

Proceedings

**The 18th International Conference on
Pattern Recognition**

ICPR2006

Volume 1A

Table of Contents

Message from the ICPR2006 General Co-Chairs	xxiv
Message from the President of IAPR	xxv
ICPR2006 Organizing Committee.....	xxvi
ICPR2006 Technical Chairs.....	xxvii
ICPR2006 Program Committee.....	xxviii
ICPR2006 Additional Reviewers.....	xxxiv
IAPR Member Societies and Members of the Governing Board	x1
IAPR Standing Committees	xlii
IAPR Technical Committees.....	xlvi

Volume I: Monday 21 August

Track 1: Computer Vision and Image Analysis

Mon-O-I-1: 3D Reconstruction and Segmentation

2D and 3D Vegetation Resource Parameters Assessment Using Marked Point Processes	1
<i>Guillaume Perrin, Xavier Descombes, and Josiane Zerubia</i>	
Multiresolution Mesh Reconstruction from Noisy 3D Point Sets	5
<i>Wai-Shun Tong and Chi-Keung Tang</i>	
A Novel Volumetric Shape from Silhouette Algorithm Based on a Centripetal Pentahedron Model	9
<i>Xin Liu, Hongxun Yao, Guilin Yao, and Wen Gao</i>	
3D Reconstruction from Uncalibrated Cameras and Uncalibrated Projectors from Shadows.....	15
<i>Keisuke Nishie and Jun Sato</i>	
Partitioning of 3D Meshes Using Reeb Graphs.....	19
<i>S. Berretti, A. Del Bimbo, and P. Pala</i>	
Cluster Analysis and Priority Sorting in Huge Point Clouds for Building Reconstruction	23
<i>Wolfgang von Hansen, Eckart Michaelsen, and Ulrich Thönnessen</i>	

Mon-P-I-1: 3D and Stereo

Surface Reconstruction from Stereovision Data Using a 3-D MRF of Discrete Object Models	27
<i>Hotaka Takizawa and Shinji Yamamoto</i>	
Noise Variance Adaptive SEA for Motion Estimation: A Two-Stage Schema.....	31
<i>Wei-Gang Chen</i>	
A Three-Frame Approach to Constraint-Consistent Motion Estimation	35
<i>Zhaohui Sun</i>	
Robust Factorisation with Uncertainty Analysis	39
<i>Sami Brandt</i>	

Geodesic Curves for Analysis of Continuous Implicit Shapes	43
<i>Jan Erik Solem</i>	
Symmetric Pixel-Group Based Stereo Matching for Occlusion Handling	47
<i>XiuZhi Zhou and Runsheng Wang</i>	
Automatic Estimation of 3D Transformations Using Skeletons for Object Alignment.....	51
<i>Tao Wang and Anup Basu</i>	
Real-Time Multi-Frame Analysis of Dominant Translation.....	55
<i>Alexander Sibiryakov and Miroslaw Bober</i>	
Combinatorial Surface Integration.....	59
<i>Roberto Fraile and Edwin Hancock</i>	
3D Segmentation by Maximally Stable Volumes (MSVs).....	63
<i>Michael Donoser and Horst Bischof</i>	
Effective and Generic Structure from Motion Using Angular Error	67
<i>Maxime Lhuillier</i>	
3D Object Digitization: Majority Interpolation and Marching Cubes	71
<i>Peer Stelldinger and Longin Jan Latecki</i>	
Detection of 3D-Flow by Characteristic of Convex-concave and Color	75
<i>Kimiya Aoki and Hiroyasu Koshimizu</i>	
Moving Obstacles Extraction with Stereo Global Motion Model	79
<i>Zhencheng Hu, Jia Wang, and Keiichi Uchimura</i>	
A New Structural Constraint and its Application in Wide Baseline Matching.....	84
<i>X. Lu and Roberto Manduchi</i>	
Real-Time 3D Articulated Pose Tracking Using Particle Filters Interacting through Belief Propagation	90
<i>Olivier Bernier</i>	
Spatial and Fourier Error Minimization for Motion Estimation and Segmentation.....	94
<i>Alexia Briassouli and Narendra Ahuja</i>	
Towards Robust Voxel-Coloring: Handling Camera Calibration Errors and Partial Emptiness of Surface Voxels	98
<i>Zeeshan Anwar and Frank Ferrie</i>	
An Information Theoretic Approach for Next Best View Planning in 3-D Reconstruction	103
<i>Stefan Wenhardt, Benjamin Deutsch, and Joachim Denzler</i>	
Exact View-Dependent Visual Hulls.....	107
<i>Gregor Miller and Adrian Hilton</i>	
Concurrent Stereo under Photometric Image Distortions	111
<i>Georgy Gimel'farb, Jiang Liu, John Morris, and Patrice Delmas</i>	
Cross Validation and Segment Support for Stereo Belief Propagation	115
<i>Murray Evans and James Ferryman</i>	

Modeling Spatial Relationships between 3D Objects.....	119
<i>Stefano Berretti and Alberto Del Bimbo</i>	
Stereo Correspondence Using Stripe Adjacency Graph	123
<i>Chang-Chang Wu and Zeng-Fu Wang</i>	
New Efficient Octree Construction from Multiple Object Silhouettes with Construction Quality Control	127
<i>Zen Chen and Hong-Long Chou</i>	
Augmenting Fast Stereo with Silhouette Constraints for Dynamic 3D Capture.....	131
<i>Stefaan De Roeck, Nico Cornelis, and Luc Van Gool</i>	
Depth Recovery from Motion Blurred Images	135
<i>Huei-Yung Lin and Chia-Hong Chang</i>	
Euclidean Reconstruction of Deformable Structure Using a Perspective Camera with Varying Intrinsic Parameters.....	139
<i>Xavier Lladó, Alessio Del Bue, and Lourdes Agapito</i>	
Efficient Monocular 3D Reconstruction from Segments for Visual Navigation in Structured Environments	143
<i>P.E. López-de-Teruel, A. Ruiz, and L. Fernández</i>	
Characteristic Line of Planar Homography Matrix and its Applications in Camera Calibration.....	147
<i>Jianhua Wang and Yuncai Liu</i>	
Reconstruction of Spheres Using Occluding Contours from Stereo Images	151
<i>Sudanthi Wijewickrema, Andrew Papliński, and Charles Esson</i>	
Concurrent Segmentation and Recognition with Shape-Driven Fast Marching Methods	155
<i>Abdulkerim Capar and Muhittin Gokmen</i>	
Differential-Algebraic Multiview Constraints	159
<i>Anders Heyden</i>	
Mon-O-I-2: Image Analysis Applications	
Correlation Based Image Defect Detection	163
<i>Toshiyuki Amano</i>	
Continuous-Discrete Filtering for Cardiac Kinematics Estimation under Spatio-Temporal Biomechanical Constrains	167
<i>Shan Tong, Albert Sinusas, and Pengcheng Shi</i>	
Automatic Segmentation of the Knee Bones Using 3D Active Shape Models.....	171
<i>Jurgen Fripp, Stuart Crozier, Simon Warfield, and Sébastien Ourselin</i>	
Modelling Crowd Scenes for Event Detection	175
<i>Ernesto Andrade, Scott Blunsden, and Robert Fisher</i>	
Probabilistic Image-Based Rendering with Gaussian Mixture Model.....	179
<i>Wenfeng Li and Baoxin Li</i>	

Mon-P-I-2: Face and Human Analysis

Automatic Segmentation of the Papilla in a Fundus Image Based on the C-V Model and a Shape Restraint	183
<i>Yandong Tang, Xiaomao Li, Axel von Freyberg, and Gert Goch</i>	
A Compact Model of Human Postures Extracting Common Motion from Individual Samples.....	187
<i>Rui Ishiyama, Hiroo Ikeda, and Shizuo Sakamoto</i>	
Learning to Imitate Human Movement to Adapt to Environmental Changes	191
<i>Stephan Al-Zubi and Gerald Sommer</i>	
Recognizing Rotated Faces from Two Orthogonal Views in Mugshot Databases	195
<i>Xiaozheng Zhang, Yongsheng Gao, and Bai-ling Zhang</i>	
Real-Time Camera Tracking Using Known 3D Models and a Particle Filter	199
<i>Mark Pupilli and Andrew Calway</i>	
Relighting of Facial Video.....	203
<i>Peter Csakany and Adrian Hilton</i>	
Binocular Hand Tracking and Reconstruction Based on 2D Shape Matching	207
<i>Antonis Argyros and Manolis Lourakis</i>	
Using Evolution to Learn How to Perform Interest Point Detection	211
<i>Leonardo Trujillo and Gustavo Olague</i>	
An Illumination Insensitive Representation for Face Verification in the Frequency Domain.....	215
<i>Eduardo Garea Llano, Josef Kittler, Heydi Mendez Vazquez, and Kieron Messer</i>	
Real Time Tracking for 3D Realistic Lip Animation	219
<i>Brice Beaumesnil and Franck Luthon</i>	
Background Subtraction Based on a Robust Consensus Method	223
<i>Hanzi Wang and David Suter</i>	
A Hybrid Approach to Face Detection under Unconstrained Environments.....	227
<i>Abdenour Hadid and Matti Pietikäinen</i>	
A Simple Coupled Statistical Model for 3D Face Shape Recovery.....	231
<i>Mario Castelán and Edwin Hancock</i>	
A Facial Statistical Model from Complex Numbers.....	235
<i>Mario Castelán and Edwin Hancock</i>	
A Unified System for Segmentation and Tracking of Face and Hands in Sign Language Recognition.....	239
<i>George Awad, Junwei Han, and Alistair Sutherland</i>	
Behavior Modeling and Recognition Based on Space-Time Image Features.....	243
<i>Heping Li, Zhanyi Hu, Yihong Wu, and Fuchao Wu</i>	
Analysis of Overlapping Faces for Constructing Paper-made Objects from Sketches.....	247
<i>Hiroshi Shimanuki, Jien Kato, and Toyohide Watanabe</i>	

Action Recognition in Broadcast Tennis Video	251
<i>Guangyu Zhu, Changsheng Xu, Qingming Huang, and Wen Gao</i>	
Estimating the Location of Illuminants in Realist Master Paintings: Computer Image Analysis Addresses a Debate in Art History of the Baroque	255
<i>David Stork</i>	
Biologically Inspired Hierarchical Model for Feature Extraction and Localization	259
<i>Liang Wu, Predrag Neskovic, and Leon N. Cooper</i>	
HMM-Based Human Action Recognition Using Multiview Image Sequences.....	263
<i>Mohiuddin Ahmad and Seong-Whan Lee</i>	
Variational Multigrid for Fast 3D Interpretation of Image Sequences	267
<i>Jong-Sung Kim and Ki-Sang Hong</i>	
Automatic Segmentation of Lung Fields from Radiographic Images of SARS Patients Using a New Graph Cuts Algorithm	271
<i>Shifeng Chen, Liangliang Cao, Jianzhuang Liu, and Xiaoou Tang</i>	
A Real-Time Facial Expression Recognition Using the STAAM	275
<i>Jaewon Sung, Sangjae Lee, and Daijin Kim</i>	
A Maximum <i>A Posteriori</i> Probability Viterbi Data Association Algorithm for Ball Tracking in Sports Video	279
<i>Fei Yan, William Christmas, and Josef Kittler</i>	
Facial Feature Tracking Using a Multi-State Hierarchical Shape Model under Varying Face Pose and Facial Expression	283
<i>Yan Tong, Yang Wang, Zhiwei Zhu, and Qiang Ji</i>	
Face Recognition from Video Using Active Appearance Model Segmentation.....	287
<i>Nathan Faggian, Andrew Paplinski, and Tat-Jun Chin</i>	
Audio-Visual Speaker Localization Using Graphical Models.....	291
<i>Akash Kushal, Mandar Rahurkar, Li Fei-Fei, Jean Ponce, and Thomas Huang</i>	
Improving Human Activity Detection by Combining Multi-Dimensional Motion Descriptors with Boosting.....	295
<i>Takehito Ogata, William Christmas, Josef Kittler, and Seiji Ishikawa</i>	
A Stereo and Color-Based Method for Face Pose Estimation and Facial Feature Extraction.....	299
<i>Robert Niese, Ayoub Al-Hamadi, and Bernd Michaelis</i>	
Performance Driven Facial Animation Using Illumination Independent Appearance-Based Tracking.....	303
<i>José Buenaposada, Enrique Muñoz, and Luis Baumela</i>	
Multiview Facial Feature Tracking with a Multi-modal Probabilistic Model	307
<i>Yan Tong and Qiang Ji</i>	
Improving Face Recognition by Online Image Alignment.....	311
<i>Peng Wang, Lam Cam Tran, and Qiang Ji</i>	

Robust Recursive Learning for Foreground Region Detection in Videos with Quasi-Stationary Backgrounds	315
<i>Alireza Tavakkoli, Mircea Nicolescu, and George Bebis</i>	
A New Method of Object Segmentation in the Basketball Videos.....	319
<i>Lifang Wu, Xianglong Meng, Xun Liu, and Shiju Chen</i>	
A New Image Segmentation Method for Removing Background of Object Movies by Learning Shape Priors.....	323
<i>Cheng-Hung Ko, Yu-Pao Tsai, Zen-Chung Shih, and Yi-Ping Hung</i>	
Skin Color Detection through Estimation and Conversion of Illuminant Color Using Sclera Region of Eye under Varying Illumination	327
<i>Hyun-Chul Do, Ju-Yeon You, and Sung-Il Chien</i>	
Gesture Segmentation from a Video Sequence Using Greedy Similarity Measure.....	331
<i>Qiulei Dong, Yihong Wu, and Zhanyi Hu</i>	
Human Model for People Detection in Dynamic Scenes	335
<i>Sebastien Harasse, Laurent Bonnaud, and Michel Desvignes</i>	
Dynamic Foveation Model for Video Compression.....	339
<i>Gaetano Somma</i>	
Vessel Segmentation in 2D-Projection Images Using a Supervised Linear Hysteresis Classifier	343
<i>Alexandru Paul Condurache and Til Aach</i>	
Activity Recognition from Silhouettes Using Linear Systems and Model (In)validation Techniques.....	347
<i>Roberto Lubliner, Necmiye Özyay, Dimitrios Zarpalas, and Octavia Camps</i>	
Face Recognition Using Most Discriminative Local and Global Features.....	351
<i>Yong Gao, Yangsheng Wang, Xuetao Feng, and Xiaoxu Zhou</i>	
Segmentation of Human Body Parts Using Deformable Triangulation.....	355
<i>Chih-Chiang Chen, Jun-Wei Hsieh, Yung-Tai Hsu, and Chuan-Yu Huang</i>	
Estimation of Ball Route under Overlapping with Players and Lines in Soccer Video Image Sequence	359
<i>Takumi Shimawaki, Takuro Sakiyama, Jun Miura, and Yoshiaki Shirai</i>	
Adaptive Contour Construction for Face Regions.....	363
<i>Jinfeng Yang and Renbiao Wu</i>	
Image Classification from Generalized Image Distance Features: Application to Detection of Interstitial Disease in Chest Radiographs.....	367
<i>Yulia Arzhaeva, Bram van Ginneken, and David Tax</i>	
Atlas-Based 3D-Shape Reconstruction from X-Ray Images.....	371
<i>Hans Lamecker, Thomas Wenckeback, and Hans-Christian Hege</i>	
Detection of Fence Climbing from Monocular Video	375
<i>Elden Yu and J.K. Aggarwal</i>	

Semantic Understanding of Continued and Recursive Human Activities	379
<i>M.S. Ryoo and J.K. Aggarwal</i>	
Efficient Measurement of Eye Blinking under Various Illumination Conditions for Drowsiness Detection Systems.....	383
<i>Ilkwon Park, Jung-Ho Ahn, and Hyeran Byun</i>	
Finding Highly Frequent Paths in Video Sequences.....	387
<i>Dietmar Bauer, Norbert Brändle, Stefan Seer, and Roman Pflugfelder</i>	
An Illumination Independent Eye Detection Algorithm.....	392
<i>Xingming Zhang and Huangyuan Zhan</i>	
Detection of Spiral Waves in Video	396
<i>Valentina Korzhova, Dmitry Goldgof, and Grigori Sisoiev</i>	
A Machine Learning Approach for Locating Boundaries of Liver Tumors in CT Images	400
<i>Yuanzhong Li, Shoji Hara, and Kazuo Shimura</i>	
Face Verification Using Gabor Wavelets and AdaBoost.....	404
<i>Mian Zhou and Hong Wei</i>	
Face Recognition Using Patch-Based Spin Images	408
<i>Yang Li, William Smith, and Edwin Hancock</i>	
Event Recognition with Fragmented Object Tracks	412
<i>Michael Chan, Anthony Hoogs, Zhaohui Sun, John Schmiederer, Rahul Bhotika, and Gianfranco Doretto</i>	
Active Feature Models.....	417
<i>Georg Langs, Philipp Peloschek, René Donner, Michael Reiter, and Horst Bischof</i>	
Radon Space and Adaboost for Pose Estimation.....	421
<i>Patrick Etyngier, Nikos Paragios, Renaud Keriven, Yakup Genc, and Jean-Yves Audibert</i>	
3D and Infrared Face Reconstruction from RGB Data Using Canonical Correlation Analysis	425
<i>Michael Reiter, René Donner, Georg Langs, and Horst Bischof</i>	
Bilateral Two Dimensional Linear Discriminant Analysis for Stereo Face Recognition	429
<i>Jian-Gang Wang, Hui Kong, and Wei-Yun Yau</i>	
Activity Discovery from Surveillance Videos	433
<i>Prithwjit Guha, Amitabha Mukerjee, K.S. Venkatesh, and Pabitra Mitra</i>	
A Robust and Accurate Method for Pupil Features Extraction.....	437
<i>Zhifei Xu and Pengfei Shi</i>	
Detection-Assisted Initialization, Adaptation and Fusion of Body Region Trackers for Robust Multiperson Tracking	441
<i>Keni Bernardin, Alexander Elbs, and Rainer Stiefelhagen</i>	

Facial Components Detection with Boosting and Geometric Constraints.....	446
<i>Tiesheng Wang and Pengfei Shi</i>	
Part Based Human Tracking in a Multiple Cues Fusion Framework	450
<i>Qi Zhao, Jinman Kang, Hai Tao, and Wei Hua</i>	
A Verification Method for Viewpoint Invariant Sign Language Recognition.....	456
<i>Qi Wang, Xilin Chen, Chunli Wang, and Wen Gao</i>	
Hidden Markov Models for Optical Flow Analysis in Crowds	460
<i>Ernesto Andrade, Scott Blunsden, and Robert Fisher</i>	
Data Fusion for 3D Gestures Tracking Using a Camera Mounted on a Robot.....	464
<i>Paulo Menezes, Frédéric Lerasle, and Jorge Dias</i>	
Coupled Shape Model Segmentation of Pig Carcasses	468
<i>Mads Fogtmann Hansen, Rasmus Larsen, Bjarne Ersbøll, and Lars Bager Christensen</i>	
Action Spaces for Efficient Bayesian Tracking of Human Motion	472
<i>Ignasi Rius, Javier Varona, Jordi González, and Juan Villanueva</i>	
Vertebra Edge Detection Using Polar Signature	476
<i>M. Benjelloun, H. Téllez, and S. Mahmoudi</i>	
Robust Model Driven Matching Method for Face Analysis with Multi Image Photogrammetry	480
<i>Gerhard Schrotter and Li Zhang</i>	
Supervised Learning for Guiding Hierarchy Construction: Application to Osteo-Articular Medical Images Database	484
<i>Karim Yousfi, Christophe Ambroise, Jean Pierre Cocquerez, and Jonathan Chevelu</i>	
A Hybrid Resampling Framework for Facial Shape Alignment.....	488
<i>William Ivaldi, Maurice Milgram, and Stéphane Gencic</i>	
Video Foreground Segmentation Based on Sequential Feature Clustering	492
<i>Mei Han, Wei Xu, and Yihong Gong</i>	
Mon-O-I-3: Face Recognition	
Nonlinear Shape and Appearance Models for Facial Expression Analysis and Synthesis	497
<i>Chan-Su Lee and Ahmed Elgammal</i>	
Face Representation by Using Non-tensor Product Wavelets	503
<i>Xinge You, Dan Zhang, Qiuhui Chen, Patrick Wang, and Yuan Yan Tang</i>	
Fast, Illumination Insensitive Face Detection Based on Multilinear Techniques and Curvature Features.....	507
<i>Christian Bauckhage and Thomas Käster</i>	
Face Set Classification Using Maximally Probable Mutual Modes	511
<i>Ognjen Arandjelović and Roberto Cipolla</i>	
Face Recognition Robust to Head Pose from One Sample Image.....	515
<i>Ting Shan, Brian Lovell, and Shaokang Chen</i>	

Boosting in Random Subspaces for Face Recognition	519
<i>Yong Gao and Yangsheng Wang</i>	
Mon-P-I-3: Computer Vision	
Weighted Bayesian Networks for Visual Tracking	523
<i>Yue Zhou and Thomas Huang</i>	
Fundamental Matrix and Slightly Overlapping Views	527
<i>Roman Pflugfelder and Horst Bischof</i>	
Identification of Degraded Traffic Sign Symbols by a Generative Learning Method	531
<i>Hiroyuki Ishida, Tomokazu Takahashi, Ichiro Ide, Yoshito Mekada, and Hiroshi Murase</i>	
A Novel Linear Approach to Camera Calibration from Sphere Images	535
<i>Xianghua Ying and Hongbin Zha</i>	
Using Sphere Images for Calibrating Fisheye Cameras under the Unified Imaging Model of the Central Catadioptric and Fisheye Cameras	539
<i>Xianghua Ying and Hongbin Zha</i>	
Reflectance from Surfaces with Layers of Variable Roughness.....	543
<i>Hossein Ragheb and Edwin Hancock</i>	
Robust Projective Reconstruction with Missing Information.....	547
<i>Mingxing Hu, Karen McMenemy, Stuart Ferguson, Gordon Dodds, and Baozong Yuan</i>	
Real-time Camera Pose and Focal Length Estimation.....	551
<i>Sumit Jain and Ulrich Neumann</i>	
Object Tracking with Dynamic Template Update and Occlusion Detection.....	556
<i>Longin Jan Latecki and Roland Mieziako</i>	
Automatic Pose Recovery for High-Quality Textures Generation	561
<i>Jinhui Hu, Suya You, and Ulrich Neumann</i>	
DTM Generation from LIDAR Data Using <i>Skewness Balancing</i>	566
<i>Marc Bartels, Hong Wei, and David Mason</i>	
Omnidirectional Vision and Invariant Theory for Robot Navigation Using Conformal Geometric Algebra	570
<i>Carlos López-Franco and Eduardo Bayro-Corrochano</i>	
An Oriented-Contour Point Based Voting Algorithm for Vehicle Type Classification	574
<i>Pablo Negri, Xavier Clady, Maurice Milgram, and Raphael Poulenard</i>	
Empirical Study of Multi-scale Filter Banks for Object Categorization.....	578
<i>Manuel J. Marin Jimenez and Nicolas Perez de la Blanca</i>	
Chaining Planar Homographies for Fast and Reliable 3D Plane Tracking.....	582
<i>Manolis Lourakis and Antonis Argyros</i>	
Using Specularities to Recover Multiple Light Sources in the Presence of Texture	587
<i>Pascal Lagger and Pascal Fua</i>	

A Coarse-to-Fine Strategy for Vehicle Motion Trajectory Clustering	591
<i>Xi Li, Weiming Hu, and Wei Hu</i>	
Self-Calibration Using Constant Camera Motion.....	595
<i>Xiaochun Cao, Jiangjian Xiao, and Hassan Foroosh</i>	
Motion Segmentation by Multibody Trifocal Tensor Using Line Correspondence	599
<i>Jing Zhang, Fanhuai Shi, and Yuncai Liu</i>	
Planning of Multiple Camera Arrangement for Object Recognition in Parametric Eigenspace.....	603
<i>Tomokazu Takahashi, Osanori Matsugano, Ichro Ide, Yoshito Mekada, and Hiroshi Murase</i>	
Camera Calibration with a Transparent Calibration Tool Using Color Filters: Application to Stereo Camera Calibration for a Distant Object	607
<i>Yasuhiro Katayama</i>	
Object Contour Detection Using Spatio-temporal Self-similarity	613
<i>Hidenori Takeshima, Takashi Ida, and Toshimitsu Kaneko</i>	
Recognizing Interaction Activities Using Dynamic Bayesian Network.....	618
<i>Youtian Du, Feng Chen, Wenli Xu, and Yongbin Li</i>	
New RHT-Based Ellipsoid Recovery Method.....	622
<i>Chunguang Cao and Timothy Newman</i>	
Detection of Moving Cast Shadows Using Image Orthogonal Transform	626
<i>Wei Zhang, Xiang Zhong Fang, and Yi Xu</i>	
Five-Point Motion Estimation Made Easy.....	630
<i>Hongdong Li and Richard Hartley</i>	
Augmented Lagrangian Approach for Projective Reconstruction from Multiple Views.....	634
<i>F. Mai and Y.S. Hung</i>	
Multiple Objects Tracking with Multiple Hypotheses Graph Representation.....	638
<i>Alex Yong Sang Chia, Weimin Huang, and Liyuan Li</i>	
Restoring Warped Document Images Using Shape-from-Shading and Surface Interpolation	642
<i>Li Zhang and Chew Lim Tan</i>	
Camera Calibration Using Circle and Right Angles.....	646
<i>H. Zhong, F. Mai, and Y.S. Hung</i>	
Simultaneous Classification and Visual Word Selection Using Entropy-Based Minimum Description Length	650
<i>SungHo Kim and In So Kweon</i>	
Defect Detection in Low-Contrast Glass Substrates Using Anisotropic Diffusion	654
<i>Shin-Min Chao, Du-Ming Tsai, Yan-Hsin Tseng, and Yuan-Ruei Jhang</i>	
Integrating Differential Evolution and Condensation Algorithms for License Plate Tracking.....	658
<i>İlhan Kubilay Yalçın and Muhittin Gökmen</i>	

Boosted Gabor Features Applied to Vehicle Detection	662
<i>Hong Cheng, Nanning Zheng, Chong Sun, Huub van de Wetering</i>	
Unsupervised Segmentation Using Gabor Wavelets and Statistical Features in LIDAR Data Analysis	667
<i>Hong Wei and Marc Bartels</i>	
A Clustering Based Color Model and Fast Algorithm for Object Tracking	671
<i>Peihua Li</i>	
Radial Distortion Refinement by Inverse Mapping-Based Extrapolation	675
<i>Ho Gi Jung, Yun Hee Lee, Pal Joo Yoon, and Jaihie Kim</i>	
Estimation of the Fundamental Matrix Based on EV Model.....	679
<i>Tingbo Hou, Feng Zhu, and Zelin Shi</i>	
Detection and Recognition of Moving Objects by Using Motion Invariants	683
<i>Satoshi Ito and Nobuyuki Otsu</i>	
Nighttime Vehicle Detection for Driver Assistance and Autonomous Vehicles	687
<i>Yen-Lin Chen, Yuan-Hsin Chen, Chao-Jung Chen, and Bing-Fei Wu</i>	
Microfossils Shape Classification Using a Set of Width Values	691
<i>Roberto Marmo and Sabrina Amodio</i>	
Robot Navigation by Panoramic Vision and Attention Guided Features	695
<i>Alexandre Bur, Adriana Tapus, Nabil Ouerhani, Roland Siegart, and Heinz Hügli</i>	
Reliability Index of Optical Flow that Considers Error Margin of Matches and Stabilizes Camera Movement Estimation.....	699
<i>Eisuke Adachi, Takio Kurita, and Nobuyuki Otsu</i>	
An Integrated Monte Carlo Data Association Framework for Multi-Object Tracking.....	703
<i>Jianru Xue, Nanning Zheng, and Xiaopin Zhong</i>	
Estimating Intrinsic Parameters of Cameras Using Two Arbitrary Rectangles.....	707
<i>Jun-Sik Kim and In So Kweon</i>	
Generic Real-Time Tracking Method on Semi-Dynamic Scenes.....	711
<i>François Cayouette and Jeremy R. Cooperstock</i>	
Reconstruction from Plane Mirror Reflection	715
<i>H. Zhong, W.F. Sze, and Y.S. Hung</i>	
Box-like Superquadric Recovery in Range Images by FUsing Region and Boundary Information	719
<i>Dimitrios Kosmopoulos and Dimitrios Kosmopoulos</i>	
On-Line Machine Vision System for Detect Split Defects in Sheet-Metal Forming Processes.....	723
<i>Fernando Gayubo, José L. González, Eusebio de la Fuente, Félix Miguel, and José R. Perán</i>	
Cast Shadow Removal with GMM for Surface Reflectance Component.....	727
<i>Zhou Liu, Kaiqi Huang, Tieniu Tan, and Liangsheng Wang</i>	

Improving Shape from Focus Using Defocus Information.....	731
<i>K.S. Pradeep and A.N. Rajagopalan</i>	
Browsing Graphics without Prior Knowledge.....	735
<i>Daniel Zuwala and Jan Rendek</i>	
A Pixel-wise Object Tracking Algorithm with Target and Background Sample.....	739
<i>Chunsheng Hua, Haiyuan Wu, Qian Chen, and Toshikazu Wada</i>	
Shadow Detection by Integrating Multiple Features	743
<i>Kuo-Hua Lo and Mau-Tsuen Yang</i>	
Real-Time Object Tracking without Feature Extraction.....	747
<i>Takayuki Moritani, Shinsaku Hiura, and Kosuke Sato</i>	
Local Representation of 3D Free-Form Contours for Pose Estimation	751
<i>Marco Chavarría and Gerald Sommer</i>	
Recognition and Segmentation of Scene Content Using Region-Based Classification.....	755
<i>John Kaufhold, Roderic Collins, Anthony Hoogs, and Pascale Rondot</i>	
A Combined Bayesian Markovian Approach for Behavioural Recognition.....	761
<i>Nicholas Carter, David Young, and James Ferryman</i>	
Detection over Viewpoint via the Object Class Invariant.....	765
<i>Matthew Toews and Tal Arbel</i>	
Identifying Centers of Circulating and Spiraling Flow Patterns.....	769
<i>Chi Lap Yip and Ka Yan Wong</i>	
Object and Scene Classification: What does a Supervised Approach Provide Us?.....	773
<i>Anna Bosch, Xavier Muñoz, Arnau Oliver, and Robert Martí</i>	
A Hierarchical Object Recognition System Based on Multi-scale Principal Curvature Regions	778
<i>Wei Zhang, Hongli Deng, Thomas G. Dietterich, and Eric N. Mortensen</i>	
Hierarchical, Generic to Specific Multi-class Object Recognition	783
<i>Arnab Dhua and Florin Cutzu</i>	
Measurement Function Design for Visual Tracking Applications	789
<i>Andrew Smith and Brian Lovell</i>	
Perspective Pose Estimation from Uncertain Omnidirectional Image Data	793
<i>Christian Gebken, Antti Tolvanen, Christian Perwass, and Gerald Sommer</i>	
Efficient, Simultaneous Detection of Multiple Object Classes.....	797
<i>Philipp Zehnder, Esther Koller-Meier, and Luc Van Gool</i>	
Adaptive, Region-Based, Layered Background Model for Target Tracking.....	803
<i>Meng Wan and Jean-Yves Hervé</i>	
Optimal Cascade Construction for Detection Using 3D Models	808
<i>Hon-Keat Pong and Tat-Jen Cham</i>	

Specular Free Spectral Imaging Using Orthogonal Subspace Projection.....	812
<i>Zhouyu Fu, Robby Tan, and Terry Caelli</i>	
A Unified Camera Calibration Using Geometry and Blur of Feature Points.....	816
<i>Masashi Baba, Masayuki Mukunoki, and Naoki Asada</i>	
Object Detection in Video via Particle Filters	820
<i>Jacek Czyz</i>	
License Plate Extraction in Low Resolution Video	824
<i>Hsien-Huang Wu, Hung-Hsiang Chen, Ruei-Jan Wu, and Day-Fann Shen</i>	
A Real-Time Multiple-Vehicle Detection and Tracking System with Prior Occlusion Detection and Resolution, and Prior Queue Detection and Resolution	828
<i>Shin-Ping Lin, Yuan-Hsin Chen, and Bing-Fei Wu</i>	
Simple Shadow Removal.....	832
<i>Clement Fredembach and Graham Finlayson</i>	
FocUsing on Target’s Features while Tracking.....	836
<i>Christian Micheloni and Gian Luca Foresti</i>	
Generic Detection of Multi-Part Objects	840
<i>Jean-François Bernier and Robert Bergevin</i>	
Object Tracking Using Globally Coordinated Nonlinear Manifolds.....	844
<i>Che-Bin Liu, Ruei-Sung Lin, Ming-Hsuan Yang, Narendra Ahuja, and Stephen Levinson</i>	
Adaptative Markov Random Fields for Omnidirectional Vision.....	848
<i>Cédric Demonceaux and Pascal Vasseur</i>	
Geodesic Curves for Analysis of Continuous Implicit Shapes	852
<i>Jan Erik Solem</i>	

Track II: Pattern Recognition and Basic Technologies

Invited Paper

Some Pattern Recognition Challenges in Data-Intensive Astronomy	856
<i>S. Djorgovski, C. Donalek, A. Mahabal, R. Williams, A.J. Drake, M.J. Graham, and E. Glikman</i>	

Mon-O-II-1: Character Recognition and Document Analysis

Low Resolution Character Recognition by Image Quality Evaluation.....	864
<i>Chunmei Liu, Chunheng Wang, and Ruwei Dai</i>	
Stroke Segmentation of Chinese Characters Using Markov Random Fields.....	868
<i>Jia Zeng and Zhi-Qiang Liu</i>	
Pixel-Accurate Representation and Evaluation of Page Segmentation in Document Images	872
<i>Faisal Shafait, Daniel Keysers, and Thomas Breuel</i>	
Logical Entity Recognition in Multi-style Document Page Images	876
<i>Song Mao, Zheng Xu, Tardi Tjahjadi, and George R. Thoma</i>	

Improve Handwritten Character Recognition Performance by Heteroscedastic Linear Discriminant Analysis	880
<i>Hailong Liu and Xiaoqing Ding</i>	
Brush Writing Style Classification from Individual Chinese Characters	884
<i>Sam Wong, Howard Leung, and Horace Ip</i>	
Mon-O-II-2: Clustering Algorithms I	
A K-means-Based Algorithm for Projective Clustering	888
<i>Mohamed Bouguessa, Shengrui Wang, and Qingshan Jiang</i>	
A Cluster Validity Approach Based on Nearest-Neighbor Resampling	892
<i>Ulrich Möller and Dörte Radke</i>	
An Adaptive Classification Algorithm Using Robust Incremental Clustering	896
<i>Herward Prehn and Gerald Sommer</i>	
Improved Clustering Algorithm Based on Calculus of Variation.....	900
<i>Benson Lam and Hong Yan</i>	
Mon-O-II-3: Clustering Algorithms II	
Unsupervised Discriminant Projection Analysis for Feature Extraction	904
<i>Jian Yang, David Zhang, Zhong Jin, and Jing-yu Yang</i>	
Scalable non-linear Support Vector Machine Using hierarchical clustering	908
<i>Asharaf S., S.K. Shevade, and M. Murty</i>	
<i>l</i> -DBSCAN: A Fast Hybrid Density Based Clustering Method.....	912
<i>P. Viswanath and Rajwala Pinkesh</i>	
Learning Wormholes for Sparsely Labelled Clustering	916
<i>Eng-Jon Ong and Richard Bowden</i>	
Nonlinear Manifold Clustering by Dimensionality	920
<i>Wenbo Cao and Robert Haralick</i>	
Learning Pairwise Similarity for Data Clustering	925
<i>Ana Fred and Anil Jain</i>	

Track III: Signal, Speech and Image Processing

Invited Paper

Image Representation and Retrieval Using Support Vector Machine and Fuzzy C-Means Clustering Based Semantical Spaces.....	929
<i>Prabir Bhattacharya, Md. Mahmudur Rahman, and Bipin Desai</i>	

Mon-O-III-1: Signal Coding and Compression

Machine Learning for Video Compression: Macroblock Mode Decision.....	936
<i>Christoph Lampert</i>	
LBT Based Low Complexity Image Compression Method.....	941
<i>Bo Chen, Lizhi Cheng, and Hongxia Wang</i>	
Onset Detection through Maximal Redundancy Detection	945
<i>Gert Van Dijck and Marc Van Hulle</i>	

ICA-Based Clustering for Resolving Permutation Ambiguity in Frequency-Domain Convolutional Source Separation	950
<i>Minje Kim and Seungjin Choi</i>	

Mon-O-III-2: Document Image Enhancement

Document Image Binarization Based on Stroke Enhancement	955
<i>Yuanping Zhu, Chunheng Wang, and Ruwei Dai</i>	

Shape Alignment by Learning a Landmark-PDM Coupled Model	959
<i>Yifeng Jiang, Jun Xie, and Hung Tat Tsui</i>	

Seeing Around Occluding Objects	963
<i>Scott McCloskey, Michael Langer, and Kaleem Siddiqi</i>	

Non-linear Wiener filter in Reproducing Kernel Hilbert Space	967
<i>Yoshikazu Washizawa and Yukihiko Yamashita</i>	

Document Flattening through Grid Modeling and Regularization	971
<i>Shijian Lu and Chew Lim Tan</i>	

Mon-O-III-3: Visualization and Restoration

Space-time Analysis of Spherical Projection Image.....	975
<i>Shintaro Ono, Takeshi Mikami, Hiroshi Kawasaki, and Katsushi Ikeuchi</i>	

Context Enhancement of Nighttime Surveillance by Image Fusion.....	980
<i>Yinghao Cai, Kaiqi Huang, Tieniu Tan, and Yunhong Wang</i>	

View Dependent Enhancement of Dynamic Range of Video.....	984
<i>Matti Niskanen</i>	

Scene Recovery from Many Randomly Distributed Single Pixel Cameras	988
<i>R. Fisher</i>	

Multi-layer Mosaics in the Presence of Motion and Depth Effects	992
<i>Changki Min, Qian Yu, and Gérard Medioni</i>	

Tone Mapping for HDR Image Using Optimization — A New Closed Form Solution.....	996
<i>Guoping Qiu, Jian Guan, Jian Duan, and Min Chen</i>	

Track IV: Systems, Robotics and Applications with Associated Theme: Biometrics

Invited Paper

Challenges for Data Mining in Distributed Sensor Networks	1000
<i>Virginio Cantoni, Luca Lombardi, and Paolo Lombardi</i>	

Mon-O-IV-1: Biomedical Imaging I

A Computational Framework for Automatic Determination of Morphological Parameters of Proximal Femur from Intraoperative Fluoroscopic Images	1008
<i>Xiao Dong and Guoyan Zheng</i>	

Interacting Active Rectangles for Estimation of Intervertebral Disk Orientation.....	1013
<i>Amer Abufadel, Greg Slabaugh, Gozde Unal, Li Zhang, and Benjamin Odry</i>	
A Note on Feature Selection for Polyp Detection in CT Colonography.....	1017
<i>Tarik Chowdhury, Ovidiu Ghita, Paul Whelan, and Abhilash Miranda</i>	
Automatic Surveying of Cutaneous Hemangiomas.....	1022
<i>Sebastian Zambanini, Georg Langs, Robert Sablatnig, Peter Donath, and Harald Maier</i>	
Transforming Static CT in Gated 3D PET/CT Studies to Multiple Respiratory Phases.....	1026
<i>M. Dawood, F. Büther, N. Lang, X. Jiang, and K.P. Schäfers</i>	
Markov Chain Monte Carlo Data Association for Merge and Split Detection in Tracking Protein Clusters	1030
<i>Quan Wen, Jean Gao, and Kate Luby-Phelps</i>	
Mon-O-IV-2: Fingerprints	
An Efficient Algorithm for Fingerprint Matching.....	1034
<i>Chengfeng Wang, Marina Gavrilova, Yuan Luo, and Jon Rokne</i>	
Fingerprint Indexing Based on Symmetrical Measurement	1038
<i>Jun Li, Wei-Yun Yau, and Han Wang</i>	
Fingerprint Retrieval by Complex Filter Responses.....	1042
<i>Manhua Liu, Xudong Jiang, and Alex Kot</i>	
Fingerprint Matching Using Minutia Polygons	1046
<i>Xuefeng Liang and Tetsuo Asano</i>	
Fingerprint Reference Point Detection Based on Local Axial Symmetry	1050
<i>Tong Liu, Chao Zhang, and Pengwei Hao</i>	
Mon-O-IV-3: Range Imaging and Remote Sensing Applications	
Use of Viewpoint Information for Example Selection in CBIR.....	1054
<i>Kanji Tanaka, Mitsuru Hirayama, Nobuhiro Okada, and Eiji Kondo</i>	
Boosted Band Ratio Feature Selection for Hyperspectral Image Classification.....	1059
<i>Zhouyu Fu, Terry Caelli, Nianjun Liu, and Antonio Robles-Kelly</i>	
Robust 3D Head Tracking Using Camera Pose Estimation.....	1063
<i>Shay Ohayon and Ehud Rivlin</i>	
Unsupervised Decomposition of Mixed Pixels Using the Maximum Entropy Principle.....	1067
<i>Lidan Miao, Hairong Qi, and Harold Szu</i>	
3D Acquisition System Using Uncalibrated Line-Laser Projector	1071
<i>Hiroshi Kawasaki, Ryo Furukawa, and Yasuaki Nakamura</i>	
An Efficient Implementation Technique of Bidirectional Matching for Real-Time Trinocular Stereo Vision.....	1076
<i>Toshio Ueshiba</i>	

Track V: Cognitive Approaches & Soft Computing

Invited Paper

- A Computational Model of Social Signaling..... 1080
Alex Pentland

Mon-O-V-1: Gesture and Emotion Recognition

- Continuous Gesture Recognition Using a Sparse Bayesian Classifier 1084
Shu-Fai Wong and Roberto Cipolla

- Fuzzy Point of View Combination for Contextual Shape Recognition:
Application to On-line Graphic Gesture Recognition..... 1088
François Bouteruche and Éric Anquetil

- Robust Pose Invariant Facial Feature Detection and Tracking in Real-Time 1092
Zhiwei Zhu and Qiang Ji

- Mandarin Emotional Speech Recognition Based on SVM and NN 1096
Tsang-Long Pao, Yu-Te Chen, Jun-Heng Yeh, and Pei-Jia Li

- Visual Recognition of Similar Gestures 1100
Héctor Avilés-Arriaga, Enrique Sucar, and Carlos Mendoza

Mon-P-V-1: Cognitive Approaches and Soft Computing

- A Novel Vision Based Finger-writing Character Recognition System 1104
Lianwen Jin, Duanduan Yang, Li-Xin Zhen, and Jian-Cheng Huang

- Hybrid Kernel Machine Ensemble for Imbalanced Data Sets 1108
Peng Li, Kap Luk Chan, and Wen Fang

- Detecting Virulent Cells of *Cryptococcus Neoformans* Yeast:
Clustering Experiments 1112
*Jinshuo Liu, Peter van der Putten, Ferry Hagen, Xinmeng Chen,
Teun Boekhout, and Fons Verbeek*

- Honeybees as an Intelligent Based Approach for 3D Reconstruction 1116
Gustavo Olague and Cesar Puente

- Object Manipulation Using Fuzzy Logic and Geometric Algebra 1120
Eduardo Bayro Corrochano and Ruben Machucho-Cadena

- An Interactive Trajectory Synthesizer to Study Outlier Patterns in
Handwriting Recognition and Signature Verification 1124
Moussa Djioua, Christian O'Reilly, and Réjean Plamondon

- Speech Animation Using Coupled Hidden Markov Models 1128
Lei Xie and Zhi-Qiang Liu

- Nonlinear Eye Gaze Mapping Function Estimation via Support Vector Regression 1132
Zhiwei Zhu, Qiang Ji, and Kristin Bennett

- Emotion Recognition Based on Joint Visual and Audio Cues..... 1136
Nicu Sebe, Ira Cohen, Theo Gevers, and Thomas Huang

An Intelligent Bulletin Board System with Real-Time Vision-Based Interaction Using Head Pose Estimation	1140
<i>Cheng-Yu Chang, Pau-Choo Chung, Yu-Sheng Yeh, and Jar-Ferr Yang</i>	
An Efficient SVM Classifier for Lopsided Corpora	1144
<i>Xian Fei Zhang, Bi Cheng Li, Wang Shi, and Luo Cheng</i>	
A Bimodal Face and Body Gesture Database for Automatic Analysis of Human Nonverbal Affective Behavior.....	1148
<i>Hatice Gunes and Massimo Piccardi</i>	
An MOE Framework for Biclustering of Microarray Data	1154
<i>Sushmita Mitra, Haider Banka, and Sankar K. Pal</i>	
A Kernel-Based Signal Localization Method for NIRS Brain-Computer Interfaces.....	1158
<i>Haihong Zhang and Guan Cuntai</i>	
Type-2 Fuzzy Markov Random Fields to Handwritten Character Recognition	1162
<i>Jia Zeng and Zhi-Qiang Liu</i>	
The Role of Featural and Configural Information in Face Classification: A Simulation of the Expertise Hypothesis.....	1166
<i>Yafei Sun, Nicu Sebe, Theo Gevers, and Michel Mercera</i>	
GMM-Based Classification Method for Continuous Prediction in Brain-Computer Interface	1171
<i>Xiaoyuan Zhu, Jiankang Wu, Yimin Cheng, and Yixiao Wang</i>	
Automatic Acquisition of Context Models and its Application to Video Surveillance	1175
<i>Oliver Brdiczka, Pong C. Yuen, Sofia Zaidenberg, Patrick Reignier, and James Crowley</i>	
A Captcha Mechanism by Exchanging Image Blocks.....	1179
<i>Wen-Hung Liao</i>	
Adaptive Processing of Face Emotion Tree Structures	1184
<i>Jia-Jun Wong and Siu-Yeung Cho</i>	
Classification of Team Behaviors in Sports Video Games.....	1188
<i>Christian Thureau, Thomas Hettenhausen, and Christian Bauckhage</i>	
Continuous Optimization Based-on Boosting Gaussian Mixture Model.....	1192
<i>Bin Li, Xian-ji Wang, Run-tian Zhong, and Zhen-quan Zhuang</i>	
Finding Rule Groups to Classify High Dimensional Gene Expression Datasets.....	1196
<i>Jiyuan An and Yi-Ping Phoebe Chen</i>	
Multi-Objective Evolutionary Clustering Using Variable-Length Real Jumping Genes Genetic Algorithm	1200
<i>Kazi Shah Nawaz Ripon, Chi-Ho Tsang, Sam Kwong, and Man-Ki Ip</i>	
Toward a Speaker-Independent Real-Time Affect Detection System	1204
<i>Rongqing Huang and Changxue Ma</i>	
Tree Based Behavior Monitoring for Adaptive Fraud Detection.....	1208
<i>Jianyun Xu, Andrew Sung, and Qingzhong Liu</i>	

Mining for Implications in Medial Data.....	1212
<i>Cindy Bethel, Lawrence Hall, and Dmitry Goldgof</i>	
Association of Sound to Motion in Video Using Perceptual Organization	1216
<i>Sunil Ravulapalli and Sudeep Sarkar</i>	
Recognizing Expressions in a New Database Containing Played and Natural Expressions.....	1220
<i>James Skelley, Robert Fischer, Arup Sarma, and Bernd Heisele</i>	
Three Dimensional Short-Term Memory Image	1226
<i>Satoru Morita</i>	
Simultaneous Gesture Segmentation and Recognition Based on Forward Spotting Accumulative HMMs	1231
<i>Jinyoung Song and Daijin Kim</i>	
A Multi-Agent Based Interactive System towards Child’s Emotion Performances Quantified through Affective Body Gestures	1236
<i>P. Ravindra De Silva, Ajith P. Madurapperuma, Ashu Marasinghe, and Minetada Osano</i>	
Mon-O-V-2: Human Computer Interaction	
An Improved Semi-Supervised Support Vector Machine Based Translation Algorithm for BCI Systems.....	1240
<i>Jianzhao Qin and Yuanqing Li</i>	
Bayesian Imitation of Human Behavior in Interactive Computer Games	1244
<i>Bernard Gorman, Christian Thureau, Christian Bauckhage, and Mark Humphrys</i>	
Analyzing Facial Expressions Using Intensity-Variant 3D Data for Human Computer Interaction.....	1248
<i>Lijun Yin, Xiaozhou Wei, Peter Longo, and Abhinesh Bhuvanesh</i>	
Mon-O-V-3: Semantic Analysis for Content Retrieval	
Word Completion with Latent Semantic Analysis	1252
<i>Tristan Miller and Elisabeth Wolf</i>	
Lexicon Based Browsers for Searching in News Video Archives.....	1256
<i>M. Worrying, C.G.M. Snoek, D.C. Koelma, G.P. Nguyen, and O. de Rooij</i>	
Semantic Analysis on Medical Images: A Case Study	1260
<i>Da Qi, Erika Denton, and Reyer Zwiggelaar</i>	

Author Index