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Dan Popescu · Paul Scheunders (Eds.)

Advanced Concepts for Intelligent Vision Systems

16th International Conference, ACIVS 2015
Catania, Italy, October 26–29, 2015
Proceedings

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Preface

These proceedings gather the selected papers of the Advanced Concepts for Intelligent Vision Systems (ACIVS) conference which was held in Catania, Italy, during October 26–29, 2015.

This event was the 16th ACIVS. After the first event in Germany in 1999, ACIVS has become a larger and independent scientific conference. However, the seminal distinctive governance rules have been maintained:

- To update the conference scope on a yearly basis. While keeping a technical backbone (the classic low-level image processing techniques), we have introduced topics of interest such as – chronologically – image and video compression, 3D, surveillance, etc., in order to fit the conference scope to our scientific community's needs. In addition, speakers usually give invited talks on hot issues.
- To remain a single-track conference in order to promote scientific exchanges within the audience.
- To grant oral presentations a duration of 25 minutes and published papers a length of 12 pages, which is significantly different from most other conferences.

The second and third items generate a complex management of the conference; in particular, the number of time slots is rather small. Although the selection between the two presentation formats is primarily determined by the need to compose a well-balanced program, papers presented during plenary and poster sessions enjoy the same importance and publication format.

The first item is strengthened by the notoriety of ACIVS, which has been growing over the years: official 2015 Springer records show a cumulated number of downloads on January 1, of more than 325,000.

ACIVS 2015 started with a special session on the topic of large-scale video processing and embedded intelligence highlighted by invited talks from Michael Tchagaspanian (CEA, France) and Alessandro Capra (STMicroelectronics, Italy). The goal of this special session was to facilitate discussion of the state of the art and future challenges in the booming research area of computer vision and video processing for interconnected camera systems. The session provided an opportunity for liaison between academic and industrial research and development in this field demonstrated by several successful cross-national projects and collaborations whose representatives were among the session participants.

The regular sessions also included a couple of invited talks by Prof. Raimondo Schettini (University of Milano Bicocca) and Prof. Gabriela Csurka (Xerox Research Centre Europe). We would like to thank all of them for enhancing the technical program with their presentations.

ACIVS 2015 attracted submissions from many different countries, mostly from Europe, but also from the rest of the world: Algeria, Australia, Austria, Brazil, Belgium, Canada, China, Cyprus, Czech Republic, Denmark, Ecuador, France, Finland,

Germany, Hungary, India, Israel, Italy, Korea, Mexico, The Netherlands, Poland, Romania, Russia, Switzerland, Taiwan, Tunisia, Turkey, the Ukraine, United Arab Emirates, the UK, and the USA.

From 129 submissions, 35 were selected for oral presentation and 41 as posters. The paper submission and review procedure was carried out electronically and a minimum of three reviewers were assigned to each paper. A large and energetic Program Committee (87 people), helped by additional referees (about 150 people in total), as listed on the following pages, completed the long and demanding reviewing process. We would like to thank all of them for their timely and high-quality reviews, achieved in quite a short time and just before the summer holidays.

Also, we would like to thank our sponsors (in alphabetical order) Antwerp University, University of Catania, CSIRO (Commonwealth Scientific and Industrial Research Organization), Ghent University, and GIRPR (Gruppo Italiano Ricercatori in Pattern Recognition) for their valuable support.

Finally, we would like to thank all the participants who trusted in our ability to organize this conference for the 16th time. We hope they attended a different and stimulating scientific event and that they enjoyed the atmosphere of the ACIVS social events in the city of Catania.

As explained, a conference like ACIVS would not be feasible without the concerted effort of many people and the support of various institutions. We are indebted to the local organizers for having smoothed all the harsh practical details of an event venue, and we hope to welcome them in the near future.

July 2015

Sebastiano Battiato
Jacques Blanc-Talon
Giovanni Gallo
Wilfried Philips
Dan Popescu
Paul Scheunders

About the Volume Editors

Sebastiano Battiato received his degree in computer science (summa cum laude) in 1995 from the University of Catania and his PhD in computer science and applied mathematics from the University of Naples in 1999. From 1999 to 2003 he was the leader of the "Imaging" team at STMicroelectronics in Catania. He joined the Department of Mathematics and Computer Science at the University of Catania as assistant professor in 2004 and became associate professor in the same department in 2011. His research interests include image enhancement and processing, image coding, camera imaging technology, and multimedia forensics. He has edited six books and co-authored more than 180 papers in international journals, conference proceedings, and book chapters. He is a co-inventor of about 20 international patents, reviewer for several international journals, and he has been regularly a member of numerous international conference committees. Prof. Battiato has participated in many international and national research projects. He has chaired several international events (VAAM 2014, 2015; VISAPP 2012, 2013, 2014, 2015; ICIAP 2011; ACM MiFor 2010, 2011; SPIE EI Digital Photography 2011, 2012, 2013, etc.); he served as associate editor for IEEE TCSVT (2008–2011) and for SPIE *Journal of Electronic Imaging*. Prof. Battiato has been guest editor of several special issues on various topics related to imaging applications for the following journals: *EURASIP Journal on Image and Video Processing* (2010), *IEEE Multimedia Magazine* (2012), and *Pattern Recognition Letters* (2015). He is the recipient of the 2011 Best Associate Editor Award of the *IEEE Transactions on Circuits and Systems for Video Technology*. He is director (and co-founder) of the International Computer Vision Summer School (ICVSS), Sicily, Italy. Prof. Battiato is a senior member of the IEEE.

Jacques Blanc-Talon received his PhD degree from Paris XI (Orsay) University in 1991. After a postdoc at CSIRO in Australia, he joined the Ministry of Defence in France. He worked as Scientific Manager, Head of the "Information Engineering and Robotics" scientific domain at the DGA/MRIS and is currently with the Integrated Navigation Systems department. He was the French delegate of several NATO Groups and of the Horizon 2020 Security Research Programme Committee. J. Blanc-Talon has conducted the review of around 400 PhD and postdoc grant applications, has participated in 80 defence juries and has supervised some 40 PhD students. He has published about 90 scientific papers and was the editor or co-editor of 12 books and special journals issues. He served as associate editor for IOS ICAE from 2000 to 2006, and IEEE TIP from 2005 to 2008; he is a reviewer for IEEE PAMI and TIP, IEE *Electronics Letters*, *SIAM Journal on Applied Mathematics,* and *IAPR Pattern Recognition*. He has been involved in the organization of more than 90 international conferences. J. Blanc-Talon was promoted to "Chevalier de l'ordre des Palmes Académiques" in 2010, and IEEE Senior Member in 2015. He is currently the IEEE Chapter Chair for the French Signal Processing Chapter.

Wilfried Philips received a diploma in electrical engineering (1989, summa cum laude) and a PhD degree in applied sciences (1993, summa cum laude), both from

Ghent University, Belgium. He is currently a senior full professor at the Department of Telecommunications and Information Processing of Ghent University, where he heads the research group "Image Processing and Interpretation," which currently consists of about 35 researchers. The current interests of the group are in real-time video improvement, image analysis, multi-camera computer vision and big data analysis, for a variety of applications; these include remote sensing, analysis of the behavior of people, visual odometry, and traffic scene analysis. W. Philips is co-author of over 750 papers in scientific conference and journal papers. He is also on the editorial board of the *Journal of Ambient Intelligence and Smart Environments* (JAISE).

W. Philips is a senior member of IEEE. Recently, he also became a founding partner of the company Senso2Me, which currently focuses on Internet of Things solutions for elderly care. He is also the promoter of Ghent University's Innovation Centre for Intelligent Information Processing — iKnow, which aims to market Ghent University's research through partnerships with companies, licensing agreements, and the creation of spin-offs.

Dan Popescu completed his undergraduate and postgraduate studies at the Polytechnical Institute of Bucharest, Romania, between 1975 and 1980, graduating with an MEngSc degree (honors) in Computer Science. In 1977 he won the national mathematical competition for engineering students, and represented Romania at the 6th Balkan Mathematics Olympiad, in Belgrade (Serbia), where he won the first prize. From 1980 until 1990 he worked in a joint research team from industry and academia, firstly as an engineer with the Factory for Computer Peripherals (1980–1984), and then as a research engineer and adjunct professor in the Electronics and Telecommunications Department of the Polythechnical Institute of Bucharest (1984–1990). During this period he developed both system and application software for a new graphical personal computer. He provided technical assistance and took part in the installation of the system in Sofia, Dresden, and Magdeburg. In 1991, he briefly worked for a software development company in Dusseldorf, Germany. During 1992–1996 he completed his PhD studies at Sydney University, in the department of Electrical Engineering. Since April 1996, he has been a research scientist with CSIRO, initially with the Division of Information Technology, and currently with the ICT Centre. He worked on several projects focusing on the themes of imaging and vision, with applications to remote sensing, image coding and acquisition, and virtual reality and haptic interaction, applied to the simulation of medical procedures. His interests include image and signal processing, pattern recognition, coding theory, modeling and simulation. He likes to combine his natural mathematical skills and his engineering background to solve real-world problems.

Paul Scheunders received a BS degree and a PhD degree in physics, with work in the field of statistical mechanics, from the University of Antwerp, Belgium, in 1983 and 1990, respectively. In 1991, he became a research associate with the Vision Lab, Department of Physics, University of Antwerp, where he is currently a professor. His current research interest includes remote sensing and hyper-spectral image processing. He has published over 150 papers in international journals and proceedings in the field of image processing, pattern recognition, and remote sensing. Paul Scheunders is associate editor of the *IEEE Transactions in Geoscience and Remote Sensing*, and has served as program committee member in numerous international conferences on remote sensing. He is senior member of the IEEE Geoscience and Remote Sensing Society.

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Contents

Low-Level Image Processing

BNRFBE Method for Blur Estimation in Document Images 3
Van Cuong Kieu, Florence Cloppet, and Nicole Vincent

Edge Width Estimation for Defocus Map from a Single Image 15
Andrey Nasonov, Alexandra Nasonova, and Andrey Krylov

RSD-DOG: A New Image Descriptor Based on Second Order Derivatives . . . 23
Darshan Venkatrayappa, Philippe Montesinos, Daniel Diep, and Baptiste Magnier

Ringing Artifact Suppression Using Sparse Representation 35
Alexey V. Umnov, Andrey S. Krylov, and Andrey V. Nasonov

Patch-Based Mathematical Morphology for Image Processing, Segmentation and Classification 46
Olivier Lézoray

Time Ordering Shuffling for Improving Background Subtraction. 58
Benjamin Laugraud, Philippe Latour, and Marc Van Droogenbroeck

Fast and Low Power Consumption Outliers Removal for Motion Vector Estimation 70
Giuseppe Spampinato, Arcangelo Bruna, Giovanni Maria Farinella, Sebastiano Battiato, and Giovanni Puglisi

Adaptive Scale Selection for Multiscale Image Denoising 81
Federico Angelini, Vittoria Bruni, Ivan Selesnick, and Domenico Vitulano

Secure Signal Processing Using Fully Homomorphic Encryption. 93
Thomas Shortell and Ali Shokoufandeh

Video Processing and Camera Networks

Towards a Bayesian Video Denoising Method 107
Pablo Arias and Jean-Michel Morel

Collaborative, Context Based Activity Control Method for Camera Networks. 118
Marek Kraft, Michał Fularz, and Adam Schmidt

EFIC: Edge Based Foreground Background Segmentation and Interior Classification for Dynamic Camera Viewpoints 130
Gianni Allebosch, Francis Deboeverie, Peter Veelaert, and Wilfried Philips

A Unified Camera Calibration from Arbitrary Parallelograms and Parallepipeds 142
Jae-Hean Kim and Jin Sung Choi

Motion Compensation Based on Robust Global Motion Estimation: Experiments and Applications. 154
Mathieu Pouzet, Patrick Bonnin, Jean Laneurit, and Cédric Tessier

Bayesian Fusion of Back Projected Probabilities (BFBP): Co-occurrence Descriptors for Tracking in Complex Environments. 167
Mark Moyou, Koffi Eddy Ihou, Rana Haber, Anthony Smith, Adrian M. Peter, Kevin Fox, and Ronda Henning

Embedded System Implementation for Vehicle Around View Monitoring. . . . 181
Wan-Jhen Lo and Daw-Tung Lin

Motion and Tracking

Cosine-Sine Modulated Filter Banks for Motion Estimation and Correction. . . 195
Marco Maass, Huy Phan, Anita Möller, and Alfred Mertins

Fast and Robust Variational Optical Flow for High-Resolution Images Using SLIC Superpixels. 205
Simon Donné, Jan Aelterman, Bart Goossens, and Wilfried Philips

Depth-Based Filtration for Tracking Boost 217
David Chrapek, Vitezslav Beran, and Pavel Zemcik

Robust Fusion of Trackers Using Online Drift Prediction. 229
Isabelle Leang, Stéphane Herbin, Benoît Girard, and Jacques Droulez

Bootstrapping Computer Vision and Sensor Fusion for Absolute and Relative Vehicle Positioning. 241
Karel Janssen, Erwin Rademakers, Boulaid Boulkroune, Norddin El Ghouti, and Richard Kleihorst

Detection of Social Groups in Pedestrian Crowds Using Computer Vision . . . 249
Sultan Daud Khan, Giuseppe Vizzari, Stefania Bandini, and Saleh Basalamah

Single Image Visual Obstacle Avoidance for Low Power Mobile Sensing . . . 261
Levente Kovács

ROS-Based SLAM for a Gazebo-Simulated Mobile Robot in Image-Based 3D Model of Indoor Environment 273
Ilya Afanasyev, Artur Sagitov, and Evgeni Magid

Security, Forensics and Biometrics

Full-Body Human Pose Estimation by Combining Geodesic Distances and 3D-Point Cloud Registration 287
Sebastian Handrich and Ayoub Al-Hamadi

A Graph Based People Silhouette Segmentation Using Combined Probabilities Extracted from Appearance, Shape Template Prior, and Color Distributions 299
Christophe Coniglio, Cyril Meurie, Olivier Lézoray, and Marion Berbineau

Improved Region-Based Kalman Filter for Tracking Body Joints and Evaluating Gait in Surveillance Videos 311
Binu M. Nair and Kimberly D. Kendricks

A Predictive Model for Human Activity Recognition by Observing Actions and Context 323
Dennis G. Romero, Anselmo Frizera, Angel D. Sappa, Boris X. Vintimilla, and Teodiano F. Bastos

Direct Image Alignment for Active Near Infrared Image Differencing 334
Jinwoo Kang, David V. Anderson, and Monson H. Hayes

Two-Stage Filtering Scheme for Sparse Representation Based Interest Point Matching for Person Re-identification 345
Mohamed Ibn Khedher and Mounim A. El Yacoubi

Distance-Based Descriptors for Pedestrian Detection 357
Radovan Fusek and Eduard Sojka

Spatiotemporal Integration of Optical Flow Vectors for Micro-expression Detection 369
Devangini Patel, Guoying Zhao, and Matti Pietikäinen

Unified System for Visual Speech Recognition and Speaker Identification . . . 381
Ahmed Rekik, Achraf Ben-Hamadou, and Walid Mahdi

Soft Biometrics by Modeling Temporal Series of Gaze Cues Extracted in the Wild 391
Dario Cazzato, Marco Leo, Andrea Evangelista, and Cosimo Distante

Online Face Recognition System Based on Local Binary Patterns and Facial Landmark Tracking 403
Marko Linna, Juho Kannala, and Esa Rahtu

A Minimax Framework for Gender Classification Based on Small-Sized Datasets 415
Marco Del Coco, Pierluigi Carcagnì, Marco Leo, and Cosimo Distante

Age and Gender Characterization Through a Two Layer Clustering of Online Handwriting 428
Gabriel Marzinotto, José C. Rosales, Mounim A. El-Yacoubi, and Sonia Garcia-Salicetti

Head Roll Estimation Using Horizontal Energy Maximization 440
Nam-Jun Pyun and Nicole Vincent

Tooth Segmentation Algorithm for Age Estimation 452
Mauro Bacaloni, Pierluigi Maponi, and Roberto Cameriere

On Blind Source Camera Identification 464
G.M. Farinella, M.V. Giuffrida, V. Digiacomo, and S. Battiato

Content-Fragile Commutative Watermarking-Encryption Based on Pixel Entropy 474
Roland Schmitz, Shujun Li, Christos Grecos, and Xinpeng Zhang

A PNU-Based Technique to Detect Forged Regions in Digital Images 486
Giuseppe Cattaneo, Umberto Ferraro Petrillo, Gianluca Roscigno, and Carmine De Fusco

Depth and 3D

What Does One Image of One Ball Tell Us About the Focal Length? 501
Rudi Penne, Bart Ribbens, Luc Mertens, and Paul Levrie

Visual Localisation from Structureless Rigid Models 510
Guido Manfredi, Michel Devy, and Daniel Sidobre

Optical Sensor Tracking and 3D-Reconstruction of Hydrogen-Induced Cracking 521
Christian Freye, Christian Bendicks, Erik Lilienblum, and Ayoub Al-Hamadi

Plane Extraction for Indoor Place Recognition 530
Ciro Potena, Alberto Pretto, Domenico D. Bloisi, and Daniele Nardi

A Trust Region Optimization Method for Fast 3D Spherical Configuration in Morphing Processes 541
Naziha Dhibi, Akram Elkefi, Wajdi Bellil, and Chokri Ben Amar

On Optimal Illumination for DOVID Description Using Photometric Stereo . . . 553
Daniel Soukup, Svorad Štolc, and Reinhold Huber-Mörk

Human Machine Interaction via Visual Speech Spotting 566
Ahmed Rekik, Achraf Ben-Hamadou, and Walid Mahdi

Improving Kinect-Skeleton Estimation 575
Jakub Valcik, Jan Sedmidubsky, and Pavel Zezula

Image Quality Improvement and Assessment

Color Image Quality Assessment Based on Gradient Similarity and Distance Transform 591
Zianou Ahmed Seghir and Fella Hachouf

Toward a Universal Stereoscopic Image Quality Metric Without Reference. . . . 604
Aladine Chetouani

Analysis of HVS-Metrics' Properties Using Color Image Database TID2013 613
Nikolay Ponomarenko, Vladimir Lukin, Jaakko Astola, and Karen Egiazarian

Solidarity Filter for Noise Reduction of 3D Edges in Depth Images 625
Hani Javan Hemmat, Egor Bondarev, and Peter H.N. de With

A Task-Driven Eye Tracking Dataset for Visual Attention Analysis 637
Yingyue Xu, Xiaopeng Hong, Qiuhai He, Guoying Zhao, and Matti Pietikäinen

Classification and Recognition

Image Analysis and Microscopy in Food Science: Computer Vision and Visual Inspection 651
Gaetano Impoco

Semantic Shape Models for Leaf Species Identification 661
Olfa Mzoughi, Itheri Yahiaoui, Nozha Boujemaa, and Ezzeddine Zagrouba

Multi-distinctive MSER Features and Their Descriptors: A Low-Complexity Tool for Image Matching 672
Andrzej Śluzek

Spatio-Temporal Object Recognition 681
Roeland De Geest, Francis Deboeverie, Wilfried Philips, and Tinne Tuytelaars

Image Recognition in UAV Application Based on Texture Analysis 693
Dan Popescu and Loretta Ichim

Cascaded Regressions of Learning Features for Face Alignment 705
Ngoc-Trung Tran, Fakhreddine Ababsa, Sarra Ben Fredj, and Maurice Charbit

A Generic Feature Selection Method for Background Subtraction Using Global Foreground Models 717
Marc Braham and Marc Van Droogenbroeck

Towards More Natural Social Interactions of Visually Impaired Persons 729
Sergio Carrato, Gianfranco Fenu, Eric Medvet, Enzo Mumolo, Felice Andrea Pellegrino, and Giovanni Ramponi

A Mobile Application for Braille to Black Conversion. 741
Giovanni Maria Farinella, Paolo Leonardi, and Filippo Stanco

Unsupervised Salient Object Matting 752
Jaehwan Kim and Jongyoul Park

A Comparison of Multi-scale Local Binary Pattern Variants for Bark Image Retrieval 764
Safia Boudra, Itheri Yahiaoui, and Ali Behloul

Multidimensional Signal Processing

Improvement of a Wavelet-Tensor Denoising Algorithm by Automatic Rank Estimation 779
Julien Marot and Salah Bourennane

Minimizing the Impact of Signal-Dependent Noise on Hyperspectral Target Detection 791
Josselin Juan, Salah Bourennane, and Caroline Fossati

Edge Detection Method Based on Signal Subspace Dimension for Hyperspectral Images 803
Caroline Fossati, Salah Bourennane, and Alexis Cailly

Dictionary-Based Compact Data Representation for Very High Resolution Earth Observation Image Classification 816
Corina Văduva, Florin-Andrei Georgescu, and Mihai Datcu

Sphere-Tree Semi-regular Remesher 826
Mejda Chihaoui, Akram Elkefi, Wajdi Bellil, and Chokri Ben Amar

Multimedia Compression. Retrieval and Navigation

Exploring Protected Nature Through Multimodal Navigation of Multimedia Contents 841
Giovanni Signorello, Giovanni Maria Farinella, Giovanni Gallo, Luciano Santo, Antonino Lopes, and Emanuele Scuderi

An H.264 Sensor Aided Encoder for Aerial Video Sequences with In-the-Loop Metadata Enhancement 853
Luca Cicala, Cesario Vincenzo Angelino, Nadir Raimondo, Enrico Baccaglini, and Marco Gavelli

Buffering Hierarchical Representation of Color Video Streams for Interactive Object Selection 864
François Merciol and Sébastien Lefèvre

Multiple Description Coding for Multi-view Video 876
Jing Chen, Canhui Cai, Xiaolan Wang, Huanqiang Zeng, and Kai-Kuang Ma

A Game Engine as a Generic Platform for Real-Time Previz-on-Set in Cinema Visual Effects 883
Timothée de Goussencourt, Jean Dellac, and Pascal Bertolino

Author Index 895