

2014 22nd International Conference on Pattern Recognition

ICPR 2014

Table of Contents

Message from the General Chair.....	lvix
Message from the Program Chairs.....	lx
Message from the President of IAPR.....	lxi
Invited Speakers.....	lxii
Contests, Tutorials, and Workshops.....	lxvii
Organizing Committee.....	lxix
Track and Area Chairs.....	lxx
Reviewers.....	lxxiv

Invited Talk: Computer Vision

Statistical Optimization for Geometric Estimation: Minimization vs. Non-minimization	1
<i>Kenichi Kanatani</i>	

Invited Talk: Pattern Recognition and Machine Learning

Putting the Scientist in the Loop—Accelerating Scientific Progress with Interactive Machine Learning	9
<i>Oisín Mac Aodha, Vassilios Stathopoulos, Gabriel J. Brostow, Michael Terry, Mark Girolami, and Kate E. Jones</i>	

Invited Talk: Biomedical Image Analysis

Discrete Visual Perception	18
<i>Nikos Paragios and Nikos Komodakis</i>	

Invited Talk: Image, Speech, Signal, and Video Processing

Learning Features and Parts for Fine-Grained Recognition	26
<i>Jonathan Krause, Timnit Gebru, Jia Deng, Li-Jia Li, and Li Fei-Fei</i>	

Invited Talk: Document Analysis, Biometrics, and Pattern Recognition Applications

Deep Metric Learning for Person Re-identification	34
<i>Dong Yi, Zhen Lei, Shengcai Liao, and Stan Z. Li</i>	

Shape and Matching

Facial 3D Shape Estimation from Images for Visual Speech Animation	40
<i>Utpala Musti, Ziheng Zhou, and Matti Pietikäinen</i>	
Shape from Phase: An Integrated Level Set and Probability Density Shape Representation	46
<i>John Corring and Anand Rangarajan</i>	
LBO-Shape Densities: Efficient 3D Shape Retrieval Using Wavelet Density Estimation	52
<i>Mark Moyou, Koffi Eddy Ihou, and Adrian Peter</i>	
Robust Point Set Matching under Variational Bayesian Framework	58
<i>Han-Bing Qu, Ji-Chao Li, Jia-Qiang Wang, Lin Xiang, and Hai-Jun Tao</i>	
Spatially-Varying Image Warps for Scene Alignment	64
<i>Che-Han Chang, Chiu-Ju Chen, and Yung-Yu Chuang</i>	
Visualization of Hyperspectral Imaging Data Based on Manifold Alignment	70
<i>Danping Liao, Yuntao Qian, and Jun Zhou</i>	

Statistical, Syntactic, and Structural Pattern Recognition

A Matrix Factorization Approach to Graph Compression	76
<i>Farshad Nourbakhsh, Samuel Rota Bulò, and Marcello Pelillo</i>	
BoG: A New Approach for Graph Matching	82
<i>Fernanda B. Silva, Salvatore Tabbone, and Ricardo da S. Torres</i>	
An Attributed Graph Kernel from the Jensen-Shannon Divergence	88
<i>Lu Bai, Horst Bunke, and Edwin R. Hancock</i>	
The Mutual Information between Graphs	94
<i>Francisco Escolano and Edwin R. Hancock</i>	
Graph Signatures for Evaluating Network Models	100
<i>Richard C. Wilson</i>	
Pattern Theory-Based Interpretation of Activities	106
<i>Fillipe D.M. de Souza, Sudeep Sarkar, Anuj Srivastava, and Jingyong Su</i>	

Segmentation, Features, and Descriptors

Automatic Object Segmentation by Quantum Cuts	112
<i>Caglar Aytekin, Serkan Kiranyaz, and Moncef Gabbouj</i>	
A Two-Stage Image Segmentation Method Using Euler's Elastica Regularized Mumford-Shah Model	118
<i>Yuping Duan, Weimin Huang, Jiayin Zhou, Huibin Chang, and Tiejong Zeng</i>	
Comparison of Body Shape Descriptors for Biometric Recognition Using MMW Images	124
<i>Ester Gonzalez-Sosa, Ruben Vera-Rodriguez, Julian Fierrez, and Javier Ortega-Garcia</i>	
A Fast and Adaptive Random Walks Approach for the Unsupervised Segmentation of Natural Images	130
<i>Christian Desrosiers</i>	
Wide Baseline Multi-view Video Matting Using a Hybrid Markov Random Field	136
<i>Tinghuai Wang, John Collomosse, and Adrian Hilton</i>	
Dictionary Snakes	142
<i>Anders Bjorholm Dahl and Vedrana Andersen Dahl</i>	

Pattern Recognition / Biometrics

An Automated System for Plant-Level Disease Rating in Real Fields	148
<i>Muhammad Jamal Afridi, Xiaoming Liu, and J. Mitchell McGrath</i>	
Evaluation of Binary Descriptors for Fast and Fully Automatic Identification	154
<i>Line Eikvil and Marit Holden</i>	
Vein Pattern Visualization through Multiple Mapping Models and Local Parameter Estimation for Forensic Investigation	160
<i>Hamid Reza Sharifzadeh, Hengyi Zhang, and Adams Wai-Kin Kong</i>	
Appearance-Based Object Detection Under Varying Environmental Conditions	166
<i>Rogério Feris, Lisa M. Brown, Sharath Pankanti, and Ming-Ting Sun</i>	
Vehicle Type Classification Using Unsupervised Convolutional Neural Network	172
<i>Zhen Dong, Mingtao Pei, Yang He, Ting Liu, Yanmei Dong, and Yunde Jia</i>	
Multi-view Based AdaBoost Classifier Ensemble for Class Prediction from Gene Expression Profiles	178
<i>Le Li, Zhiwen Yu, Jiming Liu, Jane You, Hau-San Wong, and Guoqiang Han</i>	

Geometry

Generalized Radial Alignment Constraint for Camera Calibration	184
<i>Avinash Kumar and Narendra Ahuja</i>	
Benchmarking 3D Pose Estimation for Face Recognition	190
<i>Pengfei Dou, Yuhang Wu, Shishir K. Shah, and Ioannis A. Kakadiaris</i>	

Localization of 2D Cameras in a Known Environment Using Direct 2D-3D Registration	196
<i>Danda Pani Paudel, Cédric Demonceaux, Adlane Habed, and Pascal Vasseur</i>	
Non-frontal Camera Calibration Using Focal Stack Imagery	202
<i>Avinash Kumar and Narendra Ahuja</i>	
Cross-Trees for Stereo Matching with Priors	208
<i>Feiyang Cheng, Hong Zhang, Mingui Sun, Helong Wang, and Ding Yuan</i>	
Classification and Clustering I	
Unsupervised Clustering of Depth Images Using Watson Mixture Model	214
<i>Md. Abul Hasnat, Olivier Alata, and Alain Trémeau</i>	
A Multi-task Learning Framework for Joint Disease Risk Prediction and Comorbidity Discovery	220
<i>Xiang Wang, Fei Wang, and Jianying Hu</i>	
2-Sided Best Fitting Hyperplane Classifier	226
<i>Hakan Cevikalp</i>	
Boosting Stochastic Newton with Entropy Constraint for Large-Scale Image Classification	232
<i>Wafa Bel Haj Ali, Richard Nock, and Michel Barlaud</i>	
Learning with Hidden Information	238
<i>Ziheng Wang, Xiaoyang Wang, and Qiang Ji</i>	
Handwriting Analysis and Recognition	
Improving Handwritten Chinese Character Recognition with Discriminative Quadratic Feature Extraction	244
<i>Ming-Ke Zhou, Xu-Yao Zhang, Fei Yin, and Cheng-Lin Liu</i>	
A Sigma-Lognormal Model for Handwritten Text CAPTCHA Generation	250
<i>Chetan Ramaiah, Réjean Plamondon, and Venu Govindaraju</i>	
BH2M: The Barcelona Historical, Handwritten Marriages Database	256
<i>David Fernández-Mota, Jon Almazán, Núria Cirera, Alicia Fornés, and Josep Lladós</i>	
k-NN Classification of Handwritten Characters Using a New Distortion-Tolerant Matching Measure	262
<i>Yukihiko Yamashita and Toru Wakahara</i>	
Assessing Textural Features for Writer Identification on Different Writing Styles and Forgeries	268
<i>Diego Bertolini, Luiz S. Oliveira, Edson Justino, and Robert Sabourin</i>	

Biometrics and Pattern Recognition Applications

Analysis of the Effect of Image Resolution on Automatic Face Gender Classification	273
<i>Yasmina Andreu, Josep López-Centelles, Ramón A. Mollineda, and Pedro García-Sevilla</i>	
Learning Semantic Binary Codes by Encoding Attributes for Image Retrieval	279
<i>Jianwei Luo and Zhiguo Jiang</i>	
Belief-Function-Based Framework for Deformable 3D-Shape Retrieval	285
<i>Halim Benhabiles, Hedi Tabia, and Jean-Philippe Vandeborre</i>	
Fusion of Multibiometrics Based on a New Robust Linear Programming	291
<i>Di Miao, Zhenan Sun, and Yongzhen Huang</i>	
3D Shape Classification Using Information Fusion	297
<i>Hedi Tabia and Ngoc-Son Vu</i>	
Face Recognition in Videos by Label Propagation	303
<i>Vijay Kumar, Anoop M. Namboodiri, and C.V. Jawahar</i>	
Plane Geometry Figure Retrieval Based on Bilayer Geometric Attributed Graph Matching	309
<i>Lu Liu, Xiaoqing Lu, Songping Fu, Jingwei Qu, Liangcai Gao, and Zhi Tang</i>	
EM-Based Layout Analysis Method for Structured Documents	315
<i>Francisco Cruz and Oriol Ramos Terrades</i>	
Ancient Coin Recognition Based on Spatial Coding	321
<i>Jongpil Kim and Vladimir Pavlovic</i>	
Signature Matching Using Supervised Topic Models	327
<i>Xianzhi Du, David Doermann, and Wael Abd-Almageed</i>	
Selective Concealment of Characters for Privacy Protection	333
<i>Kohei Inai, Mårten Pålsson, Volkmar Frinken, Yaokai Feng, and Seiichi Uchida</i>	
RGB-D Based Face Reconstruction and Recognition	339
<i>Gee-Sern Hsu, Yu-Lun Liu, Hsiao-Chia Peng, and Sheng-Luen Chung</i>	
A Direct Method for 3D Hand Pose Recovery	345
<i>Farid Abedan Kondori, Shahrouz Yousefit, Ahmad Ostovar, Li Liu, and Haibo Li</i>	
A Performance Comparison between Circular and Spline-Based Methods for Iris Segmentation	351
<i>Yajie Zhao, Changpeng Ti, Xinyu Huang, Alade Tokuta, and Ruigang Yang</i>	
Children Gender Recognition Under Unconstrained Conditions Based on Contextual Information	357
<i>Riccardo Satta, Javier Galbally, and Laurent Beslay</i>	
Down-sampling Coupled to Elastic Kernel Machines for Efficient Recognition of Isolated Gestures	363
<i>Pierre-Francois Marteau, Sylvie Gibet, and Clément Reverdy</i>	

Enhanced Human Parsing with Multiple Feature Fusion and Augmented Pose Model	369
<i>Zhaoxiang Zhang, Jianliang Hao, Yunhong Wang, and Yuhang Zhao</i>	
Detection of Realistic Facial Occlusions for Robust 3D Face Recognition	375
<i>Nese Alyuz, Berk Gokberk, and Lale Akarun</i>	
Learning Pose Dictionary for Human Action Recognition	381
<i>Jia-xin Cai, Xin Tang, and Guocan Feng</i>	
Local Gradient Order Pattern for Face Representation and Recognition	387
<i>Zhen Lei, Dong Yi, and Stan Z. Li</i>	
Mid-level-Representation Based Lexicon for Vehicle Make and Model Recognition	393
<i>Muhammad Fraz, Eran A. Edirisinghe, and M. Saquib Sarfraz</i>	
Periocular Recognition Using Unsupervised Convolutional RBM Feature Learning	399
<i>Lei Nie, Ajay Kumar, and Song Zhan</i>	
Adaptive Security for Human Surveillance Using Multimodal Open Set Biometric Recognition	405
<i>Amioy Kumar and Ajay Kumar</i>	
Using Appearance-Based Hand Features for Dynamic RGB-D Gesture Recognition	411
<i>Xi Chen and Markus Koskela</i>	
A Local Approach for Negative Emotion Detection	417
<i>Adel Lablack, Taner Danisman, Ioan Marius Bilasco, and Chaabane Djeraba</i>	
A Multimodal Approach for Recognizing Human Actions Using Depth Information	421
<i>Ali Seydi Keceli and Ahmet Burak Can</i>	
A Preliminary Study of Lower Leg Geometry as a Soft Biometric Trait for Forensic Investigation	427
<i>Md. Rabiul Islam, Frodo Kin-Sun Chan, and Adams Wai-Kin Kong</i>	
Activity Recognition for a Smartphone Based Travel Survey Based on Cross-User History Data	432
<i>Youngsung Kim, Francisco C. Pereira, Fang Zhao, Ajinkya Ghorpade, P. Christopher Zegras, and Moshe Ben-Akiva</i>	
Automatic Face Quality Assessment from Video Using Gray Level Co-occurrence Matrix: An Empirical Study on Automatic Border Control System	438
<i>R. Raghavendra, Kiran B. Raja, Bian Yang, and Christoph Busch</i>	
Gait Recognition Using Flow Histogram Energy Image	444
<i>Yazhou Yang, Dan Tu, and Guohui Li</i>	
Human Hair Segmentation and Length Detection for Human Appearance Model	450
<i>Yue Wang, Zhi Zhou, Eam Khwang Teoh, and Bolan Su</i>	
Learning the Deep Features for Eye Detection in Uncontrolled Conditions	455
<i>Yue Wu and Qiang Ji</i>	

Learning to Rank the Severity of Unrepaired Cleft Lip Nasal Deformity on 3D Mesh Data	460
<i>Jia Wu, Raymond Tse, and Linda G. Shapiro</i>	
Real-Time Pose-Invariant Face Recognition by Triplet Pose Sparse Matrix from Only a Single Image	465
<i>Ali Moeini, Hossein Moeini, and Karim Faez</i>	
Regularized Multi-view Multi-metric Learning for Action Recognition	471
<i>Xuqing Wu and Shishir K. Shah</i>	
Selection of Unknown Objects Specified by Speech Using Models Constructed from Web Images	477
<i>Hitoshi Nishimura, Yuko Ozasa, Yasuo Ariki, and Mikio Nakano</i>	
Sensing Visual Attention by Sequential Patterns	483
<i>Yasuyuki Yamazaki, Hideitsu Hino, and Kazuhiro Fukui</i>	
Spatio-temporal Keypoints for Video-Based Face Recognition	489
<i>Annalisa Franco, Dario Maio, and F. Turrone</i>	
Using Leg Geometry to Align Androgenic Hair Patterns in Low Resolution Images for Criminal and Victim Identification	495
<i>Frodo Kin-Sun Chan and Adams Wai-Kin Kong</i>	
View-Invariant 3D Action Recognition Using Spatiotemporal Self-Similarities from Depth Camera	501
<i>A-Reum Lee, Heung-Il Suk, and Seong-Whan Lee</i>	
A Low Dimensionality Expression Robust Rejector for 3D Face Recognition	506
<i>Jiangning Gao, Mehryar Emambakhsh, and Adrian N. Evans</i>	
Dual Fuzzy Hypergraph Regularized Multi-label Learning for Protein Subcellular Location Prediction	512
<i>Jing Gien, Yuan Yan Tang, C.L. Philip Client, and Yuewei Lin</i>	
Optimal Feature Selection for Robust Classification via $l_{2,1}$ -Norms Regularization	517
<i>Jiajun Wen, Zhihui Lai, Wai Keung Wong, Jinrong Cui, and Minghua Wan</i>	
Boosted Stable Path for Staff-Line Detection Using Order Statistic Downscaling and Coarse-to-Fine Technique	522
<i>Hoang-Nam Bui, In-Seop Na, Guee-Sang Lee, Hyung-Jeong Yang, and Soo-Hyung Kim</i>	
A Ground Truth for Iris Segmentation	527
<i>Heinz Hofbauer, Fernando Alonso-Fernandez, Peter Wild, Josef Bigun, and Andreas Uhl</i>	
On the Scalability of Graphic Symbol Recognition	533
<i>Jean-Pierre Salmon and Laurent Wendling</i>	
Accurate Facial Landmarks Detection for Frontal Faces with Extended Tree-Structured Models	538
<i>Antoni Liang, Wanquan Liu, Ling Li, Mir Rizwan Farid, and Vuong Le</i>	

View-Invariant Gesture Recognition Using Nonparametric Shape Descriptor544
Xingyu Wu, Xia Mao, Lijiang Chen, Yuli Xue, and Angelo Compere

Real Time Fingertip Detection with Kinect Depth Image Sequences550
Yu Yu, Yonghong Song, and Yuanlin Zhang

Biomedical Image Analysis: Image Segmentation

Efficient Interactive Brain Tumor Segmentation as Within-Brain kNN Classification556
Mohammad Havaei, Pierre-Marc Jodoin, and Hugo Larochelle

Brain Lobes Revealed by Spectral Clustering562
Julien Lefevre, Guillaume Auzias, and David Germanaud

Segmentation of Anatomical Structures in Four-Chamber View Echocardiogram
Images568
Yu Cao, Patrick McNeillie, and Tanveer Syeda-Mahmood

Segmentation of Retinal Arteries in Adaptive Optics Images574
Nicolas Lermé, Florence Rossant, Isabelle Bloch, Michel Paques, and Edouard Koch

Exploring Brain Tumor Heterogeneity for Survival Time Prediction580
Mu Zhou, Lawrence O. Hall, and Dmitry B. Goldgof

Recognition - Categorization

Object Categorization from Range Images Using a Hierarchical Compositional
Representation586
Vladislav Kramarev, Sebastian Zurek, Jeremy L. Wyatt, and Aleš Leonardis

Fast and Robust Generation of Semantic Urban Terrain Models from UAV Video
Streams592
Mathias Rothmel, Norbert Haala, Konrad Wenzel, and Dimitri Bulatov

Exemplar Network: A Generalized Mixture Model598
Chikao Tsuchiya, Tomasz Malisiewicz, and Antonio Torralba

Robust Object Recognition via Visual Pathway Feedback604
Chong Wang, Junge Zhang, PeiPei Yang, and Kaiqi Huang

Fine-Grained Visual Categorization with 2D-Warping608
Harald Hanselmann and Hermann Ney

Support Vector Machines and Kernel Methods

Bayesian Inference for Gaussian Process Classifiers with Annealing
and Pseudo-Marginal MCMC614
Maurizio Filippone

A Novel Sphere-Based Maximum Margin Classification Method620
Phuoc Nguyen, Dat Tran, Xu Huang, and Wanli Ma

Network-Dependent Image Annotation Based on Explicit Context-Dependent Kernel Maps	625
<i>Hichem Sahbi</i>	
A Graph Kernel Incorporating Molecule's Stereoisomerism Information	631
<i>Pierre-Anthony Grenier, Luc Brun, and Didier Villemin</i>	
Graph Kernel Encoding Substituents' Relative Positioning	637
<i>Benoît Gaüzère, Luc Brun, and Didier Villemin</i>	

Image and Video Analysis and Understanding I

Robust Context Dependent Spectral Unmixing	643
<i>Hamdi Jenzri, Hichem Frigui, and Paul Gader</i>	
Discriminative Context Models for Collective Activity Recognition	648
<i>Chaoyang Zhao, Wei Fu, Jinqiao Wang, Xiao Bai, Qingshan Liu, and Hanqing Lu</i>	
Efficient Non-iterative Domain Adaptation of Pedestrian Detectors to Video Scenes	654
<i>Kyaw Kyaw Htike and David C. Hogg</i>	
Head, Eye, and Hand Patterns for Driver Activity Recognition	660
<i>Eshed Ohn-Bar, Sujitha Martin, Ashish Tawari, and Mohan M. Trivedi</i>	
Video Event Detection via Multi-modality Deep Learning	666
<i>I-Hong Jhuo and D.T. Lee</i>	

Biometrics and Forensic Applications

Anti-forensics of JPEG Detectors via Adaptive Quantization Table Replacement	672
<i>Chao Chen, Haodong Li, Weiqi Luo, Rui Yang, and Jiwu Huang</i>	
Overlapped Fingerprints Separation Based on Adaptive Orientation Model Fitting	678
<i>Ning Zhang, Xin Yang, Yali Zang, Xiaofei Jia, and Jie Tian</i>	
3D Fingerprint Phantoms	684
<i>Sunpreet S. Arora, Kai Cao, Anil K. Jain, and Nicholas G. Paulter Jr.</i>	
Fingerprint Geometric Hashing Based on Binary Minutiae Cylinder Codes	690
<i>Yi Wang, Lipeng Wang, Yiu-ming Cheung, and Pong Chi Yuen</i>	
Pre-registration for Improved Latent Fingerprint Identification	696
<i>Ram P. Krish, Julian Fierrez, Daniel Ramos, Javier Ortega-Garcia, and Josef Bigun</i>	

Image Processing

Localized Image Blur Removal through Non-parametric Kernel Estimation	702
<i>Kevin Schelten and Stefan Roth</i>	
Recovery of Spectral Sensitivity Functions from a Colour Chart Image under Unknown Spectrally Smooth Illumination	708
<i>Cong Phuoc Huynh and Antonio Robles-Kelly</i>	

Nighttime Traffic Flow Analysis for Rain-Drop Tampered Cameras	714
<i>Hsu-Yung Cheng and Chih-Chang Yu</i>	
Super-high Dynamic Range Imaging	720
<i>Takehito Hayami, Masayuki Tanaka, Masatoshi Okutomi, Takashi Shibata, and Shuji Senda</i>	
Dimensionality Reduction and Manifold Learning	
Max-K-Min Distance Analysis for Dimension Reduction	726
<i>Jiani Hu, Weihong Deng, Jun Guo, and Yajing Xu</i>	
A General Nonlinear Embedding Framework Based on Deep Neural Network	732
<i>Yan Huang, Wei Wang, Liang Wang, and Tieniu Tan</i>	
Efficient Metric Learning Based Dimension Reduction Using Sparse Projectors for Image Near Duplicate Retrieval	738
<i>Romain Negrel, David Picard, and Philippe-Henri Gosselin</i>	
Ensemble Manifold Structured Low Rank Approximation for Data Representation	744
<i>Liang Tao, Horace H.S. Ip, Yinglin Wang, and Xin Shu</i>	
Image, Speech, Signal, and Video Processing	
Prime Rigid Graphs and Multidimensional Scaling with Missing Data	750
<i>Magnus Oskarsson, Kalle Åström, and Anna Torstensson</i>	
Auditory Movie Summarization by Detecting Scene Changes and Sound Events	756
<i>Tong Lu, Yangbing Weng, and Gongyou Wang</i>	
Linked Source and Target Domain Subspace Feature Transfer Learning—Exemplified by Speech Emotion Recognition	761
<i>Jun Deng, Zixing Zhang, and Björn Schuller</i>	
Identifying Ragas in Indian Music	767
<i>Vijay Kumar, Harit Pandya, and C.V. Jawahar</i>	
Automatic Speech Emotion Recognition Using Auditory Models with Binary Decision Tree and SVM	773
<i>Enes Yüncü, Hüseyin Hacıhabiboglu, and Cem Bozsahin</i>	
Optimizing PLLR Features for Spoken Language Recognition	779
<i>Mireia Diez, Amparo Varona, Mike Penagarikano, Luis Javier Rodriguez-Fuentes, and German Bordel</i>	
Audio-visual Keyword Spotting for Mandarin Based on Discriminative Local Spatial-Temporal Descriptors	785
<i>Hong Liu, Ting Fan, and Pingping Wu</i>	
Lip Reading Using Wavelet-Based Features and Random Forests Classification	791
<i>Lucas D. Terissi, Marianela Parodi, and Juan C. Gómez</i>	

Computational Auditory Scene Analysis Based Voice Activity Detection	797
<i>Ming Tu, Xiang Xie, and Xingyu Na</i>	
Prosodic, Spectral and Voice Quality Feature Selection Using a Long-Term Stopping Criterion for Audio-Based Emotion Recognition	803
<i>Markus Kächele, Dimitrij Zharkov, Sascha Meudt, and Friedhelm Schwenker</i>	
Robust and Invariant Phase Based Local Feature Matching	809
<i>Anders Hast</i>	
A Gradient Extension of Center Symmetric Local Binary Patterns for Robust RGB-NIR Image Matching	815
<i>Sajid Saleem, Abdul Bais, and Robert Sablatnig</i>	
DRINK: Discrete Robust Invariant Keypoints	821
<i>Matheus A. Gadelha and Bruno M. Carvalho</i>	
Sufficient Statistics Feature Mapping over Deep Boltzmann Machine for Detection	827
<i>Chao Zhang, Xiong Li, Junchi Yan, Stephen Qui, Yu Wang, Chunhua Tian, and Yuming Zhao</i>	
Full Reference Image Quality Assessment: Limitation	833
<i>Aladine Chetouani</i>	
Cloud Model-Based Dynamic Texture Synthesis for Video Coding	838
<i>Zhiqiang Hou, Ruimin Hu, and Zhongyuan Wang</i>	
Super-resolution Facial Images from Single Input Images Based on Discrete Wavelet Transform	843
<i>Ali Mohammed Darvish, Haibo Li, and Ulrik Söderström</i>	
A Bit Allocation Optimization Method for ROI Based Image Compression with Stable Image Quality	849
<i>Yuanping Zhu and Jianliang Yuan</i>	
Automatic Enhancement and Detection of Active Sea Faults from Bathymetry	855
<i>Costas Panagiotakis and Eleni Kokinou</i>	
Temporal Consistency Based Method for Blind Video Deblurring	861
<i>Weiguo Gong, Wenzhi Wang, Weihong Li, and Shu Tang</i>	
Three-Dimensional Deconvolution of Wide Field Microscopy with Sparse Priors: Application to Zebrafish Imagery	865
<i>Bo Dong, Ling Shao, Alejandro F. Frangi, Oliver Bandmann, and Marc Da Costa</i>	
Image Completion Using Global Patch Matching and Optimal Seam Synthesis	871
<i>Shiming Ge, Kaixuan Xie, Rui Yang, and Zhiqiang Shi</i>	
Snowfall Detection in a Foggy Scene	877
<i>Hiroshi Kawarabuki and Kazunori Onoguchi</i>	
Atmospheric Turbulence Mitigation Using Optical Flow	883
<i>Tufan Çalişkan and Nafiz Arica</i>	

A New Filter for Reducing HALO Artifacts in Tone Mapped Images	889
<i>Alain Horé and Orly Yadid-Pecht</i>	
Improvement of Benign and Malignant Probability Detection Based on Non-subsample Contourlet Transform and Super-resolution	895
<i>Fatemeh Pak, Hamidreza Rashidy Kanan, and Afsaneh Alikhassi</i>	
Computing Histogram of Tensor Images Using Orthogonal Series Density Estimation and Riemannian Metrics	900
<i>Emmanuel Chevallier, Augustin Chevallier, and Jesús Angulo</i>	
Corner Detection in Images Under Different Noise Levels	906
<i>Yi Song, Yiping Shen, Shuxiao Li, Chengfei Zhu, Jinglan Zhang, and Hongxing Chang</i>	
Unsupervised Alignment of Image Manifolds with Centrality Measures	912
<i>Devis Tuia, Michele Volpi, and Gustau Camps-Valls</i>	
Local Image Feature Matching Improvements for Omnidirectional Camera Systems	918
<i>Benjamin Resch, Jochen Lang, and Hendrik P.A. Lensch</i>	
A Multilayer Markovian Model for Change Detection in Aerial Image Pairs with Large Time Differences	924
<i>Praveer Singh, Zoltan Kato, and Josiane Zerubia</i>	
Fusion of Image Segmentations under Markov, Random Fields	930
<i>Ozge Oztimur Karadag and Fatos T. Yarman Vural</i>	
Statistical Criteria for Shape Fusion and Selection	936
<i>Alexandre Boulch and Renaud Marlet</i>	
A New Approach of Arc Skeletonization for Tree-like Objects Using Minimum Cost Path	942
<i>Dakai Jin, Krishna S. Iyer, Eric A. Hoffman, and Punam K. Saha</i>	
Adaptive-Threshold Region Merging via Path Scanning	948
<i>Gaurav Gupta and Alexandra Psarrou</i>	
A Histogram-Based Chan-Vese Model Driven by Local Contrast Pattern for Texture Image Segmentation	954
<i>Haiying Tian, Yanfei Liu, and Jian-Huang Lai</i>	
Learning Graph Cut Energy Functions for Image Segmentation	960
<i>Marco Manfredi, Costantino Grana, and Rita Cucchiara</i>	
Multipage Administrative Document Stream Segmentation	966
<i>Hani Daher, Mohamed-Rafik Bouguelia, Abdel Belaid, and Vincent Poulain D'Andecy</i>	
Femur Bone Segmentation Using a Pressure Analogy	972
<i>Thamer S. Alathari, Mark S. Nixon, and Mamadou T. Bah</i>	
Building Optimal Radio-Frequency Signal Maps	978
<i>Piotr Mirowski, Tin Kam Ho, and Philip Whiting</i>	

Learning to Detect Contours with Dynamic Programming Snakes	984
<i>Sharmin Nilufar and Theodore J. Perkins</i>	
Segment-Forest for Segmentation	990
<i>Haoqi Fan and Han Li</i>	
Compact Watershed and Preemptive SLIC: On Improving Trade-offs of Superpixel Segmentation Algorithms	996
<i>Peer Neubert and Peter Protzel</i>	
Multiphase Image Segmentation Using the Deformable Simplicial Complex Method	1002
<i>Vedrana Andersen Dahl, Asger Nyman Christiansen, and Jakob Andreas Bærentzen</i>	
Multivalued Component-Tree Filtering	1008
<i>Camille Kurtz, Benoit Naegel, and Nicolas Passat</i>	
Extension of Sparse Randomized Kaczmarz Algorithm for Multiple Measurement Vectors	1014
<i>Hemant Kumar Aggarwal and Angshul Majumdar</i>	
Joint Motion Deblurring with Blurred/Noisy Image Pair	1020
<i>Haisen Li, Yanning Zhang, Jinqiu Sun, and Dong Gong</i>	
A Graph-Based Implementation of the Anti-aliased Euclidean Distance Transform	1025
<i>Elisabeth Linnér and Robin Strand</i>	
Matrix Recovery Using Split Bregman	1031
<i>Anupriya Gogna, Ankita Shukla, and Angshul Majumdar</i>	
Smoothing Security Prices	1037
<i>Adrian Letchford, Junbin Gao, and Lihong Zheng</i>	
Spatially-Variant Area Openings for Reference-Driven Adaptive Contour Preserving Filtering	1043
<i>Gianni Franchi and Jesús Angulo</i>	
Image Fusion Using Region Segmentation and Sigmoid Function	1049
<i>Xiaoqing Luo, Zhancheng Zhang, and Xiaojun Wu</i>	
Surface Interpolation to Image with Edge Preserving	1055
<i>Ling Zhang, Caiming Zhang, Yuanfeng Zhou, and Xuemei Li</i>	
Sandwich Cut: An Algorithm for Temporally-Coherent Video Bilayer Segmentation	1061
<i>Songtao Pu and Hongbin Zha</i>	
Statistical Modeling of Multi-modal Medical Image Fusion Method Using C-CHMM and M-PCNN	1067
<i>Hongying Zhang, Xiaoqing Luo, Xiaojun Wu, and Zhancheng Zhang</i>	
Superpixel-Based Disocclusion Filling in Depth Image Based Rendering	1073
<i>Michael Schmeing and Xiaoyi Jiang</i>	

Binary Tomography on the Triangular Grid with 3 Alternative Directions—A Genetic Approach	1079
<i>Benedek Nagy and Elisa Valentina Moisi</i>	
Effective Image Block Compressed Sensing	1085
<i>Ying Hou and Yanning Zhang</i>	
Search-Based Content Analysis System on Online Collaborative Platform for Film Production	1091
<i>Minoru Mori, Hiroyuki Kimiyama, and Masanori Ogawara</i>	
Robust Image Description with Weighted and Adaptive Local Binary Pattern Features	1097
<i>Reza Davarzani and Saeed Mozaffari</i>	
Forest Species Recognition Using Deep Convolutional Neural Networks	1103
<i>Luiz G. Hafemann, Luiz S. Oliveira, and Paulo Cavalin</i>	
Sparseness-Based Descriptors for Texture Segmentation	1108
<i>Melissa Cote and Alexandra Branzan Albu</i>	
Local Oriented Statistics Information Booster (LOSIB) for Texture Classification	1114
<i>Oscar García-Olalla, Enrique Alegre, Laura Fernández-Robles, and Victor González-Castro</i>	
An Orientation-Adaptive Extension to Scale-Adaptive Local Binary Patterns	1120
<i>Sebastian Hegenbart and Andreas Uhl</i>	
3D Facial Skin Texture Analysis Using Geometric Descriptors	1126
<i>Alassane Seck, Hannah Dee, and Bernard Tiddeman</i>	
A Morphological Tree of Shapes for Color Images	1132
<i>Edwin Carlinet and Thierry Géraud</i>	
Adaptive Median Binary Patterns for Texture Classification	1138
<i>Adel Hafiane, Kannappan Palaniappan, and Guna Seetharaman</i>	
Texture Classification Using 2D LSTM Networks	1144
<i>Wonmin Byeon, Marcus Liwicki, and Thomas M. Breuel</i>	
A New Hybrid Texture-Perceptual Descriptor: Application CBIR	1150
<i>Dounia Awad, Vincent Courboulay, and Arnaud Revel</i>	

Face Anti-spoofing and Gaze Estimation

Gaze Estimation Based on 3D Face Structure and Pupil Centers	1156
<i>Chunshui Xiong, Lei Huang, and Changping Liu</i>	
3-D Gaze Tracking Using Pupil Contour Features	1162
<i>Chih-Chuan Lai, Sheng-Wen Shih, Hsin-Ruey Tsai, and Yi-Ping Hung</i>	
Manifold Alignment for Person Independent Appearance-Based Gaze Estimation	1167
<i>Timo Schneider, Boris Schauerte, and Rainer Stiefelbogen</i>	

Face Anti-spoofing Based on General Image Quality Assessment	1173
<i>Javier Galbally and Sébastien Marcel</i>	

Biomedical Image Analysis: Computer-Aided Detection and Classification

Localization of Diagnostically Relevant Regions of Interest in Whole Slide Images	1179
<i>Ezgi Mercan, Selim Aksoy, Linda G. Shapiro, Donald L. Weaver, Tad Brunye, and Joann G. Elmore</i>	
Lesion Detection in Breast Ultrasound Images Using Tissue Transition Analysis	1185
<i>Soma Biwas, Fei Zhao, Xiaoxing Li, Rakesh Mullick, and Vivek Vaidya</i>	
A Structural Texture Approach for Characterising Malignancy Associated Changes in Pap Smears Based on Mean-Shift and the Watershed Transform	1189
<i>Andrew Mehnert, Ramin Moshavegh, K. Sujathan, Patrik Malm, and Ewert Bengtsson</i>	
RSURF—The Efficient Texture-Based Descriptor for Fluorescence Microscopy Images of HEP-2 Cells	1194
<i>Tomáš Majtner, Roman Stoklasa, and David Svoboda</i>	

Tracking I

Exploiting Temporal Geometry for Moving Camera Background Subtraction	1200
<i>Daniya Zamalieva, Alper Yilmaz, and James W. Davis</i>	
DIET: Dynamic Integration of Extended Tracklets for Tracking Multiple Persons	1206
<i>Viet-Quoc Pham, Tatsuo Kozakaya, and Ryuzo Okada</i>	
MAP-Based Online Data Association for Multiple People Tracking in Crowded Scenes	1212
<i>Soo Wan Kim, Moonsub Byeon, Kikyung Kim, and Jin Young Choi</i>	
Improving Object Tracking by Adapting Detectors	1218
<i>Lu Zhang and Laurens van der Maaten</i>	
Real-Time Object Tracking with Generalized Part-Based Appearance Model and Structure-Constrained Motion Model	1224
<i>Honghui Zhang, Shengnan Cai, and Long Quan</i>	

Pattern Recognition and Machine Learning I

On Meta-learning for Dynamic Ensemble Selection	1230
<i>Rafael M.O. Cruz, Robert Sabourin, and George D.C. Cavalcanti</i>	
Diversity-Based Ensemble with Sample Weight Learning	1236
<i>Chun Yang, Xu-Cheng Yin, and Hong-Wei Hao</i>	
A Distributed Approach for Classifying Anuran Species Based on Their Calls	1242
<i>Juan G. Colonna, Marco Cristo, and Eduardo F. Nakamura</i>	

Active Learning from Video Streams in a Multi-camera Scenario	1248
<i>Samaneh Khoshrou, Jaime S. Cardoso, and Luis F. Teixeira</i>	
Generic Subclass Ensemble: A Novel Approach to Ensemble Classification	1254
<i>Mohammad Ali Bagheri, Qigang Gao, and Sergio Escalera</i>	
A Framework of Multi-classifier Fusion for Human Action Recognition	1260
<i>Mohammad Ali Bagheri, Gang Hu, Qigang Gao, and Sergio Escalera</i>	
Confusion Network Based Recurrent Neural Network Language Modeling for Chinese OCR Error Detection	1266
<i>Jinying Chen, Yue Wu, Huaigu Cao, and Prem Natarajan</i>	
Multi-view Nonnegative Matrix Factorization for Clothing Image Characterization	1272
<i>Wei-Yi Chang, Chia-Po Wei, and Yu-Chiang Frank Wang</i>	
Logistic Component Analysis for Fast Distance Metric Learning	1278
<i>Kenji Watanabe and Toshikazu Wada</i>	
Quadratic Discriminant Revisited	1283
<i>Wenbo Cao and Robert M. Haralick</i>	
Large-Scale Multiclass Support Vector Machine Training via Euclidean Projection onto the Simplex	1289
<i>Mathieu Blondel, Akinori Fujino, and Naonori Ueda</i>	
PLSA-Based Sparse Representation for Object Classification	1295
<i>Yilin Yan, Jun-Wei Hsieh, Hui-Fen Chiang, Shyi-C. Cheng, and Duan-yu Chen</i>	
An Algebraic Approach to Ensemble Clustering	1301
<i>F. Dumonceaux, G. Raschia, and M. Gelgon</i>	
Regularizing Topic Discovery in EMRs with Side Information by Using Hierarchical Bayesian Models	1307
<i>Cheng Li, Santu Rana, Dinh Phung, and Svetha Venkatesh</i>	
A Heuristic for the Automatic Parametrization of the Spectral Clustering Algorithm	1313
<i>Pierrick Bruneau, Olivier Parisot, and Benoît Otjacques</i>	
Random Forest for Reliable Pre-classification of Handwritten Characters	1319
<i>L.P. Cordella, C. De Stefano, F. Fontanella, and A. Scotto di Freca</i>	
Feature Relevance for Kernel Logistic Regression and Application to Action Classification	1325
<i>Ouiza Ouyed and Mohand Saïd Allili</i>	
Sparse Representation and Low-Rank Approximation for Robust Face Recognition	1330
<i>Kha Gia Quach, Chi Nhan Duong, and Tien D. Bui</i>	
Semi-supervised Classification of Human Actions Based on Neural Networks	1336
<i>Alexandros Iosifidis, Anastasios Tefas, and Ioannis Pitas</i>	
Feature Selection Scheme Based on Zero-Sum Two-Player Game	1342
<i>Azzedine Touazi, Fatiha Mokdad, and Djamel Bouchaffra</i>	

Activity Recognition in Smart Homes Using Clustering Based Classification	1348
<i>Labiba Gillani Fahad, Syed Fahad Tahir, and Muttukrishnan Rajarajan</i>	
Incremental Delaunay Triangulation Construction for Clustering	1354
<i>Octavio Razafindramanana, Frédéric Rayar, and Gilles Venturini</i>	
Geodesic Based Similarities for Approximate Spectral Clustering	1360
<i>Kadim Tasdemir, Yaser Moazzen, and Isa Yildirim</i>	
Large Scale Image Categorization in Sparse Nonparametric Bayesian Representation	1365
<i>Sun Xing and Nelson H.C. Yung</i>	
NEATER: Filtering of Over-sampled Data Using Non-cooperative Game Theory	1371
<i>B.A. Almogahed and I.A. Kakadiaris</i>	
Multiple Instance Dictionary Learning for Activity Representation	1377
<i>Sabanadesan Umakanthan, Simon Denman, Clinton Fookes, and Sridha Sridharan</i>	
Multi-scale Tensor l1-Based Algorithm for Hyperspectral Image Classification	1383
<i>Haoliang Yuan and Yuan Yan Tang</i>	
Learning with Hidden Information Using a Max-Margin Latent Variable Model	1389
<i>Ziheng Wang, Tian Gao, and Qiang Ji</i>	
Optimized Window Arrangement for Spatial Pyramid Matching Scheme	1395
<i>K. Kristo and Chua Chin Seng</i>	
Discriminative Representative Selection via Structure Sparsity	1401
<i>Baoxing Wang, Qiyue Yin, Shu Wu, Liang Wang, and Guiquan Liu</i>	
A Binary Krill Herd Approach for Feature Selection	1407
<i>Douglas Rodrigues, Luís A.M. Pereira, João P. Papa, and Silke A.T. Weber</i>	
Approximate Maximum Common Sub-graph Isomorphism Based on Discrete-Time Quantum Walk	1413
<i>Kai Lu, Yi Zhang, Kai Xu, Yinghui Gao, and Richard C. Wilson</i>	
A Theoretical and Experimental Comparison of the EM and SEM Algorithm	1419
<i>Johannes Blömer, Kathrin Bujna, and Daniel Kuntze</i>	
Extracting Texture Features for Time Series Classification	1425
<i>Vinicius M.A. Souza, Diego F. Silva, and Gustavo E.A.P.A. Batista</i>	
Average Overlap for Clustering Incomplete Data Using Symmetric Non-negative Matrix Factorization	1431
<i>Sneha Chaudhari and M. Narasimha Murty</i>	
Exploring User Behaviour on Etsy through Dominant Colors	1437
<i>Kamelia Aryafar, Corey Lynch, and Josh Attenberg</i>	
Factor Graphs for Image Processing	1443
<i>Lawrence D. Mutumbu and Antonio Robles-Kelly</i>	

Handling Imbalanced Datasets by Partially Guided Hybrid Sampling for Pattern Recognition	1449
<i>Tushar Sandhan and Jin Young Choi</i>	
Bit Error Recovery in ECOC Systems through LDPC Codes	1454
<i>Claudio Marrocco and Francesco Tortorella</i>	
Bayesian Non-parametric Parsimonious Gaussian Mixture for Clustering	1460
<i>Faïcel Chamroukhi, Marius Bartcus, and Hervé Glotin</i>	
Robust Clustering Based on Dominant Sets	1466
<i>Jian Hou, Xu E, Lei Chi, Qi Xia, and Nai-Ming Qi</i>	
On the Training of Artificial Neural Networks with Radial Basis Function Using Optimum-Path Forest Clustering	1472
<i>Gustavo H. Rosa, Kelton A.P. Costa, Leandro A. Passos Júnior, João P. Papa, Alexandre X. Falcão, and João Manuel R.S. Tavares</i>	
Test Point Specific k Estimation for kNN Classifier	1478
<i>Gautam Bhattacharya, Koushik Ghosh, and Ananda S. Chowdhury</i>	
Unsupervised Image Segmentation Contest	1484
<i>Michal Haindl and Stanislav Mikeš</i>	
Hybrid Aggregation of Sparse Coded Descriptors for Food Recognition	1490
<i>Riko Kusumoto, Xianhua Han, and Yen-Wei Chen</i>	
Leaf Species Classification Based on a Botanical Shape Sub-classifier Strategy	1496
<i>H. Liu, D. Coquin, L. Valet, and G. Cerutti</i>	
Feature Learning Using Bayesian Linear Regression Model	1502
<i>Siqi Nie and Qiang Ji</i>	
Classification of COPD with Multiple Instance Learning	1508
<i>Veronika Cheplygina, Lauge Sørensen, David M.J. Tax, Jesper Holst Pedersen, Marco Loog, and Marleen de Bruijne</i>	
Scale Coding Bag-of-Words for Action Recognition	1514
<i>Fahad Shahbaz Khan, Joost van de Weijer, Andrew D. Bagdanov, and Michael Felsberg</i>	
To Be Bernoulli or to Be Gaussian, for a Restricted Boltzmann Machine	1520
<i>Takayoshi Yamashita, Masayuki Tanaka, Eiji Yoshida, Yuji Yamauchi, and Hironobu Fujiyoshii</i>	
A Novel Inference of a Restricted Boltzmann Machine	1526
<i>Masayuki Tanaka and Masatoshi Okutomi</i>	
Deep Embedding Network for Clustering	1532
<i>Peihao Huang, Yan Huang, Wei Wang, and Liang Wang</i>	
Early Hierarchical Contexts Learned by Convolutional Networks for Image Segmentation	1538
<i>Zifeng Wu, Yongzhen Huang, Yinan Yu, Liang Wang, and Tieniu Tan</i>	

Kernel Archetypal Analysis for Clustering Web Search Frequency Time Series	1544
<i>Christian Bauckhage and Kasra Manshaei</i>	
Unsupervised Discriminant Canonical Correlation Analysis for Feature Fusion	1550
<i>Sheng Wang, Xingjian Gu, Jianfeng Lu, Jing-Yu Yang, Ruili Wang, and Jian Yang</i>	
A Dictionary-Based Algorithm for Dimensionality Reduction and Data Reconstruction	1556
<i>Zhong Zhao and Guocan Feng</i>	
Curvature Estimation for Ricci Flow Embedding	1562
<i>Eilza Xu, Richard C. Wilson, and Edwin R. Hancock</i>	
Nonlinear Supervised Locality Preserving Projections for Visual Pattern Discrimination	1568
<i>Erik M. Rehn and Henning Sprekeler</i>	
Sparse Representation Preserving for Unsupervised Feature Selection	1574
<i>Hui Yan, Zhong Jin, and Jian Yang</i>	
An Extended Isomap for Manifold Topology Learning with SOINN Landmarks	1579
<i>Qiang Gan, Furao Shen, and Jinxi Zhao</i>	
An Improved Linear Discriminant Analysis with L1-Norm for Robust Feature Extraction	1585
<i>Xiaobo Chen, Jian Yang, and Zhong Jin</i>	
Selection of Features in Accord with Population Drift	1591
<i>Hiroshi Tsukioka and Mineichi Kudo</i>	
Discriminative Partition Sparsity Analysis	1597
<i>Li Liu and Ling Shao</i>	
Covariance-Based PCA for Multi-size Data	1603
<i>Menghua Zhai, Feiyu Shi, Drew Duncan, and Nathan Jacobs</i>	
Laplacian Support Vector Analysis for Subspace Discriminative Learning	1609
<i>Nikolaos Arvanitopoulos, Dimitrios Bouzas, and Anastasios Tefas</i>	
A Method of Discriminative Information Preservation and In-Dimension Distance Minimization Method for Feature Selection	1615
<i>Shangrong Huang, Jian Zhang, Xinwang Liu, and Lei Wang</i>	
 Texture and Color Analysis	
Colour Image Filtering with Component-Graphs	1621
<i>Benoit Naegel and Nicolas Passat</i>	
Texture Analysis with Shape Co-occurrence Patterns	1627
<i>Gang Liu, Gui-Song Xia, Wen Yang, and Liangpei Zhang</i>	
A Noise-Robust Adaptive Hybrid Pattern for Texture Classification	1633
<i>Ziqi Zhu, Xinge You, C.L. Philip Chent, Dacheng Tao, Xiubao Jiang, Fanyu You, and Jixing Zou</i>	

Texture Defect Detection Using Independent Vector Analysis in Wavelet Domain	1639
<i>Leda Sari and Aysin Ertüzün</i>	
O(1) Algorithms for Overlapping Group Sparsity	1645
<i>Chen Chen, Zhongxing Peng, and Junzhou Huang</i>	

Facial Expression Recognition

Extraction and Selection of Muscle Based Features for Facial Expression Recognition	1651
<i>Kristin S. Benli and M. Taner Eskil</i>	
Relevance Metric Learning for Person Re-identification by Exploiting Global Similarities	1657
<i>Jiixin Chen, Zhaoxiang Zhang, and Yunhong Wang</i>	
Multiple-Facial Action Unit Recognition by Shared Feature Learning and Semantic Relation Modeling	1663
<i>Yachen Zhu, Shangfei Wang, Lihua Yue, and Qiang Ji</i>	
Self-Updating with Facial Trajectories for Video-to-Video Face Recognition	1669
<i>Miguel De-la-Torre, Eric Granger, Paulo Radtke, Robert Sabourin, and Dmitry O. Gorodnichy</i>	
Sensor-Display Registration for 3D Physical User Interaction Using a Flat-Panel Display	1675
<i>Jun-Sik Kim and Jung-Min Park</i>	

Biometrics and Emerging Applications

On Iris Spoofing Using Print Attack	1681
<i>Priyanshu Gupta, Shipra Behera, Mayank Vatsa, and Richa Singh</i>	
Vehicle Driver Face Detection in Various Sunlight Environments Using Composed Face Images	1687
<i>Haruo Matsuo, Tomokazu Sato, and Naokazu Yokoya</i>	
Pyramidal Fisher Motion for Multiview Gait Recognition	1692
<i>Francisco M. Castro, Manuel J. Marín-Jimenez, and Rafael Medina-Carnicer</i>	
Dynamic Pore Filtering for Keypoint Detection Applied to Newborn Authentication	1698
<i>Rubisley de Paula Lemes, Maurlcio Pamplona Segundo, Olga R.P. Bellon, and Luciano Silva</i>	
Iris Segmentation System Based on Approximate Feature Detection with Subsequent Refinements	1704
<i>Ivan Matveev and Konstantin Gankin</i>	
Makeup-Invariant Face Recognition by 3D Face: Modeling and Dual-Tree Complex Wavelet Transform from Women's 2D Real-World Images	1710
<i>Ali Moeini, Hossein Moeini, Fazael Ayatollahi, and Karim Faez</i>	

RGB-D-T Based Face Recognition	1716
<i>Olegs Nikisins, Kamal Nasrollahi, Modris Greitans, and Thomas B. Moeslund</i>	
Spotting Rapid Facial Movements from Videos Using Appearance-Based Feature Difference Analysis	1722
<i>Antti Moilanen, Guoying Zhao, and Matti Pietikäinen</i>	
Shape Features for Candidate Photo Selection in Sketch Recognition	1728
<i>Simone Buoncompagni, Annalisa Franco, and Dario Maio</i>	
Robust Facial Expression Recognition Using Revised Canonical Correlation	1734
<i>Xiaohua Huang, Guoying Zhao, Matti Pietikäinen, and Wenming Zheng</i>	
Pose Estimation via Complex-Frequency Domain Analysis of Image Gradient Orientations	1740
<i>Xiaopeng Hong, Guoying Zhao, and Matti Pietikäinen</i>	
Pose-Invariant Facial Expression Recognition Based on 3D Face Reconstruction and Synthesis from a Single 2D Image	1746
<i>Ali Moeini, Hossein Moeini, and Karim Faez</i>	
IDEM: Iris DEtection on Mobile Devices	1752
<i>Maria Frucci, Chiara Galdi, Michele Nappi, Daniel Riccio, and Gabriella Sanniti di Baja</i>	
Finger Vein Recognition Using Histogram of Competitive Gabor Responses	1758
<i>Yu Lu, Sook Yoon, Shan Juan Xie, Jucheng Yang, Zhihui Wang, and Dong Sun Park</i>	
Behavioural Biometrics Using Electricity Load Profiles	1764
<i>M. Bicego, F. Recchia, A. Farinelli, S.D. Ramchurn, and E. Grosso</i>	
Expression Microarray Data Classification Using Counting Grids and Fisher Kernel	1770
<i>Alessandro Perina, Maria Kesa, and Manuele Bicego</i>	
Decision Level Fusion of Domain Specific Regions for Facial Action Recognition	1776
<i>Bihan Jiang, Brais Martinez, Michel F. Valstar, and Maja Pantic</i>	
Robust Multi-pose Facial Expression Recognition	1782
<i>Qiong Hu, Xi Peng, Peng Yang, Fei Yang, and Dimitris N. Metaxas</i>	
On Effectiveness of Histogram of Oriented Gradient Features for Visible to Near Infrared Face Matching	1788
<i>Tejas Indulal Dhamecha, Praneet Sharma, Richa Singh, and Mayank Vatsa</i>	
On Clustering Human Gait Patterns	1794
<i>Brian DeCann, Arun Ross, and Mark Culp</i>	
Head Pose Estimation by Instance Parameterization	1800
<i>Xi Peng, Junzhou Huang, Qiong Hu, Shaoting Zhang, and Dimitris N. Metaxas</i>	
ShearFace: Efficient Extraction of Anisotropic Features for Face Recognition	1806
<i>Mohamed Anouar Borgi, Demetrio Labate, Maher El Arbi, and Chokri Ben Amar</i>	
A Defect Recognition System for Automated Inspection of Non-rigid Surfaces	1812
<i>Sebastian von Enzberg and Ayoub Al-Hamadi</i>	

Optical Flow Based Expression Suppression in Video	1817
<i>Jesse Brizzi, Dmitry B. Goldgof, Sudeep Sarkar, and Matthew Shreve</i>	
Arctic Soil Hydraulic Conductivity and Soil Type Recognition Based on Aerial Gamma-Ray Spectroscopy and Topographical Data	1822
<i>Jonne Pohjankukka, Paavo Nevalainen, Tapio Pahikkala, Pekka Hänninen, Eija Hyvönen, Raimo Sutinen, and Jukka Heikkonen</i>	
Nonparametric Discovery of Learning Patterns and Autism Subgroups from Therapeutic Data	1828
<i>Pratibha Vellanki, Thi Duong, Svetha Venkatesh, and Dinh Phung</i>	
Nuclear Norm Regularized Sparse Coding	1834
<i>Lei Luo, Jian Yang, Jianjun Qian, and Jingyu Yang</i>	
Stereovision-Only Based Interactive Mobile Robot for Human-Robot Face-to-Face Interaction	1840
<i>Lei Chen, Zhen Dong, Sheng Gao, Baofeng Yuan, and Mingtao Pei</i>	
An Accurate Approach for Microaneurysm Detection in Digital Fundus Images	1846
<i>Shan Ding and Wenyi Ma</i>	
Characterization of Mountain Drainage Patterns for GPS-Denied UAS Navigation Augmentation	1852
<i>Teng Wang, Koray Celik, and Arun K. Somani</i>	
Coupled Hidden Markov Model for Electrocorticographic Signal Classification	1858
<i>Rui Zhao, Gerwin Schalk, and Qiang Ji</i>	
Simultaneous Detection of Multiple Facial Action Units via Hierarchical Task Structure Learning	1863
<i>Xiao Zhang and Mohammad H. Mahoor</i>	
Appearance-Based Gaze Tracking with Free Head Movement	1869
<i>Chih-Chuan Lai, Yu-Ting Chen, Kuan-Wen Chen, Shen-Chi Chen, Sheng-Wen Shih, and Yi-Ping Hung</i>	
Color Models and Weighted Covariance Estimation for Person Re-identification	1874
<i>Yang Yang, Shengcai Liao, Zhen Lei, Dong Yi, and Stan Z. Li</i>	
GPU-Based PostgreSQL Extensions for Scalable High-Throughput Pattern Matching	1880
<i>Grant Scott, Matthew England, Kevin Melkowski, Zachary Fields, and Derek T. Anderson</i>	
Unsupervised Focus Group Identification from Online Product Reviews	1886
<i>Sneha Chaudhari, Rashmi Gangadharaiah, and Balakrishnan Narayanaswamy</i>	
Temporal Segmentation and Seamless Stitching of Motion Patterns for Synthesizing Novel Animations of Periodic Dances	1892
<i>Costas Panagiotakis, Antonis Argyros, and Damien Michel</i>	
Estimating Driver Awareness of Crossing Pedestrians While Turning Left Based on Vehicle Behavior Using Bayesian Approach	1898
<i>Keiichi Yamada and Tomonori Mitani</i>	

Shallow Classification or Deep Learning: An Experimental Study	1904
<i>Xu-Cheng Yin, Chun Yang, Wei-Yi Pei, and Hong-Wei Hao</i>	
Scribe Attribution for Early Medieval Handwriting by Means of Letter Extraction and Classification and a Voting Procedure for Larger Pieces	1910
<i>Mats Dahllöf</i>	
Transfer Learning of a Temporal Bone Performance Model via Anatomical Feature Registration	1916
<i>Yun Zhou, Ioanna Ioannou, Sudanthi Wijewickrema, James Bailey, Patorn Piromchai, Gregor Kennedy, and Stephen O'Leary</i>	
Novel HHT-Based Features for Biometric Identification Using EEG Signals	1922
<i>Su Yang and Farzin Deravi</i>	

Tracking II

Improving Object Tracking with Voting from False Positive Detections	1928
<i>Vassileios Balntas, Lilian Tang, and Krystian Mikolajczyk</i>	
Unsupervised Detection of Video Sub-scenes	1934
<i>George Kamberov, Matt Burlick, Lazaros Karydas, and Olga Koteogou</i>	
Video Segmentation Descriptors for Event Recognition	1940
<i>Remi Trichet and Ramakant Nevatia</i>	
Capturing Global and Local Dynamics for Human Action Recognition	1946
<i>Siqi Nie and Qiang Ji</i>	
3D Motion Trail Model Based Pyramid Histograms of Oriented Gradient for Action Recognition	1952
<i>Bin Liang and Lihong Zheng</i>	

Machine Learning and Data Mining I

Discovering User-Communities and Associated Topics from YouTube	1958
<i>Sumit Negi, Ramnath Balasubramanyan, and Santanu Chaudhury</i>	
Multi-label Learning with Missing Labels	1964
<i>Baoyuan Wu, Zhilei Liu, Shangfei Wang, Bao-Gang Hu, and Qiang Ji</i>	
Hellinger Distance Trees for Imbalanced Streams	1969
<i>R.J. Lyon, J.M. Brooke, J.D. Knowles, and B.W. Stappers</i>	
Discovering and Aligning Discriminative Mid-level Features for Image Classification	1975
<i>Ronan Sicre and Frédéric Jurie</i>	
S3CCA: Smoothly Structured Sparse CCA for Partial Pattern Matching	1981
<i>Takumi Kobayashi</i>	

Image and Video Analysis and Understanding II

Learning Room Occupancy Patterns from Sparsely Recovered Light Transport Models	1987
<i>Quan Wang, Xinchu Zhang, Meng Wang, and Kim L. Boyer</i>	
Kernelized Structural Classification for 3D Dogs Body Parts Detection	1993
<i>Simone Pistocchi, Simone Calderara, Shanis Barnard, Nicola Ferri, and Rita Cucchiara</i>	
Boosted Multi-modal Supervised Latent Dirichlet Allocation for Social Event Classification	1999
<i>Shengsheng Qian, Tianzhu Zhang, and Changsheng Xu</i>	
Modeling the Relationship of Action, Object, and Scene	2005
<i>Jing Liu, Xinxiao Wu, and Yang Feng</i>	
Personalized Economy of Images in Social Forums: An Analysis on Supply, Consumption, and Saliency	2011
<i>Sangmin Oh, Megha Pandey, Ilseo Kim, Anthony Hoogs, and Jeff Baumes</i>	

Document Analysis (Handwriting Processing)

A Bayesian Nonparametric Framework for Activity Recognition Using Accelerometer Data	2017
<i>Thuong Nguyen, Sunil Gupta, Svetha Venkatesh, and Dinh Phung</i>	
Delta-n Hinge: Rotation-Invariant Features for Writer Identification	2023
<i>Sheng He and Lambert Schomaker</i>	
Supervision Strategies for the Online Learning of an Evolving Classifier for Gesture Commands	2029
<i>Manuel Bouillon and Eric Anquetil</i>	
Word-Graph-Based Handwriting Keyword Spotting of Out-of-Vocabulary Queries	2035
<i>Joan Puigcerver, Alejandro Héctor Toselli, and Enrique Vidal</i>	
Bayesian Active Learning for Keyword Spotting in Handwritten Documents	2041
<i>Gaurav Kumar and Venu Govindaraju</i>	

Computer Vision I

Effective Acquisition of Dense Anisotropic BRDF	2047
<i>Jiří Filip, Radomír Vávra, and Michal Havlíček</i>	
Masking Light Fields to Remove Partial Occlusion	2053
<i>Scott McCloskey</i>	
An HDR Spectral Imaging System for Time-Varying Omnidirectional Scene	2059
<i>Keita Hirai, Naoto Osawa, Takahiko Horiuchi, and Shoji Tominaga</i>	
Simultaneous HDR and Optic Flow Computation	2065
<i>David Hafner, Oliver Demetz, and Joachim Weickert</i>	

Linear Unmixing in BRDF Reproduction and 3D Shape Recovery	2071
<i>Malte Lenoch, Steffen Herbot, Arne Grumpe, and Christian Wöhler</i>	
Region Tree Based Sparse Model for Optical Flow Estimation	2077
<i>Wei Luo, Fanglong Zhang, Jian Yang, and Jingyu Yang</i>	
Line-Images in Cone Mirror Catadioptric Systems	2083
<i>J. Bermudez-Cameo, G. Lopez-Nicolas, and J.J. Guerrero</i>	
Inferring Plane Orientation from a Single Motion Blurred Image	2089
<i>M. Purnachandra Rao, A.N. Rajagopalan, and Guna Seetharaman</i>	
3D Acquisition of Occluded Surfaces from Scattering in Participating Media	2095
<i>Masaaki Iiyama, Shohei Miki, Takuya Funatomi, and Michihiko Minoh</i>	
A Lighting Robust Fitting Approach of 3D Morphable Model Using Spherical Harmonic Illumination	2101
<i>Mingyang Ma, Xiyuan Hu, Yuquan Xu, and Silong Peng</i>	
Underwater Microscopic Shape from Focus	2107
<i>S. Karthik and A.N. Rajagopalan</i>	
A J-Linkage Based Approach for Vanishing Direction Estimation in Catadioptric Images	2113
<i>Wenting Duan and Nigel Allinson</i>	
A New Geometric Approach for Faster Solving the Perspective-Three-Point Problem	2119
<i>Andreas Masselli and Andreas Zell</i>	
3D Moving Object Reconstruction by Temporal Accumulation	2125
<i>Anas Abuzaina, Mark S. Nixon, and John N. Carter</i>	
Neural Network Based Image Modification for Shape from Observed SEM Images	2131
<i>Yuji Iwahori, Kenji Funahashi, Robert J. Woodham, and M.K. Bhuyan</i>	
Camera Calibration from Coplanar Circles	2137
<i>Filippo Bergamasco, Luca Cosmo, Andrea Albarelli, and Andrea Torsello</i>	
Correspondence Preserving Elastic Surface Registration with Shape Model Prior	2143
<i>F. Danckaers, T. Huysmans, D. Lacko, A. Ledda, S. Verwulgent, S. Van Dongen, and J. Sijbers</i>	
Accurate Camera Pose Estimation for KinectFusion Based on Line Segment Matching by LEHF	2149
<i>Yusuke Nakayama, Toshihiro Honda, Hideo Saito, Masayoshi Shimizu, and Nobuyasu Yamaguchi</i>	
Affine Alignment of Occluded Shapes	2155
<i>Zsolt Sánta and Zoltan Kato</i>	
Stereo Similarity Metric Fusion Using Stereo Confidence	2161
<i>Gorkem Saygili, Laurens van der Maaten, and Emile A. Hendriks</i>	

Body Part Tracking of Infants	2167
<i>Mikkel Damgaard Olsen, Anna Herskindt, Jens Bo Nielsen, and Rasmus R. Paulsen</i>	
A 3D Approach to Facial Landmarks: Detection, Refinement, and Tracking	2173
<i>Jan Cech, Vojtech Franc, and Jiri Matas</i>	
Real-Time Tracking via Deformable Structure Regression Learning	2179
<i>Xian Yang, Quan Xiao, Shoujue Wang, and Peizhong Liu</i>	
Discovering Emergent Behaviors from Tracks Using Hierarchical Non-parametric Bayesian Methods	2185
<i>Guillaume Chiron, Petra Gomez-Krämer, and Michel Ménard</i>	
Tracking Using Multiple Linear Searches and Motion Direction Sampling	2191
<i>Tuan Nguyen and Tony P. Pridmore</i>	
Context Aware Detection and Tracking	2197
<i>Aryana Tavanai, Muralikrishna Sridhar, Feng Gu, Anthony G. Cohn, and David C. Hogg</i>	
Anomaly Detection through Spatio-temporal Context Modeling in Crowded Scenes	2203
<i>Tong Lu, Liang Wu, Xiaolin Ma, Palaiahnakote Shivakumara, and Chew Lim Tan</i>	
Spatial People Density Estimation from Multiple Viewpoints by Memory Based Regression	2209
<i>Yoshimune Tabuchi, Tomokazu Takahashi, Daisuke Deguchi, Ichiro Ide, Hiroshi Murase, Takayuki Kurozumi, and Kunio Kashino</i>	
Comparison of General Object Trackers for Hand Tracking in High-Speed Videos	2215
<i>Ville Hiltunen, Tuomas Eerola, Lasse Lensu, and Heikki Kälviäinen</i>	
Hierarchical Group Structures in Multi-person Tracking	2221
<i>Xu Yan, Anil Cheriyyadat, and Shishir K. Shah</i>	
Real-Time Visual Target Tracking in RGB-D Data for Person-Following Robots	2227
<i>Youngwoo Yoon, Woo-han Yun, Hosub Yoon, and Jaehong Kim</i>	
Scale Adaptive Tracking Using Mean Shift and Efficient Feature Matching	2233
<i>Yi Song, Shuxiao Li, Jinglan Zhang, and Hongxing Chang</i>	
Temporal Non-maximum Suppression for Pedestrian Detection Using Self-Calibration	2239
<i>Lisa M. Brown, Rogerio Feris, and Sharathchandra Pankanti</i>	
A Generalized Search Method for Multiple Competing Hypotheses in Visual Tracking	2245
<i>Muhammad H. Khan, Michel F. Valstar, and Tony P. Pridmore</i>	
Crossroad Traffic Surveillance Using Superpixel Tracking and Vehicle Trajectory Analysis	2251
<i>Daw-Tung Lin and Chin-Hao Hsu</i>	
3D Face Reconstruction via Feature Point Depth Estimation and Shape Deformation	2257
<i>Quan Xiao, Lihua Han, and Peizhong Liu</i>	
Robust Real-Time Extreme Head Pose Estimation	2263
<i>Sergey Tulyakov, Radu-Laurentiu Vieriu, Stanislau Semeniuta, and Nicu Sebe</i>	

Pruning the 3D Curve Skeleton	2269
<i>Luca Serino and Gabriella Sanniti di Baja</i>	
Kinect-Variety Fusion: A Novel Hybrid Approach for Artifacts-Free 3DTV Content Generation	2275
<i>Mansi Sharma, Santanu Chaudhury, and Brejesh Lall</i>	
Image Segmentation and Labeling Using Free-Form Semantic Annotation	2281
<i>Agnes Tegen, Rebecka Weegar, Linus Hammarlund, Magnus Oskarsson, Fangyuan Jiang, Dennis Medved, Pierre Nugues, and Kalle Åström</i>	
Learning Generative Models of Object Parts from a Few Positive Examples	2287
<i>Ekaterina Riabchenko, Joni-Kristian Kämäräinen, and Ke Chen</i>	
Center-Surround Contrast Features for Pedestrian Detection	2293
<i>Shanshan Zhang, Dominik A. Klein, Christian Bauckhage, and Armin B. Cremers</i>	
A Hybrid Holistic/Semantic Approach for Scene Classification	2299
<i>Zenghai Chen, Zheru Chi, and Hong Fu</i>	
Implicit Rank-Sparsity Decomposition: Applications to Saliency/Co-saliency Detection	2305
<i>Yi-Lei Chen and Chiou-Ting Hsu</i>	
A Unified Online Dictionary Learning Framework with Label Information for Robust Object Tracking	2311
<i>Baojie Fan, Jing Sun, Yang Cong, and Yingkui Du</i>	
KIZUKI Processing for Visual Inspection: A Smart Pattern Pop-Out Algorithm Based on Human Visual Architecture	2317
<i>Kimiya Aoki, Takuma Funahashi, Hiroyasu Koshimizu, and Yasuhiko Miwata</i>	
Automated Social Behaviour Recognition at Low Resolution	2323
<i>Tanmay Nath, Guangda Liu, Bassem Hassan, Barbara Weyn, Steve De Backer, and Paul Scheunders</i>	
A Cognitive Approach for Object Discovery	2329
<i>Simone Frintrop, Germán Martín García, and Armin B. Cremers</i>	
S-BLOSUM: Classification of 2D Shapes with Biological Sequence Alignment	2335
<i>Pietro Lovato, Alessio Milanese, Cesare Centomo, Alejandro Giorgetti, and Manuele Bicego</i>	
Background Subtraction with Dynamic Noise Sampling and Complementary Learning	2341
<i>Weifeng Ge, Yuhan Dong, Zhenhua Guo, and Youbin Chen</i>	
Emergent Properties from Feature Co-occurrence in Image Collections	2347
<i>Umair Mateen Khan, Steven Mills, Brendan McCane, and Andrew Trotman</i>	
Spatio-temporal Saliency Detection in Dynamic Scenes Using Local Binary Patterns	2353
<i>Satya M. Muddamsetty, Désire Sidibé, Alain Trémeau, and Fabrice Mériaudeau</i>	

Image-Based Road Type Classification	2359
<i>Viktor Slavkovikj, Steven Verstockt, Wesley De Neve, Sofie Van Hoecke, and Rik Van de Walle</i>	
A FAST Extreme Illumination Robust Feature in Affine Space	2365
<i>Peng Ouyang, Shouyi Yin, Leibo Liu, and Shaojun Wei</i>	
Graph Construction for Salient Object Detection in Videos	2371
<i>Keren Fu, Irene Y.H. Gu, Yixiao Yun, Chen Gong, and Jie Yang</i>	
Semi-supervised Learning for RGB-D Object Recognition	2377
<i>Yanhua Cheng, Xin Zhao, Kaiqi Huang, and Tieniu Tan</i>	
Integral Line Scan Features for Pedestrian Detection	2383
<i>Sateesh Pedagadi, James Orwell, and Boghos Boghossian</i>	
Gender Recognition Using Complexity-Aware Local Features	2389
<i>Haoyu Ren and Ze-Nian Li</i>	
aZIBO: A New Descriptor Based in Shape Moments and Rotational Invariant Features	2395
<i>María Teresa García-Ordás, Enrique Alegre, Víctor González-Castro, and Diego García-Ordás</i>	
Performance Evaluation of Neuromorphic-Vision Object Recognition Algorithms	2401
<i>Rangachar Kasturi, Dmitry B. Goldgof, Rajmadhan Ekambaram, Gill Pratt, Eric Krotkov, Douglas D. Hackett, Yang Ran, Qinfen Zheng, Rajeev Sharma, Mark Anderson, Mark Peot, Mario Aguilar, Deepak Khosla, Yang Chen, Kyungnam Kim, Lior Elazary, Randolph C. Voorhies, Daniel F. Parks, and Laurent Itti</i>	
Compound Exemplar Based Object Detection by Incremental Random Forest	2407
<i>Kai Ma and Jezekiel Ben-Arie</i>	
Perceptual Differences between Men and Women: A 3D Facial Morphometric Perspective	2413
<i>Syed Zulqarnain Gilani and Ajmal Mian</i>	
Revisiting Trifocal Tensor Estimation Using Lines	2419
<i>Yubin Kuang, Magnus Oskarsson, and Kalle Åström</i>	
Improved Optimization Based on Graph Cuts for Discrete Energy Minimization	2424
<i>Kangwei Liu, Junge Zhang, and Kaiqi Huang</i>	
Computing Local Binary Patterns on Discrete Manifolds	2430
<i>Naoufel Werghi, Stefano Berretti, and Alberto Del Bimbo</i>	
Background Subtraction Algorithms with Post-processing: A Review	2436
<i>Insaf Setitra and Slimane Larabi</i>	
Adaptive Non-local Means for Cost Aggregation in a Local Disparity Estimation Algorithm	2442
<i>Casper Pedersen, Kamal Nasrollahi, and Thomas B. Moeslund</i>	
An Improved Filtering for Fast Stereo Matching	2448
<i>Xiaoming Huang, Guoqin Cui, and Yundong Zhang</i>	

A More Robust Mean Shift Tracker Using Joint Monogenic Signal Analysis and Color Histogram	2453
<i>Oumaima Sliti, Habib Hamam, Faouzi Benzarti, and Hamid Amiri</i>	
RGB-D Multi-view System Calibration for Full 3D Scene Reconstruction	2459
<i>Hassan Afzal, Djamila Aouada, David Font, Bruno Mirbach, and Björn Ottersten</i>	

Semi-supervised Learning and Spectral Methods

Semi-supervised Learning on Bi-relational Graph for Image Annotation	2465
<i>Hien Duy Pham, Kye-Hyeon Kim, and Seungjin Choi</i>	
A Topological Framework for Training Latent Variable Models	2471
<i>Heydar Maboudi Afkham, Carl Henrik Ek, and Stefan Carlsson</i>	
Graph Construction Based on Labeled Instances for Semi-supervised Learning	2477
<i>Lilian Berton and Alneu de Andrade Lopes</i>	
Locality Constrained Encoding Graph Construction and Application to Outdoor Object Classification	2483
<i>Fadi Dornaika, Alireza Bosaghzadeh, Houssam Salmane, and Yassine Ruichek</i>	

Image, Video, and Scene Understanding and Applications

Highly Usable and Accurate Iris Segmentation	2489
<i>Marco Leo, Tommaso De Marco, and Cosimo Distanto</i>	
A Fully Automatic Breast Ultrasound Image Segmentation Approach Based on Neutro-Connectedness	2495
<i>Min Xian, H.D. Cheng, and Yingtao Zhang</i>	
Handwritten Text Segmentation Using Elastic Shape Analysis	2501
<i>Sebastian Kurtek and Anuj Srivastava</i>	
Automatic Gait Motion Capture with Missing-Marker Fillings	2507
<i>Xiaoming Deng, Shihong Xia, Wenzhong Wang, Zhaoqi Wang, Liang Chang, and Hongan Wang</i>	
A Hybrid Method for Human Interaction Recognition Using Spatio-temporal Interest Points	2513
<i>Nijun Li, Xu Cheng, Haiyan Guo, and Zhenyang Wu</i>	
High-Stakes Deception Detection Based on Facial Expressions	2519
<i>Lin Su and Martin D. Levine</i>	
A Pose-Adaptive Constrained Local Model for Accurate Head Pose Tracking	2525
<i>Lucas Zamuner, Kevin Bailly, and Erwan Bigorgne</i>	
Interaction Recognition Using Sparse Portraits	2531
<i>Ivan Bogun, Haidar Khan, Jacob Chen, and Eraldo Ribeiro</i>	
Object Segmentation Based on Contour-Skeleton Duality	2537
<i>Ling Cai, Fengna Wang, Valentin Enescu, and Hichem Sahli</i>	

A Belief Based Correlated Topic Model for Trajectory Clustering in Crowded Video Scenes	2543
<i>Jialing Zou, Qixiang Ye, Yanting Cui, David Doermann, and Jianbin Jiao</i>	
Model Semantic Relations with Extended Attributes	2549
<i>Ye Liu, Xiangwei Kong, Haiyan Fu, Xingang You, and Yunbiao Guo</i>	
Fast Adaptive Robust Subspace Tracking for Online Background Subtraction	2555
<i>Jong-Hoon Ahn</i>	
Video Content Detection with Single Frame Level Accuracy Using Dynamic Thresholding Technique	2560
<i>Minoru Mori, Takayuki Kurozumi, Hidehisa Nagano, and Kunio Kashino</i>	
ZebraRecognizer: Efficient and Precise Localization of Pedestrian Crossings	2566
<i>Dragan Ahmetovic, Cristian Bernareggi, Andrea Gerino, and Sergio Mascetti</i>	
Interactive Design of Object Classifiers in Remote Sensing	2572
<i>Bertrand Le Saux</i>	
Parametric Local Multi-modal Metric Learning for Person Re-identification	2578
<i>Kai Liu, Zhicheng Zhao, and Anni Cai</i>	
Experiments on Recognising the Handshape in Blobs Extracted from Sign Language Videos	2584
<i>Ville Viitaniemi, Matti Karppa, and Jorma Laaksonen</i>	
Correntropy-Based Adaptive Learning to Support Video Surveillance Systems	2590
<i>A.M. Álvarez-Meza, S. Molina-Giraldo, and G. Castellanos-Dominguez</i>	
Evaluation of Feature Detectors and Descriptors for Motion Detection from Aerial Videos	2596
<i>Chenxu Wang, Shuxiao Li, Yiping Shen, Yi Song, and Hongxing Chang</i>	
Locality-Constrained Sparse Reconstruction for Trajectory Classification	2602
<i>Ce Li, Zhenjun Han, Qixiang Ye, Shan Gao, Lijin Pang, and Jianbin Jiao</i>	
A Joint Evaluation of Dictionary Learning and Feature Encoding for Action Recognition	2607
<i>Xiaojiang Peng, Limin Wang, Yu Qiao, and Qiang Peng</i>	
A Hierarchical Model Based on Latent Dirichlet Allocation for Action Recognition	2613
<i>Shuang Yang, Chunfeng Yuan, Weiming Hu, and Xinmiao Ding</i>	
Automatic Image Attribute Selection for Zero-Shot Learning of Object Categories	2619
<i>Liangchen Liu, Arnold Wiliem, Shaokang Chen, and Brian C. Lovell</i>	
On Performance Evaluation Metrics for Lane Estimation	2625
<i>Ravi Kumar Satzoda and Mohan M. Trivedi</i>	
Incremental Graph Clustering for Efficient Retrieval from Streaming Egocentric Video Data	2631
<i>Vijay Chandrasekhar, Cheston Tan, Wu Min, Li Liyuan, Li Xiaoli, and Lim Joo Hwee</i>	

Design of Multi-kernel Distance Based Hashing with Multiple Objectives for Image Indexing	2637
<i>Vaibhav Gaur, Ehtesham Hassan, and Santanu Chaudhury</i>	
Scale-Adaptive Texture Classification	2643
<i>Michael Gadermayr, Sebastian Hegenbart, and Andreas Uhl</i>	
Action Recognition in Motion Capture Data Using a Bag of Postures Approach	2649
<i>Ioannis Kapsouras and Nikos Nikolaidis</i>	
Automatic Video Genre Classification Using Multiple SVM Votes	2655
<i>Won-Dong Jang, Chulwoo Lee, Jae-Young Sim, and Chang-Su Kim</i>	
Currency Recognition on Mobile Phones	2661
<i>Suriya Singh, Shushman Choudhury, Kumar Vishal, and C.V. Jawahar</i>	
Multi-modal and Cross-Modal for Lecture Videos Retrieval	2667
<i>Nhu Van Nguyen, Mickal Coustaty, and Jean-Marc Ogier</i>	
Spatial Face Context with Gender Information for Group Photo Similarity Assessment	2673
<i>Yi-I Chiu, Ru-Yun Hsu, and Chun-Rong Huang</i>	
Binary Code Reranking Method Based on Bit Importance	2679
<i>Haiyan Fu, Xiangwei Kong, Yanqing Guo, Xingang You, and Linna Zhou</i>	
Learning Flexible Binary Code for Linear Projection Based Hashing with Random Forest	2685
<i>Shuze Du, Wei Zhang, Shifeng Chen, and Yafei Wen</i>	
Estimating Attention in Exhibitions Using Wearable Cameras	2691
<i>Ali S. Razavian, Omid Aghazadeh, Josephine Sullivan, and Stefan Carlsson</i>	

Scene Text Processing

Improving Accuracy of Printed Character Recognition Using Hexagonal Zoning of Directional Histogram Feature	2697
<i>Wataru Ohyama, Akihito Yamamoto, Tetsushi Wakabayashi, and Fumitaka Kimura</i>	
Scene Text Segmentation with Multi-level Maximally Stable Extremal Regions	2703
<i>Shangxuan Tian, Shijian Lu, Bolan Su, and Chew Lim Tan</i>	
Enhancing Word Image Retrieval in Presence of Font Variations	2709
<i>Viresh Ranjan, Gaurav Harit, and C.V. Jawahar</i>	
Robust Text Detection in Natural Scene Images by Generalized Color-Enhanced Contrasting Extremal Region and Neural Networks	2715
<i>Lei Sun, Qiang Huo, Wei Jia, and Kai Chen</i>	

Biomedical Image Analysis: Video Image Analysis

A Web-Based Education System for Reading Video Capsule Endoscopy	2721
<i>Hai Vu, Yukiko Yanagawa, Tomio Echigo, Masatsugu Shiba, Hirotoshi Okazaki, Yasuhiro Fujiwara, Tetsuo Arakawa, and Yasushi Yagi</i>	
Integrated Model for Understanding Pollen Tube Growth in Video	2727
<i>Asongu L. Tambo, Bir Bhanu, Nan Luo, Geoffrey Harlowt, and Zhenbiao Yang</i>	
Interactive Framework for Insect Tracking with Active Learning	2733
<i>Minmin Shen, Wei Huang, Paul Szyszka, C. Giovanni Galizia, and Dorit Merhof</i>	
Bridging the Resolution Gap between Endoscope Types for a Colonic Polyp Classification	2739
<i>M. Häfner, M. Liedlgruber, Andreas Uhl, and G. Wimmer</i>	

Geometry - 3D Modelling

Incremental Solid Modeling from Sparse Structure-from-Motion Data with Improved Visual Artifacts Removal	2745
<i>Vadim Litvinov and Maxime Lhuillier</i>	
Hybrid Kinect Depth Map Refinement for Transparent Objects	2751
<i>Gorkem Saygili, Laurens van der Maaten, and Emile A. Hendriks</i>	
CPU-Based Real-Time Surface and Solid Voxelization for Incomplete Point Cloud	2757
<i>Frederic Garcia and Björn Ottersten</i>	

Transfer Learning

DensityTransfer: A Data Driven Approach for Imputing Electronic Health Records	2763
<i>Fei Wang, Jiayu Zhou, and Jianying Hu</i>	
Multi-source Adaptive Learning for Fast Control of Prosthetics Hand	2769
<i>Novi Patricia, Tatiana Tommasit, and Barbara Caputo</i>	
What to Transfer? High-Level Semantics in Transfer Metric Learning for Action Similarity	2775
<i>Ziad Al-Halah, Lukas Rybok, and Rainer Stiefelhagen</i>	

Document Understanding

Transforming Web Tables to a Relational Database	2781
<i>David W. Embley, Sharad Seth, and George Nagy</i>	
Staff Line Removal Using Line Adjacency Graph and Staff Line Skeleton for Camera-Based Printed Music Scores	2787
<i>Hoang-Nam Bui, In-Seop Na, and Soo-Hyung Kim</i>	

A Product Aspects Identification Method by Using Translation-Based Language Model	2790
<i>Jintao Du, Wen Chan, and Xiangdong Zhou</i>	

Recognition - Object Detection

Robust Head-Shoulder Detection Using a Two-Stage Cascade Framework	2796
<i>Ronghang Hu, Ruiping Wang, Shiguang Shan, and Xilin Chen</i>	
Face Recognition Using 3D Directional Corner Points	2802
<i>Xun Yu, Yongsheng Gao, and Jun Zhou</i>	
Robust Registration and Filtering for Moving Object Detection in Aerial Videos	2808
<i>Falk Schubert and Krystian Mikolajczyk</i>	
Density-Aware Part-Based Object Detection with Positive Examples	2814
<i>Ekaterina Riabchenko, Joni-Kristian Kämäräinen, and Ke Chen</i>	
Graph Contexts for Retrieving Deformable Non-rigid 3D Shapes	2820
<i>Zhenzhong Kuang, Zongmin Li, Xiaxia Jiang, and Yujie Liu</i>	

Deep, Active, and Ensemble Learning

Efficient Active Novel Class Detection for Data Stream Classification	2826
<i>Mohamed-Rafik Bouguelia, Yolande Belaid, and Abdel Belaid</i>	
Multiple One-Class Classifier Combination for Multi-class Classification	2832
<i>Bilal Hadjadji, Youcef Chibani, and Yasmine Guerbai</i>	
Weighted One-Class Classifier Ensemble Based on Fuzzy Feature Space Partitioning	2838
<i>Bartosz Krawczyk, Michal Wozniak, and Boguslaw Cyganek</i>	
Face Clustering in Photo Album	2844
<i>Siyu Xia, Hong Pan, and A.K. Qin</i>	
An Adaptive-Profile Active Shape Model for Facial-Feature Detection	2849
<i>Ke Sun, Huiling Zhou, and Kin Man Lam</i>	

Pattern Recognition Applications

Automatic Prediction of Perceived Traits Using Visual Cues under Varied Situational Context	2855
<i>Jyoti Joshi, Hatice Gunes, and Roland Goecke</i>	
Design and Evaluation of a Viewer-Dependent Stereoscopic Display	2861
<i>Luca Cosmo, Andrea Albarelli, Filippo Bergamasco, and Andrea Torsello</i>	
An Image Inpainting Algorithm Using Higher Order Singular Value Decomposition	2867
<i>Mrinmoy Ghorai and Bhabatosh Chanda</i>	
Semi-supervised Learning for Cross-Device Visual Location Recognition	2873
<i>Pengcheng Liu, Peipei Yang, Kaiqi Huang, Tieniu Tan, and Hong-Wei Hao</i>	

A Two-Dimensional Barcode with Robust Decoding against Distortion and Occlusion for Automatic Recognition of Garbage Bags	2879
<i>Satoshi Ono, Yudai Kawakami, Hiroshi Kawasaki, and Shinsuke Fujita</i>	

Document Analysis

Performance Evaluation and Benchmarking of Six Texture-Based Feature Sets for Segmenting Historical Documents	2885
<i>Maroua Mehri, Mohamed Mhiri, Pierre Heroux, Petra Gomez-Krämer, Mohamed Ali Mahjoub, and Rémy Mullot</i>	
An Application-Independent and Segmentation-Free Approach for Spotting Queries in Document Images	2891
<i>Houssem Chatbri, Paul Kwan, and Keisuke Kameyama</i>	
Cost-Sensitive Transformation for Chinese Address Recognition	2897
<i>Shujing Lu, Xiaohua Wei, and Yue Lu</i>	
Embedding Document Structure to Bag-of-Words through Pair-wise Stable Key-Regions	2903
<i>Hongxing Gao, Marçal Rusiñol, Dimosthenis Karatzas, and Josep Lladós</i>	
Stroke Bank: A High-Level Representation for Scene Character Recognition	2909
<i>Song Gao, Chunheng Wang, Baihua Xiao, Cunzhao Shi, and Zhong Zhang</i>	
Unconstrained Handwritten Word Recognition Based on Trigrams Using BLSTM	2914
<i>Xi Zhang and Chew Lim Tan</i>	
Fast and Accurate Text Detection in Natural Scene Images with User-Intention	2920
<i>Liuan Wang, Wei Fan, Yuan He, Jun Sun, Yutaka Katsuyama, and Yoshinobu Hotta</i>	
Character Recognition in Natural Scenes Using Convolutional Co-occurrence HOG	2926
<i>Bolan Su, Shijian Lu, Shangxuan Tian, Joo Hwee Lim, and Chew Lim Tan</i>	
2D and 3D Video Scene Text Classification	2932
<i>Jiamin Xu, Palaiahnakote Shivakumara, Tong Lu, and Chew Lim Tan</i>	
Video Text Extraction Using the Fusion of Color Gradient and Log-Gabor Filter	2938
<i>Zhike Zhang, Weiqiang Wang, and Ke Lu</i>	
Offline Features for Classifying Handwritten Math Symbols with Recurrent Neural Networks	2944
<i>Francisco Álvaro, Joan-Andreu Sánchez, and José-Miguel Benedí</i>	
A Study of Designing Compact Classifiers Using Deep Neural Networks for Online Handwritten Chinese Character Recognition	2950
<i>Jun Du, Jin-Shui Hu, Bo Zhu, Si Wei, and Li-Rong Dai</i>	
Distorted Music Score Recognition without Staffline Removal	2956
<i>Quang Nhat Vo, Tam Nguyen, Soo-Hyung Kim, Hyung-Jeong Yang, and Guee-Sang Lee</i>	

NSHP-HMM Based on Conditional Zone Observation Probabilities for Off-Line Handwriting Recognition	2961
<i>Hanene Boukerma, Abdallah Benouareth, and Nadir Farah</i>	
Improving Point of View Scene Recognition by Considering Textual Data	2966
<i>Volkmar Frinken, Yutaro Iwakiri, Ryosuke Ishida, Kensho Fujisaki, and Seiichi Uchida</i>	
Noise-Resistant Image Retrieval	2972
<i>Cyril Höschl IV and Jan Flusser</i>	
Robust Text Line Segmentation for Historical Manuscript Images Using Color and Texture	2978
<i>Kai Chen, Hao Wei, Marcus Liwicki, Jean Hennebert, and Rolf Ingold</i>	
GIST: Graphical Interactive Display Tools Defining a Model for Interactive Search	2984
<i>Ingrid Montealegre and Robert M. Haralick</i>	
Hierarchical Semantic Hashing: Visual Localization from Buildings on Maps	2990
<i>Turgay Senlet, Tarek El-Gaaly, and Ahmed Elgammal</i>	
Optimal Performance-Efficiency Trade-off for Bag of Words Classification of Road Signs	2996
<i>Lykele Hazelhoff, Ivo M. Creusen, and Peter H.N. de With</i>	
Recognition of Handwritten Characters in Chinese Legal Amounts by Stacked Autoencoders	3002
<i>Meng Wang, Youbin Chen, and Xingjun Wang</i>	
A Global-to-Local Approach to Binarization of Degraded Document Images	3008
<i>Barun Biswas, Ujjwal Bhattacharya, and Bidyut B. Chaudhuri</i>	
Generalized BRIEF: A Novel Fast Feature Extraction Method for Robust Hand Detection	3014
<i>Chun Fui Liew and Takehisa Yairi</i>	
Robust Skew Estimation of Handwritten and Printed Documents Based on Grayvalue Images	3020
<i>Florian Kleber, Markus Diem, and Robert Sablatnig</i>	
Constrained Energy Maximization and Self-Referencing Method for Invisible Ink Detection from Multispectral Historical Document Images	3026
<i>Rachid Hedjam, Mohamed Cheriet, and Margaret Kalacska</i>	
Classifying Ancient Coins by Local Feature Matching and Pairwise Geometric Consistency Evaluation	3032
<i>Sebastian Zambanini, Albert Kavelar, and Martin Kampel</i>	
Recognition of Pen-Based Music Notation: The HOMUS Dataset	3038
<i>Jorge Calvo-Zaragoza and Jose Oncina</i>	
Word Spotting in Bangla and English Graphical Documents	3044
<i>Arundhati Tarafdar, Umapada Pal, Jean-Yves Ramel, Nicolas Ragot, and Bidyut B. Chaudhuri</i>	

Writer Identification for Historical Arabic Documents	3050
<i>Daniel Fecker, Abedelkadir Asit, Volker Märgner, Jihad El-Sana, and Tim Fingscheidt</i>	
Document Retrieval Based on Logo Spotting Using Key-Point Matching	3056
<i>Viet Phuong Le, Nibal Nayef, Muriel Visani, Jean-Marc Ogier, and Cao De Tran</i>	
Motion Interaction Field for Accident Detection in Traffic Surveillance Video	3062
<i>Kimin Yun, Hawook Jeong, Kwang Moo Yi, Soo Wan Kim, and Jin Young Choi</i>	
Domain Adaptive Self-Taught Learning for Heterogeneous Face Recognition	3068
<i>Cheng-An Hou, Min-Chun Yang, and Yu-Chiang Frank Wang</i>	
A Coarse-to-Fine Word Spotting Approach for Historical Handwritten Documents Based on Graph Embedding and Graph Edit Distance	3074
<i>Peng Wang, Véronique Eglin, Christophe Garcia, Christine LARGERON, Josep Lladós, and Alicia Fornés</i>	
Improving OCR Accuracy by Applying Enhancement Techniques on Multispectral Images	3080
<i>Fabian Hollaus, Markus Diem, and Robert Sablatnig</i>	
Object Classification in Traffic Scene Surveillance Based on Online Semi-supervised Active Learning	3086
<i>Zhaoxiang Zhang, Jie Qin, Yunhong Wang, and Meng Liang</i>	
Automated Chinese Essay Scoring from Topic Perspective Using Regularized Latent Semantic Indexing	3092
<i>Shudong Hao, Yanyan Xu, Hengli Peng, Kaile Su, and Dengfeng Ke</i>	
Gradient-Angular-Features for Word-wise Video Script Identification	3098
<i>Palaiahnakote Shivakumara, Nabin Sharma, Umapada Pal, Michael Blumenstein, and Chew Lim Tan</i>	
Semi-supervised Online Bayesian Network Learner for Handwritten Characters Recognition	3104
<i>Rituraj Kunwar, Umapada Pal, and Michael Blumenstein</i>	
MSER-Based Real-Time Text Detection and Tracking	3110
<i>Llifs Gómez and Dimosthenis Karatzas</i>	
Real-Time Scene Text Detection Based on Stroke Model	3116
<i>Yi Liu, Dongming Zhang, Yongdong Zhang, and Shouxun Lin</i>	
Data Sufficiency for Online Writer Identification: A Comparative Study of Writer-Style Space vs. Feature Space Models	3121
<i>Arti Shivram, Chetan Ramaiah, and Venu Govindaraju</i>	
Evaluation of Time Series Distance Functions in the Task of Detecting Remote Phenology Patterns	3126
<i>José C. Conti, Fabio A. Farial, Jurandy Almeida, Bruna Alberton, Leonor P.C. Morellato, Luiz Camolesi, and Ricardo da S. Torres</i>	

Maximal Max-Tree Simplification	3132
<i>Roberto Souza, Leticia Rittner, Rubens Machado, and Roberto Lotufo</i>	
Microenvironment-Based Protein Function Analysis by Random Forest	3138
<i>Kazunori Okada, Lorenzo Flores, Mike Wong, and Dragutin Petkovic</i>	
Cross-Database Evaluation of Normalized Raw Pixels for Gender Recognition under Unconstrained Settings	3144
<i>Taner Danisman, Ioan Marius Bilasco, and Chabane Djeraba</i>	
On Validation of Clustering Techniques for Bibliographic Databases	3150
<i>Sumit Mishra, Sriparna Saha, and Samrat Mondal</i>	
Pill Recognition Using Imprint Information by Two-Step Sampling Distance Sets	3156
<i>Jiye Yu, Zhiyuan Chen, and Sei-ichiro Kamata</i>	
A Machine Learning Based Method for Staff Removal	3162
<i>Igor dos Santos Montagner, Roberto Hirata Jr., and Nina S.T. Hirata</i>	
Convolutional Neural Networks for Document Image Classification	3168
<i>Le Kang, Jayant Kumar, Peng Ye, Yi Li, and David Doermann</i>	

Biomedical Image Analysis

An Automated and Robust Framework for Quantification of Muscle and Fat in the Thigh	3173
<i>Chaowei Tan, Zhennan Yan, Shaoting Zhang, Boubakeur Belaroussi, Hui Jing Yu, Colin Miller, and Dimitris N. Metaxas</i>	
Volume-Based Fabric Tensors through Lattice-Boltzmann Simulations	3179
<i>Rodrigo Moreno and Örjan Smedby</i>	
Pseudo-Marginal Bayesian Multiple-Class Multiple-Kernel Learning for Neuroimaging Data	3185
<i>Andrew D. O'Harney, Andre Marquand, Katya Rubia, Kaylita Chantiluke, Anna Smith, Ana Cubillo, Camilla Blain, and Maurizio Filippone</i>	
Using Shape-Aware Models for Lumbar Spine Intervertebral Disc Segmentation	3191
<i>Rabia Haq, David A. Besachio, Roderick C. Borgie, and Michel A. Audette</i>	
A New Divergence Measure Based on Arimoto Entropy for Medical Image Registration	3197
<i>Bicao Li, Guanyu Yang, Huazhong Shu, and Jean Louis Coatrieux</i>	
A Kernel-Based Representation to Support 3D MRI Unsupervised Clustering	3203
<i>D. Cárdenas-Peña, M. Orbes-Arteaga, A. Castro-Ospina, A. Álvarez-Meza, and G. Castellanos-Dominguez</i>	
Geodesic Active Contours with Adaptive Configuration for Cerebral Vessel and Aneurysm Segmentation	3209
<i>Xin Yang, K.T. Tim Cheng, and Aichi Chien</i>	

A Comparative Study of Feature Descriptors for Mitochondria and Synapse Segmentation	3215
<i>Kendrick Cetina, Pablo Márquez-Neila, and Luis Baumela</i>	
An Improved BET Method for Brain Segmentation	3221
<i>Liping Wang, Ziming Zeng, and Reyer Zwiggelaar</i>	
Virus Recognition Based on Local Texture	3227
<i>Ida-Maria Sintorn and Gustaf Kylberg</i>	
Classifying Anti-nuclear Antibodies HEp-2 Images: A Benchmarking Platform	3233
<i>Peter Hobson, Brian C. Lovell, Gennaro Percannella, Mario Vento, and Arnold Wiliem</i>	
Automatic Detection of Embryo Location in Medical Imaging Using Trigonometric Rotation for Noise Reduction	3239
<i>Anna Mölder, Silvester Czanner, Nicholas Costen, and Geraldine Hartshorne</i>	
Automated Prediction of Glasgow Outcome Scale for Traumatic Brain Injury	3245
<i>Bolan Sut, Thien Anh Dinh, Abhinit Kumar Ambastha, Tianxia Gong, Tomi Silander, Shijian Lu, C.C. Tchoyoson Lim, Boon Chuan Pang, Cheng Kiang Lee, Tze-Yun Leong, and Chew Lim Tan</i>	
Quantification of Actin Structures Using Unsupervised Pattern Analysis Techniques	3251
<i>Birgit Möller, Elisabeth Piltz, and Nadine Bley</i>	
Scalable Arrow Detection in Biomedical Images	3257
<i>K.C. Santosh, Laurent Wendling, Sameer K. Antani, and George R. Thoma</i>	
Segmenting Reddish Lesions in Capsule Endoscopy Images Using a Gastrointestinal Color Space	3263
<i>Hai Vu, Tomio Echigo, Yuma Imura, Yukiko Yanagawa, and Yasushi Yagi</i>	
The Contribution of Morphological Features in the Classification of Prostate Carcinoma in Digital Pathology Images	3269
<i>Nicholas McCarthy, Pádraig Cunningham, and Gillian O'Hurley</i>	
Skull Segmentation in MRI by a Support Vector Machine Combining Local and Global Features	3274
<i>Jens Sjölund, Andreas Eriksson Järlideni, Mats Andersson, Hans Knutsson, and Håkan Nordström</i>	
Automatic Liver Segmentation and Hepatic Fat Fraction Assessment in MRI	3280
<i>Zhennan Yan, Chaowei Tan, Shaoting Zhang, Yan Zhou, Boubakeur Belaroussi, Hui Jing Yu, Colin Miller, and Dimitris N. Metaxas</i>	
A Filtration Strategy Based on FD-CRF for Image Matching	3286
<i>Shao Huang and Weiqiang Wang</i>	
A Novel Mammography Image Representation Framework with Application to Image Registration	3292
<i>Said Pertuz, Carme Julia, and Domenec Puig</i>	

Hybrid Decision Forests for Prostate Segmentation in Multi-channel MR Images	3298
<i>Qinquan Gao, Akshay Asthana, Tong Tong, Yipeng Hu, Daniel Rueckert, and Philip Edwards</i>	
A Probabilistic Model for the Optimal Configuration of Retinal Junctions Using Theoretically Proven Features	3304
<i>Touseef Ahmad Qureshi, Andrew Hunter, and Bashir Al-Diri</i>	
Using Object Probabilities in Deformable Model Fitting	3310
<i>Christoph Jud and Thomas Vetter</i>	
Erosion Band Features for Cell Phone Image Based Plant Disease Classification	3315
<i>Marion Neumann, Lisa Hallau, Benjamin Klatt, Kristian Kersting, and Christian Bauckhage</i>	
Automatic CAD System for HEp-2 Cell Image Classification	3321
<i>Shahab Ensafi, Shijian Lu, Ashraf A. Kassim, and Chew Lim Tan</i>	
Automatic Multi-organ Segmentation in Non-enhanced CT Datasets Using Hierarchical Shape Priors	3327
<i>Chunliang Wang and Örjan Smedby</i>	
Optimizing Optics and Imaging for Pattern Recognition Based Screening Tasks	3333
<i>Joakim Lindblad, Natašja Sladoje, Patrik Malm, Ewert Bengtsson, Ramin Moshavegh, and Andrew Mehnert</i>	
Modeling the Brain Connectivity for Pattern Analysis	3339
<i>Itir Onal, Emre Aksan, Burak Velioglu, Orhan Firat, Mete Ozay, Ilke Oztekin, and Fatos T. Yarman Vural</i>	
Detection of Tumor Cell Spheroids from Co-cultures Using Phase Contrast Images and Machine Learning Approach	3345
<i>Neslihan Bayramoglu, Mika Kaakinen, Lauri Eklund, Malin Åkerfelt, Matthias Nees, Juho Kannala, and Janne Heikkilä</i>	
Volume Reconstruction for MRI	3351
<i>Meiqing Zhang, Huirao Nie, Yang Pei, and Linmi Tao</i>	
Adaptive Probabilistic Thresholding Method for Accurate Breast Region Segmentation in Mammograms	3357
<i>Hamed Habibi Aghdam, Domenec Puig, and Agusti Solanas</i>	
Sparse and Low Rank Matrix Decomposition Based Local Morphological Analysis and Its Application to Diagnosis of Cirrhosis Livers	3363
<i>Junping Deng, Xianhua Han, Gang Xu, and Yen-Wei Chen</i>	
Learning Multiple Complex Features Based on Classification Results	3369
<i>Yoshikuni Sato, Kazuki Kozuka, Yoshihide Sawada, and Masaki Kiyono</i>	
Shape-Based Classification of Environmental Microorganisms	3374
<i>Cong Yang, Chen Li, Oliver Tiebe, Kimiaki Shirahama, and Marcin Grzegorzec</i>	

Evaluating Cell Nuclei Segmentation for Use on Whole-Slide Images in Lung Cytology	3380
<i>Daniel Forsberg and Nastaran Monsef</i>	
Computer Assisted Analysis System of Electroencephalogram for Diagnosing Epilepsy	3386
<i>Malik Anas Ahmad, Nadeem Ahmad Khan, and Waqas Majeed</i>	
Extraction of Retinal Blood Vessel Using Curvelet Transform and Fuzzy C-Means	3392
<i>Sudeshna Sil Kar and Santi P. Maity</i>	
A Measure of Septum Shape Using Shortest Path Segmentation in Echocardiographic Images of LVAD Patients	3398
<i>Matilda Landgren, Niels Chr. Overgaard, and Anders Heyden</i>	
Scene Recognition and Labelling	
Scene Recognition with Naive Bayes Non-linear Learning	3404
<i>Marco Fornoni and Barbara Caputo</i>	
Ranking Images Based on Aesthetic Qualities	3410
<i>Aarushi Gaur and Krystian Mikolajczyk</i>	
Indoor Scene Recognition from RGB-D Images by Learning Scene Bases	3416
<i>Shaohua Wan, Changbo Hu, and J.K. Aggarwal</i>	
Spatial-Visual Label Propagation for Local Feature Classification	3422
<i>Tarek El-Gaaly, Marwan Torki, and Ahmed Elgammal</i>	
Information Divergence Based Saliency Detection with a Global Center-Surround Mechanism	3428
<i>Ibrahim M.H. Rahman, Christopher Hollitt, and Mengjie Zhang</i>	
Classification and Clustering II	
Enhanced Random Forest with Image/Patch-Level Learning for Image Understanding	3434
<i>Wai Lam Hoo, Tae-Kyun Kim, Yuru Pei, and Chee Seng Chan</i>	
An Infinite Adaptive Online Learning Model for Segmentation and Classification of Streaming Data	3440
<i>Ava Bargi, Richard Yi Da Xu, and Massimo Piccardi</i>	
Elastic Net Regularized Logistic Regression Using Cubic Majorization	3446
<i>Mikael Nilsson</i>	
Learning of Multilabel Classifiers	3452
<i>Ignazio Pillai, Giorgio Fumera, and Fabio Roli</i>	
Dominant Sets as a Framework for Cluster Ensembles: An Evolutionary Game Theory Approach	3457
<i>Alireza Chakeri and Lawrence O. Hall</i>	

Video and Motion Estimation, Clustering, and Classification

Key-Frame Extraction Using Weighted Multi-view Convex Mixture Models and Spectral Clustering	3463
<i>Antonis I. Ioannidis, Vasileios T. Chasanis, and Aristidis C. Likas</i>	
Recursive Separation of Stationary Components by Subspace Projection and Stochastic Constraints	3469
<i>J.D. Martínez-Vargas, C. Castro-Hoyos, A.M. Álvarez-Meza, C.D. Acosta-Medina, and G. Castellanos-Dominguez</i>	
Motion Estimation and Classification in Compressive Sensing from Dynamic Measurements	3475
<i>Vijay Rengarajan, A.N. Rajagopalan, and R. Aravind</i>	
Scalable Video Summarization Using Skeleton Graph and Random Walk	3481
<i>Rameswar Panda, Sanjay K. Kuanar, and Ananda S. Chowdhury</i>	
Aerial Implicit 3D Video Stabilization Using Epipolar Geometry Constraint	3487
<i>Loc Huynh, Jongmoo Choi, and Gérard Medioni</i>	

Gesture and Behavior Analysis

Clustered Multi-task Linear Discriminant Analysis for View Invariant Color-Depth Action Recognition	3493
<i>Yan Yan, Elisa Ricci, Gaowen Liu, Ramanathan Subramanian, and Nicu Sebe</i>	
Grassmannian Representation of Motion Depth for 3D Human Gesture and Action Recognition	3499
<i>Rim Slama, Hazem Wannous, and Mohamed Daoudi</i>	
Pose Invariant Activity Classification for Multi-floor Indoor Localization	3505
<i>Saehoon Yi, Piotr Mirowski, Tin Kam Ho, and Vladimir Pavlovic</i>	
Action Classification with Locality-Constrained Linear Coding	3511
<i>Hossein Rahmani, Arif Mahmood, Du Huynh, and Ajmal Mian</i>	
Group Activity Recognition with Group Interaction Zone	3517
<i>Young-Ji Kim, Nam-Gyu Cho, and Seong-Whan Lee</i>	

Recognition and Pedestrian Detection

The Combinator: Optimal Combination of Multiple Pedestrian Detectors	3522
<i>Floris De Smedt, Kristof Van Beeck, Tinne Tuytelaars, and Toon Goedeme</i>	
Discriminative Autoencoders for Small Targets Detection	3528
<i>Sebastien Razakarivony and Frédéric Jurie</i>	
Unsupervised Scene Adaptation for Faster Multi-scale Pedestrian Detection	3534
<i>Federico Bartoli, Giuseppe Lisanti, Svebor Karaman, Andrew D. Bagdanov, and Alberto Del Bimbo</i>	

Multi-shot Person Re-identification with Automatic Ambiguity Inference and Removal	3540
<i>Chun-Chao Guo, Shi-Zhe Chen, Jian-Huang Lai, Xiao-Jun Hu, and Shi-Chang Shi</i>	

Pattern Recognition and Machine Learning II

Bayesian Network Structure Learning Using Causality	3546
<i>Zhen Xu and Sargur N. Srihari</i>	
LSTM-Based Early Recognition of Motion Patterns	3552
<i>Markus Weber, Marcus Liwicki, Didier Stricker, Christopher Scholzel, and Seiichi Uchida</i>	
ANTSAC: A Generic RANSAC Variant Using Principles of Ant Colony Algorithms	3558
<i>Sebastian Otte, Ulrich Schwanecke, and Andreas Zell</i>	
Optimization-Based Extreme Learning Machine with Multi-kernel Learning Approach for Classification	3564
<i>Le-le Cao, Wen-bing Huang, and Fu-chun Sun</i>	
Statistical Anomaly Detection in Mean and Variation of Energy Consumption	3570
<i>Bei Chen, Mathieu Sinn, Joern Ploennigs, and Anika Schumann</i>	
VC-Dimension of Rule Sets	3576
<i>Olcay Taner Yildiz</i>	
Budding Trees	3582
<i>Ozan Irsoy, Olcay Taner Yildiz, and Ethem Alpaydin</i>	
Label Consistent Fisher Vectors for Supervised Feature Aggregation	3588
<i>Quan Wang, Xin Shen, Meng Wang, and Kim L. Boyer</i>	
Quality Evaluation of an Anonymized Dataset	3594
<i>Sam Fletcher and Md Zahidul Islam</i>	
Effective Mean-Field Inference Method for Nonnegative Boltzmann Machines	3600
<i>Muneki Yasuda</i>	
Using Contextual Information from Topic Hierarchies to Improve Context-Aware Recommender Systems	3606
<i>Marcos Aurélio Domingues, Marcelo Garcia Manzato, Ricardo Marcondes Maracacini, Camila Vaccari Sundermann, and Solange Oliveira Rezende</i>	
Confidence Estimation and Reputation Analysis in Aspect Extraction	3612
<i>Yan Li, Hui Wang, Zhen Qin, Weiran Xu, and Jun Guo</i>	
A Hierarchical Bayesian Choice Model with Visibility	3618
<i>Takayuki Osogami and Takayuki Katsuki</i>	
Identifying Diverse Set of Images in Flickr	3624
<i>Sumit Negi and Santanu Chaudhury</i>	
Playscript Classification and Automatic Wikipedia Play Articles Generation	3630
<i>Siddhartha Banerjee, Cornelia Caragea, and Prasenjit Mitra</i>	

Privileged Information for Hierarchical Document Clustering: A Metric Learning Approach	3636
<i>Ricardo Marcondes Marcacini, Marcos Aurélio Domingues, Eduardo R. Hruschka, and Solange Oliveira Rezende</i>	
Bad Data Analysis with Sparse Sensors for Leak Localisation in Water Distribution Networks	3642
<i>Francesco Fusco, Bradley Eck, and Sean McKenna</i>	
Label-Denoising Auto-encoder for Classification with Inaccurate Supervision Information	3648
<i>Dong Wang and Xiaoyang Tan</i>	
Non-enumerative Cross Validation for the Determination of Structural Parameters in Feature-Selective SVMs	3654
<i>Elena Chernousova, Pavel Levdik, Alexander Tatarchuk, Vadim Mottl, and David Windridge</i>	
Domain Adaptation under Data Misalignment: An Application to Cepheid Variable Star Classification	3660
<i>Ricardo Vilalta, Kinjal Dhar Gupta, and Lucas Macri</i>	
Sparse Online Co-regularization Using Conjugate Functions	3666
<i>Boliang Sun, Min Tang, and Guohui Li</i>	
Circular Regression Based on Gaussian Processes	3672
<i>Pablo Guerrero and Javier Ruiz del Solar</i>	
Unsupervised Tracking from Clustered Graph Patterns	3678
<i>Fabien Diot, Elisa Fromont, Baptiste Jeudy, Emmanuel Marilly, and Olivier Martinot</i>	
A Hybrid Feature Selection Approach by Correlation-Based Filters and SVM-RFE	3684
<i>Jing Zhang, Xuegang Hu, Peipei Li, Wei He, Yuhong Zhang, and Huizong Li</i>	
Simultaneous Ground Metric Learning and Matrix Factorization with Earth Mover's Distance	3690
<i>Gloria Zen, Elisa Ricci, and Nicu Sebe</i>	
Improving Personalized Ranking in Recommender Systems with Topic Hierarchies and Implicit Feedback	3696
<i>Marcelo Garcia Manzato, Marcos Aurélio Domingues, Ricardo Marcondes Marcacini, and Solange Oliveira Rezende</i>	
A Survey on Intrusive Load Monitoring for Appliance Recognition	3702
<i>Antonio Ridi, Christophe Gisler, and Jean Hennebert</i>	
Representation Learning for Contextual Object and Region Detection in Remote Sensing	3708
<i>Orhan Firat, Gulcan Can, and Fatos T. Yarman Vural</i>	
Fast Similarity Search Using Multiple Binary Codes	3714
<i>Shinichi Shirakawa</i>	

The Effect of Aggregating Subtype Performances Depends Strongly on the Performance Measure Used	3720
<i>David M.J. Tax, Herman M.J. Sontrop, Marcel J.T Reinders, and Perry D. Moerland</i>	
SUnGP: A Greedy Sparse Approximation Algorithm for Hyperspectral Unmixing	3726
<i>Naveed Akhtar, Faisal Shafait, and Ajmal Mian</i>	
SuperPixel Based Angular Differences as a Mid-level Image Descriptor	3732
<i>Ronan Sicre, H. Emrah Tasli, and Theo Gevers</i>	
Transformation-Invariant Collaborative Sub-representation	3738
<i>Yeqing Li, Chen Chen, and Jungzhou Huang</i>	
Local Hybrid Coding for Image Classification	3744
<i>Wu Xiang, Jianmin Wang, and Mingsheng Long</i>	
Pixel Classification Using General Adaptive Neighborhood-Based Features	3750
<i>Victor González-Castro, Johan Debayle, and Vladimir Curie</i>	
An Unsupervised Band Selection Method Based on Overall Accuracy Prediction	3756
<i>Chenhong Sui, Yan Tian, and Yiping Xu</i>	
Implicitly Constrained Semi-supervised Linear Discriminant Analysis	3762
<i>Jesse H. Krythe and Marco Loog</i>	
Multiple Instance Learning with Response-Optimized Random Forests	3768
<i>Christoph Straehle, Melih Kandemir, Ullrich Koethe, and Fred A. Hamprecht</i>	
Multiple Kernel Learning Based Multi-view Spectral Clustering	3774
<i>Dongyan Guo, Jian Zhang, Xinwang Liu, Ying Cui, and Chunxia Zhao</i>	
Time Series Transductive Classification on Imbalanced Data Sets: An Experimental Study	3780
<i>Celso A.R. de Sousa, Vinicius M.A. Souza, and Gustavo E.A.P.A. Batista</i>	
A Novel Graph-Based Fisher Kernel Method for Semi-supervised Learning	3786
<i>Alessandro Rozza, Mario Manzo, and Alfredo Petrosino</i>	
Transformed Neighborhood Propagation	3792
<i>Zhao Zhang, Fan-Zhang Li, and Mingbo Zhao</i>	
Active Semi-supervised Learning Using Optimum-Path Forest	3798
<i>Priscila T.M. Saito, Willian P. Amorim, Alexandre X. Falcão, Pedro J. de Rezende, Celso T.N. Suzuki, Jancarlo F. Gomes, and Marcelo H. de Carvalho</i>	
A Unified Model for Human Behavior Modeling Using a Hierarchy with a Variable Number of States	3804
<i>Hande Alemdar, T.L.M van Kasteren, M.E. Niessen, A. Merentitis, and Cem Ersoy</i>	
GPT Correlation for 2D Projection Transformation Invariant Template Matching	3810
<i>Toru Wakahara and Yukihiro Yamashita</i>	
Multiple Model Fitting by Evolutionary Dynamics	3816
<i>Michael Donoser, Martin Hirzer, and Dieter Schmalstieg</i>	

Graph Characterization Using Wave Kernel Trace	3822
<i>Furqan Aziz, Richard C. Wilson, and Edwin R. Hancock</i>	
Dynamic Insertions in TLAESA Fast NN Search Algorithm	3828
<i>Luisa Micó and Jose Oncina</i>	
A Novel Robust Modified Support Vector Machines	3834
<i>Shuchun Liu, Jun Guo, Sizhi Zhong, and Yifan Li</i>	
Semi-supervised Segmentation Fusion of Multi-spectral and Aerial Images	3839
<i>Mete Ozay</i>	
Graph Characterization from Entropy Component Analysis	3845
<i>Cheng Ye, Richard C. Wilson, and Edwin R. Hancock</i>	
Margin Perceptrons for Graphs	3851
<i>Brijnesh Jain</i>	
GR2T vs L2E with Nuisance Scale	3857
<i>Rozenn Dahyot</i>	
Two-Dimensional Global Image Registration Using Local Linear Property of Image Manifold	3862
<i>Hayato Itoh, Atsushi Imiya, and Tomoya Sakai</i>	
Multiple-Output Regression with High-Order Structure Information	3868
<i>Changsheng Li, Lin Yang, Qingshan Liu, Fanjing Meng, Weishan Dong, Yu Wang, and Jingmin Xu</i>	
Directed Depth-Based Complexity Traces of Hypergraphs from Directed Line Graphs	3874
<i>Lu Bai, Edwin R. Hancock, Peng Ren, and Francisco Escolano</i>	
A Hypergraph Kernel from Isomorphism Tests	3880
<i>Lu Bai, Peng Ren, and Edwin R. Hancock</i>	
Cost-Sensitive Structured SVM for Multi-category Domain Adaptation	3886
<i>Jiaolong Xu, Sebastian Ramos, David Vázquez, and Antonio M. López</i>	
A Spectral Graph Kernel and Its Application to Collective Activities Classification	3892
<i>Nicoletta Noceti and Francesca Odone</i>	
Random Walk Kernel Applications to Classification Using Support Vector Machines	3898
<i>Vasileios Gavriilidis and Anastasios Tefas</i>	
Incremental Learning with Support Vector Data Description	3904
<i>Weiye Xie, Stefan Uhlmann, Serkan Kiranyaz, and Moncef Gabbouj</i>	
Improving Graph Edit Distance Approximation by Centrality Measures	3910
<i>Kaspar Riesen, Horst Bunke, and Andreas Fischer</i>	
Multi-group Adaptation for Event Recognition from Videos	3915
<i>Yang Feng, Xinxiao Wu, Han Wang, and Jing Liu</i>	

Network-Based Correlated Correspondence for Unsupervised Domain Adaptation of Hyperspectral Satellite Images	3921
<i>Julien Rebetez, Devis Tuia, and Nicolas Courty</i>	

Cross Domain Shared Subspace Learning for Unsupervised Transfer Classification	3927
<i>Zheng Fang and Zhongfei (Mark) Zhang</i>	

Image and Video Matching and Retrieval

Compact Signature-Based Compressed Video Matching Using Dominant Color Profiles (DCP)	3933
<i>Saddam Bekhet and Amr Ahmed</i>	

Low Rank Global Geometric Consistency for Partial-Duplicate Image Search	3939
<i>Li Yang, Yang Lin, Zhouchen Lin, and Hongbin Zha</i>	

Visual Group Binary Signature for Video Copy Detection	3945
<i>Savas Özkan, Ersin Esen, and Gözde Bozdagi Akar</i>	

Image Retrieval Based on Anisotropic Scaling and Shearing Invariant Geometric Coherence	3951
<i>Xiaomeng Wu and Kunio Kashino</i>	

Identification and Action Recognition

Crowd Saliency Detection via Global Similarity Structure	3957
<i>Mei Kuan Lim, Ven Jyn Kok, Chen Change Loy, and Chee Seng Chan</i>	

Clustered Spatio-temporal Manifolds for Online Action Recognition	3963
<i>Victoria Bloom, Dimitrios Makris, and Vasileios Argyriou</i>	

Gesture Control Using Active Difference Signatures and Sparse Learning	3969
<i>Andreas Savakis, Raviteja Rudra, and Raymond Ptucha</i>	

Person Re-identification via Discriminative Accumulation of Local Features	3975
<i>Tetsu Matsukawa, Takahiro Okabe, and Yoichi Sato</i>	

Computer Vision II

Kinematic Reeb Graph Extraction Based on Heat Diffusion	3981
<i>M. Hachani, A. Ouled Zaid, and W. Puech</i>	

Local Binary Patterns Calculated over Gaussian Derivative Images	3987
<i>Varun Jain, James L. Crowley, and Augustin Lux</i>	

Scale Normalized Radial Fourier Transform as a Robust Image Descriptor	3993
<i>Evanthia Mavridou, Manh-Dung Hoang, James L. Crowley, and Augustin Lux</i>	

Generalized Optical Flow Model for Scattering Media	3999
<i>Paulo Drews Jr., Erickson R. Nascimento, Arthur Xavier, and Mario Campos</i>	

Skeleton Filling Rate for Shape Recognition	4005
<i>Yahya Sirin and M. Fatih Demirci</i>	

Euclidean Structure from Conic Feature Correspondences	4010
<i>Zijian Zhao</i>	
New Geometric Interpretation and Analytic Solution for Quadrilateral Reconstruction	4015
<i>Joo-Haeng Lee</i>	
Finding Corresponding Patches in Texture Images Using Tensor Consistency Check	4021
<i>Saba Batoool Miyan and Jun Sato</i>	
Multiple View Based Building Modeling with Multi-box Grammar	4027
<i>Ruiling Deng, Qiuliang Wang, Rui Gan, Gang Zeng, and Hongbin Zha</i>	
The Perspective-3-Point Problem When Using a Planar Mirror	4033
<i>Xianghua Ying, Ganwen Wang, Xiang Mei, Sen Yang, and Hongbin Zha</i>	
Robust Camera Tracking by Combining Color and Depth Measurements	4038
<i>Erik Bylow, Carl Olsson, and Fredrik Kahl</i>	
Robust 3D Morphable Model Fitting by Sparse SIFT Flow	4044
<i>Xiangyu Zhu, Dong Yi, Zhen Lei, and Stan Z. Li</i>	
Semantic Urban Maps	4050
<i>J.R. Siddiqui and S. Khatibi</i>	
Local Refinement for Stereo Regularization	4056
<i>Carl Olsson, Johannes Ulen, and Anders Eriksson</i>	
Semi-supervised Learning of Geospatial Objects through Multi-modal Data Integration	4062
<i>Yi Yang and Shawn Newsam</i>	
Camera Calibration for Plate Refractive Imaging System	4068
<i>Longxiang Huang and Yuncai Liu</i>	
Uncertainty, Baseline, and Noise Analysis for L1 Error-Based Multi-view Triangulation	4074
<i>Mauricio Hess-Flores, Shawn Recker, and Kenneth I. Joy</i>	
High-Coverage 3D Scanning through Online Structured Light Calibration	4080
<i>Andrea Albarelli, Luca Cosmo, Filippo Bergamasco, and Andrea Torsello</i>	
Piecewise-Bézier C1 Interpolation on Riemannian Manifolds with Application to 2D Shape Morphing	4086
<i>Pierre-Yves Gouenbourger, Chafik Samir, and P.A. Absil</i>	
Visual Tracking via Saliency Weighted Sparse Coding Appearance Model	4092
<i>Wanyi Li, Peng Wang, and Hong Qiao</i>	
Real-Time Tracking Combined with Object Segmentation	4098
<i>Hongzhi Wang, Nong Sang, and Yi Yan</i>	
Visual Tracking Using Multi-stage Random Simple Features	4104
<i>Yang He, Zhen Dong, Min Yang, Lei Chen, Mingtao Pei, and Yunde Jia</i>	
Pedestrian's Trajectory Forecast in Public Traffic with Artificial Neural Networks	4110
<i>Michael Goldhammer, Konrad Doll, Ulrich Brunsmann, André Gensler, and Bernhard Sick</i>	

Sparse Feature Tracking for Crowd Change Detection and Event Recognition	4116
<i>Hajer Fradi and Jean-Luc Dugelay</i>	
Intention-Aware Multiple Pedestrian Tracking	4122
<i>Francisco Madrigal, Jean-Bernard Hayet, and Frédéric Lerasle</i>	
Temporal Mapping of Surveillance Video	4128
<i>Saeid Bagheri and Jiang Yu Zheng</i>	
Dynamic Task Decomposition for Probabilistic Tracking in Complex Scenes	4134
<i>Tao Hu, Stefano Messelodi, and Oswald Lanz</i>	
Go with the Flow: Improving Multi-view Vehicle Detection with Motion Cues	4140
<i>Alfredo Ramirez, Eshed Ohn-Bar, and Mohan M. Trivedi</i>	
Soft Biometrics Integrated Multi-target Tracking	4146
<i>Xiaojing Chen and Bir Bhanu</i>	
Depth Structure Association for RGB-D Multi-target Tracking	4152
<i>Shan Gao, Zhenjun Han, David Doermann, and Jianbin Jiao</i>	
Transfer Learning of Motion Patterns in Traffic Scene via Convex Optimization	4158
<i>YoungJoon Yoo, Hawook Jeong, Soo Wan Kim, and Jin Young Choi</i>	
Realtime Multilevel Crowd Tracking Using Reciprocal Velocity Obstacles	4164
<i>Aniket Bera and Dinesh Manocha</i>	
Anonymous Camera for Privacy Protection	4170
<i>Yupeng Zhang, Yuheng Lu, Hajime Nagahara, and Rin-ichiro Taniguchi</i>	
Discriminative Directional Texture and Color for Robust Target Tracking	4176
<i>Mahbub Murshed, Taskeed Jabid, and S.M. Zahid Ishraque</i>	
Evaluating Multi-task Learning for Multi-view Head-Pose Classification in Interactive Environments	4182
<i>Yan Yan, Ramanathan Subramanian, Elisa Ricci, Oswald Lanz, and Nicu Sebe</i>	
Head Pose Estimation in First-Person Camera Views	4188
<i>Stefano Alletto, Giuseppe Serra, Simone Calderara, and Rita Cucchiara</i>	
Hybrid On-Line 3D Face and Facial Actions Tracking in RGBD Video Sequences	4194
<i>Hai X. Pham and Vladimir Pavlovic</i>	
Calibrating Non-overlapping RGB-D Cameras	4200
<i>Wuhe Zou and Shigang Li</i>	
Super-resolution Reconstruction for Binocular 3D Data	4206
<i>Wei-Tsung Hsiao, Jing-Jang Leou, and Han-Hui Hsiao</i>	
Depth Super-resolution by Fusing Depth Imaging and Stereo Vision with Structural Determinant Information Inference	4212
<i>Yucheng Wang, Huijun Di, Bingjie Wang, Wei Liang, Jian Zhang, and Yunde Jia</i>	
Automatic Segmentation and Recognition of Human Actions in Monocular Sequences	4218
<i>Carlos Orrite, Mario Rodriguez, Elias Herrero, Gregory Rogez, and Sergio A. Velastin</i>	

3D-Object Recognition Based on LLC Using Depth Spatial Pyramid	4224
<i>Tom Nakashika, Takafumi Hori, Tetsuya Takiguchi, and Yasuo Ariki</i>	
Online Learning and Detection with Part-Based, Circulant Structure	4229
<i>Osman Akin and Krystian Mikolajczyk</i>	
Combining Spatial and Temporal Information for Inactivity Modeling	4234
<i>Rainer Planinc and Martin Kampel</i>	
Humanoid Robot Imitation with Pose Similarity Metric Learning	4240
<i>Jie Lei, Mingli Song, Ze-Nian Li, Chun Chen, Xianghua Xu, and Shiliang Pu</i>	
Self-Organizing Cascaded Structure of Deformable Part Models for Fast Object Detection	4246
<i>Sangdoon Yun, Hawook Jeong, Woo-Sung Kang, Byeongho Heo, and Jin Young Choi</i>	
Local Label Probability Propagation for Hyperspectral Image Classification	4251
<i>Haichang Li, Jiangyong Duan, Shiming Xiang, Lingfeng Wang, and Chunhong Pan</i>	
Recognizing Point Clouds Using Conditional Random Fields	4257
<i>Farzad Husain, Labette Dellen, and Carme Torras</i>	
A Bio-Inspired Early-Level Image Representation and Its Contribution to Object Recognition	4263
<i>Wei Hui and Zuo Qingsong</i>	
Effective Part Localization in Latent-SVM Training	4269
<i>Yaodong Chen and Renfa Li</i>	
Estimating Floor Regions in Cluttered Indoor Scenes from First Person Camera View	4275
<i>Sanchit Aggarwal, Anoop M. Namboodiri, and C.V. Jawahar</i>	
Fast Human Detection Combining Range Image Segmentation and Local Feature Based Detection	4281
<i>Tom Ubukata, Masatoshi Shibata, Kenji Terabayashi, Alessandro Mora, Takehiro Kawashita, Gakuto Masuyama, and Kazunori Umeda</i>	
Graph-Based Kinship Recognition	4287
<i>Yuanhao Guo, Hamdi Dibeklioglu, and Laurens van der Maaten</i>	
Regularized Hierarchical Feature Learning with Non-negative Sparsity and Selectivity for Image Classification	4293
<i>Bingyuan Liu, Jing Liu, Xiao Bai, and Hanqing Lu</i>	
Car Detection in High-Resolution Urban Scenes Using Multiple Image Descriptors	4299
<i>Mohamed Elmikaty and Tania Stathaki</i>	
Fisher's Discriminant with Natural Image Priors	4305
<i>Yao-Hsiang Yang, Lu-Hung Chen, Chu-Song Chen, and Chieh-Chih Wang</i>	
First-Person Animal Activity Recognition from Egocentric Videos	4310
<i>Yumi Iwashita, Asamichi Takamine, Ryo Kurazume, and M.S. Ryoo</i>	

4D Space-Time Mereotopogeometry-Part Connectivity Calculus for Visual Object Representation	4316
<i>Karthik Mahesh Varadarajan and Markus Vincze</i>	
People Detection with Heterogeneous Features and Explicit Optimization on Computation Time	4322
<i>A.A. Mekonnen, Frédéric Lerasle, A. Herbulot, and C. Briand</i>	
Fisher Vectors over Random Density Forests for Object Recognition	4328
<i>Claudio Baccchi, Francesco Turchini, Lorenzo Seidenari, Andrew D. Bagdanov, and Alberto Del Bimbo</i>	
Small Object Discovery and Recognition Using Actively Guided Robot	4334
<i>Sudhandhu Mittal, M. Siva Karthik, Suryansh Kumar, and K. Madhava Krishna</i>	
Exploring Depth Information for Object Segmentation and Detection	4340
<i>Tyng-Luh Liu, Kai-Yueh Chang, and Shang-Hong Lai</i>	
An Optimized Sliding Window Approach to Pedestrian Detection	4346
<i>Victor Hugo Cunha de Melo, Samir Leão, David Menotti, and William Robson Schwartz</i>	
Attribute Augmentation with Sparse Coding	4352
<i>Xiaoyang Wang and Qiang Ji</i>	
Learning Convolutional Nonlinear Features for K Nearest Neighbor Image Classification	4358
<i>Weiqiang Ren, Yinan Yu, Junge Zhang, and Kaiqi Huang</i>	
When Patches Match—A Statistical View on Matching under Illumination Variation	4364
<i>Rudolf Mester and Christian Conrad</i>	
Multi-view Event Detection in Crowded Scenes Using Tracklet Plots	4370
<i>Pau Climent-Pérez, Dorothy N. Monekosso, and Paolo Remagnino</i>	
Robust Human Detection to Pose and Occlusion Using Bag-of-Words	4376
<i>Yuta Tani and Kazuhiro Hotta</i>	
Light Transport Refocusing for Unknown Scattering Medium	4382
<i>Md. Abdul Mannan, Seiichi Tagawa, Toru Tamaki, Hajime Nagahara, Yasuhiro Mukaigawa, and Yasushi Yagi</i>	
Kernel Density Estimation Using Joint Spatial-Color-Depth Data for Background Modeling	4388
<i>Daniela Giordano, Simone Palazzo, and Concetto Spampinato</i>	
A Nonlocal Filter-Based Hybrid Strategy for Depth Map Enhancement	4394
<i>Li Li and Caiming Zhang</i>	
Position-Based Action Recognition Using High Dimension Index Tree	4400
<i>Qian Xiao, Jun Cheng, Jun Jiang, and Wei Feng</i>	

Machine Learning and Data Mining II

Finding the Largest Hypercavity in a Linear Data Space	4406
<i>Anna Gubareva, Valentina Sulimova, Oleg Seredin, Alexander Larin, and Vadim Mottl</i>	
Efficient Evaluation of SVM Classifiers Using Error Space Encoding	4411
<i>Nisarg Raval, Rashmi Tonge, and C.V. Jawahar</i>	
Systematic Labeling Bias: De-biasing Where Everyone is Wrong	4417
<i>Guillermo F. Cabrera, Christopher J. Miller, and Jeff Schneider</i>	
Toward Sparse Coding on Cosine Distance	4423
<i>Jonghyun Choi, Hyunjong Cho, Jungsuk Kwac, and Larry S. Davis</i>	
String Kernels for Complex Time-Series: Counting Targets from Sensed Movement	4429
<i>Theodoros Damoulas, Jin He, Rich Bernstein, Carla P. Gomes, and Anish Arora</i>	

Coding, Compression, and Super-resolution

An Evaluation of the Faster STORM Method for Super-resolution Microscopy	4435
<i>Omer Ishaq, Johan Elf, and Carolina Wahlby</i>	
Deblurring of Document Images Based on Sparse Representations Enhanced by Non-local Means	4441
<i>Nibal Nayef, Petra Gomez-Krämer, and Jean-Marc Ogier</i>	
Sub-band Energy Constraints for Self-Similarity Based Super-resolution	4447
<i>Abhishek Singh and Narendra Ahuja</i>	
Super-resolution System for 4K-HDTV	4453
<i>Tomio Goto, Takafumi Fukuoka, Fumiya Nagashima, Satoshi Hirano, and Masaru Sakurai</i>	
Sparse Coding with a Coupled Dictionary Learning Approach for Textual Image Super-resolution	4459
<i>Rim Walha, Fadoua Drira, Franck Lebourgeois, Christophe Garcia, and Adel M. Alimi</i>	

Face Recognition

Facial Age Estimation by Adaptive Label Distribution Learning	4465
<i>Xin Geng, Qin Wang, and Yu Xia</i>	
An In-depth Examination of Local Binary Descriptors in Unconstrained Face Recognition	4471
<i>Juha Ylioinas, Abdenour Hadid, Juho Kannala, and Matti Pietikäinen</i>	
Pose Independent Face Recognition by Localizing Local Binary Patterns via Deformation Components	4477
<i>Iacopo Masi, Claudio Ferrari, Alberto Del Bimbo, and Gérard Medioni</i>	

Protected Facial Biometric Templates Based on Local Gabor Patterns and Adaptive Bloom Filters	4483
<i>Marta Gomez-Barrero, Christian Rathgeb, Javier Galbally, Julian Fierrez, and Christoph Busch</i>	
Watch-List Screening Using Ensembles Based on Multiple Face Representations	4489
<i>Saman Bashbaghi, Eric Granger, Robert Sabourin, and Guillaume-Alexandre Bilodeau</i>	
Action Recognition and Identification	
A Performance Evaluation on Action Recognition with Local Features	4495
<i>Xiantong Zhen and Ling Shao</i>	
Locating People in Video from Semantic Descriptions: A New Database and Approach	4501
<i>Michael Halstead, Simon Denman, Sridha Sridharan, and Clinton Fookes</i>	
Indian Classical Dance Classification on Manifold Using Jensen-Bregman LogDet Divergence	4507
<i>Soumitra Samanta and Bhabatosh Chanda</i>	
Skeletal Quads: Human Action Recognition Using Joint Quadruples	4513
<i>Georgios Evangelidis, Gurkirt Singh, and Radu Horaud</i>	
A Two-Stage Regression Using Bioimpedance and Temperature for Hydration Assessment During Sports	4519
<i>Matthias Ring, Clemens Lohmueller, Manfred Rauh, and Bjoern M. Eskofier</i>	
Correspondence-Free Dictionary Learning for Cross-View Action Recognition	4525
<i>Fan Zhu and Ling Shao</i>	
Type-2 Fuzzy GMMs for Robust Text-Independent Speaker Verification in Noisy Environments	4531
<i>Hector N.B. Pinheiro, Tsang Ing Ren, George D.C. Cavalcanti, Tsang Ing Jyh, and Jan Sijbers</i>	
Vision-Based Road Bump Detection Using a Front-Mounted Car Camcorder	4537
<i>Hua-Tsung Chen, Chun-Yu Lai, Chun-Chieh Hsu, Suh-Yin Lee, Bao-Shuh Paul Lin, and Chien-Peng Ho</i>	
Low Computation Face Verification Using Class Center Analysis	4543
<i>Xinzi Zhang, Jinjun Wang, Yihong Gong, Shizhou Zhang, and Shun Zhang</i>	
Pedestrian Detection Using Augmented Training Data	4548
<i>Jonas Nilsson, Patrik Andersson, Irene Y.H. Gu, and Jonas Fredriksson</i>	
Principal Local Binary Patterns for Face Representation and Recognition	4554
<i>Jun Yi and Fei Su</i>	
Robust Surface Pattern Matching for Ball Spin Estimation with Multi-exposed Images Under Varying Illumination Conditions	4560
<i>Jongsung Kim and Myunggyu Kim</i>	

Velocity-Based Multiple Change-Point Inference for Unsupervised Segmentation of Human Movement Behavior	4564
<i>Lisa Senger, Martin Schröer, Jan Hendrik Metzen, and Elsa Andrea Kirchner</i>	
Sketch-Based 3D Model Retrieval via Multi-feature Fusion	4570
<i>Yafei Wen, Changqing Zou, Jianzhuang Liu, Shuze Du, and Shifeng Chen</i>	
Extracting Watermark from 3D Prints	4576
<i>Shuntaro Yamazaki, Satoshi Kagami, and Masaaki Mochimaru</i>	
Automatic Pain Recognition from Video and Biomedical Signals	4582
<i>Philipp Werner, Ayoub Al-Hamadi, Robert Niese, Steffen Walter, Sascha Gruss, and Harald C. Traue</i>	
Creating a Unified, Wide-Area Activity Map for Multi-camera Networks	4588
<i>Lawrence O’Gorman, Dorel Livescu, and Guang Yang</i>	
Early Facial Expression Recognition Using Hidden Markov Models	4594
<i>Jun Wang, Shangfei Wang, and Qiang Ji</i>	
Left-Luggage Detection from Finite-State-Machine Analysis in Static-Camera Videos	4600
<i>Kevin Lin, Shen-Chi Chen, Chu-Song Chen, Daw-Tung Lin, and Yi-Ping Hung</i>	
Online Regression of Grandmother-Cell Responses with Visual Experience Learning for Face Recognition	4606
<i>Jiani Hu, Weihong Deng, and Jun Guo</i>	
Iconic Methods for Multimodal Face Recognition: A Comparative Study	4612
<i>Marinella Cadoni, Andrea Lagorio, and Enrico Grosso</i>	
Person Orientation and Feature Distances Boost Re-identification	4618
<i>Jorge García, Niki Martinel, Gian Luca Foresti, Alfredo Gardel, and Christian Micheloni</i>	
Novel Global and Local Features for Near-Duplicate Document Image Matching	4624
<i>Li Liu, Yue Lu, and Ching Y. Suen</i>	
Unsupervised Surveillance Video Retrieval Based on Human Action and Appearance	4630
<i>David Gerónimo and Hedvig Kjellström</i>	
Sparse Multi-regularized Shearlet-Network Using Convex Relaxation for Face Recognition	4636
<i>Mohamed Anouar Borgi, Demetrio Labate, Maher El Arbi, and Chokri Ben Amar</i>	
Traffic Camera Anomaly Detection	4642
<i>Yuan-Kai Wang, Ching-Tang Fan, and Jian-Fu Chen</i>	
Temporal Facial Expression Modeling for Automated Action Unit Intensity Measurement	4648
<i>S. Mohammad Mavadati and Mohammad H. Mahoor</i>	
Person Re-identification Based on Relaxed Nonnegative Matrix Factorization with Regularizations	4654
<i>Weiya Ren and Guohui Li</i>	

Cascaded Fusion of Dynamic, Spatial, and Textural Feature Sets for Person-Independent Facial Emotion Recognition	4660
<i>Markus Kächele and Friedhelm Schwenker</i>	
Emotional Valence Recognition, Analysis of Saliency and Eye Movements	4666
<i>Hamed R. Tavakoli, Victoria Yanulevskaya, Esa Rahtu, Janne Heikkilä, and Nicu Sebe</i>	
Learning to Count with Back-propagated Information	4672
<i>Ke Chen and Joni-Kristian Kämäräinen</i>	
Micro-expression Recognition Using Dynamic Textures on Tensor Independent Color Space	4678
<i>Su-Jing Wang, Wen-Jing Yan, Xiaobai Li, Guoying Zhao, and Xiaolan Fu</i>	
Multi-camera Trajectory Mining: Database and Evaluation	4684
<i>Yang Hu, Shengcai Liao, Dong Yi, Zhen Lei, and Stan Z. Li</i>	
On Human Perception and Automatic Target Recognition: Strategies for Human-Computer Cooperation	4690
<i>David P. Williams, Michel Couillard, and Samantha Dugelay</i>	
Pain Intensity Evaluation through Facial Action Units	4696
<i>Zuhair Zafar and Nadeem Ahmad Khan</i>	
People Semantic Description and Re-identification from Point Cloud Geometry	4702
<i>Modesto Castrillón-Santana, Javier Lorenzo-Navarro, and Daniel Hernández-Sosa</i>	
Expression-Invariant Face Recognition via 3D Face Reconstruction Using Gabor Filter Bank from a 2D Single Image	4708
<i>Ali Moeini, Hossein Moeini, and Karim Faez</i>	
Graphics and Scene Text Classification in Video	4714
<i>Jiamin Xu, Palaiahnakote Shivakumara, Tong Lu, Trung Quy Phan, and Chew Lim Tan</i>	
Author Index	4720