PROCEEDINGS OF SPIE

SPIDigitalLibrary.org/conference-proceedings-of-spie

Front Matter: Volume 7526

, "Front Matter: Volume 7526," Proc. SPIE 7526, Three-Dimensional Image Processing (3DIP) and Applications, 752601 (26 February 2010); doi: 10.1117/12.858901

SPIE.

Event: IS&T/SPIE Electronic Imaging, 2010, San Jose, California, United States

Three-Dimensional Image Processing (3DIP) and Applications

Atila M. Baskurt

Editor

18–19 January 2010

San Jose, California, United States

Sponsored and Published by

IS&T—The Society for Imaging Science and Technology

SPIE

Volume 7526

Proceedings of SPIE, 0277-786X, v. 7526

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*, edited by Atilla M. Baskurt, Proceedings of SPIE-IS&T Electronic Imaging, SPIE Vol. 7526, Article CID Number (2010).

ISSN 0277-786X

ISBN 9780819479198

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 © 2010, 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/10/\$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 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 3D ANALYSIS, FEATURE EXTRACTION, SEGMENTATION

- 7526 02 **Symmetry analysis with multiscale descriptor** [7526-01]
D. Cailliere, Orange Labs (France); F. Denis, LIRIS, CNRS, Univ. Lyon I (France); D. Pele, Orange Labs (France); A. Baskurt, LIRIS, CNRS, Univ. Lyon I (France)
- 7526 03 **A novel 3D anisotropic diffusion filter** [7526-02]
S. Pop, R. Terebes, Technical Univ. of Cluj-Napoca (Romania); J.-P. Da Costa, C. Germain, Univ. Bordeaux I (France); M. Borda, Technical Univ. of Cluj-Napoca (Romania); C. Ludusan, Technical Univ. of Cluj-Napoca (Romania) and Univ. Bordeaux I (France); O. Laviolle, Univ. Bordeaux I (France)

SESSION 2 3D FACE RECOGNITION

- 7526 06 **Realistic and animatable face models for expression simulations in 3D** [7526-06]
N. Erdogmus, R. Ethève, J.-L. Dugelay, EURECOM (France)
- 7526 08 **3D BSM for face segmentation and landmarks detection** [7526-08]
A. E. Salazar, F. A. Prieto, Univ. Nacional de Colombia (Colombia)

SESSION 3 MULTIVIEW CODING, 3D TV

- 7526 09 **Efficient disparity vector coding for multi-view 3D displays** [7526-09]
A. Avci, Ghent Univ. (Belgium); L. Bogaert, Vrije Univ. Brussel (Belgium); R. Beernaert, J. De Smet, Ghent Univ. (Belgium); Y. Meuret, H. Thienpont, Vrije Univ. Brussel (Belgium); H. De Smet, Ghent Univ. (Belgium) and Interuniv. MicroElectronics Ctr. (Belgium)
- 7526 0A **Looking for an adequate quality criterion for depth coding** [7526-10]
P. Kerbiriou, G. Boisson, Thomson R&D France (France)
- 7526 0B **Virtual view image synthesis for eye-contact in TV conversation system** [7526-11]
D. Murayama, K. Kimura, T. Hosaka, T. Hamamoto, Tokyo Univ. of Science (Japan); N. Shibuhisa, S. Tanaka, S. Sato, S. Saito, Sharp Corp. (Japan)

SESSION 4 3D RECONSTRUCTION FROM 2D VIEWS, VIDEOS, AND POINT CLOUDS

- 7526 0C **3D polygonal representation of dense point clouds by triangulation, segmentation, and texture projection** [7526-14]
T. Tajbakhsh, Silicon Image GmbH (Germany)

- 7526 0D **A 2D to 3D video and image conversion technique based on a bilateral filter** [7526-15]
L. J. Angot, W.-J. Huang, K.-C. Liu, Industrial Technology Research Institute (Taiwan)
- 7526 0E **Robust 3D object localization and pose estimation for random bin picking with the 3DMaMa algorithm** [7526-16]
O. Skotheim, J. T. Thielemann, A. Berge, SINTEF ICT (Norway); A. Sommerfelt, Tordivel AS (Norway)

SESSION 5 3D COMPRESSION AND WATERMARKING

- 7526 0F **Compression of 3D mesh sequences based on an adaptive 3D wavelet transform** [7526-19]
K. Jafari, F. Dupont, LIRIS, CNRS, Univ. Lyon I (France)
- 7526 0G **Sensitivity analysis of Euclidean minimum spanning tree** [7526-20]
N. Tournier, LIRMM Lab., CNRS, Univ. Montpellier II (France) and Strategies S.a. (France);
W. Puech, G. Subsol, LIRMM Lab., CNRS, Univ. Montpellier II (France); J.-P. Pedeboy, Strategies S.a. (France)
- 7526 0H **A polygon soup representation for free viewpoint video** [7526-21]
T. Collet, Orange Labs. (France) and INRIA-Rennes Bretagne Atlantique, IRISA (France);
S. Pateux, Orange Labs. (France); L. Morin, IETR/INSA Rennes (France); C. Labit, INRIA-Rennes Bretagne Atlantique, IRISA (France)
- 7526 0I **Efficient compression scheme by use of the region division of elemental images on MALT in three-dimensional integral imaging** [7526-22]
H.-H. Kang, Kwangwoon Univ. (Korea, Republic of); J.-W. Lee, D.-H. Shin, Dongseo Univ. (Korea, Republic of); E.-S. Kim, Kwangwoon Univ. (Korea, Republic of)

SESSION 6 3D SHAPE MATCHING, INDEXING, AND RETRIEVAL

- 7526 0J **Index spaces for 3D retrieval: toward a better understanding of their geometry and distribution** [7526-23]
E. Paquet, National Research Council (Canada) and Univ. of Ottawa (Canada); H. L. Viktor, Univ. of Ottawa (Canada)
- 7526 0K **Correspondence-free alignment of 3D object models** [7526-24]
C. B. Akgül, Bogaziçi Univ. (Turkey); B. Sankur, Y. Yemez, Koç Univ. (Turkey)
- 7526 0L **Sketch-driven mental 3D object retrieval** [7526-25]
T. Napoléon, H. Sahbi, TELECOM ParisTech, CNRS (France)
- 7526 0M **View subspaces for indexing and retrieval of 3D models** [7526-26]
H. Dutagaci, A. Godil, National Institute of Standards and Technology (United States);
B. Sankur, Boğaziçi Univ. (Turkey); Y. Yemez, Koç Univ. (Turkey)

SESSION 7 3D AND 4D IMAGE CAPTURE, HARDWARE IMPLEMENTATION

- 7526 ON **Memory efficient belief propagation for high-definition real-time stereo matching systems** [7526-27]
J. Pérez, P. Sánchez, Univ. de Cantabria (Spain); M. Martínez, DS2 (Spain)
- 7526 OO **Robot navigation and obstacle detection in pipelines using time-of-flight imagery** [7526-28]
J. T. Thielemann, G. M. Breivik, A. Berge, SINTEF (Norway)
- 7526 OP **A four-directional body shape measurement system and its application for pectus excavatum severity assessment** [7526-29]
M. Witkowski, Warsaw Univ. of Technology (Poland); W. Glinkowski, Medical Univ. of Warsaw (Poland); R. Sitnik, Warsaw Univ. of Technology (Poland); H. Kocoń, Medical Univ. of Warsaw (Poland); P. Bolewicki, Warsaw Univ. of Technology (Poland); A. Górecki, Medical Univ. of Warsaw (Poland)
- 7526 OQ **Integrated shape, color, and reflectivity measurement method for 3D digitization of cultural heritage objects** [7526-30]
R. Sitnik, G. Maczkowski, J. Krzeslowski, Warsaw Univ. of Technology (Poland)
- 7526 OR **Crosstalk measurement and mitigation for autostereoscopic displays** [7526-31]
M. Barkowsky, Univ. of Nantes (France); P. Campisi, Univ. degli Studi di Roma Tre (Italy); P. Le Callet, Univ. of Nantes (France); V. Rizzo, Univ. of Nantes (France) and Univ. degli Studi di Roma Tre (Italy)

SESSION 8 3D VISUALIZATION, 3D DISPLAY, QUALITY ASSESSMENT

- 7526 OS **A comprehensive database and subjective evaluation methodology for quality of experience in stereoscopic video** [7526-32]
L. Goldmann, F. De Simone, T. Ebrahimi, Ecole Polytechnique Fédérale de Lausanne (Switzerland)
- 7526 OT **Measuring errors for huge semi-regular meshes** [7526-33]
A. Roquel, A. Meftah, F. Payan, M. Antonini, I3S Lab., CNRS, Univ. of Nice-Sophia Antipolis (France)
- 7526 OU **A novel 3D hand-area space sharing system** [7526-34]
A. Morishita, R. Fukushima, H. Kobayashi, Y. Kokojima, S. Yamamoto, Y. Hirayama, Toshiba Corp. (Japan)

INTERACTIVE PAPER SESSION

- 7526 OV **Universal 4D multiplexing of layered disparity image sequences for pixel and voxel based display devices** [7526-35]
A. Grasnack, Sunny Ocean Studios Pte. Ltd. (Singapore)

- 7526 OW **Context-dependent player's movement interpretation: application to adaptive game development** [7526-36]
F. Picard, XD Productions (France) and Univ. of La Rochelle (France); P. Estrailier, Univ. of La Rochelle (France)
- 7526 OX **Three-dimensional shape construction of pulsatile tissue from ultrasonic movies for assistance of clinical diagnosis** [7526-37]
M. Fukuzawa, H. Kawaguchi, M. Yamada, N. Nakamori, Kyoto Institute of Technology (Japan); Y. Kitsunozuka, Saiseikai Hyogo-ken Hospital (Japan)
- 7526 OY **Automation of 3D scan data capturing and processing** [7526-38]
R. Sitnik, M. Karaszewski, W. Załuski, J. Rutkiewicz, Warsaw Univ. of Technology (Poland)
- 7526 OZ **Feature-based quality evaluation of 3D heterogeneous data registration** [7526-39]
T. Ridene, F. Goulette, Mines ParisTech (France)

Author Index

Conference Committee

Symposium Chair

Jan P. Allebach, Purdue University (United States)

Symposium Cochair

Sabine Süsstrunk, Ecole Polytechnique Fédérale de Lausanne
(Switzerland)

Conference Chair

Atilla M. Baskurt, University of Lyon (France)

Program Committee

Mongi A. Abidi, The University of Tennessee (United States)
Hugues Benoit-Cattin, University of Lyon (France)
Adrian G. Bors, The University of York (United Kingdom)
Saida Bouakaz, University of Lyon (France)
Mohamed Daoudi, Institut Télécom (France)
Jean-Luc E. Dugelay, Institut Eurécom (France)
Florent Dupont, University of Lyon (France)
Afzal Godil, National Institute of Standards and Technology
(United States)
Benoît Macq, Université Catholique de Louvain (Belgium)
Serge Mignet, University of Lyon (France)
Levent Onural, Bilkent University (Turkey)
Eric Paquet, National Research Council Canada (Canada)
Marc Pollefeys, University of North Carolina, Chapel Hill (United States)
and ETH Zürich (Switzerland)
Bülent Sankur, Boğaziçi Üniv. (Turkey)
Peter Schelkens, Vrije Universiteit Brussel (Belgium)
Robert Sitnik, Warsaw University of Technology (Poland)
Michela Spagnuolo, IMATI (Italy)
Frédéric Truchetet, Université de Bourgogne (France)
Stefano Tubaro, Politecnico di Milano (Italy)

Session Chairs

- 1 3D Analysis, Feature Extraction, Segmentation
Atilla M. Baskurt, University of Lyon (France)

- 2 3D Face Recognition
Afzal Godil, National Institute of Standards and Technology (United States)
- 3 Multiview Coding, 3D TV
Jean-Luc E. Dugelay, EURECOM (France)
- 4 3D Reconstruction from 2D Views, Videos, and Point Clouds
Eric Paquet, National Research Council Canada (Canada)
- 5 3D Compression and Watermarking
Jean-Luc E. Dugelay, EURECOM (France)
- 6 3D Shape Matching, Indexing, and Retrieval
Frédéric Truchetet, Université de Bourgogne (France)
- 7 3D and 4D Image Capture, Hardware Implementation
Robert Sitnik, Warsaw University of Technology (Poland)
- 8 3D Visualization, 3D Display, Quality Assessment
Eric Paquet, National Research Council Canada (Canada)