

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

Friedemann Mattern

ETH Zurich, Switzerland

John C. Mitchell

Stanford University, CA, USA

Moni Naor

Weizmann Institute of Science, Rehovot, Israel

C. Pandu Rangan

Indian Institute of Technology, Madras, India

Bernhard Steffen

TU Dortmund University, Germany

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

Eduardo Bayro-Corrochano
Edwin Hancock (Eds.)

Progress in Pattern Recognition Image Analysis, Computer Vision, and Applications

19th Iberoamerican Congress, CIARP 2014
Puerto Vallarta, Mexico, November 2-5, 2014
Proceedings



Springer

Volume Editors

Eduardo Bayro-Corrochano
CINVESTAV, Unidad Guadalajara
Department of Electrical Engineering and Computer Science
Guadalajara, Mexico
E-mail: edb@gdl.cinvestav.mx

Edwin Hancock
University of York
Department of Computer Science
York, UK
E-mail: erh@cs.york.ac.uk

ISSN 0302-9743 e-ISSN 1611-3349
ISBN 978-3-319-12567-1 e-ISBN 978-3-319-12568-8
DOI 10.1007/978-3-319-12568-8
Springer Cham Heidelberg New York Dordrecht London

Library of Congress Control Number: 2014951406

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

© Springer International Publishing Switzerland 2014

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed. Exempted from this legal reservation are brief excerpts in connection with reviews or scholarly analysis or material supplied specifically for the purpose of being entered and executed on a computer system, for exclusive use by the purchaser of the work. Duplication of this publication or parts thereof is permitted only under the provisions of the Copyright Law of the Publisher's location, in its current version, and permission for use must always be obtained from Springer. Permissions for use may be obtained through RightsLink at the Copyright Clearance Center. Violations are liable to prosecution under the respective Copyright Law.

The use of general descriptive names, registered names, trademarks, service marks, 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.

While the advice and information in this book are believed to be true and accurate at the date of publication, neither the authors nor the editors nor the publisher can accept any legal responsibility for any errors or omissions that may be made. The publisher makes no warranty, express or implied, with respect to the material contained herein.

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

The 19th Iberoamerican Congress on Pattern Recognition (CIARP 2014 Congreso IberoAmericano de Reconocimiento de Patrones) was the latest of a now well-established and successful series of meetings arranged by the rapidly growing Iberoamerican pattern recognition community. The conference was held in Puerto Vallarta, Jalisco, México, and organized by CINVESTAV, Campus Guadalajara, México. The event was sponsored by the Mexican Association for Computer Vision, Neural Computing and Robotics (MACVNR) together with five additional Iberoamerican pattern recognition societies. As with the previous conferences in the series, CIARP 2014 was supported by the International Association for Pattern Recognition (IAPR). This edition of the conference attracted participants from 31 countries (11 from Iberoamerican and 20 from elsewhere in the world). The total number of submitted papers was 160. After a rigorous review process, 122 papers were accepted for presentation and publication in this volume: 44 papers were selected for oral presentation and 68 as posters and 10 for the CASI 2014 workshop. The accepted papers focused on state-of-the-art research in mathematical methods and computing techniques for pattern recognition, signal and image analysis, speech recognition, medical image analysis, computer vision, robot vision as well as on a wide range of their applications.

Since 2008 the CIARP conference has been single track, but no real distinction in quality exists between the oral and poster presentations. In addition to this volume, selected papers will appear in special issues of the journals *Intelligent Data Analysis* and the *Journal of Real-Time Image Processing*.

A highlight of the conference program were the invited talks presented by four internationally leading scientists, namely, Raganchar Kasturi on biometrics technology, Carlos Coello Coello on evolutionary multi-objective optimization, Fazel Famili on searching for patterns in imbalanced data, and Gerhard Ritter on lattice neural networks. These four professors also contributed to the conference by presenting tutorials on biometrics; metaheuristics for multi-objective optimization; pattern recognition, learning case studies and future directions; and lattice neural networks theory and applications, respectively.

The full-day CASI 2014 Workshop on Computational Advances of Intelligent Processing of Remote Satellite Imagery was also held in conjunction with the conference. The workshop was co-sponsored by IEEE GRSS and was chaired by Prof. Yuriy Shkvarko, CINVESTAV, Campus Guadalajara. After a double-blind review process, 10 papers were accepted for presentation at the workshop.

As co-organizers of CIARP 2014 we would like to express our gratitude to both the supporting organizations and to all those who contributed to the conference. We gratefully acknowledge the support from CINVESTAV and MACVNR, the five sponsoring Iberoamerican PR societies and the International Association for Pattern Recognition for supporting the main meeting. We are particularly

grateful to the Program Committee for bringing their unique expertise to the reviewing of the submitted papers, and the invaluable feedback they have provided to the authors. A special thanks goes to the members of the Organizing Committee, whose hard work contributed to the success of the conference. Finally, a conference is only as good and fruitful as the participants make it, and last but certainly not least we extend our gratitude to all those who through their presence and contributions helped make this an excellent conference.

September 2014

Eduardo Bayro-Corrochano
Edwin Hancock

Organization

The 14th Iberoamerican Congress on Pattern Recognition (Congreso IberoAmericano de Reconocimiento de Patrones CIAP/2014) was held in Pto. Vallarta, Jalisco, México, November 1–5, 2014, and organized by (MACVNR), endorsed by the International Association for Pattern Recognition (IAPR).

General Chair

Eduardo Bayro-Corrochano CINEVESTAV, Campus Guadalajara, México

Co-chair

Edwin Hancock University of York, UK

CASI 2014 Workshop Chair

Yuriy Shkvarko CINEVESTAV, Guadalajara, México

IAPR-CIARP 2014 Award Committee

Raganchar Kasturi	University of South Florida, USA
Gerard Ritter	University of Florida, USA
Fazel Famili	National Research Council, Canada
Carlos Coello Coello	CINEVESTAV-IPN México

Organizing Committee

Eduardo Bayro-Corrochano	CINEVESTAV, Guadalajara, México
Miguel Bernal-Marin	INTEL, Guadalajara, México
Gehova López	CINEVESTAV, Guadalajara, México
Gerardo Altamirano	CINEVESTAV, Guadalajara, México
Susana Ortega	CINEVESTAV, Guadalajara, México
Carlos Lopez-Franco	Universidad de Guadalajara, CUSEI, México
Nancy Arana-Daniel	Universidad de Guadalajara, CUSEI, México

CIARP Steering Committee

Hector Allende	ACHiRP, Chile
Helder Araujo	APRP, Portugal
Eduardo Bayro-Corrochano	MACVNR, México

VIII Organization

Cesar Beltran Castaño	PAPR, Peru
Jose Ruiz-Shulcloper	ACRP, Cuba
Alberto Sanfeliu	AERFAI, Spain
Alvaro Pardo	APRU, Uruguay
Hemerson Pistori	SIGPR-SBC, Brazil

Program Committee

Eduardo Bayro-Corrochano	CINVESTAV, Guadalajara, México
Carlos Lopez-Franco	Universidad de Guadalajara, México
Miguel Bernal-Marin	INTEL, Guadalajara, México
Gehova López	CINVESTAV, Guadalajara, México
Gerardo Altamirano	CINVESTAV, Guadalajara, México
Jaime Ortegon	Universidad de Quintana-Roo, México
Jorge Rivera-Rovelo	Universidad de Anahuac Mayab, México

Steering Committee

Marta Mejail	SARP, Argentina
Olga R. Pereira Bellon	SIGPR-SBC, Brazil
Cesar Enrique San Martin	
Salas	UDEC, Chile
Jos Ruiz-Shulcloper	ACRP, Cuba
Eduardo Bayro-Corrochano	MACVNR, México
Cesar Beltrán-Castaño	PAPR, Peru
Miguel Sanches	APRP, Portugal
Alberto Sanfeliu	AERFAI, Spain
Alvaro Pardo	APRU, Uruguay

Local Committee

Prof. Eduardo Bayro Corrochano	CINVESTAV, Campus Guadalajara, México
Prof. Yuriy Shkwarko	CINVESTAV Campus Guadalajara, México
Dr. Luis Eduardo Falcón	Tec. Monterrey, Campus Guadalajara, México
Dr. Jorge Rivera Rovelo	Universidad Anhuac Maya, Mérida, México
Dr. Jaime Ortégón Aguilar	Universidad Autonoma

Sponsoring Institutions

International Association for Pattern Recognition (IAPR);
Mexican Association for Computer Vision;
Neurocomputing and Robotics (MACVNR);

Cuban Association for Pattern Recognition (ACRP);
 Chilean Association for Pattern Recognition (AChiRP);
 Special Interest Group of the Brazilian Computer Society (SIGPR-SBC);
 Spanish Association for Pattern Recognition and Image Analysis (AERFAI);
 Portuguese Association for Pattern Recognition (APRP);
 CINVESTAV, Campus Guadalajara, Jalisco, México;
 INTEL Education

Table of Contents

Keynote 1

An Introduction to Evolutionary Multi-objective Optimization with Some Applications in Pattern Recognition.....	1
<i>Carlos A. Coello-Coello</i>	

Image Coding, Processing and Analysis

Rotation-Invariant Nonlinear Filters Design	14
<i>Saúl Martínez-Díaz and Saúl Martínez-Chavelas</i>	
Topology-Preserving General Operators in Arbitrary Binary Pictures ...	22
<i>Kálmán Palágyi</i>	
Evaluating Robustness of Template Matching Algorithms as a Multi-objective Optimisation Problem	30
<i>Jose Bernal, Maria Trujillo, and Ivan Cabezas</i>	
Estimation of Bubble Size Distribution Based on Power Spectrum	38
<i>Jarmo Ilonen, Tuomas Eerola, Heikki Mutikainen, Lasse Lensu, Jari Käyhkö, and Heikki Kälviäinen</i>	
Edge-Based Coding Tree Unit Partitioning Strategy in Inter Prediction	46
<i>Maria Santamaria and Maria Trujillo</i>	
A Robust Tracking Algorithm Based on HOGs Descriptor	54
<i>Daniel Miramontes-Jaramillo, Vitaly Kober, and Víctor Hugo Díaz-Ramírez</i>	
Fast Heuristics for Eliminating Switching Components in Binary Matrices by 0-1 Flips	62
<i>Norbert Hantos and Péter Balázs</i>	
Practical Genericity: Writing Image Processing Algorithms Both Reusable and Efficient	70
<i>Roland Levillain, Thierry Géraud, Laurent Najman, and Edwin Carlinet</i>	
Real Time Hardware Accelerator for Image Filtering	80
<i>Susana Ortega-Cisneros, Miguel A. Carrazco-Díaz, Adrian Pedroza de-la-Cruz, Juan J. Raygoza-Panduro, Federico Sandoval-Ibarra, and Jorge Rivera-Domínguez</i>	

FPGA Implementation of a NARX Network for Modeling Nonlinear Systems	88
<i>J.A. Rentería-Cedano, L.M. Aguilar-Lobo, Susana Ortega-Cisneros, J.R. Loo-Yau, and Juan J. Raygoza-Panduro</i>	

Segmentation, Analysis of Shape and Texture

Self-Adaptive Skin Segmentation in Color Images	96
<i>Michal Kawulok, Jolanta Kawulok, Jakub Nalepa, and Bogdan Smolka</i>	
Spoken Emotion Recognition Using Deep Learning	104
<i>E.M. Albornoz, M. Sánchez-Gutiérrez, F. Martínez-Licona, H.L. Rufiner, and J. Goddard</i>	
A Comparison of Fused Segmentation Algorithms for Iris Verification ...	112
<i>Yasiel Sanchez-Gonzalez, Yasser Chacon-Cabrera, and Eduardo Gareal-Llano</i>	
A Linear Time Implementation of k-Means for Multilevel Thresholding of Grayscale Images	120
<i>Pablo Fonseca and Jacques Wainer</i>	
Angle Estimation Using Hahn Moments for Image Analysis	127
<i>C. Camacho-Bello and J.J. Báez-Rojas</i>	
A Fast Gabor Filter Approach for Multi-Channel Texture Feature Discrimination	135
<i>Antonio Carlos Sobieranski, Rodrigo T.F. Linhares, Eros Comunello, and Aldo von Wangenheim</i>	
Color Skin Segmentation Based on Non-linear Distance Metrics	143
<i>Antonio Carlos Sobieranski, Vito F. Chiarella, Eduardo Barreto-Alexandre, Rodrigo T.F. Linhares, Eros Comunello, and Aldo von Wangenheim</i>	
Partial Shape Matching and Retrieval under Occlusion and Noise	151
<i>Leonardo Chang, Miguel Arias-Estrada, José Hernández-Palancar, and L. Enrique Sucar</i>	

Keynote II

Searching for Patterns in Imbalanced Data: Methods and Alternatives with Case Studies in Life Sciences	159
<i>A. Fazel Famili</i>	

Analysis of Signal, Speech and Language

The Place Theory as an Alternative Solution in Automatic Speech Recognition Tasks.....	167
<i>José Luis Oropeza-Rodríguez, Sergio Suárez-Guerra, and Mario Jiménez-Hernández</i>	
On the Use of Locality Sensitive Hashing for Audio Following	175
<i>Luis F. Guzmán and Antonio Camarena-Ibarrola</i>	
Stationary Signal Separation Using Multichannel Local Segmentation...	183
<i>C. Castro-Hoyos, F.M. Grisales-Franco, J.D Martínez-Vargas, Carlos D. Acosta-Medina, and Germán Castellanos-Domínguez</i>	
On the Use of Evolutionary Programming for Combinational Logic Circuits Design	191
<i>Marco A. Contreras-Cruz, Victor Ayala-Ramírez, and Paola B. Alvarado-Velazco</i>	
From Speech Quality Measures to Speaker Recognition Performance....	199
<i>Claudia Bello, Dayana Ribas, José R. Calvo, and Carlos A. Ferrer</i>	
Temporal Information in a Binary Framework for Speaker Recognition	207
<i>Gabriel Hernández-Sierra, José R. Calvo, and Jean-François Bonastre</i>	
Artificial Neural Networks for Acoustic Lung Signals Classification	214
<i>Alvaro D. Orjuela-Cañón, Diego F. Gómez-Cajas, and Robinson Jiménez-Moreno</i>	
RASCNA: Radio Astronomy Signal Classification through Neighborhood Assemblies	222
<i>Mildred Morales-Xicohtencatl, Leticia Flores-Pulido, Carolina Rocío Sánchez-Pérez, and Juan José Córdova-Zamorano</i>	
Spectral Correlation Measure for Selecting Intrinsic Mode Functions....	231
<i>Edgar F. Sierra-Alonso, Oscar Cardona-Morales, Carlos D. Acosta-Medina, and Germán Castellanos-Domínguez</i>	
Feature Analysis for Audio Classification	239
<i>Gaston Bengolea, Daniel Acevedo, Martín Rais, and Marta Mejail</i>	
Neural Decoding Using Kernel-Based Functional Representation of ECoG Recordings	247
<i>S. García-Vega, A.M. Álvarez-Meza, and Germán Castellanos-Domínguez</i>	
Comparison of Methods to Assess Similarity between Phrases.....	255
<i>Renzo Angles, Valeria Araya, Jesus Concha, and Rodrigo Paredes</i>	

Document Processing and Recognition

Efficient Overlapping Document Clustering Using GPUs and Multi-core Systems	264
<i>Lázaro J. González Soler, Aírel Pérez-Suárez, and Leonardo Chang</i>	
Assessing Cross-Cut Shredded Document Assembly	272
<i>Priscila Saboia and Siome Goldenstein</i>	

Keynote III

Person Reidentification and Recognition in Video	280
<i>Rangachar Kasturi and Rajmadhan Ekambaram</i>	

Feature Extraction, Clustering and Classification

Are Reducts and Typical Testors the Same?	294
<i>Manuel S. Lazo-Cortés, José Fco. Martínez-Trinidad, Jesús Ariel Carrasco-Ochoa, and Guillermo Sanchez-Díaz</i>	
A Multiscale and Multi-Perturbation Blind Forensic Technique for Median Detecting	302
<i>Anselmo Ferreira and Anderson Rocha</i>	
Automatic Classification of Coating Epithelial Tissue	311
<i>Claudia Mazo, María Trujillo, and Liliana Salazar</i>	
Human Action Classification Using N-Grams Visual Vocabulary	319
<i>Ruber Hernández-García, Edel García-Reyes, Julián Ramos-Cózar, and Nicolás Guil</i>	
Spectral Clustering Using Compactly Supported Graph Building	327
<i>A.M. Álvarez-Meza, A.E. Castro-Ospina, and Germán Castellanos-Domínguez</i>	
Unsupervised Kernel Function Building Using Maximization of Information Potential Variability	335
<i>A.M. Álvarez-Meza, D. Cárdenas-Peña, and Germán Castellanos-Domínguez</i>	
Kernel-Based Image Representation for Brain MRI Discrimination	343
<i>D. Cárdenas-Peña, A.M. Álvarez-Meza, and Germán Castellanos-Domínguez</i>	
Estimation of Cyclostationary Codebooks for Kernel Adaptive Filtering	351
<i>S. García-Vega, A.M. Álvarez-Meza, and Germán Castellanos-Domínguez</i>	

Person Re-Identification Based on Weighted Indexing Structures	359
<i>Cristianne R.S. Dutra, Matheus Castro Rocha, and William Robson Schwartz</i>	
Using Reference Point as Feature for Fingerprint Indexing	367
<i>Alfredo Muñoz-Briseño, Andrés Gago-Alonso, and José Hernández-Palancar</i>	
Scalable Feature Extraction for Visual Surveillance	375
<i>Antonio C. Nazare Jr., Renato Ferreira, and William Robson Schwartz</i>	
The Evaluation of Ordered Features for SMS Spam Filtering	383
<i>José M. Bande Serrano, José Hernández Palancar, and René Cumplido</i>	
Graph Clustering via Inexact Patterns	391
<i>Marisol Flores-Garrido, Jesús Ariel Carrasco-Ochoa, and José Fco. Martínez-Trinidad</i>	
Large-Scale Micro-Blog Authorship Attribution: Beyond Simple Feature Engineering	399
<i>Thiago Cavalcante, Anderson Rocha, and Ariadne Carvalho</i>	
Quadratic Problem Formulation with Linear Constraints for Normalized Cut Clustering	408
<i>D.H. Peluffo-Ordóñez, C. Castro-Hoyos, Carlos D. Acosta-Medina, and Germán Castellanos-Domínguez</i>	
YYC: A Fast Performance Incremental Algorithm for Finding Typical Testors	416
<i>Eduardo Alba-Cabrera, Julio Ibarra-Fiallo, Salvador Godoy-Calderon, and Fernando Cervantes-Alonso</i>	
Evolutionary Multi-Objective Approach for Prototype Generation and Feature Selection	424
<i>Alejandro Rosales-Pérez, Jesus A. Gonzalez, Carlos A. Coello-Coello, Carlos A. Reyes-García, and Hugo Jair Escalante</i>	
Estimations of Clustering Quality via Evaluation of Its Stability	432
<i>Vladimir Ryazanov</i>	
A Comparison between Time-Frequency and Cepstral Feature Representations for the Classification of Seismic-Volcanic Signals	440
<i>Paola Alexandra Castro-Cabrera, Mauricio Orozco-Alzate, Andrea Adami, Manuele Bicego, John Makario Londoño-Bonilla, and Germán Castellanos-Domínguez</i>	

A Method to Build Classification and Regression Trees	448
<i>Emilio Unda-Trillas and Jorge Rivera-Rovelo</i>	

An Adaptive Vehicle License Plate Detection at Higher Matching Degree.....	454
<i>Raphael C. Prates, Guillermo Cámara-Chávez, William Robson Schwartz, and David Menotti</i>	

Pattern Recognition and Machine Learning

On the Influence of Markovian Models for Contextual-Based Optimum-Path Forest Classification	462
<i>D. Osaku, A.L.M. Levada, and J.P. Papa</i>	

SPaMi-FTS: An Efficient Algorithm for Mining Frequent Sequential Patterns	470
<i>José Kadir Febrer-Hernández, José Hernández-Palancar, Raudel Hernández-León, and Claudia Feregrino-Urbe</i>	

Local Binary Pattern Matching for Fast Retina Map Relocalization Using the Slit-Lamp.....	478
<i>Rodrigo T.F. Linhares, Rogério Richa, Ricardo Moraes, Eros Comunello, and Aldo von Wangenheim</i>	

Thermal Face Recognition Using Local Patterns	486
<i>Gabriel Hermosilla, Gonzalo Farias, Hector Vargas, Francisco Gallardo, and Cesar San-Martin</i>	

Comments on Randomly Sampled Non Local Means Image Filter	498
<i>Alvaro Pardo</i>	

Learning Graph-Matching Substitution Costs Based on the Optimality of the Oracle's Correspondence	506
<i>Xavier Cortés, Carlos Francisco Moreno-García, and Francesc Serratosa</i>	

How Fashion Talks: Clothing-Region-Based Gender Recognition.....	515
<i>Shengnan Cai, Jingdong Wang, and Long Quan</i>	

Discriminating Fingerprint Images of Other Images	524
<i>Armando Rodríguez-Fonte and José Hernández-Palancar</i>	

Pattern Analysis in DNA Microarray Data through PCA-Based Gene Selection	532
<i>Ricardo Ocampo, Marco A. de Luna, Roberto Vega, Gildardo Sanchez-Ante, Luis E. Falcon-Morales, and Humberto Sossa</i>	

Recognizing Visual Categories with Symbol-Relational Grammars and Bayesian Networks	540
<i>Elías Ruiz and L. Enrique Sucar</i>	
Geometric Indexing for Recognition of Places	548
<i>Carlos Lara-Alvarez, Alfonso Rojas, and Eduardo Bayro-Corrochano</i>	
Rolled-Plain Fingerprint Images Classification	556
<i>Katy Castillo-Rosado and José Hernández-Palancar</i>	
Evaluation of Keypoint Descriptors for Gender Recognition	564
<i>Florencia Soledad Iglesias, María Elena Buemi, Daniel Acevedo, and Julio Jacobo-Berlles</i>	
Automated Banknote Identification Method for the Visually Impaired	572
<i>A. Rojas-Domínguez, Carlos Lara-Alvarez, and Eduardo Bayro-Corrochano</i>	
Using Complex Networks for Offline Handwritten Signature Characterization	580
<i>César Armando Beltrán Castañón and Ronald Juárez Chambi</i>	
Automatic Camera-Screen Localization	588
<i>Francisco Gómez-Fernández, Zicheng Liu, Alvaro Pardo, and Marta Mejail</i>	
Learning Similarities by Accumulating Evidence in a Probabilistic Way	596
<i>Helena Aidos and Ana Fred</i>	
Unsupervised Manifold Learning for Video Genre Retrieval	604
<i>Jurandy Almeida, Daniel C.G. Pedronette, and Otávio A.B. Penatti</i>	
A Tipicity Concept for Data Analysis and Its Application to Cleft Lip and Palate	613
<i>Leticia Vega-Alvarado and Martha R. Ortíz-Posadas</i>	
A Machine Learning Method for High-Frequency Data Forecasting	621
<i>Erick López, Héctor Allende, and Héctor Allende-Cid</i>	
Spatial Pyramid Matching for Finger Spelling Recognition in Intensity Images	629
<i>Samira Silva, William Robson Schwartz, and Guillermo Cámara-Chávez</i>	
Perspective Based Model for Constructing Diverse Ensemble Members in Multi-classifier Systems for Multi-spectral Image Classification	637
<i>Laxmi Narayana Eeti and Krishna Mohan Buddhiraju</i>	

Neural Networks for Pattern Recognition

Neuro-Fuzzy Data Mining Mexico's Economic Data	645
<i>Gustavo Becerra-Gaviño and Liliana Ibeth Barbosa-Santillán</i>	
Handwritten Digit Recognition Based on Pooling SVM-Classifiers Using Orientation and Concavity Based Features.....	658
<i>Jose M. Saavedra</i>	
Enhanced Fuzzy-Relational Neural Network with Alternative Relational Products.....	666
<i>Efraín Mendoza-Castañeda, Carlos A. Reyes-García, Hugo Jair Escalante, Wilfrido Moreno, and Alejandro Rosales-Pérez</i>	
Weighted Convolutional Neural Network Ensemble	674
<i>Xavier Frazão and Luís A. Alexandre</i>	
Bio-inspired Aging Model Particle Swarm Optimization Neural Network Training for Solar Radiation Forecasting	682
<i>Eduardo Rangel, Alma Y. Alanís, Luis J. Ricalde, Nancy Arana-Daniel, and Carlos López-Franco</i>	
Dairy Cattle Sub-clinical Uterine Disease Diagnosis Using Pattern Recognition and Image Processing Techniques	690
<i>Matías Tailanián, Federico Lecumberry, Alicia Fernández, Giovanni Gnemmi, Ana Meikle, Isabel Pereira, and Gregory Randall</i>	
Semisupervised Approach to Non Technical Losses Detection	698
<i>Juan Tacón, Damián Melgarejo, Fernanda Rodríguez, Federico Lecumberry, and Alicia Fernández</i>	
New Radial Basis Function Neural Network Architecture for Pattern Classification: First Results	706
<i>Humberto Sossa, Griselda Cortés, and Elizabeth Guevara</i>	
Predicting Very Early Stage Mild Cognitive Impairment Based on a Voxel-wise Arterial Spin Labeling Analysis	714
<i>Gloria Díaz, Pablo García-Polo, Virginia Mato, Eva Alfayate, Juan Antonio Hernández-Tamames, and Norberto Malpica</i>	
Quaternion Support Vector Classifier	722
<i>G. López-González, Nancy Arana-Daniel, and Eduardo Bayro-Corrochano</i>	

Keynote IV

Lattice Based Dendritic Computing: A Biomimetic Approach to ANNs	730
<i>Gerhard X. Ritter and Gonzalo Urcid</i>	

Computer Vision and Robot Vision

Partial to Full Image Registration Based on Candidate Positions and Multiple Correspondences	745
<i>Carlos Francisco Moreno-García, Xavier Cortés, and Francesc Serratosa</i>	
Automatic Corner Matching in Highly Distorted Images of Zhang's Calibration Pattern	754
<i>Miguel Alemán-Flores, Luis Alvarez, Luis Gomez, and Daniel Santana-Cedrés</i>	
Bio-inspired Aging Model-Particle Swarm Optimization and Geometric Algebra for Structure from Motion	762
<i>Nancy Arana-Daniel, Carlos Villaseñor, Carlos López-Franco, and Alma Y. Alanís</i>	
Detecting Subtle Human-Object Interactions Using Kinect	770
<i>Sebastian Ubalde, Zicheng Liu, and Marta Mejail</i>	
A New Saliency Detection Method for Stereoscopic Images Using Contrast and Prior Knowledge	778
<i>Sang-Hyun Cho and Hang-Bong Kang</i>	
Krawtchouk Moments for Gait Phase Detection	787
<i>C. Camacho-Bello and J.J. Báez-Rojas</i>	
3D Face Reconstruction from a Single Shaded Image Using Subspace Crossing Engine	794
<i>Tanasai Sucontphunt</i>	
Conformal Geometric Method for Voting	802
<i>Gerardo E. Altamirano-Gómez and Eduardo Bayro-Corrochano</i>	
Hybrid Parallel Cascade Classifier Training for Object Detection	810
<i>Eanes Torres-Pereira, Herman Martins-Gomes, Andrey Elísio Monteiro-Brito, and João Marques de Carvalho</i>	
3D Face Recognition by Functional Data Analysis	818
<i>Dania Porro-Muñoz, Francisco José Silva-Mata, Anier Revilla-Eng, Isneri Talavera-Bustamante, and Stefano Berretti</i>	

Object Classification and Detection with Context Kernel Descriptors ...	827
<i>Hong Pan, Søren Ingvor Olsen, and Yaping Zhu</i>	
Gait-Based Carried Object Detection Using Persistent Homology	836
<i>Javier Lamar-Leon, Raul Alonso Baryolo, Edel García-Reyes, and Rocio Gonzalez-Diaz</i>	
A Fast Pavement Location Approach for Autonomous Car Navigation	844
<i>Thiago Rateke, Karla A. Justen, Vito F. Chiarella, Rodrigo T.F. Linhares, Antonio Carlos Sobieranski, Eros Comunello, and Aldo von Wangenheim</i>	
Plane Detection Using Particle Swarm Optimization and Conformal Geometric Algebra	852
<i>Carlos López-Franco, Jesús Hernández-Barragán, Michel López-Franco, Nancy Arana-Daniel, and Alma Y. Alanís</i>	
Face Detection in Video Using Local Spatio-temporal Representations	860
<i>Yoanna Martínez-Díaz, Noslen Hernández, and Heydi Méndez-Vázquez</i>	
Fast Edge Detection in RGB-D Images	868
<i>Heriberto Casarrubias-Vargas, Alberto Petrilli-Barceló, and Eduardo Bayro-Corrochano</i>	
MUGEN RANSAC - Multiple GENerator Applied to Motion Estimation	876
<i>Severino P. Gomes-Neto and Bruno M. de Carvalho</i>	
Multimodal Background Modeling Using RGB-Depth Features	884
<i>Rim Trabelsi, Fethi Smach, Issam Jabri, and Ammar Bouallegue</i>	

Video Segmentation and Tracking

Static Video Summarization through Optimum-Path Forest Clustering	893
<i>G.B. Martins, L.C.S. Afonso, D. Osaku, Jurandy Almeida, and J.P. Papa</i>	
Summarization of Videos by Image Quality Assessment	901
<i>Marcos Vinicius Mussel Cirne and Helio Pedrini</i>	
Modeling Video Activity with Dynamic Phrases and Its Application to Action Recognition in Tennis Videos	909
<i>Jonathan Vainstein, José F. Manera, Pablo Negri, Claudio Delrieux, and Ana Maguitman</i>	

Combining Wavelet Saliency, Color and DCT Coefficients for Content-Based Image Retrieval	917
<i>Alberto Rios Júnior and Dêbio Leandro Borges</i>	
Robust Face Tracking with Locally-Adaptive Correlation Filtering	925
<i>Leopoldo N. Gaxiola, Víctor Hugo Díaz-Ramírez, Juan J. Tapia, Arnoldo Diaz-Ramirez, and Vitaly Kober</i>	
A Deformable Model to Search Characteristic Facial Points	933
<i>Reimer-A Romero-H. and Francisco-J. Renero-C.</i>	
Fast Automatic Detection of Wildlife in Images from Trap Cameras	940
<i>Karina Figueroa, Antonio Camarena-Ibarrola, Jonathan García, and Héctor Tejeda Villela</i>	
Detection of Groups of People in Surveillance Videos Based on Spatio-Temporal Clues	948
<i>Rensso V.H. Mora-Colque, Guillermo Cámara-Chávez, and William Robson Schwartz</i>	
GPUs and Multicore CPUs Implementations of a Static Video Summarization	956
<i>Suellen S. Almeida, Edward Cayllahua-Cahuina, Arnaldo de A. Araújo, Guillermo Cámara-Chávez, and David Menotti</i>	

CASI'2014 Workshop Computational Advances in Intelligent Processing of Multimode Remote Sensing Imagery

Descriptive Experiment Design Restructured MVDR Beamforming Technique for Enhanced Imaging with Unfocused SAR Systems	965
<i>Yuriy Shkvarko and Joel Amao Oliva</i>	
Super Resolution Imaging via Sparse Interpolation in Wavelet Domain with Implementation in DSP and GPU	973
<i>H. Chavez, V. Gonzalez, A. Hernandez, and V. Ponomaryov</i>	
2D to 3D Conversion Based on Disparity Map Estimation	982
<i>V. Gonzalez-Huitron, E. Ramos-Diaz, V. Kravchenko, and V. Ponomaryov</i>	
Lifting Filters Adjustment for Lossless Image Compression Applications	990
<i>Oleksiy Pogrebnyak and Ignacio Hernández-Bautista</i>	

Texture Analysis of Mean Shift Segmented Low-Resolution
Speckle-Corrupted Fractional SAR Imagery through Neural Network
Classification 998
*Gustavo D. Martín del Campo-Becerra, Juan I. Yañez-Vargas, and
Josué A. López-Ruíz*

Morphological Change of a Scene Employing Synthetic Multispectral
and Panchromatic Images 1006
Jorge Lira and Erick Marín

Comparative Evaluation of Edge Linking Methods Using Markov Chain
and Regression Applied Heuristic 1014
Haklin Kimm, Neda Abolhassani, and Eun-Joo Lee

Data Fusion Approach for Employing Multiple Classifiers to Improve
Lake Shoreline Analysis 1022
Alejandra A. López-Caloca

An Efficient GPU-Based Implementation of the R-MSF-Algorithm for
Remote Sensing Imagery 1030
*David Castro-Palazuelos, Daniel Robles-Valdez, and
Deni Torres-Roman*

Hybrid FPGA/ARM Co-design for Near Real Time of Remote Sensing
Imagery 1039
*C. Góngora-Martín, A. Castillo-Atoche, J. Estrada-López,
J. Vázquez-Castillo, J. Ortégón-Aguilar, and
R. Carrasco-Álvarez*

Author Index 1047