PROCEEDINGS OF SPIE

SPIDigitalLibrary.org/conference-proceedings-of-spie

Front Matter: Volume 8290

, "Front Matter: Volume 8290," Proc. SPIE 8290, Three-Dimensional Image Processing (3DIP) and Applications II, 829001 (20 March 2012); doi: 10.1117/12.927794

Event: IS&T/SPIE Electronic Imaging, 2012, Burlingame, California, United States

Three-Dimensional Image Processing (3DIP) and Applications II

**Atila M. Baskurt
Robert Sitnik**
Editors

**24–26 January 2012
Burlingame, California, United States**

Sponsored and Published by
IS&T—The Society for Imaging Science and Technology
SPIE

Volume 8290

Proceedings of SPIE, 0277-786X, v. 8290

Three-Dimensional Image Processing (3DIP) and Applications II, edited by Atila M. Baskurt, Robert Sitnik,
Proc. of SPIE-IS&T Electronic Imaging, SPIE Vol. 8290, 829001 · © 2012 SPIE-IS&T
CCC code: 0277-786X/12/\$18 · doi: 10.1117/12.927794

SPIE-IS&T/ Vol. 8290 829001-1

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 *Three-Dimensional Image Processing (3DIP) and Applications II*, edited by Atila M. Baskurt, Robert Sitnik, Proceedings of SPIE-IS&T Electronic Imaging, SPIE Vol. 8290, Article CID Number (2012).

ISSN 0277-786X

ISBN 9780819489371

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

ix *Conference Committee*

STEREO AND MULTIVIEW IMAGING I

- 8290 02 **Edge-aware stereo matching with $O(1)$ complexity** [8290-01]
C. Çiğla, Middle East Technical Univ. (Turkey) and VESTEK Electronics Research and Development Corp. (Turkey); A. A. Alatan, Middle East Technical Univ. (Turkey)
- 8290 03 **Establishing eye contact for home video communication using stereo analysis and free viewpoint synthesis** [8290-02]
C. Weigel, Ilmenau Univ. of Technology (Germany); N. Treutner, Humboldt-Univ. zu Berlin (Germany)
- 8290 04 **Depth adaptive hierarchical hole filling for DIBR-based 3D videos** [8290-03]
M. Solh, G. AlRegib, Georgia Institute of Technology (United States)
- 8290 05 **Space carving MVD sequences for modeling natural 3D scenes** [8290-04]
Y. Alj, Technicolor S.A. (France) and Institut National des Sciences Appliquées de Rennes (France); G. Boisson, P. Bordes, Technicolor S.A. (France); M. Pressigout, L. Morin, Institut National des Sciences Appliquées de Rennes (France)

STEREO AND MULTIVIEW IMAGING II

- 8290 06 **A locally content-dependent filter for inter-perspective anti-aliasing** [8290-05]
M. Sjöström, S. Tourancheau, X. Wang, R. Olsson, Mid Sweden Univ. (Sweden)
- 8290 07 **Photometric and geometric rectification for stereoscopic images** [8290-06]
S.-R. Han, J. Min, T. Park, Y. Kim, Samsung Electronics Co., Ltd. (Korea, Republic of)

TIME-OF-FLIGHT DATA, DEPTH MAPS ANALYSIS

- 8290 08 **Depth map upscaling through edge-weighted optimization** [8290-07]
S. Schwarz, M. Sjöström, R. Olsson, Mid Sweden Univ. (Sweden)
- 8290 09 **Adaptive switching filter for noise removal in highly corrupted depth maps from Time-of-Flight image sensors** [8290-08]
S. Lee, K. Bae, K. Kyung, T.-C. Kim, Samsung Electronics Co., Ltd. (Korea, Republic of)
- 8290 0A **Parametric model-based noise reduction for ToF depth sensors** [8290-09]
Y. S. Kim, B. Kang, H. Lim, O. Choi, K. Lee, J. D. K. Kim, C. Kim, Samsung Advanced Institute of Technology (Korea, Republic of)
- 8290 0B **Silhouette extraction using color and depth information** [8290-10]
E. Tolstaya, V. Bucha, Samsung Electronics Co., Ltd. (Russian Federation)

- 8290 0C **Discrete and continuous optimizations for depth image super-resolution** [8290-11]
O. Choi, H. Lim, B. Kang, Y. S. Kim, K. Lee, J. D. K. Kim, C. Kim, Samsung Advanced Institute of Technology (Korea, Republic of)
- 8290 0D **Superpixel-based depth image super-resolution** [8290-12]
Y. Soh, Seoul National Univ. (Korea, Republic of); J.-Y. Sim, Ulsan National Institute of Science and Technology (Korea, Republic of); C.-S. Kim, Korea Univ. (Korea, Republic of); S.-U. Lee, Seoul National Univ. (Korea, Republic of)
- 8290 0E **Efficient spatio-temporal hole filling strategy for Kinect depth maps** [8290-13]
M. Camplani, L. Salgado, Univ. Politcnica de Madrid (Spain)

3D SHAPE MODELING, RETRIEVAL

- 8290 0F **Experimental results of bispectral invariants discriminative power** [8290-14]
K. Kubicki, R. Kakarala, Nanyang Technological Univ. (Singapore)
- 8290 0G **Evaluation of algorithms for point cloud surface reconstruction through the analysis of shape parameters** [8290-15]
L. Cao, F. J. Verbeek, Leiden Univ. (Netherlands)
- 8290 0H **3D mesh Reeb graph computation using commute-time and diffusion distances** [8290-16]
R. EL Khoury, J.-P. Vandeborre, M. Daoudi, Telecom Lille 1, CNRS (France)
- 8290 0I **Geometric modeling of pelvic organs with thickness** [8290-17]
T. Bay, Lab. des Sciences de l'Information et des Systmes, CNRS, Aix-Marseille Univ. (France); Z.-W. Chen, Univ. d'Evry-Val d'Essonne (France); R. Raffin, M. Daniel, Lab. des Sciences de l'Information et des Systmes, CNRS, Aix-Marseille Univ. (France); P. Joli, Z.-Q. Feng, Univ. d'Evry-Val d'Essonne (France); M.-E. Bellemare, Lab. des Sciences de l'Information et des Systmes, CNRS, Aix-Marseille Univ. (France)
- 8290 0J **Refined facial disparity maps for automatic creation of 3D avatars** [8290-18]
R. Pags, F. Morn, L. Salgado, D. Berjn, Univ. Politcnica de Madrid (Spain)
- 8290 0K **Fast human pose estimation using 3D Zernike descriptors** [8290-19]
D. Berjn, F. Morn, Univ. Politcnica de Madrid (Spain)
- 8290 0L **Analysis of binning of normals for spherical harmonic cross-correlation** [8290-20]
R. L. Larkins, M. J. Cree, A. A. Dorrington, The Univ. of Waikato (New Zealand)
- 8290 0M **Topology reconstruction for B-Rep modeling from 3D mesh in reverse engineering applications** [8290-21]
R. Bnire, Lab. d'Informatique de Robotique et de Microelectronique de Montpellier, CNRS, Univ. Montpellier II (France) and Lab. des Sciences de l'Information et des Systmes, CNRS, Aix-Marseille Univ. (France); G. Subsol, Lab. d'Informatique de Robotique et de Microelectronique de Montpellier, CNRS, Univ. Montpellier II (France); G. Gesqure, Lab. des Sciences de l'Information et des Systmes, CNRS, Aix-Marseille Univ. (France); F. Le Breton, C4W (France); W. Puech, Lab. d'Informatique de Robotique et de Microelectronique de Montpellier, CNRS, Univ. Montpellier II (France)

- 8290 ON **An evaluation of local shape descriptors for 3D shape retrieval** [8290-22]
S. Tang, Princeton Univ. (United States); A. Godil, National Institute of Standards and Technology (United States)

3D ANALYSIS, FEATURE EXTRACTION, SEGMENTATION

- 8290 OP **Spatial modeling of bone microarchitecture** [8290-24]
H. Li, K. Li, T. Kim, A. Zhang, M. Ramanathan, Univ. at Buffalo (United States)
- 8290 OQ **A new affine invariant method for image matching** [8290-25]
J.-L. Palomares, P. Montesinos, D. Diep, LGI2P, Ecole des Mines d'Alès (France)
- 8290 OR **2D-3D feature association via projective transform invariants for model-based 3D pose estimation** [8290-26]
O. S. Gedik, A. A. Alatan, Middle East Technical Univ. (Turkey)
- 8290 OS **Reprocessing anaglyph images** [8290-27]
H. G. Dietz, Univ. of Kentucky (United States)

3D METROLOGY

- 8290 OT **X-ray stereo imaging for micro 3D motions within non-transparent objects** [8290-28]
W. H. M. Salih, J. A. N. Buytaert, J. J. J. Dirckx, Univ. of Antwerp (Belgium)
- 8290 OU **A stereoscopic imaging system for laser back scatter based trajectory measurement in ballistics: part 2** [8290-29]
U. Chalupka, H. Rothe, Helmut-Schmidt-Univ. (Germany)
- 8290 OV **Single frame coaxial 3D measurement using depth from defocus of projection system** [8290-30]
T. Kurihara, S. Ando, The Univ. of Tokyo (Japan)
- 8290 OW **Multidirectional four-dimensional shape measurement system** [8290-31]
J. Lenar, R. Sitnik, M. Witkowski, Warsaw Univ. of Technology (Poland)

3D IMAGING SYSTEMS

- 8290 OX **Estimation of surface normal vectors based on 3D scanning from heating approach** [8290-32]
O. Aubreton, Lab. Le2i, CNRS, Univ. de Bourgogne (France); G. Eren, Lab. Le2i, CNRS, Univ. de Bourgogne (France) and Sabanci Univ. (Turkey); Y. Bokhabrine, A. Bajard, F. Truchetet, Lab. Le2i, CNRS, Univ. de Bourgogne (France)
- 8290 OY **General fusion approaches for the age determination of latent fingerprint traces: results for 2D and 3D binary pixel feature fusion** [8290-33]
R. Merkel, Otto-von-Guericke-Univ. Magdeburg (Germany); S. Gruhn, Brandenburg Univ. of Applied Science (Germany); J. Dittmann, Otto-von-Guericke-Univ. Magdeburg (Germany); C. Vielhauer, Brandenburg Univ. of Applied Science (Germany); A. Bräutigam, State Criminal Police Office Saxony-Anhalt (Germany)

- 8290 02 **A single-imager, single-lens video camera prototype for 3D imaging** [8290-34]
L. A. Christopher, W. Li, Indiana Univ.-Purdue Univ. Indianapolis (United States)
- 8290 10 **3D multimodal data fusion system** [8290-35]
P. Garbat, Warsaw Univ. of Technology (Poland)
- 8290 11 **Fully automatic 3D digitization of unknown objects using progressive data bounding box** [8290-36]
S. Khalfaoui, A. Aigueperse, R. Seulin, Y. Fougerolle, D. Fofi, Lab. Le2i, CNRS, Univ. de Bourgogne (France)

3D COMPRESSION AND WATERMARKING

- 8290 12 **3D video compression with the H.264 codec** [8290-37]
N. Karpinsky, S. Zhang, Iowa State Univ. (United States)
- 8290 13 **3D multiresolution synchronization scheme based on feature point selection** [8290-38]
N. Tournier, Lab. d'Informatique de Robotique et de Microelectronique de Montpellier, CNRS, Univ. Montpellier II (France) and Stratégies S.A. (France); W. Puech, G. Subsol, Lab. d'Informatique de Robotique et de Microelectronique de Montpellier, CNRS, Univ. Montpellier II (France); J.-P. Pedebay, Stratégies S.A. (France)
- 8290 14 **A content-adaptive scheme for reduced-complexity multi-view video coding** [8290-39]
A. Avci, J. De Cock, J. De Smet, Ghent Univ. (Belgium); Y. Meuret, Vrije Univ. Brussel (Belgium); P. Lambert, Ghent Univ. (Belgium); H. De Smet, Ghent Univ. (Belgium) and imec-Cmst (Belgium)

INTERACTIVE PAPER SESSION

- 8290 15 **Novel time- and depth-stamped imaging for 3D-PIV (particle image velocimetry) using correlation image sensor** [8290-40]
K. Komiya, T. Kurihara, S. Ando, The Univ. of Tokyo (Japan)
- 8290 16 **3D imaging for ballistics analysis using chromatic white light sensor** [8290-41]
A. Makrushin, M. Hildebrandt, J. Dittmann, E. Clausen, Otto-von-Guericke-Univ. of Magdeburg (Germany); R. Fischer, C. Vielhauer, Brandenburg Univ. of Applied Sciences (Germany)
- 8290 17 **Computer-aided 3D-shape construction of hearts from CT images for rapid prototyping** [8290-41]
M. Fukuzawa, Y. Kato, N. Nakamori, Kyoto Institute of Technology (Japan); S. Ozawa, Kyoto Prefectural Univ. of Medicine (Japan); I. Shiraishi, National Cerebral and Cardiovascular Ctr. (Japan)
- 8290 19 **Semiautomatic generation of semantic building models from image series** [8290-44]
S. Wirtz, P. Decker, D. Paulus, Univ. of Koblenz-Landau (Germany)

- 8290 1A **Complex virtual urban environment modeling from CityGML data and OGC web services: application to the SIMFOR project** [8290-45]
J.-C. Chambelland, G. Gesquière, Lab. des Sciences de l'Information et des Systèmes, CNRS, Aix Marseille Univ. (France)
- 8290 1B **Liquid crystal materials and structures for image processing and 3D shape acquisition** [8290-46]
K. Garbat, Military Univ. of Technology (Poland); P. Garbat, Warsaw Univ. of Technology (Poland); L. Jaroszewicz, Military Univ. of Technology (Poland)
- 8290 1C **Piece-wise linear function estimation for platelet-based depth maps coding using edge detection** [8290-47]
D. Sebai, F. Chaieb, K. Mammou, F. Ghorbel, The Univ. of Manouba (Tunisia)
- 8290 1D **A study on the impact of compression and packet losses on rendered 3D views** [8290-48]
C. T. E. R. Hewage, M. G. Martini, H. D. Appuhami, Kingston Univ. London (United Kingdom)
- 8290 1E **New technique for capturing images containing invisible depth information on objects using brightness modulated light** [8290-49]
S. Isaka, K. Uehira, Kanagawa Institute of Technology (Japan)
- 8290 1F **Interactive 3D segmentation by tubular envelope model for the aorta treatment** [8290-50]
P. J. Łubniewski, ISIT, Clermont-Univ., Univ. d'Auvergne (France) and Cardinal Stefan Wyszyński Univ. in Warsaw (Poland); B. Miguel, V. Sauvage, C. Lohou, ISIT, Clermont-Univ., Univ. d'Auvergne (France)
- 8290 1G **A parallel stereo reconstruction algorithm with applications in entomology (APSRA)** [8290-51]
R. Bhasin, W. J. Jang, J. C. Hart, Univ. of Illinois at Urbana-Champaign (United States)

Author Index

Conference Committee

Symposium Chairs

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

Conference Chairs

Atilla M. Baskurt, University of Lyon (France)
Robert Sitnik, Warsaw University of Technology (Poland)

Program Committee

Mongi A. Abidi, The University of Tennessee (United States)
Hugues Benoit-Cattin, INSERM (France)
Adrian G. Bors, The University of York (United Kingdom)
Saida Bouakaz, University of Lyon (France)
Mohamed Daoudi, TELECOM Lille 1 (France)
Eduardo da Silva, Universidade Federal do Rio de Janeiro (Brazil)
Jean-Luc E. Dugelay, EURECOM (France)
Florent Dupont, University of Lyon (France)
Afzal Godil, National Institute of Standards and Technology
(United States)
Benoît M. Macq, Université Catholique de Louvain (Belgium)
Serge Miguet, University of Lyon (France)
Levent Onural, Bilkent University (Turkey)
Eric Paquet, National Research Council Canada (Canada)
Marc Pollefeys, The University of North Carolina at Chapel Hill
(United States)
William Puech, Laboratoire d'Informatique de Robotique et de
Microelectronique de Montpellier (France)
Bülent Sankur, Bogaziçi Üniversitesi (Turkey)
Peter Schelkens, Vrije Universiteit Brussel (Belgium)
Michela Spagnuolo, Consiglio Nazionale delle Ricerche (Italy)
Frédéric Truchetet, Université de Bourgogne (France)
Stefano Tubaro, Politecnico di Milano (Italy)

Session Chairs

Stereo and Multiview Imaging I
Afzal Godil, National Institute of Standards and Technology
(United States)

Stereo and Multiview Imaging II

Afzal Godil, National Institute of Standards and Technology
(United States)

Time-Of-Flight Data, Depth Maps Analysis

William Puech, Laboratoire d'Informatique de Robotique et de
Microelectronique de Montpellier (France)

3D Shape Modeling, Retrieval

Mohamed Daoudi, TELECOM Lille 1 (France)

3D Analysis, Feature Extraction, Segmentation

Atilla M. Baskurt, University of Lyon (France)

3D Metrology

Robert Sitnik, Warsaw University of Technology (Poland)

3D Imaging Systems

Frédéric Truchetet, Université de Bourgogne (France)

3D Compression and Watermarking

William Puech, Laboratoire d'Informatique de Robotique et de
Microelectronique de Montpellier (France)