PROCEEDINGS OF SPIE

SPIDigitalLibrary.org/conference-proceedings-of-spie

Front Matter: Volume 6983

, "Front Matter: Volume 6983," Proc. SPIE 6983, Defense and Security 2008: Special Sessions on Food Safety, Visual Analytics, Resource Restricted Embedded and Sensor Networks, and 3D Imaging and Display, 698301 (9 May 2008); doi: 10.1117/12.801195

SPIE.

Event: SPIE Defense and Security Symposium, 2008, Orlando, Florida, United States

PROCEEDINGS OF SPIE

Defense and Security 2008

Special Sessions on Food Safety, Visual Analytics, Resource Restricted Embedded and Sensor Networks, and 3D Imaging and Display

Moon S. Kim
Kaunglin Chao
William J. Tolone
William Ribarsky
Sergey I. Balandin
Bahram Javidi
Shu-I Tu
Editors

17–18 March 2008
Orlando, Florida, USA

Sponsored and Published by
SPIE

Volume 6983

Proceedings of SPIE, 0277-786X, v. 6983

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 *Defense and Security 2008: Special Sessions on Food Safety, Visual Analytics, Resource Restricted Embedded and Sensor Networks, and 3D Imaging and Display*, edited by Moon S. Kim, Kaunglin Chao, William J. Tolone, William Ribarsky, Sergey I. Balandin, Bahram Javidi, Shu-I Tu, Proceedings of SPIE Vol. 6983 (SPIE, Bellingham, WA, 2008) Article CID Number.

ISSN 0277-786X

ISBN 9780819471819

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 © 2008, 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/08/\$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 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 Committees
ix	Introduction to Resource Restricted Embedded and Sensor Networks

FOOD SAFETY

6983 03	Modified pressure system for imaging egg cracks [6983-102] K. C. Lawrence, S. C. Yoon, D. R. Jones, G. W. Heitschmidt, B. Park, W. R. Windham, USDA Agricultural Research Service (USA)
6983 04	Imaging skeletal muscle with linearly polarized light [6983-103] X. Li, J. Ranasinghesagara, G. Yao, Univ. of Missouri-Columbia (USA)
6983 05	Detecting citrus canker by hyperspectral reflectance imaging and PCA-based image classification method [6983-104] J. Qin, T. F. Burks, Univ. of Florida (USA); M. S. Kim, K. Chao, USDA Agricultural Research Service (USA); M. A. Ritenour, Univ. of Florida (USA)
6983 06	Portable hyperspectral fluorescence imaging system for detection of biofilms on stainless steel surfaces [6983-105] W. Jun, USDA Agricultural Research Service (USA); K. Lee, National Institute of Agricultural Engineering (South Korea); P. Millner, M. Sharma, K. Chao, M. S. Kim, USDA Agricultural Research Service (USA)
6983 08	Applications of immunomagnetic capture and time-resolved fluorescence detection for <i>Salmonella enteritidis</i> in liquid eggs [6983-107] S.-I Tu, A. Gehring, G. Paoli, USDA Agricultural Research Service (USA)
6983 09	Rapid screening and species identification of <i>E. coli</i>, <i>Listeria</i>, and <i>Salmonella</i> by SERS technique [6983-108] Y. Liu, Univ. of Maryland, College Park (USA); K. Chao, M. S. Kim, X. Nou, USDA Agricultural Research Service (USA)

VISUAL ANALYTICS FOR HOMELAND DEFENSE AND SECURITY

6983 0A	A human-centric approach in geospatial data fusion for real-time remotely controlled robotic platforms [6983-204] E. Levin, Michigan Technological Univ. (USA); G. Gienko, The Univ. of the South Pacific (Fiji); A. Sergeyev, Michigan Technological Univ. (USA)
6983 0B	Visual analysis for live LIDAR battlefield change detection [6983-202] T. Butkiewicz, R. Chang, Z. Wartell, W. Ribarsky, Univ. of North Carolina at Charlotte (USA)

- 6983 0C **Using a human cognition model in the creation of collaborative knowledge visualizations** [6983-203]
T. M. Green, W. Ribarsky, Univ. of North Carolina at Charlotte (USA)
- 6983 0D **Computation and visualization concept for reconnaissance requirement** [6983-205]
S. Eckel, Univ. Karlsruhe (Germany); J. Geisler, Fraunhofer-Institut für Informations- und Datenverarbeitung (Germany)
- 6983 0E **Visualizing uncertainty for geographical information in the global terrorism database** [6983-206]
J. Jones, Winthrop Univ. (USA); R. Chang, T. Butkiewicz, W. Ribarsky, Univ. of North Carolina at Charlotte (USA)
- 6983 0F **Human posture classification for intelligent visual surveillance systems** [6983-201]
H. Rababaah, A. Shirkhodaie, Tennessee State Univ. (USA)
- 6983 0G **Visual analysis of entity relationships in the Global Terrorism Database** [6983-207]
A. Godwin, R. Chang, R. Kosara, W. Ribarsky, Univ. of North Carolina at Charlotte (USA)

RESOURCE RESTRICTED EMBEDDED AND SENSOR NETWORKS

- 6983 0H **State of the art and recent development of embedded network solutions research** [6983-301]
M. Gillet, S. Balandin, Nokia Research Ctr. (Finland)
- 6983 0I **High-rate serial interconnections for embedded and distributed systems with power and resource constraints** [6983-302]
Y. Sheynin, F. Shutenko, E. Suvorova, E. Yablokov, St. Petersburg State Univ. of Aerospace Instrumentation (Russia)
- 6983 0K **Industrial and non-consumer applications of wireless sensor networks** [6983-305]
V. Pentikäinen, T. Heikkilä, K. Määttä, P. Tukeya, M. Korkalainen, P. Saavalainen, P. Kilpeläinen, VTT Technical Research Ctr. of Finland (Finland)

3D IMAGING AND DISPLAY

- 6983 0L **Extension of depth of field in integral imaging using amplitude and phase modulation of the pupil function (Invited Paper)** [6983-401]
S. Bagheri, Massachusetts Institute of Technology (USA); B. Javidi, Univ. of Connecticut (USA)
- 6983 0M **3-D TV and display using multiview (Invited Paper)** [6983-402]
J.-Y. Son, S.-H. Kim, Daegu Univ. (South Korea); M.-C. Park, S.-K. Kim, Korea Institute of Science and Technology (South Korea)
- 6983 0N **3D TV with integral imaging (Invited Paper)** [6983-403]
F. Okano, Japan Broadcasting Corp. (NHK) (Japan)
- 6983 0O **3D optical microscopy using digital holography (Invited Paper)** [6983-404]
A. Stern, Ben Gurion Univ. of the Negev (Israel); B. Javidi, Univ. of Connecticut (USA)

- 6983 OP **3D integral imaging with optical processing (Invited Paper)** [6983-406]
M. Martínez-Corral, R. Martínez-Cuenca, G. Saavedra, Univ. of Valencia (Spain); B. Javidi,
Univ. of Connecticut (USA)
- 6983 OQ **Holography of incoherently illuminated 3D scenes (Invited Paper)** [6983-407]
N. T. Shaked, J. Rosen, Ben-Gurion Univ. of the Negev (Israel)
- 6983 OR **New application of integral imaging** [6983-408]
Y. S. Hwang, B. Javidi, Univ. of Connecticut (USA)

Author Index

Conference Committees

Symposium Chair

Larry B. Stotts, Defense Advanced Research Projects Agency (USA)

Symposium Cochair

Ray O. Johnson, Lockheed Martin Corporation (USA)

Food Safety

Chairs

Moon S. Kim, USDA Agricultural Research Service (USA)

Kaunglin Chao, USDA Agricultural Research Service (USA)

Shu-I Tu, USDA Agricultural Research Service (USA)

Program Committee

Arun K. Bhunia, Purdue University (USA)

Suming Chen, National Taiwan University (Taiwan)

Stephen R. Delwiche, USDA Agricultural Research Service (USA)

Ki-Bok Kim, Korea Research Institute of Standards and Science
(South Korea)

Naoshi Kondo, Kyoto University (South Korea)

Kurt C. Lawrence, USDA Agricultural Research Service (USA)

Alan M. Lefcourt, USDA Agricultural Research Service (USA)

Kang-Jin Lee, RDA National Institute of Agricultural Engineering
(South Korea)

Renfu Lu, USDA Agricultural Research Service (USA)

Yankun Peng, China Agricultural University (China)

Yang Tao, University of Maryland, College Park (USA)

Gang Yao, University of Missouri, Columbia (USA)

Yibin Ying, Zhejiang University (China)

Visual Analytics for Homeland Defense and Security

Chairs

William J. Tolone, The University of North Carolina at Charlotte (USA)

William Ribarsky, The University of North Carolina at Charlotte (USA)

Resource Restricted Embedded and Sensor Networks

Chair

Sergey I. Balandin, Nokia Research Center (Finland)

3D Imaging and Display

Chair

Bahram Javidi, University of Connecticut (USA)

Introduction

Resource Restricted Embedded and Sensor Networks

We would like to thank all attendees of SPIE's Defense + Security (DSS) 2008 conference who visited this new promotional session on Resource Restricted Embedded and Sensor Networks, which took place on Monday, 17 March 2008.

This year's promotional session addressed most hot research questions for resource restricted embedded and sensor networks. The session consisted of a number of lectures and tutorials, which gave an overview of state of the art and existing solutions in the field, the current vision of the applications and use scenarios, and the key open issues in the area.

The first tutorial in these proceedings provides an overview of state of the art and recent development of embedded network solutions research and was authored by Michel Gillet and Sergey Balandin. Michel and Sergey work at Nokia Research Center in Finland and are official Nokia representatives in MIPI alliance standardization which is targeted in development of new embedded networks based interconnect standard for mobile devices.

The second tutorial comes from St-Petersburg University of Airspace Instrumentation (SUAI), Russia. It was presented by Prof. Sheynin, who is the key contributor and member of Spacewire standardization board from Russian side. The tutorial discusses high-rate serial interconnections for embedded and distributed systems with power and resource constraints.

The third tutorial is "Applications of wireless sensor and control networks for industrial applications, work machines, and vehicles," given by Vesa Pentikäinen from VTT Elektronikka Research Center in Finland.

The collected set of tutorials in these proceedings provides good overview of state of the art and current trends in research around resource restricted embedded and sensor networks.

Sergey I. Balandin