

Commenced Publication in 1973

Founding and Former Series Editors:

Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

Editorial Board

David Hutchison

Lancaster University, UK

Takeo Kanade

Carnegie Mellon University, Pittsburgh, PA, USA

Josef Kittler

University of Surrey, Guildford, UK

Jon M. Kleinberg

Cornell University, Ithaca, NY, USA

Alfred Kobsa

University of California, Irvine, CA, USA

Friedemann Mattern

ETH Zurich, Switzerland

John C. Mitchell

Stanford University, CA, USA

Moni Naor

Weizmann Institute of Science, Rehovot, Israel

Oscar Nierstrasz

University of Bern, Switzerland

C. Pandu Rangan

Indian Institute of Technology, Madras, India

Bernhard Steffen

TU Dortmund University, Germany

Madhu Sudan

Microsoft Research, Cambridge, MA, USA

Demetri Terzopoulos

University of California, Los Angeles, CA, USA

Doug Tygar

University of California, Berkeley, CA, USA

Gerhard Weikum

Max Planck Institute for Informatics, Saarbruecken, Germany

Abderrahim Elmoataz Driss Mammass
Olivier Lezoray Fathallah Nouboud
Driss Aboutajdine (Eds.)

Image and Signal Processing

5th International Conference, ICISP 2012
Agadir, Morocco, June 28-30, 2012
Proceedings

Volume Editors

Abderrahim Elmoataz
Université de Caen Basse-Normandie
Caen, France
E-mail: abderrahim.elmoataz-billah@unicaen.fr

Driss Mammass
Université IbnZohr
Agadir, Morocco
E-mail: mammass@univibnzohr.ac.ma

Olivier Lezoray
Université de Caen Basse-Normandie
Caen, France
E-mail: olivier.lezoray@unicaen.fr

Fathallah Nouboud
Université du Québec à Trois-Rivières
Trois-Rivières, QC, Canada
E-mail: fathallah.nouboud@uqtr.ca

Driss Aboutajdine
Université Mohammed V – Agdal
Rabat, Morocco
E-mail: aboutaj@fsr.ac.ma

ISSN 0302-9743 e-ISSN 1611-3349
ISBN 978-3-642-31253-3 e-ISBN 978-3-642-31254-0
DOI 10.1007/978-3-642-31254-0
Springer Heidelberg Dordrecht London New York

Library of Congress Control Number: Applied for

CR Subject Classification (1998): I.4.6-8, I.4, I.5.1-4, I.5, I.2.7, I.2.10, F.2, C.3

LNCS Sublibrary: SL 6 – Image Processing, Computer Vision, Pattern Recognition, and Graphics

© Springer-Verlag Berlin Heidelberg 2012

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, re-use of illustrations, recitation, broadcasting, reproduction on microfilms or in any other way, and storage in data banks. Duplication of this publication or parts thereof is permitted only under the provisions of the German Copyright Law of September 9, 1965, in its current version, and permission for use must always be obtained from Springer. Violations are liable to prosecution under the German Copyright Law.

The use of general descriptive names, registered names, trademarks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

Preface

ICISP 2012, the International Conference on Image and Signal Processing, was the fifth ICISP conference, and was held in Agadir, Morocco. Historically, ICISP is a conference resulting from the actions of researchers from Canada, France and Morocco. Previous editions of ICISP were held in Trois-Rivières, Québec, (Canada 2010), in Cherbourg-Octeville (France, 2008) and in Agadir (Morocco, 2003 and 2001). ICISP 2012 was sponsored by EURASIP (European Association for Image and Signal Processing) and IAPR (International Association for Pattern Recognition).

The response to the call for papers for ICISP 2012 was encouraging. From 158 full papers submitted, 75 were finally accepted. The review process was carried out by the Program Committee members; all are experts in various image and signal processing areas. Each paper was reviewed by at least two reviewers, and also checked by the conference Co-chairs. The quality of the papers in these proceedings is attributed first to the authors, and second to the quality of the reviews provided by the experts. We would like to thank the authors for responding to our call, and we thank the reviewers for their excellent work. We were very pleased to be able to include in the conference program keynote talks by three world-renowned experts: Matti Pietikäinen, Director of Infotech Oulu Research Center, Finland; Denis Laurendeau, President of the International Association for Pattern Recognition (IAPR), Director of the REPARTI Research Center and Head of the Computer Vision and Systems Laboratory at Laval University, Quebec, Canada; and Saad Biaz, Professor, Computer Science and Software Engineering Department, Auburn University, USA.

We would also like to thank the members of the local committee for their advice and help. We are grateful to Springer's editorial staff for supporting this publication in the LNCS series. Finally, we were very pleased to welcome all the participants to this conference. For those who did not attend, we hope this publication provides a good view into the research presented at the conference, and we look forward to meeting you at the next ICISP conference.

April 2012

Abderrahim Elmoataz
Driss Mammass
Olivier Lezoray
Fathallah Nouboud
Driss Aboutajdine

ICISP 2012 Organization

General Chairs

Driss Mammass	Ibn Zohr University, Morocco
Abderrahim Elmoataz	Université de Caen Basse-Normandie, France

Program Committee Chairs

Fathallah Nouboud	Université du Québec à Trois-Rivières, Québec, Canada
Olivier Lezoray	Université de Caen Basse-Normandie, France
Driss Aboutajdine	Université Mohammed V- Agdal, Morocco

Local Organizing Committee

Hassan Douzi	Ibn Zohr University, Agadir, Morocco
Soufiane Idbraim	Ibn Zohr University, Agadir, Morocco
Abdelkarim Zatni	Ibn Zohr University, Agadir, Morocco
Youssef Es-saady	Ibn Zohr University, Agadir, Morocco
Mohamed El Hajji	Ibn Zohr University, Agadir, Morocco

Web Masters

Mohamed El Hajji	IRFSIC, Ibn Zohr University, Agadir, Morocco
Youssef Es-saady	IRFSIC, Ibn Zohr University, Agadir, Morocco

International Associations Sponsors

International Association for Pattern Recognition (IAPR)
European Association for Signal Processing (EURASIP)
Association of Research on Pattern Recognition and Imaging (ARPRI)
Pôle de Compétences Sciences Technologies de l'information et la
Communication (STIC)

Sponsoring Institutions

Université Ibn Zohr, Agadir, Morocco
Université du Québec à Trois-Rivières, Québec, Canada
Université de Caen Basse-Normandie, France
Faculté des sciences, Université Ibn Zohr, Agadir, Morocco
Ecole supérieur de technologie, Université Ibn Zohr, Agadir, Morocco

Program Committee

Ennaji Abdel	Université de Rouen, France
Shigeo Abe	Kobe University, Japan
Driss Aboutajdine	Université Mohamed V, Morocco
Jesus Angulo	MINES ParisTech, France
Antonis Argyros	University of Crete and FORTH-ICS, Greece
Sebastiano Battiato	University of Catania, Italy
George Bebis	University of Nevada, USA
Abdel Belaid	Université Vand.-Les-Nancy, France
Mostafa Bellaflkih	INPT- Rabat, Morocco
Charles Beumier	Royal Military Academy, Belgium, Belgium
Guillaume-Alexandre Bilodeau	École Polytechnique de Montréal, Canada
Walter Blondel	INPL, France
Giuseppe Boccignone	Università degli Studi di Milano, Italy
Diego Borro	Ceit And Tecun, Spain, Spain
Adrian Bors	University of York, UK
Alain Boucher	The Francophone Institute For Computer Science, Vietnam
Sébastien Bougleux	Université de Caen Basse-Normandie, France
Alexandra Branzan	University of Victoria, Canada
Xavier Bresson	City University of Hong Kong, China
Luc Brun	ENSICAEN, France
Gustavo Carneiro	The University of Adelaide, Australia
Emre Celebi	Louisiana State University in Shreveport, USA
Alain Chalifour	Université du Québec à Trois Rivières, Canada
Jocelyn Chanussot	GIPSA-Lab, Grenoble Institute of Technology, France
Christophe Charrier	Université de Caen Basse-Normandie, France
Xiaochun Cheng	Middlesex University, UK
Mohamed Cheriet	University of Quebec's École de technologie supérieure, Canada
Ronald Chung	The Chinese University of Hong Kong, Hong Kong
Laurent Cohen	Ceremade, France
Tomeu Coll	Universitat de les Illes Balears, Spain
Jose Crespo	Universidad Politécnica de Madrid, Spain
Kevin Curran	University of Ulster, UK
Jérôme Darbon	UCLA, USA
Marleen de Bruijne	Erasmus MC, The Netherlands
Farzin Deravi	University of Kent, United Kingdom, UK
François Deschenes	Université du Québec à Rimouski, Canada
Hassan Douzi	Ibn Zohr Universty, Morocco
Jean-Luc Dugelay	Company EURECOM Sophia Antipolis, France

Laurent Duval	IFP, France, France
Abdelaziz El Fazziki	UCAM (Marrakech), Morocco
Ayman El-Baz	University of Louisville, USA
Abderrahim Elmoataz	Université de Caen Basse-Normandie, France
Adrian Evans	University of Bath, UK
Christine Fernandez-Maloigne	Univ. Poitiers, France
Antonios Gasteratos	Democritus University of Thrace, Greece
Basilios Gatos	National Center for Scientific Research “Demokritos”, Greece
Theo Gevers	University of Amsterdam, The Netherlands
Abel Gomes	Beira Interior University, Portugal
Fabio Gonzalez	National University of Colombia, Bogota, Colombia
Michael Greenspan	Queen’s University, Canada
Metin Gurcan	OSU Columbus, USA
Edwin Hancock	York University, UK
Rachid Harba	Ecole Polytechnique de l’Univ. d’Orléans, France
Jon Yngve Hardeberg	Gjovik University College, France
Laurent Jacques	Université catholique de Louvain, Belgium
Stéphanie Jehan-Besson	Laboratoire GREYC CNRS UMR 6072, France
Xiaoyi Jiang	University of Münster, Germany, Germany
Pierre-Marc Jodoin	Université de Sherbrooke, Canada
Zoltan Kato	University of Szeged, Hungary
Mohamed Lamine Kherfi	Université de Québec à Trois Rivières, Canada
Dimitrios Kosmopoulos	NCSR Demokritos, Greece
Michal Kozubek	Masaryk University, Czech Republic, Czech Republic
Zakaria Lakhdari	Université de Caen, France
Denis Laurendeau	Université Laval, Canada
John Lee	UCL, Belgium
Sébastien Lefevre	Université de Bretagne-Sud, France
Anne-Claire Legrand	Université de Saint-Etienne - Laboratoire Hubert Curien, France
Olivier Lézoray	Université de Caen Basse-Normandie, France
Xuelong Li	University of London, UK
Chen Liming	Ecole Centrale de Lyon, France
Xiaoqiang Lu	Center for Optical Imagery Analysis and Learning, China
Yves Lucas	Orleans University, France
Rastislav Lukac	Sigma Corp. / Foveon, Inc., USA

Anant Madabhushi	Rutgers University, USA
Rémy Malgouyres	Univ – Clermont-Ferrand, France
Driss Mammass	Université Ibn Zohr, Morocco
Alamin Mansouri	Université de Bourgogne, France
Franck Marzani	Université de Bourgogne, France
Petr Matula	CMM, France
Brendan Mccane	University of Otago, New Zealand
Erik Meijering	Erasmus MC - University Medical Center Rotterdam, The Netherlands
Mahmoud Melkemi	Université Haute Alsace, France
Jean Meunier	Université de Montréal, Canada
François Meunier	Université du Québec à Trois-Rivières, Canada
Cyril Meurie	Univ Université de Technologie de Belfort-Montbéliard / Laboratoire Set, France
Max Mignotte	Université de Montréal, Canada
Amar Mitiche	INRS-Enetgie, Matériaux et Télécommunications, Canada
El Yacoubi Mounim	Telecom Sud-Paris, France
Laurent Najman	Université Paris-Est, LIGM, Equipe A3SI, ESIEE Paris, France
Stéphane Nicolas	LITIS, Université de Rouen, France
Fathallah Nouboud	Université de Québec à Trois Rivières, Canada
Jean-Marc Ogier	Université de la rochelle, France
Yanwei Pang	Tianjin University, China
Ruven Pillay	C2RMF, France
Ioannis Pitas	University of Thessaloniki, Greece
Nasir Rajpoot	University of Warwick, UK
Eraldo Ribeiro	Florida Institute of Technology, USA
Audrey Roman	Université de Toulon, France
Eduardo Romero	National University of Colombia, Colombia
Christophe Rosenberger	GREYC - ENSICAEN, France
Gerald Schaefer	Loughborough University, UK
Sophie Schupp	Université de Caen, France
Lik-Kwan Shark	University of Central Lancashire, UK
Jialie Shen	Singapore Management University, Singapore
Robert Sitnik	Warsaw University of Technology, Poland
Bogdan Smolka	Silesian University of Technology, Poland
Jean-Luc Starck	CEA, France
Vinh-Thong Ta	LaBRI (Université de Bordeaux - CNRS - IPB), France
Salvatore Tabbone	LORIA-Nancy Université, France

Yi Tang	Chinese Academy of Sciences, China
Andrea Torsello	University of Venice, Italy
Sylvie Treuillet	University of Orleans, France
David Tschumperle	CNRS, France
Norimishi Tsumura	University of Chiba, France
Eiji Uchino	Yamaguchi University, Japan
Yvon Voisin	Université de Bourgogne, France
Liang Wang	University of Melbourne, Australia
Qi Wang	Xi'an Institute of Optics and Precision Mechanics of CAS, China
Michael Wilkinson	Johann Bernoulli Institute, University of Groningen, The Netherlands
Pingkun Yan	Xi'an Institute of Optics and Precision Mechanics of Chinese Academy of Sciences, China
Djemel Ziou	Université de Sherbrooke, Canada

Table of Contents

Multi/Hyperspectral Imaging

Bayesian Image Matting Using Infrared and Color Cues	1
<i>Layachi Bentabet and Hui Zhang</i>	
Salient Pixels and Dimensionality Reduction for Display of Multi/Hyperspectral Images	9
<i>Steven Le Moan, Ferdinand Deger, Alamin Mansouri, Yvon Voisin, and Jon Yngve Hardeberg</i>	
SVM and Haralick Features for Classification of High Resolution Satellite Images from Urban Areas	17
<i>Aissam Bekkari, Soufiane Idbraim, Azeddine Elhassouny, Driss Mammass, Mostafa El yassa, and Danielle Ducrot</i>	
Data Acquisition Enhancement in Shape and Multispectral Color Measurements of 3D Objects	27
<i>Grzegorz Mączkowski, Robert Sitnik, and Jakub Krzesłowski</i>	
Multi-model Approach for Multicomponent Texture Classification	36
<i>Ahmed Drissi El Maliani, Mohammed El Hassouni, Yannick Berthoumieu, and Driss Aboutajdine</i>	
Simultaneous Multispectral Imaging and Illuminant Estimation Using a Stereo Camera	45
<i>Raju Shrestha and Jon Yngve Hardeberg</i>	
Multisource Fusion/Classification Using ICM and DSMT with New Decision Rule	56
<i>Azeddine Elhassouny, Soufiane Idbraim, Aissam Bekkari, Driss Mammass, and Danielle Ducrot</i>	

Image Filtering and Coding

Text Enhancement by PDE's Based Methods	65
<i>Zouhir Mahani, Jalal Zahid, Sahar Saoud, Mohammed El Rhabi, and Abdelilah Hakim</i>	
Kernel-Based Laplacian Smoothing Method for 3D Mesh Denoising	77
<i>Hicham Badri, Mohammed El Hassouni, and Driss Aboutajdine</i>	
Embedded Real-Time Video Processing System on FPGA	85
<i>Yahia Said, Taoufik Saidani, Fethi Smach, Mohamed Atri, and Hichem Snoussi</i>	

Edge Preserving Image Fusion Based on Contourlet Transform	93
<i>Ashish Khare, Richa Srivastava, and Rajiv Singh</i>	
Selecting Vision Operators and Fixing Their Optimal Parameters Values Using Reinforcement Learning	103
<i>Issam Qaffou, Mohamed Sadgal, and Aziz Elfazziki</i>	
A Phase Congruency Based Document Binarization	113
<i>Hossein Ziaei Nafchi and Hamidreza Rashidy Kanan</i>	
Porting a H264/AVC Adaptive in Loop Deblocking Filter to a TI DM6437EVM DSP	122
<i>Abdellah Skoudarli, Mokhtar Nibouche, and Amina Serir</i>	

Signal Processing 1

Methodology for Acoustic Characterization of a Labial Constraint in Speech Production	131
<i>Leila Falek, Hocine Teffahi, and Amar Djeradi</i>	
Performance of OFDM in Radio Mobile Channel	142
<i>Mohamed Tayebi and Mrahi Bouziani</i>	
Spatial Correlation Characterization for UWB Indoor Channel Based on Measurements	149
<i>H. Chaibi, R. Saadane, My A. Faqihi, and M. Belkasm</i>	
Nonlinear Blind Source Separation Applied to a Simple Bijective Model	157
<i>Shahram Hosseini, Yannick Deville, Sonia El Amine, and Hicham Saylani</i>	
Seismic Signal Discrimination between Earthquakes and Quarry Blasts Using Fuzzy Logic Approach	166
<i>El Hassan Ait Laasri, Es-Saïd Akhouayri, Dris Agliz, and Abderrahman Atmani</i>	

Signal Processing 2

Ultra Wide-Band Channel Characterization Using Generalized Gamma Distributions	175
<i>Zakaria Mohammadi, Rachid Saadane, and Driss Aboutajdine</i>	
Design of an Antenna Array for GNSS/GPS Network	183
<i>Hocine Hamoudi, Boualem Haddad, and Philippe Lognonné</i>	
Blind Separation of Convolutional Mixtures of Non-stationary and Temporally Uncorrelated Sources Based on Joint Diagonalization	191
<i>Hicham Saylani, Shahram Hosseini, and Yannick Deville</i>	

Maximizing Network Lifetime through Optimal Power Consumption in Wireless Sensor Networks	200
<i>El Abdellaoui Saïd, Fakhri Youssef, Debbah Merouane, and Aboutajdine Driss</i>	

Evolutionary Spectrum for Random Field and Missing Observations	209
<i>Rachid Sabre</i>	

Biometric

Iris-Biometric Fuzzy Commitment Schemes under Signal Degradation...	217
<i>C. Rathgeb and Andreas Uhl</i>	

Sfax-Miracl Hand Database for Contactless Hand Biometrics Applications.....	226
<i>Salma Ben Jemaa, Mayssa Frikha, Imen Moalla, Mohamed Hammami, and Hanene Ben-Abdallah</i>	

Spiral Cube for Biometric Template Protection	235
<i>Chouaib Moujahdi, Sanaa Ghouzali, Mounia Mikram, Mohammed Rziza, and George Bebis</i>	

Sparse Representation Based Classification for Face Recognition by k -LiMapS Algorithm	245
<i>Alessandro Adamo, Giuliano Grossi, and Raffaella Lanzarotti</i>	

3D Face Recognition Using an Expression Insensitive Dynamic Mask ...	253
<i>Sadegh Salahshoor and Karim Faez</i>	

Score Fusion in Multibiometric Identification Based on Fuzzy Set Theory	261
<i>Khalid Fakhar, Mohammed El Aroussi, Mohamed Nabil Saidi, and Driss Aboutajdine</i>	

Security Analysis of Key Binding Biometric Cryptosystems	269
<i>Maryam Lafkih, Mounia Mikram, Sanaa Ghouzali, and Mohamed El Haziti</i>	

Watermarking and Texture

Improved Watermark Extraction Exploiting Undetermined Source Separation Methods	282
<i>Mohammed Khalil, Nawal EL Hamdouni, and Abdellah Adib</i>	

Texture Analysis for Trabecular Bone X-Ray Images Using Anisotropic Morlet Wavelet and Rényi Entropy	290
<i>Ahmed Salmi EL Boumnini El Hassani, Mohammed El Hassouni, Rachid Jennane, Mohammed Rziza, and Eric Lespessailles</i>	

Improving of Gesture Recognition Using Multi-hypotheses Object Association	298
<i>Sebastian Handrich, Ayoub Al-Hamadi, and Omer Rashid</i>	
An Improved Images Watermarking Scheme Using FABEMD Decomposition and DCT.....	307
<i>Noura Aherrahrou and Hamid Tairi</i>	
A Fragile Watermarking Scheme Based CRC Checksum and Public Key Cryptosystem for RGB Color Image Authentication	316
<i>Nour El-Houda Golea</i>	
Maximum Likelihood Estimation, Interpolation and Prediction for Fractional Brownian Motion	326
<i>Rachid Harba, Hassan Douzi, and Mohamed El Hajji</i>	
Gabor Filter-Based Texture Features to Archaeological Ceramic Materials Characterization	333
<i>Mohamed Abadi, Majdi Khoudeir, and Sylvie Marchand</i>	
RGB Color Distribution Analysis Using Volumetric Fractal Dimension	343
<i>Dalcimar Casanova and Odemir Martinez Bruno</i>	
Segmentation and Retrieval	
Multiobjective Genetic Algorithm for Image Thresholding	352
<i>Layla Tahri and Mohamed Wakrim</i>	
Dual-Resolution Active Contours Segmentation of Vickers Indentation Images with Shape Prior Initialization	362
<i>Michael Gadermayr and Andreas Uhl</i>	
Matching Noisy Outline Contours Using a Descriptor Reduction Approach	370
<i>Saliha Aouat and Slimane Larabi</i>	
Brain MRI Image Segmentation in View of Tumor Detection: Application to Multiple Sclerosis	380
<i>Rabeb Mezgar, Mohamed Ali Mahjoub, Randa Salem, and Abdellatif Mtibaa</i>	
3D Shape Retrieval Using Bag-of-Feature Method Basing on Local Codebooks	391
<i>El Wardani Dadi, El Mostafa Daoudi, and Claude Tadonki</i>	

Segmentation of Prostate Using Interactive Finsler Active Contours and Shape Prior	397
<i>Foued Derraz, Abdelmalik Taleb-Ahmed, Azzeddine Chikh, Christina Boydev, Laurent Peyrodie, and Gerard Forzy</i>	
Tracking Moving Objects in Road Traffic Sequences	406
<i>Salma Kammoun Jarraya, Najla Bouarada Ghrab, Mohamed Hammami, and Hanene Ben-Abdallah</i>	
Eigen Combination of Colour and Texture Informations for Image Segmentation	415
<i>D. Attia, C. Meurie, and Y. Ruichek</i>	
A Graph Based Approach for Heterogeneous Document Segmentation	424
<i>Fattah Zirari, Driss Mammass, Abdellatif Ennaji, and Stephane Nicolas</i>	
Rotation Invariant Fuzzy Shape Contexts Based on Eigenshapes and Fourier Transforms for Efficient Radiological Image Retrieval	432
<i>Alaidine Ben Ayed, Mustapha Kardouchi, and Sid-Ahmed Selouani</i>	
Image Processing	
A 2D Rigid Point Registration for Satellite Imaging Using Genetic Algorithms	442
<i>Fatiha Meskine, Nasreddine Taleb, and Ahmad Imjabeer</i>	
Image Quality Assessment Measure Based on Natural Image Statistics in the Tetrolet Domain	451
<i>Abdelkaher Ait Abdelouahad, Mohammed El Hassouni, Hocine Cherifi, and Driss Aboutajdine</i>	
Real Time Door Access Event Detection and Notification in a Reactive Smart Surveillance System	459
<i>Gaetano Di Caterina, Nurulfajar Abd Manap, Masrullizam Mat Ibrahim, and John J. Soraghan</i>	
Optical Flow Estimation on Omnidirectional Images: An Adapted Phase Based Method	468
<i>Brahim Alibouch, Amina Radgui, Mohammed Rziza, and Driss Aboutajdine</i>	

DWT Based-Approach for Color Image Compression Using Genetic Algorithm	476
<i>Aldjia Boucetta and Kamal Eddine Melkemi</i>	

Pattern Recognition

Accelerator-Based Implementation of the Harris Algorithm	485
<i>Claude Tadonki, Lionel Lacassagne, Elwardani Dadi, and Mostafa El Daoudi</i>	
Writer Recognition on Arabic Handwritten Documents	493
<i>Chawki Djeddi, Labiba Souici-Meslati, and Abdellatif Ennaji</i>	
Outline Matching of the 2D Shapes Using Extracting XML Data	502
<i>Noreddine Gherabi and Mohamed Bahaj</i>	
Texture Classification Based on Lacunarity Descriptors	513
<i>João Batista Florindo and Odemir Martinez Bruno</i>	
Real-Time Fall Detection Method Based on Hidden Markov Modelling	521
<i>Alban Meffre, Christophe Collet, Nicolas Lachiche, and Pierre Gançarski</i>	
Extracting Buildings by Using the Generalized Multi Directional Discrete Radon Transform	531
<i>I. ELouedi, A. Hamouda, H. Rojbanı, R. Fournier, and A. Nait-Ali</i>	
Speaker Tracking Using Multi-modal Fusion Framework	539
<i>Anwar Saeed, Ayoub Al-Hamadi, and Michael Heuer</i>	
New Encoding Algorithm for Distributed Speech Recognition Based on DTFS Transform	547
<i>Azzedine Touazi and Mohamed Debyeche</i>	
Satellite Image Classification Using a Divergence-Based Fuzzy c-Means Algorithm	555
<i>Dong-Chul Park</i>	
Classifiers Combination for Arabic Words Recognition: Application to Handwritten Algerian City Names	562
<i>Soulef Nemouchi, Labiba Souici Meslati, and Nadir Farah</i>	
Robust Arabic Multi-stream Speech Recognition System in Noisy Environment	571
<i>Anissa Imen Amrous and Mohamed Debyeche</i>	

SVM Based GMM Supervector Speaker Recognition Using LP Residual Signal	579
<i>Dalila Yessad and Abderrahmane Amrouche</i>	
Plugin of Recommendation Based on a Hybrid Method for the Ranking of Documents in the E-Learning Platforms	587
<i>Hicham Moutachaouik, Hassan Douzi, Abdelaziz Marzak, Hicham Behja, and Brahim Ouhbi</i>	
Author Index	597