PROCEEDINGS OF SPIE

SPIDigitalLibrary.org/conference-proceedings-of-spie

Front Matter: Volume 6574

, "Front Matter: Volume 6574," Proc. SPIE 6574, Optical Pattern Recognition XVIII, 657401 (9 April 2007); doi: 10.1117/12.731895

Event: Defense and Security Symposium, 2007, Orlando, Florida, United States

PROCEEDINGS OF SPIE

Optical Pattern Recognition XVIII

David P. Casasent
Tien-Hsin Chao
Editors

9–10 April 2007
Orlando, Florida, USA

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

Proceedings of SPIE—The International Society for Optical Engineering, 9780819466969, v. 6574

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 *Optical Pattern Recognition XVIII*, edited by David P. Casasent, Tien-Hsin Chao, Proceedings of SPIE Vol. 6574 (SPIE, Bellingham, WA, 2007) Article CID Number.

ISSN 0277-786X
ISBN 9780819466969

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 DATA PROCESSING

- 657402 **SAR classification and confuser and clutter rejection tests on MSTAR ten-class data using Minace filters (Invited Paper)** [6574-01]
R. Patnaik, D. Casasent, Carnegie Mellon Univ. (USA)
- 657403 **Track and trap in 3D (Invited Paper)** [6574-02]
J. Glückstad, P. J. Rodrigo, I. P. Nielsen, C. A. Alonzo, Risø National Lab. (Denmark)
- 657404 **Recent results of integrated sensing and processing with hyperspectral imager (Invited Paper)** [6574-03]
R. Muise, A. Mahalanobis, Lockheed Martin, MFC (USA)

SESSION 2 OPTICAL PROCESSING

- 657405 **System issues of developing grayscale optical correlator for ATR applications (Invited Paper)** [6574-04]
T.-H. Chao, T. Lu, Jet Propulsion Lab. (USA)
- 657406 **A hybrid digital-optical correlator for automatic target recognition (Invited Paper)** [6574-05]
A. K. Gupta, N. K. Nishchal, V. K. Beri, Instruments Research and Development Establishment (India)
- 657407 **Pattern recognition in hyperspectral imagery using Gaussian filter with post-processing (Invited Paper)** [6574-06]
M. S. Alam, Univ. of South Alabama (USA); M. N. Islam, Univ. of West Florida (USA); A. Bal, Univ. of South Alabama (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.

SESSION 3 TRACKING AND DISTORTION - INVARIANT RECOGNITION METHODS

- 657408 **A new SVM for scale, aspect, and depression angle tolerant IR object recognition** [6574-07]
Y.-C. F. Wang, D. Casasent, Carnegie Mellon Univ. (USA)
- 657409 **Building robust appearance models using on-line feature selection** [6574-08]
R. Porter, R. Loveland, E. Rosten, Los Alamos National Lab. (USA)
- 65740A **Fully invariant multiple object recognition and tracking using MACH and Kalman filters**
[6574-09]
P. Bone, R. Young, C. Chatwin, Univ. of Sussex (United Kingdom)
- 65740B **Advanced correlation filter methods for SHARP ATR** [6574-11]
P. Topiwala, FastVDO, LLC (USA); D. Casasent, Carnegie Mellon Univ. (USA); A. Nehemiah,
FastVDO, LLC (USA)

SESSION 4 PATTERN RECOGNITION AND PROCESSING

- 65740C **Superresolution reconstruction of hyperspectral images** [6574-12]
M. Elbakary, M. S. Alam, Univ. of South Alabama (USA)
- 65740D **Dynamic range compression deconvolution using A-law and μ -law algorithms** [6574-13]
B. Haji-saeed, Univ. of Massachusetts, Lowell (USA) and Solid State Scientific Corp. (USA);
S. K. Sengupta, W. D. Goodhue, Univ. of Massachusetts, Lowell (USA); J. Khoury,
C. L. Woods, Air Force Research Lab. (USA); J. Kierstead, Solid State Scientific Corp. (USA)
- 65740E **A neural network identification system for space-borne GCMS pattern recognition**
[6574-14]
T. T. Lu, T.-H. Chao, Jet Propulsion Lab. (USA)
- 65740F **Machine intelligence-based decision-making (Mind) for automatic anomaly detection**
[6574-15]
N. R. Prasad, New Mexico State Univ. (USA); J. C. King, Raytheon Missile Systems (USA); T. Lu,
Jet Propulsion Lab. (USA)
- 65740G **Distributed sensor network control for power and bandwidth allocation in large sensor
networks** [6574-16]
A. Talukder, A. Panangadan, Univ. of Southern California (USA)

POSTER SESSION: TRACKING AND DISTORTION — INVARIANT RECOGNITION METHODS

- 65740H **Minace filter tests on the Comanche IR database** [6574-17]
D. Casasent, R. Patnaik, Carnegie Mellon Univ. (USA)
- 65740I **Real-time multi-sensor based vehicle detection using MINACE filters** [6574-18]
P. Topiwala, A. Nehemiah, FastVDO, LLC (USA)
- 65740J **Input scene restoration in pattern recognition correlator based on digital photo camera**
[6574-20]
S. N. Starikov, N. N. Balan, M. V. Konnik, V. G. Rodin, I. V. Solyakin, E. A. Shapkarina, Moscow
Engineering Physics Institute (Russia)

- 65740K **Position estimation and driving of an autonomous vehicle by monocular vision** [6574-25]
J. C. Hanan, P. Kayathi, Oklahoma State Univ. (USA); C. L. Hughlett, Zion Labs., Inc. (USA)

POSTER SESSION: PATTERN RECOGNITION AND PROCESSING

- 65740M **Object detection in hyperspectral imagery by using K-means clustering algorithm with pre-processing** [6574-22]
M. S. Alam, M. I. Elbakary, M. S. Aslan, Univ. of South Alabama (USA)
- 65740N **Experimental estimation of the recognition reliability in the optical pattern recognition systems** [6574-23]
V. L. Perju, Technical Univ. of Moldova (Moldova) and Free International Univ. of Moldova (Moldova); D. P. Casasent, Carnegie Mellon Univ. (USA); I. A. Mardare, Technical Univ. of Moldova (Moldova); O. V. Chirca, Free International Univ. of Moldova (Moldova)
- 65740O **The intellectual processor on basis of 2nd order objects in restoration of images** [6574-24]
I. Mardare, V. L. Perju, Technical Univ. of Moldova (Moldova); D. P. Casasent, Carnegie Mellon Univ. (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

David P. Casasent, Carnegie Mellon University (USA)

Tien-Hsin Chao, Jet Propulsion Laboratory (USA)

Program Committee

Mohammad S. Alam, University of South Alabama (USA)

Don A. Gregory, The University of Alabama in Huntsville (USA)

Bahram Javidi, University of Connecticut (USA)

Richard D. Juday, NASA Johnson Space Center (USA)

Dennis R. Pape, AlphaLaunch (USA)

Yunlong Sheng, Université Laval (Canada)

Joseph L. Stufflebeam, NewTec (USA)

Ashit Talukder, University of Southern California (USA)

B. V. K. Vijaya Kumar, Carnegie Mellon University (USA)

Rupert C. D. Young, University of Sussex (United Kingdom)

Session Chairs

- 1 Data Processing
David Casasent, Carnegie Mellon University (USA)
- 2 Optical Processing
David Casasent, Carnegie Mellon University (USA)
Tien-Hsin Chao, Jet Propulsion Laboratory (USA)
- 3 Tracking and Distortion - Invariant Recognition Methods
Rupert C. D. Young, University of Sussex (United Kingdom)
- 4 Pattern Recognition and Processing
Mohammad S. Alam, University of South Alabama (USA)
Tien-Hsin Chao, Jet Propulsion Laboratory (USA)