

## Contents – Part II

### Applications

A Sparse Representation Based Classification Algorithm for Chinese Food Recognition . . . . .	3
<i>Haixiang Yang, Dong Zhang, Dah-Jye Lee, and Minjie Huang</i>	
Guided Text Spotting for Assistive Blind Navigation in Unfamiliar Indoor Environments . . . . .	11
<i>Xuejian Rong, Bing Li, J. Pablo Muñoz, Jizhong Xiao, Aries Ardit, and Yingli Tian</i>	
Automatic Oil Reserve Analysis Through the Shadows of Exterior Floating Crest Oil Tanks in Highlight Optical Satellite Images . . . . .	23
<i>Qingquan Wang, Jinfang Zhang, and Xiaohui Hu</i>	
Performance Evaluation of Video Summaries Using Efficient Image Euclidean Distance . . . . .	33
<i>Sivapriya Kannappan, Yonghuai Liu, and Bernard Paul Tiddeman</i>	
RDEPS: A Combined Reaction-Diffusion Equation and Photometric Similarity Filter for Optical Image Restoration . . . . .	43
<i>Xueqing Zhao, Pavlos Mavridis, Tobias Schreck, and Arjan Kuijper</i>	
Leveraging Multi-modal Analyses and Online Knowledge Base for Video Aboutness Generation . . . . .	55
<i>Raj Kumar Gupta and Yang Yinping</i>	
A Flood Detection and Warning System Based on Video Content Analysis. . . . .	65
<i>Martin Joshua P. San Miguel and Conrado R. Ruiz Jr.</i>	
Efficient CU Splitting Method for HEVC Intra Coding Based on Visual Saliency . . . . .	75
<i>Xin Zhou, Guangming Shi, and Wei Zhou</i>	
Video Anomaly Detection Based on Adaptive Multiple Auto-Encoders . . . . .	83
<i>Tianlong Bao, Chunhui Ding, Saleem Karmoshi, and Ming Zhu</i>	
Comprehensive Parameter Sweep for Learning-Based Detector on Traffic Lights . . . . .	92
<i>Morten B. Jensen, Mark P. Philipsen, Thomas B. Moeslund, and Mohan Trivedi</i>	

An Efficient Pedestrian Detector Based on Saliency and HOG Features Modeling . . . . .	101
<i>Mounir Errami and Mohammed Rziza</i>	

## Visual Surveillance

Preventing Drowning Accidents Using Thermal Cameras . . . . .	111
<i>Soren Bonderup, Jonas Olsson, Morten Bonderup, and Thomas B. Moeslund</i>	
Maximum Correntropy Based Dictionary Learning Framework for Physical Activity Recognition Using Wearable Sensors . . . . .	123
<i>Sherin M. Mathews, Chandra Kambhamettu, and Kenneth E. Barner</i>	
3D Human Activity Recognition Using Skeletal Data from RGBD Sensors . . . . .	133
<i>Jiaxu Ling, Lihua Tian, and Chen Li</i>	
Unsupervised Deep Networks for Temporal Localization of Human Actions in Streaming Videos . . . . .	143
<i>Binu M. Nair</i>	
A New Method for Fall Detection of Elderly Based on Human Shape and Motion Variation. . . . .	156
<i>Abderrazak Iazzi, Mohammed Rziza, Rachid Oulad Haj Thami, and Driss Aboutajdine</i>	
Motion of Oriented Magnitudes Patterns for Human Action Recognition . . . .	168
<i>Hai-Hong Phan, Ngoc-Son Vu, Vu-Lam Nguyen, and Mathias Quoy</i>	

## Computer Graphics

Adaptive Video Transition Detection Based on Multiscale Structural Dissimilarity. . . . .	181
<i>Anderson Carlos Sousa e Santos and Helio Pedrini</i>	
Fast and Accurate 3D Reconstruction of Dental Models. . . . .	191
<i>Seongje Jang, Yonghee Hahm, and Kunwoo Lee</i>	
A Portable and Unified CPU/GPU Parallel Implementation of Surface Normal Generation Algorithm from 3D Terrain Data. . . . .	202
<i>Brandon Wilson, Robert Deen, and Alireza Tavakkoli</i>	
Character Animation: An Automated Gait Cycle for 3D Characters Using Mathematical Equations . . . . .	212
<i>Mary Guindy and Rimon Elias</i>	

Realistic 3D Modeling of the Liver from MRI Images . . . . .	223
<i>Andrew Conegliano and Jürgen P. Schulze</i>	

## Virtual Reality

An Integrated Cyber-Physical Immersive Virtual Reality Framework with Applications to Telerobotics . . . . .	235
<i>Matthew Bounds, Brandon Wilson, Alireza Tavakkoli, and Donald Loffredo</i>	
Teacher-Student VR Telepresence with Networked Depth Camera Mesh and Heterogeneous Displays . . . . .	246
<i>Sam Ekong, Christoph W. Borst, Jason Woodworth, and Terrence L. Chambers</i>	
Virtual Reality Integration with Force Feedback in Upper Limb Rehabilitation . . . . .	259
<i>Víctor H. Andaluz, Pablo J. Salazar, Miguel Escudero V., Carlos Bustamante D., Marcelo Silva S., Washington Quevedo, Jorge S. Sánchez, Edison G. Espinosa, and David Rivas</i>	
Joint Keystone Correction and Shake Removal for a Hand Held Projector . . .	269
<i>Manevarthe Bhargava and Kalpati Ramakrishnan</i>	

## Poster Session

Global Evolution-Constructed Feature for Date Maturity Evaluation . . . . .	281
<i>Meng Zhang and Dah-Jye Lee</i>	
An Image Dataset of Text Patches in Everyday Scenes . . . . .	291
<i>Ahmed Ibrahim, A. Lynn Abbott, and Mohamed E. Hussein</i>	
Pre-processing of Video Streams for Extracting Queryable Representation of Its Contents . . . . .	301
<i>Manish Annappa, Sharma Chakravarthy, and Vassilis Athitsos</i>	
Physiological Features of the Internal Jugular Vein from B-Mode Ultrasound Imagery . . . . .	312
<i>Jordan P. Smith, Mohamed Shehata, Ramsey G. Powell, Peter F. McGuire, and Andrew J. Smith</i>	
Manifold Interpolation for an Efficient Hand Shape Recognition in the Irish Sign Language . . . . .	320
<i>Marlon Oliveira, Alistair Sutherland, and Mohamed Farouk</i>	
Leaf Classification Using Convexity Moments of Polygons . . . . .	330
<i>J.R. Kala, S. Viriri, and D. Moodley</i>	

Semi-automated Extraction of Retinal Blood Vessel Network with Bifurcation and Crossover Points . . . . .	340
<i>Z. Nougara, N. Kihal, and J. Meunier</i>	
SINN: Shepard Interpolation Neural Networks . . . . .	349
<i>Phillip Williams</i>	
View-Based 3D Objects Recognition with Expectation Propagation Learning . . . . .	359
<i>Adrien Bertrand, Faisal R. Al-Osaimi, and Nizar Bouguila</i>	
Age Estimation by LS-SVM Regression on Facial Images . . . . .	370
<i>Shreyank N. Gowda</i>	
Video Cut Detector via Adaptive Features using the Frobenius Norm . . . . .	380
<i>Youssef Bendraou, Fedwa Essannouni, Ahmed Salam, and Driss Aboutajdine</i>	
Practical Hand Skeleton Estimation Method Based on Monocular Camera . . .	390
<i>Sujung Bae, Jaehyeon Yoo, Moonsik Jeong, and Vladimir Savin</i>	
A Nonparametric Hierarchical Bayesian Model and Its Application on Multimodal Person Identity Verification . . . . .	399
<i>Wentao Fan and Nizar Bouguila</i>	
Performance Evaluation of 3D Keypoints and Descriptors . . . . .	410
<i>Zizui Chen, Stephen Czarnuch, Andrew Smith, and Mohamed Shehata</i>	
Features of Internal Jugular Vein Contours for Classification . . . . .	421
<i>Jordan P. Smith, Mohamed Shehata, Peter F. McGuire, and Andrew J. Smith</i>	
Gathering Event Detection by Stereo Vision . . . . .	431
<i>Qian Wang, Wei Jin, and Gang Wang</i>	
Abnormal Detection by Iterative Reconstruction . . . . .	443
<i>Kenta Toyoda and Kazuhiro Hotta</i>	
An Integrated Octree-RANSAC Technique for Automated LiDAR Building Data Segmentation for Decorative Buildings . . . . .	454
<i>Fatemeh Hamid-Lakzaeian and Debra F. Laefer</i>	
Optimization-Based Multi-view Head Pose Estimation for Driver Behavior Analysis . . . . .	464
<i>Huaixin Xiong</i>	
Reduction of Missing Wedge Artifact in Oblique-View Computed Tomography . . . . .	475
<i>Kyung-Chan Jin, Jung-Seok Yoon, and Yoon-Ho Song</i>	

Using Dense 3D Reconstruction for Visual Odometry Based on Structure from Motion Techniques . . . . .	483
<i>Marcelo de Mattos Nascimento, Manuel Eduardo Loaiza Fernandez, and Alberto Barbosa Raposo</i>	
Towards Estimating Heart Rates from Video Under Low Light. . . . .	494
<i>Antony Lam and Yoshinori Kuno</i>	
Video Tracking with Probabilistic Cooccurrence Feature Extraction. . . . .	504
<i>Kaleb Smith and Anthony O. Smith</i>	
3-D Shape Recovery from Image Focus Using Rank Transform . . . . .	514
<i>Fahad Mahmood, Jawad Mahmood, Waqar Shahid Qureshi, and Umar Shahbaz Khan</i>	
Combinatorial Optimization for Human Body Tracking . . . . .	524
<i>Andrew Hynes and Stephen Czarnuch</i>	
Automatic Detection of Deviations in Human Movements Using HMM: Discrete vs Continuous . . . . .	534
<i>Carlos Palma, Augusto Salazar, and Francisco Vargas</i>	
Quantitative Performance Optimisation for Corner and Edge Based Robotic Vision Systems: A Monte-Carlo Simulation . . . . .	544
<i>Jingduo Tian, Neil Thacker, and Alexandru Stancu</i>	
Evaluating the Change of Directional Patterns for Fingerprints with Missing Singular Points Under Rotation. . . . .	555
<i>Kribashnee Dorasamy, Leandra Webb-Ray, and Jules-Raymond Tapamo</i>	
Particle Detection in Crowd Regions Using Cumulative Score of CNN . . . . .	566
<i>Kenshiro Nishida and Kazuhiro Hotta</i>	
Preliminary Studies on Personalized Preference Prediction from Gaze in Comparing Visualizations. . . . .	576
<i>Hamed R.-Tavakoli, Hanieh Poostchi, Jaakko Peltonen, Jorma Laaksonen, and Samuel Kaski</i>	
Simulating a Predator Fish Attacking a School of Prey Fish in 3D Graphics . . . . .	586
<i>Sahithi Podila and Ying Zhu</i>	
Direct Visual-Inertial Odometry and Mapping for Unmanned Vehicle . . . . .	595
<i>Wenju Xu and Dongkyu Choi</i>	
Real-Time Automated Aerial Refueling Using Stereo Vision . . . . .	605
<i>Christopher Parsons and Scott Nykl</i>	

Signature Embedding: Writer Independent Offline Signature Verification  
with Deep Metric Learning. . . . . 616  
*Hannes Rantzsch, Haojin Yang, and Christoph Meinel*

**Author Index** . . . . . 627

# Contents – Part I

## ST: Computational Bioimaging

Similarity Metric Learning for 2D to 3D Registration of Brain Vasculature . . . . .	3
<i>Alice Tang and Fabien Scalzo</i>	
Automatic Optic Disk Segmentation in Presence of Disk Blurring. . . . .	13
<i>Samra Irshad, Xiaoxia Yin, Lucy Qing Li, and Umer Salman</i>	
An Object Splitting Model Using Higher-Order Active Contours for Single-Cell Segmentation . . . . .	24
<i>Jozsef Molnar, Csaba Molnar, and Peter Horvath</i>	
Tensor Voting Extraction of Vessel Centerlines from Cerebral Angiograms . . .	35
<i>Yu Ding, Mircea Nicolescu, Dan Farmer, Yao Wang, George Bebis, and Fabien Scalzo</i>	
Stacked Autoencoders for Medical Image Search . . . . .	45
<i>S. Sharma, I. Umar, L. Ospina, D. Wong, and H.R. Tizhoosh</i>	
CutPointVis: An Interactive Exploration Tool for Cancer Biomarker Cutpoint Optimization . . . . .	55
<i>Lei Zhang and Ying Zhu</i>	

## Computer Graphics

Adding Turbulence Based on Low-Resolution Cascade Ratios . . . . .	67
<i>Masato Ishimuroya and Takashi Kanai</i>	
Creating Feasible Reflectance Data for Synthetic Optical Flow Datasets. . . . .	77
<i>Burkhard Güssefeld, Katrin Honauer, and Daniel Kondermann</i>	
Automatic Web Page Coloring . . . . .	91
<i>Polina Volkova, Soheila Abrishami, and Piyush Kumar</i>	
Automatic Content-Aware Non-photorealistic Rendering of Images . . . . .	101
<i>Akshay Gadi Patil and Shanmuganathan Raman</i>	
Improved Aircraft Recognition for Aerial Refueling Through Data Augmentation in Convolutional Neural Networks . . . . .	113
<i>Robert Mash, Brett Borghetti, and John Pecarina</i>	

## Motion and Tracking

Detecting Tracking Failures from Correlation Response Maps. . . . .	125
<i>Ryan Walsh and Henry Medeiros</i>	
Real-Time Multi-object Tracking with Occlusion and Stationary Objects Handling for Conveying Systems . . . . .	136
<i>Adel Benamara, Serge Miguet, and Mihaela Scuturici</i>	
Fast, Deep Detection and Tracking of Birds and Nests. . . . .	146
<i>Qiaosong Wang, Christopher Rasmussen, and Chunbo Song</i>	
Camera Motion Estimation with Known Vertical Direction in Unstructured Environments . . . . .	156
<i>Jae-Hean Kim and Jin Sung Choi</i>	
A Multiple Object Tracking Evaluation Analysis Framework . . . . .	167
<i>Dao Huu Hung, Do Anh Tuan, Nguyen Ngoc Khanh, Tran Duc Hien, and Nguyen Hai Duong</i>	

## Segmentation

Stereo-Image Normalization of Voluminous Objects Improves Textile Defect Recognition . . . . .	181
<i>Dirk Siegmund, Arjan Kuijper, and Andreas Braun</i>	
Reliability-Based Local Features Aggregation for Image Segmentation. . . . .	193
<i>Fariba Zohrizadeh, Mohsen Kheirandishfard, Kamran Ghasedidizaji, and Farhad Kamangar</i>	
Chan-Vese Revisited: Relation to Otsu’s Method and a Parameter-Free Non-PDE Solution via Morphological Framework. . . . .	203
<i>Arie Shaus and Eli Turkel</i>	
Image Enhancement by Volume Limitation in Binary Tomography . . . . .	213
<i>László Varga, Zoltán Ozsvár, and Péter Balázs</i>	
Resolution-Independent Superpixels Based on Convex Constrained Meshes Without Small Angles . . . . .	223
<i>Jeremy Forsythe, Vitaliy Kurlin, and Andrew Fitzgibbon</i>	
Optimizing Intersection-Over-Union in Deep Neural Networks for Image Segmentation . . . . .	234
<i>Md Atiqur Rahman and Yang Wang</i>	



**Pattern Recognition**

A Mobile Recognition System for Analog Energy Meter Scanning . . . . .	247
<i>Martin Cerman, Gayane Shalunts, and Daniel Albertini</i>	
Towards Landmine Detection Using Ubiquitous Satellite Imaging . . . . .	257
<i>Sahar Elkazaz, Mohamed E. Hussein, Ahmed El-Mahdy, and Hiroshi Ishikawa</i>	
Robustness of Rotation Invariant Descriptors for Texture Classification . . . . .	268
<i>Raissa Tavares Vieira, Tamiris Trevisan Negri, and Adilson Gonzaga</i>	
Feature Evaluation for Handwritten Character Recognition with Regressive and Generative Hidden Markov Models . . . . .	278
<i>Kalyan Ram Ayyalasomayajula, Carl Nettelblad, and Anders Brun</i>	
DeTEC: Detection of Touching Elongated Cells in SEM Images. . . . .	288
<i>A. Memariani, C. Nikou, B.T. Endres, E. Bassères, K.W. Garey, and I.A. Kakadiaris</i>	
Object Detection Based on Image Blur Using Spatial-Domain Filtering with Haar-Like Features. . . . .	298
<i>Ryusuke Miyamoto and Shingo Kobayashi</i>	
Rare Class Oriented Scene Labeling Using CNN Incorporated Label Transfer . . . . .	309
<i>Liangjiang Yu and Guoliang Fan</i>	
Pollen Grain Recognition Using Deep Learning . . . . .	321
<i>Amar Daood, Eraldo Ribeiro, and Mark Bush</i>	
Classifying Pollen Using Robust Sequence Alignment of Sparse Z-Stack Volumes . . . . .	331
<i>Amar Daood, Eraldo Ribeiro, and Mark Bush</i>	
Complementary Keypoint Descriptors . . . . .	341
<i>Clark F. Olson, Sam A. Hoover, Jordan L. Soltman, and Siqu Zhang</i>	
Two Phase Classification for Early Hand Gesture Recognition in 3D Top View Data . . . . .	353
<i>Aditya Tewari, Bertram Taetz, Frederic Grandidier, and Didier Stricker</i>	

**Visualization**

Adaptive Isosurface Reconstruction Using a Volumetric-Divergence-Based Metric . . . . .	367
<i>Cuilan Wang and Shuhua Lai</i>	

Large Image Collection Visualization Using Perception-Based Similarity with Color Features . . . . .	379
<i>Zeyuan Chen and Christopher G. Healey</i>	
Chasing Rainbows: A Color-Theoretic Framework for Improving and Preserving Bad Colormaps . . . . .	391
<i>Robert Sisneros, Mohammad Raji, Mark W. Van Moer, and David Bock</i>	
Interpolation-Based Extraction of Representative Isosurfaces. . . . .	403
<i>Oliver Fernandes, Steffen Frey, and Thomas Ertl</i>	
Image-Based Post-processing for Realistic Real-Time Rendering of Scenes in the Presence of Fluid Simulations and Image-Based Lighting . . . . .	414
<i>Julian Puhl, Martin Knuth, and Arjan Kuijper</i>	
A Bioplausible Model for Explaining Café Wall Illusion: Foveal vs. Peripheral Resolution . . . . .	426
<i>Nasim Nematzadeh and David M.W. Powers</i>	
Automated Reconstruction of Neurovascular Networks in Knife-Edge Scanning Microscope Rat Brain Nissl Data Set. . . . .	439
<i>Wookyung An and Yoonsuck Choe</i>	
Spatiotemporal LOD-Blending for Artifact Reduction in Multi-resolution Volume Rendering . . . . .	449
<i>Sebastian Thiele, Carl-Feofan Matthes, and Bernd Froehlich</i>	
Visual Analytics Using Graph Sampling and Summarization on Multitouch Displays. . . . .	462
<i>Nicholas G. Lipari, Christoph W. Borst, and Mehmet Engin Tozal</i>	
Evaluation of Collaborative Actions to Inform Design of a Remote Interactive Collaboration Framework for Immersive Data Visualizations. . . . .	472
<i>Rajiv Khadka, Nikhil Shetty, Eric T. Whiting, and Amy Banic</i>	
<b>ST: 3D Mapping, Modeling and Surface Reconstruction</b>	
An Efficient Algorithm for Feature-Based 3D Point Cloud Correspondence Search . . . . .	485
<i>Zili Yi, Yang Li, and Minglun Gong</i>	
Extraction of Vascular Intensity Directional Derivative on Computed Tomography Angiography . . . . .	497
<i>Elijah Agbayani, Baixue Jia, Graham Woolf, David Liebeskind, and Fabien Scalzo</i>	

Capturing Photorealistic and Printable 3D Models Using Low-Cost Hardware . . . . .	507
<i>Christoph Heindl, Sharath Chandra Akkaladevi, and Harald Bauer</i>	
Improved Stereo Vision of Indoor Dense Suspended Scatterers Scenes from De-scattering Images . . . . .	519
<i>Chanh D. Tr. Nguyen, Kyeong Yong Cho, You Hyun Jang, Kyung-Soo Kim, and Soohyun Kim</i>	
Fully Automatic and Robust 3D Modeling for Range Scan Data of Complex 3D Objects . . . . .	529
<i>Jungjae Yim and Guoliang Fan</i>	

### **ST: Advancing Autonomy for Aerial Robotics**

Real-Time Detection and Tracking of Multiple Humans from High Bird's-Eye Views in the Visual and Infrared Spectrum. . . . .	545
<i>Julius Kümmerle, Timo Hinzmann, Anurag Sai Vempati, and Roland Siegwart</i>	
Combining Visual Tracking and Person Detection for Long Term Tracking on a UAV . . . . .	557
<i>Gustav Häger, Goutam Bhat, Martin Danelljan, Fahad Shahbaz Khan, Michael Felsberg, Piotr Rudl, and Patrick Doherty</i>	
Monocular Visual-Inertial SLAM for Fixed-Wing UAVs Using Sliding Window Based Nonlinear Optimization . . . . .	569
<i>Timo Hinzmann, Thomas Schneider, Marcin Dymczyk, Andreas Schaffner, Simon Lynen, Roland Siegwart, and Igor Gilitschenski</i>	
Change Detection and Object Recognition Using Aerial Robots . . . . .	582
<i>Shehryar Khattak, Christos Papachristos, and Kostas Alexis</i>	
Parallelized Iterative Closest Point for Autonomous Aerial Refueling. . . . .	593
<i>Jace Robinson, Matt Piekenbrock, Lee Burchett, Scott Nykl, Brian Woolley, and Andrew Terzuoli</i>	
Distributed Optimal Flocking Design for Multi-agent Two-Player Zero-Sum Games with Unknown System Dynamics and Disturbance. . . . .	603
<i>Hao Xu and Luis Rodolfo Garcia Carrillo</i>	

### **Medical Imaging**

MinMax Radon Barcodes for Medical Image Retrieval . . . . .	617
<i>H.R. Tizhoosh, Shujin Zhu, Hanson Lo, Varun Chaudhari, and Tahmid Mehdi</i>	

Semantic-Based Brain MRI Image Segmentation Using Convolutional Neural Network . . . . .	628
<i>Yao Chou, Dah Jye Lee, and Dong Zhang</i>	
SAHF: Unsupervised Texture-Based Multiscale with Multicolor Method for Retinal Vessel Delineation . . . . .	639
<i>Temitope Mapayi and Jules-Raymond Tapamo</i>	
Unsupervised Caries Detection in Non-standardized Bitewing Dental X-Rays . . . . .	649
<i>D. Osterloh and S. Viriri</i>	
Vessel Detection on Cerebral Angiograms Using Convolutional Neural Networks . . . . .	659
<i>Yang Fu, Jiawen Fang, Benjamin Quachtran, Natia Chachkhiani, and Fabien Scalzo</i>	
False Positive Reduction in Breast Mass Detection Using the Fusion of Texture and Gradient Orientation Features . . . . .	669
<i>Mariam Busaleh, Muhammad Hussain, Hatim A. Aboalsamh, Mansour Zuair, and George Bebis</i>	
<b>Virtual Reality</b>	
Enhancing the Communication Spectrum in Collaborative Virtual Environments . . . . .	681
<i>Edward Kim and Christopher Moritz</i>	
Narrative Approach to Assess Fear of Heights in Virtual Environments . . . . .	691
<i>Angelo D. Moro, Christian Quintero, and Wilson J. Sarmiento</i>	
Immersive Industrial Process Environment from a P&ID Diagram. . . . .	701
<i>Victor H. Andaluz, Washington X. Quevedo, Fernando A. Chicaiza, Catherine Gálvez, Gabriel Corrales, Jorge S. Sánchez, Edwin P. Pruna, Oscar Arteaga, Fabián A. Álvarez, and Galo Ávila</i>	
Automatic Environment Map Construction for Mixed Reality Robotic Applications . . . . .	713
<i>David McFadden, Brandon Wilson, Alireza Tavakkoli, and Donald Loffredo</i>	
Foveated Path Tracing: A Literature Review and a Performance Gain Analysis. . . . .	723
<i>Matias Koskela, Timo Viitanen, Pekka Jääskeläinen, and Jarmo Takala</i>	

**ST: Computer Vision as a Service**

OCR as a Service: An Experimental Evaluation of Google Docs OCR, Tesseract, ABBYY FineReader, and Transym. . . . .	735
<i>Ahmad P. Tafti, Ahmadreza Baghaie, Mehdi Assefi, Hamid R. Arabnia, Zeyun Yu, and Peggy Peissig</i>	
Animal Identification in Low Quality Camera-Trap Images Using Very Deep Convolutional Neural Networks and Confidence Thresholds. . . . .	747
<i>Alexander Gomez, German Diez, Augusto Salazar, and Angelica Diaz</i>	
A Gaussian Mixture Model Feature for Wildlife Detection . . . . .	757
<i>Shengzhi Du, Chunling Du, Rishaad Abdoola, and Barend Jacobus van Wyk</i>	

**Biometrics**

Age Classification from Facial Images: Is Frontalization Necessary? . . . . .	769
<i>A. Báez-Suárez, C. Nikou, J.A. Nolasco-Flores, and I.A. Kakadiaris</i>	
PH-BRINT: Pooled Homomorphic Binary Rotation Invariant and Noise Tolerant Representation for Face Recognition Under Illumination Variations . . . . .	779
<i>Raqinah Alrabiah, Muhammad Hussain, Hatim A. Aboalsamh, Mansour Zuair, and George Bebis</i>	
Multi-Kernel Fuzzy-Based Local Gabor Patterns for Gait Recognition . . . . .	790
<i>Amer G. Binsaadoon and El-Sayed M. El-Alfy</i>	
A Comparative Analysis of Deep and Shallow Features for Multimodal Face Recognition in a Novel RGB-D-IR Dataset. . . . .	800
<i>Tiago Freitas, Pedro G. Alves, Cristiana Carpinteiro, Joana Rodrigues, Margarida Fernandes, Marina Castro, João C. Monteiro, and Jaime S. Cardoso</i>	

**ST: Visual Perception and Robotic Systems**

Automated Rebar Detection for Ground-Penetrating Radar . . . . .	815
<i>Spencer Gibb and Hung Manh La</i>	
Improving Visual Feature Representations by Biasing Restricted Boltzmann Machines with Gaussian Filters. . . . .	825
<i>Arjun Yogeswaran and Pierre Payeur</i>	
Image Fusion Quality Measure Based on a Multi-scale Approach . . . . .	836
<i>Jorge Martinez, Silvina Pistonesi, Maria Cristina Maciel, and Ana Georgina Flesia</i>	

Vision-Based Self-contained Target Following Robot Using Bayesian Data Fusion . . . . .	846
<i>Andrés Echeverri Guevara, Anthony Hoak, Juan Tapiero Bernal, and Henry Medeiros</i>	
Dual Back-to-Back Kinects for 3-D Reconstruction . . . . .	858
<i>Ho Chuen Kam, Kin Hong Wong, and Baiwu Zhang</i>	
<b>Author Index</b> . . . . .	869

Advances in Visual Computing

12th International Symposium, ISVC 2016, Las Vegas,  
NV, USA, December 12-14, 2016, Proceedings, Part II

Bebis, G.; Boyle, R.; Parvin, B.; Koracin, D.; Porikli, F.;

Skaff, S.; Entezari, A.; Min, J.; Iwai, D.; Sadagic, A.;

Scheidegger, C.; Isenberg, T. (Eds.)

2016, XXXVI, 631 p. 307 illus., Softcover

ISBN: 978-3-319-50831-3