

Table of Contents – Part II

Biometrics and Face Recognition

Multi-stage Visible Wavelength and Near Infrared Iris Segmentation Framework	1
<i>Andreas Uhl and Peter Wild</i>	
Two Unconstrained Biometric Databases	11
<i>Hélder P. Oliveira and Filipe Magalhães</i>	
Multibiometric System Using Level Set Method and Particle Swarm Optimization	20
<i>Kaushik Roy and Mohamed S. Kamel</i>	
Explicit Integration of Identity Information from Skin Regions to Improve Face Recognition	30
<i>Garsah Farhan Al-Qarni and Farzin Deravi</i>	
Hand-Geometry Based Recognition System: A Non Restricted Acquisition Approach	38
<i>Hélder Matos, Hélder P. Oliveira, and Filipe Magalhães</i>	
Local Gradient Increasing Pattern (LGIP) for Facial Representation and Gender Recognition	46
<i>Lu Bing Zhou and Han Wang</i>	
Quality-Based Fingerprint Segmentation	54
<i>Ntethelelo A. Mngenge, Fulufhelo V. Nelwamondo, Tendani Malumedzha, and Ntsika Msimang</i>	
A New Multi-camera Based Facial Expression Analysis Concept	64
<i>Robert Niese, Ayoub Al-Hamadi, and Bernd Michaelis</i>	
Entropy in Biometric Face Template Analysis	72
<i>Maria De Marsico, Michele Nappi, and Daniel Riccio</i>	
Combining Face with Face-Part Detectors under Gaussian Assumption	80
<i>Andreas Uhl and Peter Wild</i>	
Generalized Local Discriminant Embedding for Face Recognition	90
<i>F. Dornaika and A. Bosaghzadeh</i>	

Human Activity Recognition

Depth Information in Human Gait Analysis: An Experimental Study on Gender Recognition	98
<i>Ricard Borràs, Àgata Lapedriza, and Laura Igual</i>	
A Depth Camera Based Fall Recognition System for the Elderly	106
<i>Rachit Dubey, Bingbing Ni, and Pierre Moulin</i>	
Heuristic and Voxel-Based Signature for Hand Posture Recognition Using a Range Camera	114
<i>Hervé Lahamy and Derek Lichti</i>	
A Compound Eigenspace for Recognizing Directed Human Activities ...	122
<i>Abdunnaser Diaf, Boubakeur Boufama, and Rachid Benlamri</i>	
Hand Detection and Tracking Using the Skeleton of the Blob for Medical Rehabilitation Applications	130
<i>Pedro Gil-Jiménez, Beatriz Losilla-López, Rafael Torres-Cueco, Aurélio Campilho, and Roberto López-Sastre</i>	

Biomedical Image Analysis

Denoising 3D Medical Images Using a Second Order Variational Model and Wavelet Shrinkage.....	138
<i>Minh-Phuong Tran, Renaud Péteri, and Maitine Bergounioux</i>	
Robust Impulse-Noise Filtering for Biomedical Images Using Numerical Interpolation	146
<i>Jinwei Xu and Tuan D. Pham</i>	
Segmenting Multiple Sclerosis Lesions Using a Spatially Constrained K-Nearest Neighbour Approach	156
<i>Mark Lyksborg, Rasmus Larsen, Per Soelberg Sørensen, Morten Blinkenberg, Ellen Garde, Hartwig R. Siebner, and Tim Bjørn Dyrby</i>	
A Segmentation Model and Application to Endoscopic Images	164
<i>Isabel N. Figueiredo, Juan Carlos Moreno, V.B. Surya Prasath, and Pedro N. Figueiredo</i>	
Dental X-Ray Image Segmentation and Object Detection Based on Phase Congruency	172
<i>F. Sattar and F.O. Karay</i>	
Automatic Lane Detection in Chromatography Images	180
<i>Bruno M. Moreira, António V. Sousa, Ana M. Mendonça, and Aurélio Campilho</i>	

Segmentation and Detection of Colorectal Polyps Using Local Polynomial Approximation	188
<i>Filipe Condessa and José Bioucas-Dias</i>	
Hemoglobin and Melanin Quantification on Skin Images	198
<i>Hao Gong and Michel Desvignes</i>	
Lung Tumor Segmentation Using Electric Flow Lines for Graph Cuts . . .	206
<i>Christian Hollensen, George Cannon, Donald Cannon, Søren Bentzen, and Rasmus Larsen</i>	
Segmentation and Analysis of the Oral and Nasal Cavities from MR Time Sequences	214
<i>Samuel Silva, Paula Martins, Catarina Oliveira, Augusto Silva, and António Teixeira</i>	
Automatic Internal Segmentation of Caudate Nucleus for Diagnosis of Attention-Deficit/Hyperactivity Disorder	222
<i>Laura Igual, Joan Carles Soliva, Roger Gimeno, Sergio Escalera, Oscar Vilarroya, and Petia Radeva</i>	
Automated Segmentation of Brain Tumor Using Optimal Texture Features and Support Vector Machine Classifier	230
<i>Karim Gasmî, Ahmed Kharrat, Mohamed Ben Messaoud, and Mohamed Abid</i>	
Class-Specific Mahalanobis Distance Metric Learning for Biological Image Classification	240
<i>B.S. Shajee Mohan and C. Chandra Sekhar</i>	
Supervised Content Based Image Retrieval Using Radiology Reports . . .	249
<i>José Ramos, Thessa Kockelkorn, Bram van Ginneken, Max A. Viergever, Rui Ramos, and Aurélio Campilho</i>	
Computer Aided Diagnosis of Alzheimer’s Disease from MRI Brain Images	259
<i>Namita Aggarwal, Bharti, and R.K. Agrawal</i>	
Separability Analysis of Color Classes on Dermoscopic Images	268
<i>Cátia S.P. Silva, André R.S. Marcal, Marta A. Pereira, Teresa Mendonça, and Jorge Rozeira</i>	
Pedicle Detection in Planar Radiographs Based on Image Descriptors . . .	278
<i>Pedro Cunha, Daniel C. Moura, and Jorge G. Barbosa</i>	
Function-Valued Mappings, Total Variation and Compressed Sensing for diffusion MRI	286
<i>O. Michailovich, D. La Torre, and Edward R. Vrscay</i>	

Structure from Motion Based Approaches to 3D Reconstruction in Minimal Invasive Laparoscopy	296
<i>Andrés F. Mármol Vélez, Jan Marek Marcinczak, and Rolf-Rainer Grigat</i>	
Non-rigid Diffeomorphic Image Registration of Medical Images Using Polynomial Expansion	304
<i>Daniel Forsberg, Mats Andersson, and Hans Knutsson</i>	
An Illumination Model of the Trachea Appearance in Videobronchoscopy Images	313
<i>Carles Sánchez, Javier Sánchez, Antoni Rosell, and Debora Gil</i>	
Adaptive Windowing for Optimal Visualization of Medical Images Based on a Structural Fidelity Measure	321
<i>Hojatollah Yeganeh, Zhou Wang, and Edward R. Vrscay</i>	
Descriptive Image Feature for Object Detection in Medical Images	331
<i>Fabian Lecron, Mohammed Benjelloun, and Saïd Mahmoudi</i>	

Retinal Image Analysis

3D Retinal Vascular Network from Optical Coherence Tomography Data	339
<i>Pedro Guimarães, Pedro Rodrigues, Pedro Serranho, and Rui Bernardes</i>	
The Significance of the Vessel Registration for a Reliable Computation of Arteriovenous Ratio	347
<i>S.G. Vázquez, N. Barreira, Manuel G. Penedo, and M. Rodríguez-Blanco</i>	
Fast Segmentation of Retinal Blood Vessels Using a Deformable Contour Model	355
<i>María J. Carreira, Lucia Espona, Manuel G. Penedo, and Antonio Mosquera</i>	
Detection of Retinal Vascular Bifurcations by Rotation- and Scale-Invariant COSFIRE Filters	363
<i>George Azzopardi and Nicolai Petkov</i>	
Detection of Neovascularization for Screening of Proliferative Diabetic Retinopathy	372
<i>M. Usman Akram, Anam Tariq, and Shoab A. Khan</i>	
Ensemble Classification System Applied for Retinal Vessel Segmentation on Child Images Containing Various Vessel Profiles	380
<i>M.M. Fraz, P. Remagnino, A. Hoppe, B. Uyyanonvara, A.R. Rudnicka, C.G. Owen, and S.A. Barman</i>	

Automatic Cup-to-Disc Ratio Estimation Using Active Contours and Color Clustering in Fundus Images for Glaucoma Diagnosis	390
<i>Irene Fondón, Francisco Núñez, Mercedes Tirado, Soledad Jiménez, Pedro Alemany, Qaisar Abbas, Carmen Serrano, and Begoña Acha</i>	
Detection of Peri-Papillary Atrophy and RNFL Defect from Retinal Images	400
<i>Gopal Datt Joshi, Jayanthi Sivaswamy, R. Prashanth, and S.R. Krishnadas</i>	
Automatic Photoreceptor Detection in In-Vivo Adaptive Optics Retinal Images: Statistical Validation	408
<i>Kevin Loquin, Isabelle Bloch, Kiyoko Nakashima, Florence Rossant, Pierre-Yves Boelle, and Michel Paques</i>	
Automatic Detection of Optic Disc from Retinal Fundus Images Using Dynamic Programming	416
<i>Qaisar Abbas, Irene Fondón, Soledad Jiménez, and Pedro Alemany</i>	
Automatic Localization of the Optic Disc in Retinal Images Based on the Entropy of Vascular Directions	424
<i>Ana Maria Mendonça, Filipe Cardoso, António V. Sousa, and Aurélio Campilho</i>	
Cell Detection and Modelling	
Automatic Assessment of Leishmania Infection Indexes on <i>In Vitro</i> Macrophage Cell Cultures	432
<i>Pedro Leal, Luís Ferro, Marco Marques, Susana Romão, Tânia Cruz, Ana M. Tomás, Helena Castro, and Pedro Quelhas</i>	
Analysis of Whole Slide Images of Equine Tendinopathy	440
<i>M. Toutain, O. Lézoray, F. Audigié, V. Busoni, G. Rossi, F. Parillo, and A. Elmoataz</i>	
Curvelet-Based Texture Description to Classify Intact and Damaged Boar Spermatozoa	448
<i>Víctor González-Castro, Enrique Alegre, Oscar García-Olalla, Diego García-Ordás, María Teresa García-Ordás, and Laura Fernández-Robles</i>	
Comparison of Methods for Splitting of Touching and Overlapping Macrophages in Fluorescent Micrographs	456
<i>Christian Held, Jens Wenzel, Roland Lang, Ralf Palmisano, and Thomas Wittenberg</i>	
Segmentation of Muscle Fibres in Fluorescence Microscopy Images	465
<i>Aurora Sáez, Adoración Montero-Sánchez, Luis M. Escudero, Begoña Acha, and Carmen Serrano</i>	

Generation of Synthetic Image Datasets for Time-Lapse Fluorescence
Microscopy 473
David Svoboda and Vladimír Ulman

Cervical Cell Classification Based Exclusively on Nucleus Features 483
Marina E. Plissiti and Christophoros Nikou

Author Index 491

Table of Contents – Part I

Clustering and Classification

Localized Graph-Based Feature Selection for Clustering	1
<i>Zhihong Zhang and Edwin R. Hancock</i>	
Optimal “Anti-Bayesian” Parametric Pattern Classification for the Exponential Family Using Order Statistics Criteria	11
<i>A. Thomas and B. John Oommen</i>	
Cast Shadow Detection Based on Semi-supervised Learning	19
<i>Salma Kammoun Jarraya, Rania Rebai Boukhriss, Mohamed Hammami, and Hanene Ben-Abdallah</i>	
k -Nearest Neighbor Classification Using Dissimilarity Increments	27
<i>Helena Aidos and Ana Fred</i>	
Using Permutation Tests to Study How the Dimensionality, the Number of Classes, and the Number of Samples Affect Classification Analysis . . .	34
<i>Mohammed Sadeq Al-Rawi and João Paulo Silva Cunha</i>	
Determining the Number of Clusters with Rate-Distortion Curve Modeling	43
<i>Alexander Kolesnikov and Elena Trichina</i>	
Hierarchical Classification-Based Region Growing (HCBRG): A Collaborative Approach for Object Segmentation and Classification	51
<i>Aymen Sellaouti, Atef Hamouda, Aline Deruyver, and Cédric Wemmert</i>	
Clustering through SOM Consistency	61
<i>Nicolau Gonçalves and Ricardo Vigário</i>	

Image Processing

Max and Min Values of the Structural Similarity Function $S(x, a)$ on the L^2 Sphere $S_R(a), a \in \mathbb{R}^N$	69
<i>D. Glew and Edward R. Vrscay</i>	
Biologically Motivated Local Contextual Modulation Improves Low-Level Visual Feature Representations	79
<i>Xun Shi, Neil D.B. Bruce, and John K. Tsotsos</i>	
A Statistical Operator for Detecting Weak Edges in Low Contrast Images	89
<i>Ajay Mittal, Sanjeev Sofat, Edwin Hancock, and Stéphane Mousset</i>	

Color Correction Using 3D Gaussian Mixture Models	97
<i>Miguel Oliveira, Angel D. Sappa, and Vítor Santos</i>	
Blind Noise Level Detection	107
<i>Anna Tomaszewska</i>	
Foreground Detection by Robust PCA Solved via a Linearized Alternating Direction Method	115
<i>Charles Guyon, Thierry Bouwmans, and El-Hadi Zahzah</i>	
A Mixture of Experts Approach to Multi-strategy Image Quality Assessment	123
<i>Peng Peng and Ze-Nian Li</i>	
Self-similarity of Images in the Wavelet Domain in Terms of ℓ^2 and Structural Similarity (SSIM)	131
<i>D. Glew and Edward R. Vrscay</i>	

Image Analysis

Arabic Bank Check Analysis and Zone Extraction	141
<i>Irfan Ahmad and Sabri A. Mahmoud</i>	
Image Segmentation of Vickers Indentations Using Shape from Focus . . .	149
<i>Michael Gadermayr and Andreas Uhl</i>	
On the Detection of Unknown Locally Repeating Patterns in Images . . .	158
<i>Diogo Pratas and Armando J. Pinho</i>	
A Performance Evaluation of SIFT and SURF for Multispectral Image Matching	166
<i>Sajid Saleem, Abdul Bais, and Robert Sablatnig</i>	

Motion Analysis and Tracking

Real-Time Image Alignment for a Gyro-visual Hybrid Pointing Device	174
<i>Jun Zheng and Minglun Gong</i>	
Error Analysis for Lucas-Kanade Based Schemes	184
<i>Patricia Márquez-Valle, Debora Gil, and Aura Hernández-Sabaté</i>	
Vortex Tracking in High Density Vector Fields	192
<i>Clément Guérin, Petra Gomez-Krämer, Michel Ménard, and Damien Coisne</i>	
Independent Motion Detection in the Light of the Aperture Problem . . .	200
<i>László Czúni and Mónika Gál</i>	

Dense and Sparse Optic Flows Aggregation for Accurate Motion Segmentation in Monocular Video Sequences	208
<i>Mihai Făgădar-Cosma, Vladimir-Ioan Crețu, and Mihai Victor Micea</i>	
An Improved Basic Sequential Clustering Algorithm for Background Construction and Motion Detection	216
<i>Mohcene Benalia and Samy Ait-Aoudia</i>	
GPU Accelerated Real Time Rotation, Scale and Translation Invariant Image Registration Method	224
<i>Sudhakar Sah, Jan Vanek, YoungJun Roh, and Ratul Wasnik</i>	
Gaussian Propagation Model Based Dense Optical Flow for Objects Tracking	234
<i>Houssam Salmane, Yassine Ruichek, and Louahdi Khoudour</i>	
Real Time Semi-dense Point Tracking	245
<i>Matthieu Garrigues and Antoine Manzanera</i>	

Shape Representation

A Precise Ellipse Fitting Method for Noisy Data	253
<i>Dilip K. Prasad, Chai Quek, and Maylor K.H. Leung</i>	
Shape Reconstruction from an Unorganized Point Cloud with Outliers	261
<i>Yvan Maillot, Benoît Presles, and Johan Debayle</i>	
A Non-heuristic Dominant Point Detection Based on Suppression of Break Points	269
<i>Dilip K. Prasad, Chai Quek, and Maylor K.H. Leung</i>	
A Unifying Framework for Correspondence-Less Linear Shape Alignment	277
<i>Zoltan Kato</i>	

3D Imaging

Go With the Flow: Hand Trajectories in 3D via Clustered Scene Flow	285
<i>Simon Hadfield and Richard Bowden</i>	
Cortical Multiscale Line-Edge Disparity Model	296
<i>J.M.F. Rodrigues, J.A. Martins, R. Lam, and J.M.H. du Buf</i>	
Mathematical Models for the Calibration of Cameras Mounted on a Tripod Using Primitive Tracking	304
<i>L. Alvarez, P. Henríquez, and L. Mazorra</i>	

3D-2D Laser Range Finder Calibration Using a Conic Based Geometry Shape 312
Miguel Almeida, Paulo Dias, Miguel Oliveira, and Vítor Santos

Evaluation of Similarity Functions in Multimodal Stereo 320
Fernando Barrera, Felipe Lumbreras, and Angel D. Sappa

An Unbiased and Intervoxel Watershed Algorithm for 3D Image Segmentation 330
Fabien Baldacci

Applications

Model-Based Ambient Occlusion for Inverse Rendering 338
Oswald Aldrian and William A.P. Smith

Extraction of Leaf Parts by Image Analysis 348
Olfa Mzoughi, Itheri Yahiaoui, and Nozha Boujemaa

Compression of Whole Genome Alignments Using a Mixture of Finite-Context Models 359
Luís M.O. Matos, Diogo Pratas, and Armando J. Pinho

Implementation of HDR Photographic Pipeline in Mobile Devices 367
Radosław Mantiuk, Michał Cichowicz, and Miłosław Smyk

A Markovian Engine for Text Recognition: Cursive Arabic Text, Statistical Features and Interconnected HMMs 375
M.S. Khorsheed and H. Al-Omari

A Central Reconstruction Based Strategy for Selecting Projection Angles in Binary Tomography 382
Péter Balázs and Kees Joost Batenburg

An A-contrario Approach for Obstacle Detection in Assistance Driving Systems 392
Moez Ammar, Sylvie Le Hégarat-Mascle, Marius Vasiliu, and Hugues Mounier

Real-Time Spherical Harmonics Based Subsurface Scattering 402
Anna Tomaszewska and Krzysztof Stefanowski

DOG_I: An Annotation System for Images of Dog Breeds 410
Antonios Dimas, Pyrros Koletsis, and Euripides G.M. Petrakis

Rectangular Discrete Radon Transform for Buildings Extraction from High Resolution Satellite Images 418
Elouedi Ines, Hamouda Atef, and Rojbane Hmida

Clustering-Based Feature Selection for Content Based Remote Sensing Image Retrieval	427
<i>Shijin Li, Jiali Zhu, Jun Feng, and Dingsheng Wan</i>	
Author Index	437