL IMAGING AND PROCESSING

- 8005 0O **Criteria of loop iteration break for level-set-based medical image segmentation** [8005B-33]
J. Chen, J. Luo, C. Hu, X. Zeng, C. Xia, Tsinghua Univ. (China); Y. Ma, Beijing Neurosurgical Institute (China); H. Hao, Tsinghua Univ. (China)
- 8005 0P **Fast segmentation of white blood cell based on visual salient features** [8005B-28]
X. Zheng, G. Wang, J. Liu, Huazhong Univ. of Science and Technology (China); Z. Wang, Nanchang Hangkong Univ. (China)
- 8005 0Q **A robust approach for intensity loss compensation of TIRF microscopy images** [8005B-26]
X. Wu, L. Chen, China Jiliang Univ. (China); F. Yu, Acon Biotech Co. Ltd. (China)
- 8005 0R **Ultrasonic classification of breast tumors based on multi-instance learning** [8005B-27]
J. Huang, C. Hu, Y. Zhang, J. Liu, X. Tang, Harbin Institute of Technology (China)
- 8005 0S **Multi-modal medical image registration based on phase congruency and quantitative-qualitative mutual information** [8005B-31]
S. Zhang, Beijing Univ. of Aeronautics and Astronautics (China); H. Han, Peking Univ. Third Hospital (China); Z. Liu, B. Liu, F. Zhou, Beijing Univ. of Aeronautics and Astronautics (China)
- 8005 0T **Medical image segmentation by MDP model** [8005B-32]
Y. Lu, Southern Medical Univ. (China) and South China Institute of Software Engineering (China); W. Chen, Southern Medical Univ. (China)

- 8005 0U **An adaptive brightness preserving bi-histogram equalization** [8005B-36]
H. Shen, S. Sun, B. Lei, S. Zheng, China Three Gorges Univ. (China)
- 8005 0V **The segmentation of the CT image based on k clustering and graph-cut** [8005B-37]
Y. Chen, South China Univ. of Technology (China) and General Hospital of Guangzhou Military Command of PLA (China); X. Wu, R. Yang, South China Univ. of Technology (China); S. Ou, General Hospital of Guangzhou Military Command of PLS (China); K. Cai, South China Univ. of Technology (China); H. Chen, General Hospital of Guangzhou Military Command of PLA (China)
- 8005 0W **Automatic segmentation of coronary artery tree based on multiscale Gabor filtering and transition region extraction** [8005B-39]
F. Wang, G. Wang, L. Kang, J. Wang, Huazhong Univ. of Science and Technology (China)
- 8005 0X **Contour extraction of medical images using improved deformable model by integrating region information** [8005B-40]
Y.-G. Sun, South-Central Univ. for Nationalities (China) and Huazhong Univ. of Science and Technology (China); G.-Y. Hei, J.-Q. Wang, South-Central Univ. for Nationalities (China); M.-Y. Ding, Huazhong Univ. of Science and Technology (China)

Author Index

Symposium Committee

Symposium Honorary Chair

Bo Zhang, Tsinghua University (China)

Symposium Chair

M. V. Srinivasan, University of Queensland (Australia)

Symposium Cochair

Deren Li, Wuhan University (China)

Program Committee Chairs

Bir Bhanu, University of California, Riverside (United States)

Tianxu Zhang, Huazhong University of Science and Technology (China)

Organizing Committee Chair

Jianguo Liu, Huazhong University of Science and Technology (China)

Co-organizing Committee Chairs

Jinxue Wang, SPIE

Mingyue Ding, Huazhong University of Science and Technology
(China)

Xuanju Dang, Guilin University of Electronic Technology (China)

Organizing Committee Members

Shiqing Peng, Nong Sang, Enming Song

General Secretary

Faxiong Zhang, Huazhong University of Science and Technology
(China)

Associated General Secretary

Wenwen Gu, Huazhong University of Science and Technology (China)

Secretaries

**Tian Tian, Shuai Wang, Jianlong Wu, Shuhang Gu, Xiaoyu Zhang,
Fan Ma, Meishuang Chen, Li Cao**

Program Committee

Christian Bauckhage, Fraunhofer IAIS (Germany)
Bir Bhanu, University of California, Riverside (United States)
Zhiguo Cao, Huazhong University of Science and Technology (China)
C. H. Chen, University of Massachusetts, Dartmouth (United States)
Jinkui Chu, Dalian University of Technology (China)
Melba M. Crawford, Purdue University (United States)
Armin B. Cremers, Universität Bonn (Germany)
Xuanju Dang, Guilin University of Electronic Technology (China)
Mingyue Ding, Huazhong University of Science and Technology
(China)
Jufu Feng, Beijing University (China)
Aaron Fenster, The University of Western Ontario (Canada)
James F. Greenleaf, Mayo Clinic (United States)
Bruce Hirsch, Drexel University (United States)
Xinhan Huang, Huazhong University of Science and Technology
(China)
Horace H. S. Ip, City University of Hong Kong (Hong Kong, China)
Jun Jo, Griffith University (Australia)
Lihua Li, Hangzhou Dianzi University (China)
Deren Li, Wuhan University (China)
Xuelong Li, University of London (United Kingdom)
Qiang Li, University of Chicago (United States)
Senhu Li, Pathfinder Therapeutics, Inc. (United States)
Stan Z. Li, Chinese Academy of Sciences (China)
Jianguo Liu, Huazhong University of Science and Technology (China)
Qinghuo Liu, Chinese Academy of Sciences (China)
Hanqing Lu, Chinese Academy of Sciences (China)
Henri Maître, Ecole Nationale Supérieure des Télécommunications
(France)
Laszlo G. Nyul, University of Szeged (Hungary)
Jonathan Roberts, Autonomous Systems Laboratory CSIRO ICT Centre
(Australia)
Punam K. Saha, University of Iowa (United States)
Nong Sang, Huazhong University of Science and Technology (China)
Xubang Shen, Chinese Academy of Sciences (China)
Enmin Song, Huazhong University of Science and Technology (China)
M. V. Srinivasan, University of Queensland (Australia)
Hong Sun, Wuhan University (China)

Dacheng Tao, Nanyang Technological University (Singapore)
Hengqing Tong, Wuhan University of Technology (China)
J. K. Udupa, University of Pennsylvania (United States)
Jinxue Wang, SPIE
Pingkun Yan, Philip Research North America (United States)
Yuan Yuan, Aston University (United Kingdom)
Jun Zhang, Waseda University (Japan)
Qieshi Zhang, Waseda University (Japan)
Tianxu Zhang, Huazhong University of Science and Technology (China)
Xiaoming Zhang, Mayo Clinic (United States)
Kaichun Zhao, Tsinghua University (China)
Sheng Zheng, China Three Gorges University (China)
Jie Zhou, Tsinghua University (China)

Introduction

Welcome to MIPPR 2011, the Seventh Symposium on Multispectral Image Processing and Pattern Recognition which took place in the beautiful city of Guilin, China, at the banks of the Li River. A popular Chinese saying is that Guilin's scenery is best among all under heaven. We hope that the participants of the symposium were not only hard working at the conference, but also found time to see some of the natural sites.

The MIPPR symposium has a broad charter. Multispectral is interpreted not just multiple-wavelength in a narrow sense, but also multi-sensor, multi-modal and multimedia. 'Multispectral' covers many disciplines such as sensing, image processing, computer vision, pattern recognition, and involves the development of efficient processing algorithms and their optimization and implementation. The wide range of applications considered in this symposium includes automatic target recognition, autonomous navigation, medical image processing, remote sensing, geographic information systems, biometrics, and many others.

The MIPPR symposium provided a forum for scientists and engineers from universities and government laboratories to meet and exchange ideas. We expect that there were ample discussions both inside and outside the lecture halls, and that MIPPR 2011 was viewed as an exciting meeting.

In response to the Call for Papers, we received 430 submissions. Based on the reviews provided by an excellent program committee we accepted 294 papers covering many aspects of multispectral image processing and pattern recognition. The symposium consists of 5 proceedings volumes:

- MIPPR 2011: Multispectral Image Acquisition, Processing, and Analysis (SPIE Volume 8002)
- MIPPR 2011: Automatic Target Recognition and Image Analysis (SPIE Volume 8003)
- MIPPR 2011: Pattern Recognition and Computer Vision (SPIE Volume 8004)
- MIPPR 2011: Parallel Processing of Images and Optimization and Medical Imaging Processing (SPIE Volume 8005)
- MIPPR 2011: Remote Sensing Image Processing, Geographic Information Systems, and Other Applications (SPIE Volume 8006).

The realization of a conference depends upon the hard work of many dedicated people. We thank all the members of the organizing committee for putting together this Symposium for the benefit of all the researchers, and for making this conference a success. We hope the papers and the research results presented at

MIPPR 2011 will inspire new research in all the areas related to multispectral image processing and pattern recognition.

Bir Bhanu