Contents

Image Quality Assessment

Modelling of Subjective Radiological Assessments with Objective Image Quality Measures of Brain and Body CT Images ................................. 3
Ilona A. Kowalik-Urbaniak, Jane Castelli, Nasim Hemmati, David Koff, Nadine Smolarski-Koff, Edward R. Vrscay, Jiheng Wang, and Zhou Wang

Blind Image Quality Assessment Through Wakeby Statistics Model ............ 14
Mohsen Jenadeleh and Mohsen Ebrahim Moghaddam

Improving Image Quality of Tiled Displays ........................................ 22
Steven B. McFadden and Paul A.S. Ward

Image Enhancement

Structural Similarity-Based Optimization Problems with $L^1$-Regularization:
Smoothing Using Mollifiers ............................................................... 33
Daniel Otero, Davide La Torre, and Edward R. Vrscay

Improved Non-Local Means Algorithm Based on Dimensionality Reduction ................................................................. 43
Golam M. Maruf and Mahmoud R. El-Sakka

Non-local Means for Stereo Image Denoising Using Structural Similarity . . . 51
Monagi H. Alkinani and Mahmoud R. El-Sakka

Structural Similarity Optimized Wiener Filter: A Way to Fight Image Noise ................................................................. 60
Mahmud Hasan and Mahmoud R. El-Sakka

Image Segmentation, Registration and Analysis

A Real-Time Framework for Detection of Long Linear Infrastructural Objects in Aerial Imagery ................................................................. 71
Hrishikesh Sharma, Tanima Dutta, V. Adithya, and P. Balamuralidhar

Structural Representations for Multi-modal Image Registration Based on Modified Entropy ................................................................. 82
Keyvan Kasiri, Paul Fieguth, and David A. Clausi
Attributed Relational Graph-Based Learning of Object Models for Object Segmentation .................................................. 90
Nasreen Akter and Iker Gondra

Label Fusion for Multi-atlas Segmentation Based on Majority Voting .............. 100
Jie Huo, Guanghui Wang, Q.M. Jonathan Wu, and Akilan Thangarajah

Image Coding, Compression and Encryption
An Optimized Selective Encryption for Video Confidentiality .................... 109
Khalfan Almarashda, Ali Dawood, Thomas Martin, Mohammed Al-Mualla, and Harish Bhaskar

Near-Lossless PCA-Based Compression of Seabed Surface with Prediction ... 119
Paweł Forczmanśki and Wojciech Maleika

Adaptive Weighted Neighbors Lossless Image Coding .................................. 129
AbdulWahab Kabani and Mahmoud R. El-Sakka

Dimensionality Reduction and Classification
Dimensionality Reduction of Proportional Data Through Data Separation Using Dirichlet Distribution .................................................. 141
Walid Masoudimansour and Nizar Bouguila

Image Categorization Using a Heuristic Automatic Clustering Method Based on Hierarchical Clustering .................................................. 150
François LaPlante, Mustapha Kardouchi, and Nabil Belacel

Semantic Scene Classification with Generalized Gaussian Mixture Models .... 159
Tarek Elguebaly and Nizar Bouguila

Biometrics
Classification of Tooth Shapes for Human Identification Purposes–An
Experimental Comparison of Selected Simple Shape Descriptors .................. 169
Katarzyna Gościewska and Dariusz Frejlichowski

Micro Genetic and Evolutionary Feature Extraction: An Exploratory
Data Analysis Approach for Multispectral Iris Recognition .......................... 178
Pablo A. Arias, Joseph Shelton, Kaushik Roy, Foysal Ahmad, and Gerry V. Dozier

Biometric Analysis of Human Ear Matching Using Scale and Rotation
Invariant Feature Detectors ........................................................................... 186
Soumyajit Sarkar, Jizhong Liu, and Guanghui Wang
Mutibiometric System Based on Game Theory ............................... 194

Nawaf Aljohani, Foysal Ahmad, Kaushik Roy, and Joseph Shelton

Face Description, Detection and Recognition

Head Pose Classification Using a Bidimensional Correlation Filter .......... 203

Djmel Ziou, Dayron Rizo-Rodriguez, Antoine Tabbone, and Nafaa Nacereddine

Illumination Robust Facial Feature Detection via Decoupled Illumination and Texture Features ................................................. 210

Brendan Chwyl, Alexander Wong, and David A. Clausi

Posed Facial Expression Detection Using Reflection Symmetry and Structural Similarity .................................................. 218

Harish Bhaskar, Davide La Torre, and Mohammed Al-Mualla

Improving the Recognition of Occluded Faces by Means of Two-dimensional Orthogonal Projection into Local Subspaces .......... 229

Paweł Forczmański and Piotr Łabędź

Hybrid Age Estimation Using Facial Images ................................ 239

Simon Reade and Serestina Viriri

Unsupervised Sub-graph Selection and Its Application in Face Recognition Techniques ................................................................. 247

Ahmed ELSayed, Ausif Mahmood, and Tarek Sobh

Human Activity Recognition

Dynamic Perceptual Attribute-Based Hidden Conditional Random Fields for Gesture Recognition ........................................... 259

Gang Hu and Qigang Gao

The Bag of Micro-Movements for Human Activity Recognition .......... 269

Pejman Habashi, Boubakeur Boufama, and Imran Shafiq Ahmad

An Efficient Method for Extracting Key-Frames from 3D Human Joint Locations for Action Recognition ................................ 277

Md. Hasanul Kabir, Ferdous Ahmed, and Abdullah-Al-Tariq

Robotics and 3D Vision

A Simple View-Based Software Architecture for an Autonomous Robot Navigation System .................................................. 287

Salvador E. Ayala-Raggi, Pedro de Jesús González, Susana Sánchez-Úrrieta, and Aldrin Barreto-Flores
A Comparison of Feature Detectors and Descriptors in RGB-D SLAM

Methods. ................................................................. 297
Oguzhan Guclu and Ahmet Burak Can

Accuracy Improvement for Depth from Small Irregular Camera Motions and Its Performance Evaluation. .............................. 306
Syouta Tsukada, Yishin Ho, Norio Tagawa, and Kan Okubo

Fast and Robust Algorithm for Fundamental Matrix Estimation .... 316
Ming Zhang, Guanghui Wang, Haiyang Chao, and Fuchao Wu

Medical Image Analysis

Biologically-Inspired Supervised Vasculature Segmentation in SLO Retinal Fundus Images ......................................................... 325
Samaneh Abbasi-Sureshjani, Iris Smit-Ockeloen, Jiong Zhang, and Bart Ter Haar Romeny

Assessment of Retinal Vascular Changes Through Arteriolar-to-Venular Ratio Calculation ................................................. 335
Behdad Dashtbozorg, Ana Maria Mendonça, and Aurélio Campilho

Automatic Segmentation of Vertebrae in Ultrasound Images .......... 344
Florian Berton, Wassim Azzabi, Farida Cheriet, and Catherine Laporte

Towards an Automatic Clinical Classification of Age-Related Macular Degeneration .......................................................... 352
Thanh Vân Phan, Lama Seoud, and Farida Cheriet

Optical Flow Based Approach for Automatic Cardiac Cycle Estimation in Ultrasound Images of the Carotid ......................... 360
Teresa Araújo, Guilherme Aresta, José Rouco, Carmen Ferreira, Elsa Azevedo, and Aurélio Campilho

Statistical Textural Distinctiveness in Multi-Parametric Prostate MRI for Suspicious Region Detection ........................................ 368
Audrey G. Chung, Christian Scharfenberger, Farzad Khalvati, Alexander Wong, and Masoom A. Haider

Automatic Detection of Immunogold Particles from Electron Microscopy Images ............................................................ 377
Ricardo Gamelas Sousa, Tiago Esteves, Sara Rocha, Francisco Figueiredo, Pedro Quelhas, and Luis M. Silva

Specular Reflectance Suppression in Endoscopic Imagery via Stochastic Bayesian Estimation ................................................. 385
Brendan Chwyl, Audrey G. Chung, Alexander Wong, and David A. Clausi
Characterization of Medical Images Using Edge Density and Local Directional Pattern (LDP). ......................................................... 394
  Serestina Viriri

Automated Detection of Aortic Root Landmarks in Preprocedure CT Angiography Images for Transcatheter Aortic Valve Implantation Patients . . . 402
  Mustafa Elattar, Esther Wiegerinck, Floortje van Kesteren, Lucile Dubois, Nils Planken, Ed vanbavel, Jan Baan, and Henk Marquering

Retinal Blood Vessels Differentiation for Calculation of Arterio-Venous Ratio . ........................................................................... 411
  Samra Irshad, M. Usman Akram, Sara Ayub, and Anaum Ayaz

Graph Structuring of Skeleton Object for Its High-Level Exploitation . . . 419
  Rabaa Youssef, Anis Kacem, Sylvie Sevestre-Ghalila, and Christine Chappard

Applications

Vehicle Detection Using Approximation of Feature Pyramids in the DFT Domain ................................................................. 429
  Mohamed A. Naiel, M. Omair Ahmad, and M.N.S. Swamy

Real-Time Speed-Limit Sign Detection and Recognition Using Spatial Pyramid Feature and Boosted Random Forest . ......................... 437
  JaWon Gim, MinCheol Hwang, Byoung Chul Ko, and Jae-Yeal Nam

Automatic Nacre Thickness Measurement of Tahitian Pearls. .................. 446
  Martin Loesdau, Sébastien Chabrier, and Alban Gabillon

Automated Wheat Disease Classification Under Controlled and Uncontrolled Image Acquisition ....................................................... 456
  Punnarai Siricharoen, Bryan Scotney, Philip Morrow, and Gerard Parr

Color Space Identification for Image Display ........................................ 465
  Martin Vezina, Djemel Ziou, and Fatma Kerouh

Application of the General Shape Analysis in Determining the Class of Binary Object Silhouettes in the Video Surveillance System ............... 473
  Katarzyna Gościewska, Dariusz Frejlichowski, and Radosław Hofman

Speedy Character Line Detection Algorithm Using Image Block-Based Histogram Analysis .................................................. 481
  Chinthaka Premachandra, Katsumari Goto, Shinji Tsuruoka, Hiroharu Kawanaka, and Haruhiko Takase
Detecting Parked Vehicles in Static Images Using Simple Spectral Features in the ‘SM4Public’ System .......................................................... 489
   Dariusz Frejlichowski, Katarzyna Gościewska, Adam Nowosielski, Paweł Forczmański, and Radosław Hofman

Road Detection in Urban Areas Using Random Forest Tree-Based Ensemble Classification ......................................................... 499
   Safaa M. Bedawi and Mohamed S. Kamel

Application of the Polar–Fourier Greyscale Descriptor to the Automatic Traffic Sign Recognition .................................................. 506
   Dariusz Frejlichowski

Camera-Based Lane Marking Detection for ADAS and Autonomous Driving ................................................................. 514
   Yasamin Alkhorshid, Kamelia Aryafar, Gerd Wanielik, and Ali Shokoufandeh

Handling Inter-object Occlusion for Multi-object Tracking Based on Attraction Force Constraint ............................................. 520
   Yuke Li, Isabelle Bloch, and Weiming Shen

Indian Sign Language Recognition Using Kinect Sensor ......................................................... 528
   Kapil Mehrotra, Atul Godbole, and Swapnil Belhe

Automatic Planning of Minimally Invasive Aortic Valve Replacement Surgery ................................................................. 536
   Mustafa Elattar, Floortje van Kesteren, Esther Wiegerinck, Ed van Bavel, Jan Baan, Riccardo Cocchieri, Nils Planken, and Henk Marquering

Author Index .................................................................................................................. 541
Image Analysis and Recognition
12th International Conference,ICIAR 2015, Niagara Falls, ON, Canada, July 22-24, 2015, Proceedings
Kamel, M.; Campilho, A. (Eds.)
2015, XVIII, 543 p. 247 illus., Softcover
ISBN: 978-3-319-20800-8