

Lecture Notes in Computer Science

Edited by G. Goos, J. Hartmanis, and J. van Leeuwen

2351

Springer

Berlin

Heidelberg

New York

Barcelona

Hong Kong

London

Milan

Paris

Tokyo

Anders Heyden Gunnar Sparr
Mads Nielsen Peter Johansen (Eds.)

Computer Vision – ECCV 2002

7th European Conference on Computer Vision
Copenhagen, Denmark, May 28-31, 2002
Proceedings, Part II



Springer

Series Editors

Gerhard Goos, Karlsruhe University, Germany
Juris Hartmanis, Cornell University, NY, USA
Jan van Leeuwen, Utrecht University, The Netherlands

Volume Editors

Anders Heyden
Gunnar Sparr
Lund University, Centre for Mathematical Sciences
Box 118, 22100 Lund, Sweden
E-mail: {Anders.Heyden,Gunnar.Sparr}@math.lth.se

Mads Nielsen
The IT University of Copenhagen
Glentevej 67-69, 2400 Copenhagen NW, Denmark
E-mail: malte@itu.dk

Peter Johansen
University of Copenhagen
Universitetsparken 1, 2100 Copenhagen, Denmark
E-mail: peterjo@diku.dk

Cataloging-in-Publication Data applied for

Die Deutsche Bibliothek - CIP-Einheitsaufnahme

Computer vision : proceedings / ECCV 2002, 7th European Conference on
Computer Vision, Copenhagen, Denmark, May 28 - 31, 2002. Anders Heyden ...
(ed.). - Berlin ; Heidelberg ; New York ; Barcelona ; Hong Kong ; London ;
Milan ; Paris ; Tokyo : Springer

Pt. 2 . - 2002

(Lecture notes in computer science ; Vol. 2351)

ISBN 3-540-43744-4

CR Subject Classification (1998): I.4, I.3.5, I.5, I.2.9-10

ISSN 0302-9743

ISBN 3-540-43744-4 Springer-Verlag Berlin Heidelberg New York

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, re-use of illustrations, recitation, broadcasting, reproduction on microfilms or in any other way, and storage in data banks. Duplication of this publication or parts thereof is permitted only under the provisions of the German Copyright Law of September 9, 1965, in its current version, and permission for use must always be obtained from Springer-Verlag. Violations are liable for prosecution under the German Copyright Law.

Springer-Verlag Berlin Heidelberg New York
a member of BertelsmannSpringer Science+Business Media GmbH

<http://www.springer.de>

© Springer-Verlag Berlin Heidelberg 2002
Printed in Germany

Typesetting: Camera-ready by author, data conversion by PTP-Berlin, Stefan Sossna e.K.
Printed on acid-free paper SPIN: 10870033 06/3142 5 4 3 2 1 0

Preface

Premiering in 1990 in Antibes, France, the European Conference on Computer Vision, ECCV, has been held biennially at venues all around Europe. These conferences have been very successful, making ECCV a major event to the computer vision community.

ECCV 2002 was the seventh in the series. The privilege of organizing it was shared by three universities: The IT University of Copenhagen, the University of Copenhagen, and Lund University, with the conference venue in Copenhagen. These universities lie geographically close in the vivid Öresund region, which lies partly in Denmark and partly in Sweden, with the newly built bridge (opened summer 2000) crossing the sound that formerly divided the countries.

We are very happy to report that this year's conference attracted more papers than ever before, with around 600 submissions. Still, together with the conference board, we decided to keep the tradition of holding ECCV as a single track conference. Each paper was anonymously refereed by three different reviewers. For the final selection, for the first time for ECCV, a system with area chairs was used. These met with the program chairs in Lund for two days in February 2002 to select what became 45 oral presentations and 181 posters. Also at this meeting the selection was made without knowledge of the authors' identity.

The high-quality of the scientific program of ECCV 2002 would not have been possible without the dedicated cooperation of the 15 area chairs, the 53 program committee members, and all the other scientists, who reviewed the papers. A truly impressive effort was made. The spirit of this process reflects the enthusiasm in the research field, and you will find several papers in these proceedings that define the state of the art in the field.

Bjarne Ersbøll as Industrial Relations Chair organized the exhibitions at the conference. Magnus Oskarsson, Sven Spanne, and Nicolas Guilbert helped to make the review process and the preparation of the proceedings function smoothly. Ole Fogh Olsen gave us valuable advice on editing the proceedings. Camilla Jørgensen competently headed the scientific secretariat. Erik Dam and Dan Witzner were responsible for the ECCV 2002 homepage. David Vernon, who chaired ECCV 2000 in Dublin, was extremely helpful during all stages of our preparation for the conference. We would like to thank all these people, as well as numerous others who helped in various respects. A special thanks goes to Søren Skovsgaard at the Congress Consultants, for professional help with all practical matters.

We would also like to thank Rachid Deriche and Theo Papadopoulo for making their web-based conference administration system available and adjusting it to ECCV. This was indispensable in handling the large number of submissions and the thorough review and selection procedure.

Finally, we wish to thank the IT University of Copenhagen and its president Mads Tofte for supporting the conference all the way from planning to realization.

March 2002

Anders Heyden
Gunnar Sparr
Mads Nielsen
Peter Johansen

Organization

Conference Chair

Peter Johansen

Copenhagen University, Denmark

Conference Board

Hans Burkhardt

University of Freiburg, Germany

Bernard Buxton

University College London, UK

Roberto Cipolla

University of Cambridge, UK

Jan-Olof Eklundh

Royal Institute of Technology, Sweden

Olivier Faugeras

INRIA, Sophia Antipolis, France

Bernd Neumann

University of Hamburg, Germany

Giulio Sandini

University of Genova, Italy

David Vernon

Trinity College, Dublin, Ireland

Program Chairs

Anders Heyden

Lund University, Sweden

Gunnar Sparr

Lund University, Sweden

Area Chairs

Ronen Basri

Weizmann Institute, Israel

Michael Black

Brown University, USA

Andrew Blake

Microsoft Research, UK

Rachid Deriche

INRIA, Sophia Antipolis, France

Jan-Olof Eklundh

Royal Institute of Technology, Sweden

Lars Kai Hansen

Denmark Technical University, Denmark

Steve Maybank

University of Reading, UK

Theodore Papadopoulos

INRIA, Sophia Antipolis, France

Cordelia Schmid

INRIA, Rhône-Alpes, France

Amnon Shashua

The Hebrew University of Jerusalem, Israel

Stefano Soatto

University of California, Los Angeles, USA

Bill Triggs

INRIA, Rhône-Alpes, France

Luc van Gool

K.U. Leuven, Belgium &

ETH, Zürich, Switzerland

Joachim Weichert

Saarland University, Germany

Andrew Zisserman

University of Oxford, UK

Program Committee

Luis Alvarez	University of Las Palmas, Spain
Padmanabhan Anandan	Microsoft Research, USA
Helder Araujo	University of Coimbra, Portugal
Serge Belongie	University of California, San Diego, USA
Marie-Odile Berger	INRIA, Lorraine, France
Aaron Bobick	Georgia Tech, USA
Terry Boulton	Lehigh University, USA
Francois Chaumette	INRIA, Rennes, France
Laurent Cohen	Université Paris IX Dauphine, France
Tim Cootes	University of Manchester, UK
Kostas Daniilidis	University of Pennsylvania, USA
Larry Davis	University of Maryland, USA
Frank Ferrie	McGill University, USA
Andrew Fitzgibbon	University of Oxford, UK
David J. Fleet	Xerox Palo Alto Research Center, USA
David Forsyth	University of California, Berkeley, USA
Pascal Fua	EPFL, Switzerland
Richard Hartley	Australian National University, Australia
Vaclav Hlavac	Czech Technical University, Czech Republic
Michal Irani	Weizmann Institute, Israel
Allan Jepson	University of Toronto, Canada
Peter Johansen	Copenhagen University, Denmark
Fredrik Kahl	Lund University, Sweden
Sing Bing Kang	Microsoft Research, USA
Ron Kimmel	Technion, Israel
Kyros Kutulakos	University of Rochester, USA
Tony Lindeberg	Royal Institute of Technology, Sweden
Jim Little	University of British Columbia, Canada
Peter Meer	Rutgers University, USA
David Murray	University of Oxford, UK
Nassir Navab	Siemens, USA
Mads Nielsen	IT-University of Copenhagen, Denmark
Patrick Perez	Microsoft Research, UK
Pietro Perona	California Institute of Technology, USA
Marc Pollefeys	K.U. Leuven, Belgium
Long Quan	Hong Kong University of Science and Technology, Hong Kong
Ian Reid	University of Oxford, UK
Nicolas Rougon	Institut National des Télécommunications, France
José Santos-Victor	Instituto Superior Técnico, Lisbon, Portugal
Guillermo Sapiro	University of Minnesota, USA
Yoichi Sato	IIS, University of Tokyo, Japan
Bernt Schiele	ETH, Zürich, Switzerland
Arnold Smeulders	University of Amsterdam, The Netherlands

Gerald Sommer	University of Kiel, Germany
Peter Sturm	INRIA, Rhône-Alpes, France
Tomas Svoboda	Swiss Federal Institute of Technology, Switzerland
Chris Taylor	University of Manchester, UK
Phil Torr	Microsoft Research, UK
Panos Trahanias	University of Crete, Greece
Laurent Younes	CMLA, ENS de Cachan, France
Alan Yuille	Smith-Kettlewell Eye Research Institute, USA
Josiane Zerubia	INRIA, Sophia Antipolis, France
Kalle Åström	Lund University, Sweden

Additional Referees

Henrik Aanaes	Jeffrey E. Boyd	Michael Elad
Manoj Aggarwal	Edmond Boyer	Ahmed Elgammal
Motilal Agrawal	Yuri Boykov	Ronan Fablet
Aya Aner	Chen Brestel	Ayman Farahat
Adnan Ansari	Lars Bretzner	Olivier Faugeras
Mirko Appel	Alexander Brook	Paulo Favaro
Tal Arbel	Michael Brown	Xiaolin Feng
Okan Arıkan	Alfred Bruckstein	Vittorio Ferrari
Akira Asano	Thomas Buelow	Frank Ferrie
Shai Avidan	Joachim Buhmann	Mario Figueireda
Simon Baker	Hans Burkhardt	Margaret Fleck
David Barger	Bernard Buxton	Michel Gangnet
Christian Barillot	Nikos Canterakis	Xiang Gao
Kobus Barnard	Yaron Caspi	D. Geiger
Adrien Bartoli	Alessandro Chiuso	Yakup Genc
Benedicte Bascle	Roberto Cipolla	Bogdan Georgescu
Pierre-Louis Bazin	Dorin Comaniciu	J.-M. Geusebroek
Isabelle Begin	Kurt Cornelis	Christopher Geyer
Stephen Benoit	Antonio Criminisi	Peter Giblin
Alex Berg	Thomas E. Davis	Gerard Giraudon
James Bergen	Nando de Freitas	Roman Goldenberg
Jim Bergen	Fernando de la Torre	Shaogang Gong
Marcelo Bertalmio	Daniel DeMenthon	Hayit Greenspan
Rikard Berthilsson	Xavier Descombes	Lewis Griffin
Christophe Biernacki	Hagio Djambazian	Jens Guehring
Armin Biess	Gianfranco Doretto	Yanlin Guo
Alessandro Bissacco	Alessandro Duci	Daniela Hall
Laure Blanc-Feraud	Gregory Dudek	Tal Hassner
Ilya Blayvas	Ramani Duraiswami	Horst Haussecker
Eran Borenstein	Pinar Duygulu	Ralf Hebrich
Patrick Bouthemy	Michael Eckmann	Yacov Hel-Or
Richard Bowden	Alyosha Efros	Lorna Herda

Shinsaku Hiura	Roberto Manduchi	Garbis Salgian
Jesse Hoey	Petros Maragos	Frank Sauer
Stephen Hsu	Eric Marchand	Peter Savadjiev
Du Huynh	Jiri Matas	Silvio Savarese
Naoyuki Ichimura	Bogdan Matei	Harpreet Sawhney
Slobodan Ilic	Esther B. Meier	Frederik Schaffalitzky
Sergey Ioffe	Jason Meltzer	Yoav Schechner
Michael Isard	Etienne Mémín	Chrostoph Schnoerr
Volkan Isler	Rudolf Mester	Stephan Scholze
David Jacobs	Ross J. Miceals	Ali Shahrokri
Bernd Jaehne	Anurag Mittal	Doron Shaked
Ian Jermyn	Hiroshi Mo	Eitan Sharon
Hailin Jin	William Moran	Eli Shechtman
Marie-Pierre Jolly	Greg Mori	Jamie Sherrah
Stiliyan-N. Kalitzin	Yael Moses	Akinobu Shimizu
Behrooz Kamgar-Parsi	Jane Mulligan	Ilan Shimshoni
Kenichi Kanatani	Don Murray	Kaleem Siddiqi
Danny Keren	Masahide Naemura	Hedvig Sidenbladh
Erwan Kerrien	Kenji Nagao	Robert Sim
Charles Kervrann	Mirko Navara	Denis Simakov
Renato Keshet	Shree Nayar	Philippe Simard
Ali Khamene	Oscar Nestares	Eero Simoncelli
Shamim Khan	Bernd Neumann	Nir Sochen
Nahum Kiryati	Jeffrey Ng	Yang Song
Reinhard Koch	Tat Hieu Nguyen	Andreas Soupliotis
Ullrich Koethe	Peter Nillius	Sven Spanne
Esther B. Koller-Meier	David Nister	Martin Spengler
John Krumm	Alison Noble	Alon Spira
Hannes Kruppa	Tom O'Donnell	Thomas Strömberg
Murat Kunt	Takayuki Okatani	Richard Szeliski
Prasun Lala	Nuria Olivier	Hai Tao
Michael Langer	Ole Fogh Olsen	Huseyin Tek
Ivan Laptev	Magnus Oskarsson	Seth Teller
Jean-Pierre Le Cadre	Nikos Paragios	Paul Thompson
Bastian Leibe	Ioannis Patras	Jan Tops
Ricahrd Lengagne	Josef Pauli	Benjamin J. Tordoff
Vincent Lepetit	Shmuel Peleg	Kentaro Toyama
Thomas Leung	Robert Pless	Tinne Tuytelaars
Maxime Lhuillier	Swaminathan Rahul	Shimon Ullman
Weiliang Li	Deva Ramanan	Richard Unger
David Liebowitz	Lionel Reveret	Raquel Urtasun
Georg Lindgren	Dario Ringach	Sven Utcke
David Lowe	Ruth Rosenholtz	Luca Vacchetti
John MacCormick	Volker Roth	Anton van den Hengel
Henrik Malm	Payam Saisan	Geert Van Meerbergen

Pierre Vandergheynst
Zhizhou Wang
Baba Vemuri
Frank Verbiest
Maarten Vergauwen
Jaco Vermaak
Mike Werman
David Vernon
Thomas Vetter

Rene Vidal
Michel Vidal-Naquet
Marta Wilczkowiak
Ramesh Visvanathan
Dan Witzner Hansen
Julia Vogel
Lior Wolf
Bob Woodham
Robert J. Woodham

Chenyang Xu
Yaser Yacoob
Anthony Yezzi
Ramin Zabih
Hugo Zaragoza
Lihi Zelnik-Manor
Ying Zhu
Assaf Zomet

Table of Contents, Part II

Surface Geometry

A Variational Approach to Recovering a Manifold from Sample Points	3
<i>J. Gomes, A. Mojsilovic</i>	
A Variational Approach to Shape from Defocus	18
<i>H. Jin, P. Favaro</i>	
Shadow Graphs and Surface Reconstruction	31
<i>Y. Yu, J.T. Chang</i>	
Specularities Reduce Ambiguity of Uncalibrated Photometric Stereo	46
<i>O. Drbohlav, R. Šára</i>	

Grouping and Segmentation

Pairwise Clustering with Matrix Factorisation and the EM Algorithm	63
<i>A. Robles-Kelly, E.R. Hancock</i>	
Shape Priors for Level Set Representations	78
<i>M. Rousson, N. Paragios</i>	
Nonlinear Shape Statistics in Mumford–Shah Based Segmentation	93
<i>D. Cremers, T. Kohlberger, C. Schnörr</i>	
Class-Specific, Top-Down Segmentation	109
<i>E. Borenstein, S. Ullman</i>	

Structure from Motion / Stereoscopic Vision / Surface Geometry / Shape

Quasi-Dense Reconstruction from Image Sequence	125
<i>M. Lhuillier, L. Quan</i>	
Properties of the Catadioptric Fundamental Matrix	140
<i>C. Geyer, K. Daniilidis</i>	
Building Architectural Models from Many Views Using Map Constraints	155
<i>D.P. Robertson, R. Cipolla</i>	
Motion – Stereo Integration for Depth Estimation	170
<i>C. Strecha, L. Van Gool</i>	

Lens Distortion Recovery for Accurate Sequential Structure and Motion Recovery	186
<i>K. Cornelis, M. Pollefeys, L. Van Gool</i>	
Generalized Rank Conditions in Multiple View Geometry with Applications to Dynamical Scenes	201
<i>K. Huang, R. Fossum, Y. Ma</i>	
Dense Structure-from-Motion: An Approach Based on Segment Matching	217
<i>F. Ernst, P. Wilinski, K. van Overveld</i>	
Maximizing Rigidity: Optimal Matching under Scaled-Orthography	232
<i>J. Maciel, J. Costeira</i>	
Dramatic Improvements to Feature Based Stereo	247
<i>V.N. Smelyansky, R.D. Morris, F.O. Kuehnel, D.A. Maluf, P. Cheeseman</i>	
Motion Curves for Parametric Shape and Motion Estimation	262
<i>P.-L. Bazin, J.-M. Vézien</i>	
Bayesian Self-Calibration of a Moving Camera	277
<i>G. Qian, R. Chellappa</i>	
Balanced Recovery of 3D Structure and Camera Motion from Uncalibrated Image Sequences	294
<i>B. Georgescu, P. Meer</i>	
Linear Multi View Reconstruction with Missing Data	309
<i>C. Rother, S. Carlsson</i>	
Model-Based Silhouette Extraction for Accurate People Tracking	325
<i>R. Plaenkers, P. Fua</i>	
On the Non-linear Optimization of Projective Motion Using Minimal Parameters .	340
<i>A. Bartoli</i>	
Structure from Many Perspective Images with Occlusions	355
<i>D. Martinec, T. Pajdla</i>	
Sequence-to-Sequence Self Calibration	370
<i>L. Wolf, A. Zomet</i>	
Structure from Planar Motions with Small Baselines	383
<i>R. Vidal, J. Oliensis</i>	
Revisiting Single-View Shape Tensors: Theory and Applications	399
<i>A. Levin, A. Shashua</i>	

Tracking and Rendering Using Dynamic Textures on Geometric Structure from Motion	415
<i>D. Cobzas, M. Jagersand</i>	
Sensitivity of Calibration to Principal Point Position	433
<i>R.I. Hartley, R. Kaucic</i>	
Critical Curves and Surfaces for Euclidean Reconstruction	447
<i>F. Kahl, R. Hartley</i>	
View Synthesis with Occlusion Reasoning Using Quasi-Sparse Feature Correspondences	463
<i>D. Jelinek, C.J. Taylor</i>	
Eye Gaze Correction with Stereovision for Video-Teleconferencing	479
<i>R. Yang, Z. Zhang</i>	
Wavelet-Based Correlation for Stereopsis	495
<i>M. Clerc</i>	
Stereo Matching Using Belief Propagation	510
<i>J. Sun, H.-Y. Shum, N.-N. Zheng</i>	
Symmetric Sub-pixel Stereo Matching	525
<i>R. Szeliski, D. Scharstein</i>	
New Techniques for Automated Architectural Reconstruction from Photographs	541
<i>T. Werner, A. Zisserman</i>	
Stereo Matching with Segmentation-Based Cooperation	556
<i>Y. Zhang, C. Kambhamettu</i>	
Coarse Registration of Surface Patches with Local Symmetries	572
<i>J. Vanden Wyngaerd, L. Van Gool</i>	
Multiview Registration of 3D Scenes by Minimizing Error between Coordinate Frames	587
<i>G.C. Sharp, S.W. Lee, D.K. Wehe</i>	
Recovering Surfaces from the Restoring Force	598
<i>G. Kamberov, G. Kamberova</i>	
Interpolating Sporadic Data	613
<i>L. Noakes, R. Kozera</i>	
Highlight Removal Using Shape-from-Shading	626
<i>H. Ragheb, E.R. Hancock</i>	

A Reflective Symmetry Descriptor	642
<i>M. Kazhdan, B. Chazelle, D. Dobkin, A. Finkelstein, T. Funkhouser</i>	
Gait Sequence Analysis Using Frieze Patterns	657
<i>Y. Liu, R. Collins, Y. Tsin</i>	
Feature-Preserving Medial Axis Noise Removal	672
<i>R. Tam, W. Heidrich</i>	
Hierarchical Shape Modeling for Automatic Face Localization	687
<i>C. Liu, H.-Y. Shum, C. Zhang</i>	
Using Dirichlet Free Form Deformation to Fit Deformable Models to Noisy 3-D Data	704
<i>S. Ilic, P. Fua</i>	
Transitions of the 3D Medial Axis under a One-Parameter Family of Deformations	718
<i>P. Giblin, B.B. Kimia</i>	
Learning Shape from Defocus	735
<i>P. Favaro, S. Soatto</i>	
A Rectilinearity Measurement for Polygons	746
<i>J. Žunić, P.L. Rosin</i>	
Local Analysis for 3D Reconstruction of Specular Surfaces – Part II	759
<i>S. Savarese, P. Perona</i>	
Matching Distance Functions: A Shape-to-Area Variational Approach for Global-to-Local Registration	775
<i>N. Paragios, M. Rousson, V. Ramesh</i>	
Shape from Shading and Viscosity Solutions	790
<i>E. Prados, O. Faugeras, E. Rouy</i>	
Model Acquisition by Registration of Multiple Acoustic Range Views	805
<i>A. Fusiello, U. Castellani, L. Ronchetti, V. Murino</i>	
Structure from Motion	
General Trajectory Triangulation	823
<i>J.Y. Kaminski, M. Teicher</i>	
Surviving Dominant Planes in Uncalibrated Structure and Motion Recovery	837
<i>M. Pollefeys, F. Verbiest, L. Van Gool</i>	
A Bayesian Estimation of Building Shape Using MCMC	852
<i>A.R. Dick, P.H.S. Torr, R. Cipolla</i>	

Structure and Motion for Dynamic Scenes – The Case of
Points Moving in Planes 867
 P. Sturm

What Does the Scene Look Like from a Scene Point? 883
 M. Irani, T. Hassner, P. Anandan

Author Index 899

Table of Contents, Part I

Active and Real-Time Vision

Tracking with the EM Contour Algorithm	3
<i>A.E.C. Pece, A.D. Worrall</i>	
M2Tracker: A Multi-view Approach to Segmenting and Tracking People in a Cluttered Scene Using Region-Based Stereo	18
<i>A. Mittal, L.S. Davis</i>	

Image Features

Analytical Image Models and Their Applications	37
<i>A. Srivastava, X. Liu, U. Grenander</i>	
Time-Recursive Velocity-Adapted Spatio-Temporal Scale-Space Filters	52
<i>T. Lindeberg</i>	
Combining Appearance and Topology for Wide Baseline Matching	68
<i>D. Tell, S. Carlsson</i>	
Guided Sampling and Consensus for Motion Estimation	82
<i>B. Tordoff, D.W. Murray</i>	

Image Features / Visual Motion

Fast Anisotropic Gauss Filtering	99
<i>J.-M. Geusebroek, A.W.M. Smeulders, J. van de Weijer</i>	
Adaptive Rest Condition Potentials: Second Order Edge-Preserving Regularization	113
<i>M. Rivera, J.L. Marroquin</i>	
An Affine Invariant Interest Point Detector	128
<i>K. Mikolajczyk, C. Schmid</i>	
Understanding and Modeling the Evolution of Critical Points under Gaussian Blurring	143
<i>A. Kuijper, L. Florack</i>	
Image Processing Done Right	158
<i>J.J. Koenderink, A.J. van Doorn</i>	
Multimodal Data Representations with Parameterized Local Structures	173
<i>Y. Zhu, D. Comaniciu, S. Schwartz, V. Ramesh</i>	

The Relevance of Non-generic Events in Scale Space Models	190
<i>A. Kuijper, L. Florack</i>	
The Localized Consistency Principle for Image Matching under Non-uniform Illumination Variation and Affine Distortion	205
<i>B. Wang, K.K. Sung, T.K. Ng</i>	
Resolution Selection Using Generalized Entropies of Multiresolution Histograms	220
<i>E. Hadjidemetriou, M.D. Grossberg, S.K. Nayar</i>	
Robust Computer Vision through Kernel Density Estimation	236
<i>H. Chen, P. Meer</i>	
Constrained Flows of Matrix-Valued Functions: Application to Diffusion Tensor Regularization	251
<i>C. Chefd'hotel, D. Tschumperlé, R. Deriche, O. Faugeras</i>	
A Hierarchical Framework for Spectral Correspondence	266
<i>M. Carcassoni, E.R. Hancock</i>	
Phase-Based Local Features	282
<i>G. Carneiro, A.D. Jepson</i>	
What Is the Role of Independence for Visual Recognition?	297
<i>N. Vasconcelos, G. Carneiro</i>	
A Probabilistic Multi-scale Model for Contour Completion Based on Image Statistics	312
<i>X. Ren, J. Malik</i>	
Toward a Full Probability Model of Edges in Natural Images	328
<i>K.S. Pedersen, A.B. Lee</i>	
Fast Difference Schemes for Edge Enhancing Beltrami Flow	343
<i>R. Malladi, I. Ravve</i>	
A Fast Radial Symmetry Transform for Detecting Points of Interest	358
<i>G. Loy, A. Zelinsky</i>	
Image Features Based on a New Approach to 2D Rotation Invariant Quadrature Filters	369
<i>M. Felsberg, G. Sommer</i>	
Representing Edge Models via Local Principal Component Analysis	384
<i>P.S. Huggins, S.W. Zucker</i>	
Regularized Shock Filters and Complex Diffusion	399
<i>G. Gilboa, N.A. Sochen, Y.Y. Zeevi</i>	

Multi-view Matching for Unordered Image Sets, or “How Do I Organize My Holiday Snaps?”	414
<i>F. Schaffalitzky, A. Zisserman</i>	
Parameter Estimates for a Pencil of Lines: Bounds and Estimators	432
<i>G. Speyer, M. Werman</i>	
Multilinear Analysis of Image Ensembles: TensorFaces	447
<i>M.A.O. Vasilescu, D. Terzopoulos</i>	
‘Dynamism of a Dog on a Leash’ or Behavior Classification by Eigen-Decomposition of Periodic Motions	461
<i>R. Goldenberg, R. Kimmel, E. Rivlin, M. Rudzsky</i>	
Automatic Detection and Tracking of Human Motion with a View-Based Representation	476
<i>R. Fablet, M.J. Black</i>	
Using Robust Estimation Algorithms for Tracking Explicit Curves	492
<i>J.-P. Tarel, S.-S. Ieng, P. Charbonnier</i>	
On the Motion and Appearance of Specularities in Image Sequences	508
<i>R. Swaminathan, S.B. Kang, R. Szeliski, A. Criminisi, S.K. Nayar</i>	
Multiple Hypothesis Tracking for Automatic Optical Motion Capture	524
<i>M. Ringer, J. Lasenby</i>	
Single Axis Geometry by Fitting Conics	537
<i>G. Jiang, H.-t. Tsui, L. Quan, A. Zisserman</i>	
Computing the Physical Parameters of Rigid-Body Motion from Video	551
<i>K.S. Bhat, S.M. Seitz, J. Popović, P.K. Khosla</i>	
Building Roadmaps of Local Minima of Visual Models	566
<i>C. Sminchisescu, B. Triggs</i>	
A Generative Method for Textured Motion: Analysis and Synthesis	583
<i>Y. Wang, S.-C. Zhu</i>	
Is Super-Resolution with Optical Flow Feasible?	599
<i>W.Y. Zhao, H.S. Sawhney</i>	
New View Generation with a Bi-centric Camera	614
<i>D. Weinshall, M.-S. Lee, T. Brodsky, M. Trajkovic, D. Feldman</i>	
Recognizing and Tracking Human Action	629
<i>J. Sullivan, S. Carlsson</i>	

Towards Improved Observation Models for Visual Tracking: Selective Adaptation	645
<i>J. Vermaak, P. Pérez, M. Gangnet, A. Blake</i>	
Color-Based Probabilistic Tracking	661
<i>P. Pérez, C. Hue, J. Vermaak, M. Gangnet</i>	
Dense Motion Analysis in Fluid Imagery	676
<i>T. Corpetti, É. Mémin, P. Pérez</i>	
A Layered Motion Representation with Occlusion and Compact Spatial Support	692
<i>A.D. Jepson, D.J. Fleet, M.J. Black</i>	
Incremental Singular Value Decomposition of Uncertain Data with Missing Values	707
<i>M. Brand</i>	
Symmetrical Dense Optical Flow Estimation with Occlusions Detection	721
<i>L. Alvarez, R. Deriche, T. Papadopoulo, J. Sánchez</i>	
Audio-Video Sensor Fusion with Probabilistic Graphical Models	736
<i>M.J. Beal, H. Attias, N. Jojic</i>	
Visual Motion	
Increasing Space-Time Resolution in Video	753
<i>E. Shechtman, Y. Caspi, M. Irani</i>	
Hyperdynamics Importance Sampling	769
<i>C. Sminchisescu, B. Triggs</i>	
Implicit Probabilistic Models of Human Motion for Synthesis and Tracking	784
<i>H. Sidenbladh, M.J. Black, L. Sigal</i>	
Space-Time Tracking	801
<i>L. Torresani, C. Bregler</i>	
Author Index	813

Table of Contents, Part III

Shape

3D Statistical Shape Models Using Direct Optimisation of Description Length	3
<i>R.H. Davies, C.J. Twining, T.F. Cootes, J.C. Waterton, C.J. Taylor</i>	
Approximate Thin Plate Spline Mappings	21
<i>G. Donato, S. Belongie</i>	
DEFORMOTION: Deforming Motion, Shape Average and the Joint Registration and Segmentation of Images	32
<i>S. Soatto, A.J. Yezzi</i>	
Region Matching with Missing Parts	48
<i>A. Duci, A.J. Yezzi, S. Mitter, S. Soatto</i>	

Stereoscopic Vision I

What Energy Functions Can Be Minimized via Graph Cuts?	65
<i>V. Kolmogorov, R. Zabih</i>	
Multi-camera Scene Reconstruction via Graph Cuts	82
<i>V. Kolmogorov, R. Zabih</i>	
A Markov Chain Monte Carlo Approach to Stereovision	97
<i>J. S�n�gas</i>	
A Probabilistic Theory of Occupancy and Emptiness	112
<i>R. Bhotika, D.J. Fleet, K.N. Kutulakos</i>	

Texture Shading and Colour / Grouping and Segmentation / Object Recognition

Texture Similarity Measure Using Kullback-Leibler Divergence between Gamma Distributions	133
<i>J.R. Mathiassen, A. Skavhaug, K. B�</i>	
All the Images of an Outdoor Scene	148
<i>S.G. Narasimhan, C. Wang, S.K. Nayar</i>	
Recovery of Reflectances and Varying Illuminants from Multiple Views	163
<i>Q.-T. Luong, P. Fua, Y. Leclerc</i>	

Composite Texture Descriptions	180
<i>A. Zalesny, V. Ferrari, G. Caenen, D. Auf der Maur, L. Van Gool</i>	
Constructing Illumination Image Basis from Object Motion	195
<i>A. Nakashima, A. Maki, K. Fukui</i>	
Diffuse-Specular Separation and Depth Recovery from Image Sequences	210
<i>S. Lin, Y. Li, S.B. Kang, X. Tong, H.-Y. Shum</i>	
Shape from Texture without Boundaries	225
<i>D.A. Forsyth</i>	
Statistical Modeling of Texture Sketch	240
<i>Y.N. Wu, S.C. Zhu, C.-e. Guo</i>	
Classifying Images of Materials: Achieving Viewpoint and Illumination Independence	255
<i>M. Varma, A. Zisserman</i>	
Estimation of Multiple Illuminants from a Single Image of Arbitrary Known Geometry	272
<i>Y. Wang, D. Samaras</i>	
The Effect of Illuminant Rotation on Texture Filters: Lissajous's Ellipses	289
<i>M. Chantler, M. Schmidt, M. Petrou, G. McGunnigle</i>	
On Affine Invariant Clustering and Automatic Cast Listing in Movies	304
<i>A. Fitzgibbon, A. Zisserman</i>	
Factorial Markov Random Fields	321
<i>J. Kim, R. Zabih</i>	
Evaluation and Selection of Models for Motion Segmentation	335
<i>K. Kanatani</i>	
Surface Extraction from Volumetric Images Using Deformable Meshes: A Comparative Study	350
<i>J. Tohka</i>	
DREAM ² S: Deformable Regions Driven by an Eulerian Accurate Minimization Method for Image and Video Segmentation (Application to Face Detection in Color Video Sequences)	365
<i>S. Jehan-Besson, M. Barlaud, G. Aubert</i>	
Neuro-Fuzzy Shadow Filter	381
<i>B.P.L. Lo, G.-Z. Yang</i>	
Parsing Images into Region and Curve Processes	393
<i>Z. Tu, S.-C. Zhu</i>	

Yet Another Survey on Image Segmentation: Region and Boundary Information Integration	408
<i>J. Freixenet, X. Muñoz, D. Raba, J. Martí, X. Cufí</i>	
Perceptual Grouping from Motion Cues Using Tensor Voting in 4-D	423
<i>M. Nicolescu, G. Medioni</i>	
Deformable Model with Non-euclidean Metrics	438
<i>B. Taton, J.-O. Lachaud</i>	
Finding Deformable Shapes Using Loopy Belief Propagation	453
<i>J.M. Coughlan, S.J. Ferreira</i>	
Probabilistic and Voting Approaches to Cue Integration for Figure-Ground Segmentation	469
<i>E. Hayman, J.-O. Eklundh</i>	
Bayesian Estimation of Layers from Multiple Images	487
<i>Y. Wexler, A. Fitzgibbon, A. Zisserman</i>	
A Stochastic Algorithm for 3D Scene Segmentation and Reconstruction	502
<i>F. Han, Z. Tu, S.-C. Zhu</i>	
Normalized Gradient Vector Diffusion and Image Segmentation	517
<i>Z. Yu, C. Bajaj</i>	
Spectral Partitioning with Indefinite Kernels Using the Nyström Extension	531
<i>S. Belongie, C. Fowlkes, F. Chung, J. Malik</i>	
A Framework for High-Level Feedback to Adaptive, Per-Pixel, Mixture-of-Gaussian Background Models	543
<i>M. Harville</i>	
Multivariate Saddle Point Detection for Statistical Clustering	561
<i>D. Comaniciu, V. Ramesh, A. Del Bue</i>	
Parametric Distributional Clustering for Image Segmentation	577
<i>L. Hermes, T. Zöllner, J.M. Buhmann</i>	
Probabilistic Models and Informative Subspaces for Audiovisual Correspondence	592
<i>J.W. Fisher, T. Darrell</i>	
Volterra Filtering of Noisy Images of Curves	604
<i>J. August</i>	
Image Segmentation by Flexible Models Based on Robust Regularized Networks	621
<i>M. Rivera, J. Gee</i>	

Principal Component Analysis over Continuous Subspaces and Intersection of Half-Spaces	635
<i>A. Levin, A. Shashua</i>	
On Pencils of Tangent Planes and the Recognition of Smooth 3D Shapes from Silhouettes	651
<i>S. Lazebnik, A. Sethi, C. Schmid, D. Kriegman, J. Ponce, M. Hebert</i>	
Estimating Human Body Configurations Using Shape Context Matching	666
<i>G. Mori, J. Malik</i>	
Probabilistic Human Recognition from Video	681
<i>S. Zhou, R. Chellappa</i>	
SoftPOSIT: Simultaneous Pose and Correspondence Determination	698
<i>P. David, D. DeMenthon, R. Duraiswami, H. Samet</i>	
A Pseudo-Metric for Weighted Point Sets	715
<i>P. Giannopoulos, R.C. Veltkamp</i>	
Shock-Based Indexing into Large Shape Databases	731
<i>T.B. Sebastian, P.N. Klein, B.B. Kimia</i>	
EigenSegments: A Spatio-Temporal Decomposition of an Ensemble of Images . .	747
<i>S. Avidan</i>	
On the Representation and Matching of Qualitative Shape at Multiple Scales	759
<i>A. Shokoufandeh, S. Dickinson, C. Jönsson, L. Bretzner, T. Lindeberg</i>	
Combining Simple Discriminators for Object Discrimination	776
<i>S. Mahamud, M. Hebert, J. Lafferty</i>	
Probabilistic Search for Object Segmentation and Recognition	791
<i>U. Hillenbrand, G. Hirzinger</i>	
Real-Time Interactive Path Extraction with On-the-Fly Adaptation of the External Forces	807
<i>O. Gérard, T. Deschamps, M. Greff, L.D. Cohen</i>	
Matching and Embedding through Edit-Union of Trees	822
<i>A. Torsello, E.R. Hancock</i>	
A Comparison of Search Strategies for Geometric Branch and Bound Algorithms	837
<i>T. M. Breuel</i>	
Face Recognition from Long-Term Observations	851
<i>G. Shakhnarovich, J.W. Fisher, T. Darrell</i>	

Stereoscopic Vision II

Helmholtz Stereopsis: Exploiting Reciprocity for
Surface Reconstruction 869
T. Zickler, P.N. Belhumeur, D.J. Kriegman

Minimal Surfaces for Stereo 885
C. Buehler, S.J. Gortler, M.F. Cohen, L. McMillan

Finding the Largest Unambiguous Component of Stereo Matching 900
R. Šára

Author Index 915

Table of Contents, Part IV

Object Recognition / Vision Systems Engineering and Evaluation

Face Identification by Fitting a 3D Morphable Model Using Linear Shape and Texture Error Functions	3
<i>S. Romdhani, V. Blanz, T. Vetter</i>	
Hausdorff Kernel for 3D Object Acquisition and Detection	20
<i>A. Barla, F. Odone, A. Verri</i>	
Evaluating Image Segmentation Algorithms Using the Pareto Front	34
<i>M. Everingham, H. Muller, B. Thomas</i>	
On Performance Characterization and Optimization for Image Retrieval	49
<i>J. Vogel, B. Schiele</i>	

Statistical Learning

Statistical Learning of Multi-view Face Detection	67
<i>S.Z. Li, L. Zhu, Z. Zhang, A. Blake, H. Zhang, H. Shum</i>	
Dynamic Trees: Learning to Model Outdoor Scenes	82
<i>N.J. Adams, C.K.I. Williams</i>	
Object Recognition as Machine Translation: Learning a Lexicon for a Fixed Image Vocabulary	97
<i>P. Duygulu, K. Barnard, J.F.G. de Freitas, D.A. Forsyth</i>	
Learning a Sparse Representation for Object Detection	113
<i>S. Agarwal, D. Roth</i>	

Calibration / Active and Real-Time and Robot Vision / Image and Video Indexing / Medical Image Understanding / Vision Systems / Engineering and Evaluations / Statistical Learning

Stratified Self Calibration from Screw-Transform Manifolds	131
<i>R. Manning, C. Dyer</i>	
Self-Organization of Randomly Placed Sensors	146
<i>R.B. Fisher</i>	
Camera Calibration with One-Dimensional Objects	161
<i>Z. Zhang</i>	
Automatic Camera Calibration from a Single Manhattan Image	175
<i>J. Deutscher, M. Isard, J. MacCormick</i>	

What Can Be Known about the Radiometric Response from Images?	189
<i>M.D. Grossberg, S.K. Nayar</i>	
Estimation of Illuminant Direction and Intensity of Multiple Light Sources	206
<i>W. Zhou, C. Kambhamettu</i>	
3D Modelling Using Geometric Constraints: A Parallelepiped Based Approach	221
<i>M. Wilczkowiak, E. Boyer, P. Sturm</i>	
Geometric Properties of Central Catadioptric Line Images	237
<i>J.P. Barreto, H. Araujo</i>	
Another Way of Looking at Plane-Based Calibration: The Centre Circle Constraint	252
<i>P. Gurdjos, A. Crouzil, R. Payrissat</i>	
Active Surface Reconstruction Using the Gradient Strategy	267
<i>M. Mitran, F.P. Ferrie</i>	
Linear Pose Estimation from Points or Lines	282
<i>A. Ansar, K. Daniilidis</i>	
A Video-Based Drowning Detection System	297
<i>A.H. Kam, W. Lu, W.-Y. Yau</i>	
Visual Data Fusion for Objects Localization by Active Vision	312
<i>G. Flandin, F. Chaumette</i>	
Towards Real-Time Cue Integration by Using Partial Results	327
<i>D. DeCarlo</i>	
Tracking and Object Classification for Automated Surveillance	343
<i>O. Javed, M. Shah</i>	
Very Fast Template Matching	358
<i>H. Schweitzer, J.W. Bell, F. Wu</i>	
Fusion of Multiple Tracking Algorithms for Robust People Tracking	373
<i>N.T. Siebel, S. Maybank</i>	
Video Summaries through Mosaic-Based Shot and Scene Clustering	388
<i>A. Aner, J.R. Kender</i>	
Optimization Algorithms for the Selection of Key Frame Sequences of Variable Length	403
<i>T. Liu, J.R. Kender</i>	

Multi-scale EM-ICP: A Fast and Robust Approach for Surface Registration	418
<i>S. Granger, X. Pennec</i>	
An Unified Approach to Model-Based and Model-Free Visual Servoing	433
<i>E. Malis</i>	
Comparing Intensity Transformations and Their Invariants in the Context of Color Pattern Recognition	448
<i>F. Mindru, T. Moons, L. Van Gool</i>	
A Probabilistic Framework for Spatio-Temporal Video Representation & Indexing	461
<i>H. Greenspan, J. Goldberger, A. Mayer</i>	
Video Compass	476
<i>J. Kořecká and W. Zhang</i>	
Computing Content-Plots for Video	491
<i>H. Schweitzer</i>	
Classification and Localisation of Diabetic-Related Eye Disease	502
<i>A. Osareh, M. Mirmehdi, B. Thomas, R. Markham</i>	
Robust Active Shape Model Search	517
<i>M. Rogers, J. Graham</i>	
A New Image Registration Technique with Free Boundary Constraints: Application to Mammography	531
<i>F. Richard, L. Cohen</i>	
Registration Assisted Image Smoothing and Segmentation	546
<i>B.C. Vemuri, Y. Chen, Z. Wang</i>	
An Accurate and Efficient Bayesian Method for Automatic Segmentation of Brain MRI	560
<i>J.L. Marroquin, B.C. Vemuri, S. Botello, F. Calderon</i>	
A PDE Approach for Thickness, Correspondence, and Gridding of Annular Tissues	575
<i>A. Yezzi, J.L. Prince</i>	
Statistical Characterization of Morphological Operator Sequences	590
<i>X. Gao, V. Ramesh, T. Boult</i>	
Image Registration for Foveated Omnidirectional Sensing	606
<i>F. Dornaika, J. Elder</i>	
Automatic Model Selection by Modelling the Distribution of Residuals	621
<i>T.F. Cootes, N. Thacker, C.J. Taylor</i>	

Assorted Pixels: Multi-sampled Imaging with Structural Models	636
<i>S.K. Nayar, S.G. Narasimhan</i>	
Robust Parameterized Component Analysis: Theory and Applications to 2D Facial Modeling	653
<i>F. De la Torre, M.J. Black</i>	
Learning Intrinsic Video Content Using Levenshtein Distance in Graph Partitioning	670
<i>J. Ng, S. Gong</i>	
A Tale of Two Classifiers: SNoW vs. SVM in Visual Recognition	685
<i>M.-H. Yang, D. Roth, N. Ahuja</i>	
Learning to Parse Pictures of People	700
<i>R. Ronfard, C. Schmid, B. Triggs</i>	
Learning Montages of Transformed Latent Images as Representations of Objects That Change in Appearance	715
<i>C. Pal, B.J. Frey, N. Jojic</i>	
Exemplar-Based Face Recognition from Video	732
<i>V. Krüger, S. Zhou</i>	
Learning the Topology of Object Views	747
<i>J. Wieghardt, R.P. Würtz, C. von der Malsburg</i>	
A Robust PCA Algorithm for Building Representations from Panoramic Images	761
<i>D. Skočaj, H. Bischof, A. Leonardis</i>	
Adjustment Learning and Relevant Component Analysis	776
<i>N. Shental, T. Hertz, D. Weinshall, M. Pavel</i>	
Texture, Shading, and Colour	
What Are Textons?	793
<i>S.-C. Zhu, C.-e. Guo, Y. Wu, Y. Wang</i>	
Bidirectional Texture Contrast Function	808
<i>S.C. Pont, J.J. Koenderink</i>	
Removing Shadows from Images	823
<i>G.D. Finlayson, S.D. Hordley, M.S. Drew</i>	
Author Index	837