## Table of Contents

## Biometrics: Behavioral

Features	1
Soft Biometrics for Keystroke Dynamics	11
Waving Detection Using the FuzzyBoost Algorithm and Flow-Based Features	19
Automatic Eye Gesture Recognition in Audiometries for Patients with Cognitive Decline	27
Comparative Study between Spatio/Temporal Descriptors for Pedestrians Recognition by Gait	35
Biometrics: Physiological	
Outlier Detection in Non-intrusive ECG Biometric System	43
A Unifying Approach to ECG Biometric Recognition Using the Wavelet Transform	53
Independent Performance Evaluation of Pseudonymous Identifier Fingerprint Verification Algorithms	63
On Adaptive Fingerprint Pore Extraction	72
A Novel Template Protection Method Based on Palmprint Feature Guangming Lu, Jiandong zhang, and Feiyan Shan	80



Networks	89
Fusion of Novel Iris Segmentation Quality Metrics for Failure	
Detection	97
Facial Expression Recognition by Sparse Reconstruction with Robust	
Features	107
Classification and Regression	
On Solving the Small Sample Size Problem for Marginal Fisher Analysis	116
Multiple-Classifier Fusion Using Spatial Features for Partially Occluded Handwritten Digit Recognition	124
Predicting Aquaplaning Performance from Tyre Profile Images with Machine Learning	133
Sign Language Recognition Using Hilbert Curve Features	143
Hierarchic Image Classification Visualization	152
Object Recognition	
A Two-Layer Marked Point Process Framework for Multilevel Object Population Analysis	160
Contour-Based Object Extraction and Clutter Removal for Semantic Vision	170
Spectral Geometric Descriptor for Deformable 3D Shape Matching and Retrieval	181

Table of Contents	2
A Novel Method for Barcode Localization in Image Domain	1
Evaluation of Features for Leaf Discrimination	1
Combining Leaf Salient Points and Leaf Contour Descriptions for Plant Species Recognition	2
Combined Categorization and Localization of Logistic Goods Using Superquadrics	2
Bernd Scholz-Reiter  Image Processing and Analysis: Representations and	
models	
Hyperspectral Images as Function-Valued Mappings, Their Self-similarity and a Class of Fractal Transforms	4
Image Processing and Analysis: Compression	
The Discrete Orthonormal Stockwell Transform and Variations, with Applications to Image Compression	;
Image Processing and Analysis: Enhancement	
Cosine-Driven Non-linear Denoising	
Color Correction Problem of Image Displayed on Non-white Projection Screen	
SRAD with Weighted Diffusion Function	
Correction of Geometrical Distortions in Bands of Chromatography	
Images  Bruno M. Moreira, António V. Sousa, Ana Maria Mendonça, and Aurélio Campilho	

Coherence Tomography Despeckling	282
Pedro Rodrigues, Pedro Guimarães, Adérito Araújo, Sílvia Barbeiro, Rui Bernardes, and Pedro Serranho	
A New Algorithm for Background Removal of Document Images Acquired Using Portable Digital Cameras	290
Removing Shade and Specular Noise in Images of Objects and Documents Acquired with a 3D-Scanner	299
Shading Removal of Illustrated Documents	308
Image Processing and Analysis: Feature Detection and Segmentation	
Line Detection by Spherical Gradient	318
New Tools for Gray Level Histogram Analysis, Applications in Segmentation	326
Unsupervised Visual Changepoint Detection Using Maximum Mean Discrepancy	336
Novel Technique for Image Segmentation Based on Grammar Parsing and Hilbert Transform	346
Revisiting Harris Corner Detector Algorithm: A Gradual Thresholding Approach	354
3D Image Analysis	
A View Based Approach for Matching the 3D Appearance of Local Features	364

A 3D Ear Acquisition System Design by Using Triangulation Imaging Principle	373
Yahui Liu and Guangming Lu	
Application of Enhanced-2D-CWT in Topographic Images for Mapping	220
Landslide Risk Areas	380
Three-Dimensional Object Representation Based on 2D UNL-Fourier Shape Descriptor	389
Tracking	
Cascaded Generative and Discriminative Learning for Visual	
Tracking	397
Multi-distributions Particle Filter for Eye Tracking Inside a Vehicle Céline Craye and Fakhri Karray	407
Motion Recovery of a Single Camera Installed on a Wheeled Vehicle  M. Hossein Mirabdollah and Bärbel Mertsching	417
Gaze-Dependent Tone Mapping	426
Cancer Cell Detection and Tracking Based on Local Interest Point Detectors	434
Medical Imaging: Image Segmentation	
Robust Proximal Femur Segmentation in Conventional X-Ray Images via Random Forest Regression on Multi-resolution Gradient Features Cheng Chen and Guoyan Zheng	442
Automatic Segmentation of Adipose Tissue from Thigh Magnetic Resonance Images	451
Segmentation and Analysis of Vocal Tract from MidSagittal Real-Time MRI	459

Medical Imaging: Image Registration	
A Modular Registration Algorithm for Medical Images	467
Medical Imaging: Image Analysis	
Stochastic Extraction of Elongated Curvilinear Structures in  Mammographic Images	475
Detecting and Localizing Tree Nodes in Anatomic Structures of Branching Topology	485
A Morphologic Analysis of Cirrhotic Liver in CT Images Yen-Wei Chen, Jie Luo, Xianhua Han, Tomoko Tateyama, Akira Furukawa, and Shuzo Kanasaki	494
Medical Imaging: Coronary Image Analysis	
3-D Coronary Vessel Extraction Using a Novel Minimum Path Based Region Growing	502
Coronary Artery MultiScale Enhancement Methods: A Comparative Study	510
Medical Imaging: Retinal Image Analys	
Small Red Lesions Detection Using a MAS Approach	521
Automatic Estimation of the Arteriolar-to-Venular Ratio in Retinal Images Using a Graph-Based Approach for Artery/Vein Classification	530
Behdad Dashtbozorg, Ana Maria Mendonça, and Aurélio Campilho	000
Medical Imaging: Computer Aided Diagnosis	
Classification Approach for Measurement of Atherosclerosis Using B-Mode Ultrasound Carotid Images	539

Tânia Cruz, Ana M. Tomás, Helena Castro, and Pedro Quelhas

## RGB-D Camera Applications

Sequence Alignment for RGB-D and Motion Capture Skeletons Xi Chen and Markus Koskela	630
Object Detection Using Active Contour Model with Depth Clue  Sara Memar, Karen Jin, and Boubakeur Boufama	640
A Decision Forest Based Feature Selection Framework for Action Recognition from RGB-Depth Cameras	648
Hierarchical Grid-Based Learning Approach for Recovering Unknown Depths in Kinect Depth Maps	658
Analysis of the SoftKinetic DepthSense for Range Imaging	668
The Methods of Moments	
Numerical Stability Quality-Factor for Orthogonal Polynomials: Zernike Radial Polynomials Case Study	676
Image Reconstruction from Orthogonal Fourier-Mellin Moments Xiaoyu Wang and Simon Liao	687
Break-Up Analysis of the Tear Film Based on Time, Location, Size and Shape of the Rupture Area	695
Gabor Wavelet Enabled Zernike Moments for Effective Content Based Image Retrieval	703
Chinese Character Recognition by Krawtchouk Moment Features	711
Applications	
Delineation of Impact Craters by a Mathematical Morphology Based Approach	717
Pedro Pina and Jorge S. Marques	111

Table of Contents	XXI
Steganographic Authentication Method for Electronic IDs	726
Global Constraints for Syntactic Consistency in OMR: An Ongoing Approach	734
Occluded Dark Field: A New Inspection Technique of Convex Mirrored Surfaces	742
Interactive Prototyping of Physical Lighting	<b>7</b> 50
Compressive Sensing Based Face Detection without Explicit Image Reconstruction Using Support Vector Machines	758
Unsupervised Internet-Based Category Learning for Object Recognition	766
An Algorithm for the Automatic Analysis of Characters Located on Car License Plates	774
Image-Based Delineation of Built Heritage Masonry for Automatic Classification	782
Image Analysis for Automatic Characterization of Polyhydroxyalcanoates Granules	790
Building and Evaluation of a Mosaic of Images Using Aerial Photographs	798
Author Index	807