Advanced Concepts for Intelligent Vision Systems

8th International Conference, ACIVS 2006
Antwerp, Belgium, September 18-21, 2006
Proceedings
# Table of Contents

## Noise Reduction and Restoration

Directional Filtering for Upsampling According to Direction Information of the Base Layer in the JVT/SVC Codec .......................... 1  
   Chul Keun Kim, Doug Young Suh, Gwang Hoon Park

A New Fuzzy-Based Wavelet Shrinkage Image Denoising Technique ...... 12  
   Stefan Schulte, Bruno Huysmans, Aleksandra Pižurica,  
   Etienne E. Kerre, Wilfried Philips

Mathematical Models for Restoration of Baroque Paintings ............... 24  
   Pantaleón D. Romero, Vicente F. Candela

Motion Blur Concealment of Digital Video Using Invariant Features ...... 35  
   Ville Ojansivu, Janne Heikkilä

Hybrid Sigma Filter for Processing Images Corrupted by Multiplicative Noise ................................................................. 46  
   Nikolay Ponomarenko, Vladimir Lukin, Karen Egiazarian,  
   Jaakko Astola, Benoit Vozel, Kacem Chehdi

Automatic Restoration of Old Motion Picture Films Using  
Spatiotemporal Exemplar-Based Inpainting ............................... 55  
   Ali Gangal, Bekir Dizdaroglu

Dedicated Hardware for Real-Time Computation of Second-Order  
Statistical Features for High Resolution Images .......................... 67  
   Dimitris Bariamis, Dimitris K. Iakovidis, Dimitris Maroulis

Greyscale Image Interpolation Using Mathematical Morphology .......... 78  
   Alessandro Ledda, Hiêp Q. Luong, Wilfried Philips,  
   Valérie De Witte, Etienne E. Kerre

Dilation Matrices for Nonseparable Bidimensional Wavelets .......... 91  
   Ana Ruedin

Evolutionary Tree-Structured Filter for Impulse Noise Removal .......... 103  
   Nemanja I. Petrović, Vladimir S. Crnojević
XVI Table of Contents

Perceived Image Quality Measurement of State-of-the-Art Noise Reduction Schemes .......................................................... 114  
  Ewout Vansteenkiste, Dietrich Van der Weken, Wilfried Philips, Etienne Kerre

Multiway Filtering Applied on Hyperspectral Images ................. 127  
  Nadine Renard, Salah Bourennane, Jacques Blanc-Talon

Segmentation

A Linear-Time Approach for Image Segmentation Using Graph-Cut Measures .......................................................... 138  
  Alexandre X. Falcão, Paulo A.V. Miranda, Anderson Rocha

The RIM Framework for Image Processing ................................. 150  
  Øyvind Ryan

A Proposal Method for Corner Detection with an Orthogonal Three-Direction Chain Code ........................................... 161  
  Hermilo Sánchez-Cruz

A Charged Active Contour Based on Electrostatics ....................... 173  
  Ronghua Yang, Majid Mirmehdi, Xianghua Xie

Comparison of Statistical and Shape-Based Approaches for Non-rigid Motion Tracking with Missing Data Using a Particle Filter .................................................. 185  
  Abir El Abed, Séverine Dubuisson, Dominique Béréziat

An Active Contour Model Guided by LBP Distributions .................. 197  
  Michalis A. Savelonas, Dimitris K. Iakovidis, Dimitris E. Maroulis, Stavros A. Karkanis

Characterizing the Lacunarity of Objects and Image Sets and Its Use as a Technique for the Analysis of Textural Patterns ................... 208  
  Rafael H.C. de Melo, Evelyn de A. Vieira, Aura Conci

Adaptive Vision Leveraging Digital Retinas: Extracting Meaningful Segments .......................................................... 220  
  Nicolas Burrus, Thierry M. Bernard

A Fast Dynamic Border Linking Algorithm for Region Merging .......... 232  
  Johan De Bock, Rui Pires, Patrick De Smet, Wilfried Philips
# Motion Estimation and Tracking

- **Fast Sub-pixel Motion Estimation for H.264**
  
  Hong Yin Lim, Ashraf A. Kassim
  
  Page 242

- **Temporal Error Concealment Based on Optical Flow in the H.264/AVC Standard**
  
  Donghyung Kim, Jongho Kim, Jechang Jeong
  
  Page 253

- **Foreground-to-Ghost Discrimination in Single-Difference Pre-processing**
  
  Francesco Archetti, Cristina E. Manfredotti, Vincenzina Messina, Domenico Giorgio Sorrenti
  
  Page 263

- **Moving Object Removal Based on Global Feature Registration**
  
  Soon-Yong Park, Jaekyoung Moon, Chang-Joon Park, Inho Lee
  
  Page 275

- **Object Tracking Using Discriminative Feature Selection**
  
  Bogdan Kwolek
  
  Page 287

- **Color-Based Multiple Agent Tracking for Wireless Image Sensor Networks**
  
  Emre Oto, Frances Lau, Hamid Aghajan
  
  Page 299

- **A Fast Motion Vector Search Algorithm for Variable Blocks**
  
  Yung-Lyul Lee, Yung-Ki Lee, Hyun Wook Park
  
  Page 311

---

# Video Processing and Coding

- **Constrained Region-Growing and Edge Enhancement Towards Automated Semantic Video Object Segmentation**
  
  Li Gao, Jianmin Jiang, Shuyuan Y. Yang
  
  Page 323

- **Spatio-temporal Composite-Features for Motion Analysis and Segmentation**
  
  Raquel Dosil, Xosé Manuel Pardo, Xosé Ramón Pdez-Vidal, Antón García
  
  Page 332

- **New Intra Luma Prediction Mode in H.264/AVC Using Collocated Weighted Chroma Pixel Value**
  
  Ik-Hwan Cho, Jung-Ho Lee, Woong-Ho Lee, Dong-Seok Jeong
  
  Page 344

- **Fast Mode Decision for H.264/AVC Using Mode Prediction**
  
  Song-Hak Ri, Joern Ostermann
  
  Page 354
Performing Deblocking in Video Coding Based on Spatial-Domain Motion-Compensated Temporal Filtering .................................. 364
  Adrian Munteanu, Joeri Barbarien, Jan Cornelis, Peter Schelkens

Improving DCT-Based Coders Through Block Oriented Transforms .......... 375
  Antoine Robert, Isabelle Amonou, Béatrice Pesquet-Popescu

Improvement of Conventional Deinterlacing Methods with Extrema Detection and Interpolation .............................................. 384
  Jérôme Roussel, Pascal Bertolino, Marina Nicolas

Adaptive Macroblock Mode Selection for Reducing the Encoder Complexity in H.264 .......................................................... 396
  Donghyung Kim, Jongho Kim, Jechang Jeong

Dynamic Light Field Compression Using Shared Fields and Region Blocks for Streaming Service .............................................. 406
  Yebin Liu, Qionghai Dai, Wenli Xu, Zhihong Liao

Complexity Scalability in Motion-Compensated Wavelet-Based Video Coding .............................................................................. 418
  Tom Clerckx, Adrian Munteanu, Jan Cornelis, Peter Schelkens

Spatial Error Concealment with Low Complexity in the H.264 Standard ...................................................................................... 431
  Donghyung Kim, Seungjong Kim, Jechang Jeong

A Real-Time Content Adaptation Framework for Exploiting ROI Scalability in H.264/AVC ............................................................... 442
  Peter Lambert, Davy De Schrijver, Davy Van Deursen, Wesley De Neve, Yves Dhondt, Rik Van de Walle

Complexity Reduction Algorithm for Intra Mode Selection in H.264/AVC Video Coding .............................................................. 454
  Jongho Kim, Donghyung Kim, Jechang Jeong

Simple and Effective Filter to Remove Corner Outlier Artifacts in Highly Compressed Video ....................................................... 466
  Jongho Kim, Donghyung Kim, Jechang Jeong

Content-Based Model Template Adaptation and Real-Time System for Behavior Interpretation in Sports Video ...................... 474
  Jungong Han, Peter H.N. de With

New Approach to Wireless Video Compression with Low Complexity .... 485
  Gangyi Jiang, Zhipeng Jin, Mei Yu, Tae-Young Choi
Fast Multi-view Disparity Estimation for Multi-view Video Systems...... 493
   Gangyi Jiang, Mei Yu, Feng Shao, You Yang, Haitao Dong

AddCanny: Edge Detector for Video Processing.......................... 501
   Luis Antón-Canalis, Mario Hernández-Tejera,
   Elena Sánchez-Nielsen

Video-Based Facial Expression Hallucination: A Two-Level Hierarchical
Fusion Approach ............................................................... 513
   Jian Zhang, Yueting Zhuang, Fei Wu

Blue Sky Detection for Picture Quality Enhancement ................. 522
   Bahman Zafarifar, Peter H.N. de With

Requantization Transcoding in Pixel and Frequency Domain for Intra
16x16 in H.264/AVC ............................................................ 533
   Jan De Cock, Stijn Notebaert, Peter Lambert, Davy De Schrijver,
   Rik Van de Walle

Motion-Compensated Deinterlacing Using Edge Information ........ 545
   Taeuk Jeong, Chulhee Lee

Video Enhancement for Underwater Exploration Using Forward
Looking Sonar ................................................................. 554
   Kio Kim, Nicola Neretti, Nathan Intrator

Camera Calibration, Image Registration and Stereo
Matching

Optimal Parameters Selection for Non-parametric Image Registration
Methods ................................................................. 564
   Jorge Larrey-Ruiz, Juan Morales-Sánchez

Camera Calibration from a Single Frame of Planar Pattern ....... 576
   Jianhua Wang, Fanhuai Shi, Jing Zhang, Yuncai Liu

Stereo Matching Using Scanline Disparity Discontinuity
Optimization ............................................................. 588
   Ho Yub Jung, Kyoung Mu Lee, Sang Uk Lee

A New Stereo Matching Model Using Visibility Constraint Based
on Disparity Consistency .................................................. 598
   Ju Yong Chang, Kyoung Mu Lee, Sang Uk Lee
Refine Stereo Correspondence Using Bayesian Network and Dynamic Programming on a Color Based Minimal Span Tree .......................... 610
Naveed Iqbal Rao, Huijun Di, GuangYou Xu

Estimation of Rotation Parameters from Blurred Image .................... 620
Qian Li, Shi-gang Wang

Hierarchical Stereo Matching: From Foreground to Background ............. 632
Kai Zhang, Yuzhou Wang, Guoping Wang

Biometrics and Security

Gabor Feature Based Face Recognition Using Supervised Locality Preserving Projection ................................................................. 644
Zhonglong Zheng, Jianmin Zhao, Jie Yang

Alternative Fuzzy Clustering Algorithms with L1-Norm and Covariance Matrix ................................................................. 654
Miin-Shen Yang, Wen-Liang Hung, Tsiung-Iou Chung

A Statistical Approach for Ownership Identification of Digital Images ................................................................. 666
Ching-Sheng Hsu, Shu-Fen Tu, Young-Chang Hou

Rigid and Non-rigid Face Motion Tracking by Aligning Texture Maps and Stereo-Based 3D Models ............................................ 675
Fadi Dornaika, Angel D. Sappa

Curve Mapping Based Illumination Adjustment for Face Detection ....... 687
Xiaoyue Jiang, Tuo Zhao, Rongchun Zhao

Common Image Method(Null Space + 2DPCAs) for Face Recognition ................................................................. 699
Hae Jong Seo, Young Kyung Park, Joong Kyu Kim

Discrete Choice Models for Static Facial Expression Recognition ........ 710
Gianluca Antonini, Matteo Sorci, Michel Bierlaire, Jean-Philippe Thiran

Scalable and Channel-Adaptive Unequal Error Protection of Images with LDPC Codes ................................................................. 722
Adrian Munteanu, Maryse R. Stoufs, Jan Cornelis, Peter Schelkens
Robust Analysis of Silhouettes by Morphological Size Distributions ........ 734
   Olivier Barnich, Sébastien Jodogne, Marc Van Droogenbroeck

Enhanced Watermarking Scheme Based on Texture Analysis ............. 746
   Ivan O. Lopes, Célia A.Z. Barcelos, Marcos A. Batista,
   Anselmo M. Silva

A Robust Watermarking Algorithm Using Attack Pattern Analysis .... 757
   Dongeun Lee, Tae Kyung Kim, Seongwon Lee, Joonki Paik

Probability Approximation Using Best-Tree Distribution for Skin
Detection ........................................................................ 767
   Sanaa El Fkihi, Mohamed Daoudi, Driss Aboutajdine

Fusion Method of Fingerprint Quality Evaluation: From the Local
Gabor Feature to the Global Spatial-Frequency Structures ............ 776
   Decong Yu, Lihong Ma, Hanqing Lu, Zhiqing Chen

3D Face Recognition Based on Non-iterative Registration and Single
B-Spline Patch Modelling Techniques .................................. 786
   Yi Song, Li Bai

Automatic Denoising of 2D Color Face Images Using Recursive PCA
Reconstruction .................................................................. 799
   Hyun Park, Young Shik Moon

Facial Analysis and Synthesis Scheme .................................... 810
   Ilse Ravyse, Hichem Sahli

Medical Imaging

Detection of Pathological Cells in Phase Contrast Cytological Images .... 821
   Marcin Smereka, Grzegorz Glab

Water Flow Based Complex Feature Extraction ........................... 833
   Xin U Liu, Mark S Nixon

Seeded Region Merging Based on Gradient Vector Flow for Image
Segmentation .................................................................... 846
   Yuan He, Yupin Luo, Dongcheng Hu

System for Reading Braille Embossed on Beverage Can Lids for
Authentication .................................................................... 855
   Trine Kirkhus, Jens T Thielemann, Britta Fismen,
   Henrik Schumann-Olsen, Ronald Sivertsen, Mats Carlin
<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leukocyte Segmentation in Blood Smear Images Using Region-Based Active Contours</td>
<td>Seongeun Eom, Seungjun Kim, Vladimir Shin, Byungha Ahn</td>
<td>867</td>
</tr>
<tr>
<td>Multiresolution Lossy-to-Lossless Coding of MRI Objects</td>
<td>Habibollah Danyali, Alfred Mertins</td>
<td>877</td>
</tr>
<tr>
<td>A Novel Fuzzy Segmentation Approach for Brain MRI</td>
<td>Gang Yu, Changguo Wang, Hongmei Zhang, Yuxiang Yang, Zhengzhong Bian</td>
<td>887</td>
</tr>
<tr>
<td>Extrema Temporal Chaining: A New Method for Computing the 2D-Displacement Field of the Heart from Tagged MRI</td>
<td>Jean-Pascal Jacob, Corinne Vachier, Jean-Michel Morel, Jean-Luc Daire, Jean-Noel Hyacinthe, Jean-Paul Vallée</td>
<td>897</td>
</tr>
<tr>
<td>Robust Tracking of Migrating Cells Using Four-Color Level Set Segmentation</td>
<td>Sumit K. Nath, Filiz Bunyak, Kannappan Palaniappan</td>
<td>920</td>
</tr>
<tr>
<td><strong>Image Retrieval and Image Understanding</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Robust Visual Identifier for Cropped Natural Photos</td>
<td>Ik-Hwan Cho, A-Young Cho, Hae-Kwang Kim, Weon-Geun Oh, Dong-Seok Jeong</td>
<td>933</td>
</tr>
<tr>
<td>Affine Epipolar Direction from Two Views of a Planar Contour</td>
<td>Maria Alberich-Carramiñana, Guillem Alenyà, Juan Andrade-Cetto, Elisa Martínez, Carme Torras</td>
<td>944</td>
</tr>
<tr>
<td>Toward Visually Inferring the Underlying Causal Mechanism in a Traffic-Light-Controlled Crossroads</td>
<td>Joaquín Salas, Sandra Canchola, Pedro Martínez, Hugo Jiménez, Reynaldo C. Pless</td>
<td>956</td>
</tr>
<tr>
<td>Computer Vision Based Travel Aid for the Blind Crossing Roads</td>
<td>Tadayoshi Shiroyama</td>
<td>966</td>
</tr>
</tbody>
</table>
## Table of Contents

A Novel Stochastic Attributed Relational Graph Matching Based on Relation Vector Space Analysis ................................................. 978  
*Bo Gun Park, Kyoung Mu Lee, Sang Uk Lee*

A New Similarity Measure for Random Signatures: Perceptually Modified Hausdorff Distance .................................................. 990  
*Bo Gun Park, Kyoung Mu Lee, Sang Uk Lee*

Tracking of Linear Appearance Models Using Second Order Minimization .......................................................... 1002  
*Jose Gonzalez-Mora, Nicolas Guil, Emilio L. Zapata*

Visibility of Point Clouds and Mapping of Unknown Environments .............................................................. 1014  
*Yanina Landa, Richard Tsai, Li-Tien Cheng*

Adjustment for Discrepancies Between ALS Data Strips Using a Contour Tree Algorithm .................................................. 1026  
*Dongyeob Han, Jaebin Lee, Yongil Kim, Kiyun Yu*

Visual Bootstrapping for Unsupervised Symbol Grounding ................................. 1037  
*Josef Kittler, Mikhail Shevchenko, David Windridge*

A 3D Model Acquisition System Based on a Sequence of Projected Level Curves .................................................. 1047  
*Huei-Yung Lin, Ming-Liang Wang, Ping-Hsiu Yu*

Scale Invariant Robust Registration of 3D-Point Data and a Triangle Mesh by Global Optimization ............................................. 1059  
*Onay Urfahoglu, Patrick A. Mikulastik, Ivo Stegmann*

Fast Hough Transform Based on 3D Image Space Division .............................................................. 1071  
*Witold Zorski*

Context-Based Scene Recognition Using Bayesian Networks with Scale-Invariant Feature Transform ............................................. 1080  
*Seung-Bin Im, Sung-Bae Cho*

A Portable and Low-Cost E-Learning Video Capture System ................................. 1088  
*Richard Yi Da Xu*

On Building Omnidirectional Image Signatures Using Haar Invariant Features: Application to the Localization of Robots ................................................. 1099  
*Cyril Charron, Ouiddad Labbani-Igbida, El Mustapha Mouaddib*

Accurate 3D Structure Measurements from Two Uncalibrated Views .................................................. 1111  
*Benjamin Albouy, Emilie Koenig, Sylvie Treuillet, Yves Lucas*
A Fast Offline Building Recognition Application on a Mobile Telephone
Nikolaj J.C. Groeneweg, Bastiaan de Groot, Arvid H.R. Halma, Bernardo R. Quiroga, Maarten Tromp, Frans C.A. Groen

Adaptive Learning Procedure for a Network of Spiking Neurons and Visual Pattern Recognition
Simei Gomes Wysoski, Lubica Benuskova, Nikola Kasabov

Interactive Learning of Scene Context Extractor Using Combination of Bayesian Network and Logic Network
Keum-Sung Hwang, Sung-Bae Cho

Classification and Recognition

Adaptative Road Lanes Detection and Classification
Juan M. Collado, Cristina Hilario, Arturo de la Escalera, Jose M. Armingol

An Approach to the Recognition of Informational Traffic Signs Based on 2-D Homography and SVMs
Amelio Vázquez-Reina, Roberto Javier López-Sastre, Philip Siegmann, Sergio Lafuente-Arroyo, Hilario Gómez-Moreno

On Using a Dissimilarity Representation Method to Solve the Small Sample Size Problem for Face Recognition
Sung-Woon Kim

A Comparison of Nearest Neighbor Search Algorithms for Generic Object Recognition
Ferid Bajramovic, Frank Mattern, Nicholas Butko, Joachim Denzler

Non Orthogonal Component Analysis: Application to Anomaly Detection
Jean-Michel Gaucel, Mireille Guillaume, Salah Bourennane

A Rough Set Approach to Video Genre Classification
Wengang Cheng, Chang’an Liu, Xingbo Wang

Author Index

Author Index

1221