

ICCV 2003 Program

Ninth IEEE International Conference on
Computer Vision

Conference, demonstrations, courses and workshops

11–17 October 2003

Acropolis Conference Centre

Nice, France

| | |
|--|----|
| ICCV Main Conference | 1 |
| ICCV 2003 Demonstrations | 19 |
| Course 1. PDE-LSM: PDE's and Level Sets Methods in Imaging Sciences | 23 |
| Course 2. Omnidirectional Vision | 26 |
| Course 3. Efficient Algorithms for Matching | 29 |
| Course 4. Learning & Inference in Vision: Generative Methods | 31 |
| Course 5. Dense Multiview Stereo | 34 |
| Course 6. Learning & Inference in Vision: Discriminative Methods | 36 |
| Course 7. Image-based Rendering | 38 |
| Workshop 1. VS-PETS: Visual Surveillance and Performance Evaluation of Tracking & Surveillance | 40 |
| Workshop 2. VLSM: Variational, Geometric and Level Set Methods in Computer Vision | 43 |
| Workshop 3. SCTV: Statistical and Computational Theories of Vision | 47 |
| Workshop 4. CPMCV: Color and Photometric Methods in Computer Vision | 50 |
| Workshop 5. PROCAMS: Projector-Camera Systems | 52 |
| Workshop 6. WOMTEC: Multimedia Technologies in E-Learning and Collaboration | 55 |
| Workshop 7. TEXTURE: Texture Analysis and Synthesis | 57 |
| Workshop 8. HLK: Higher-Level Knowledge in 3D Modeling and Motion Analysis | 60 |
| Workshop 9. AMFG: Analysis and Modeling of Faces and Gestures | 62 |
| Overview and Timetable | 67 |

ICCV 2003 Program

Ninth IEEE International Conference on
Computer Vision

Conference, demonstrations, courses and workshops

11–17 October 2003

Acropolis Conference Centre

Nice, France

ICCV 2003 Main Conference

Monday 13 October

Opening : 10:20 – 10:30

Session 1. Image Segmentation : 10:30 – 12:20

1. Regression based Bandwidth Selection for Segmentation using Parzen Windows

Maneesh Singh, Narendra Ahuja. Pages 2–9.

2. Learning a Classification Model for Segmentation

Xiaofeng Ren, Jitendra Malik. Pages 10–17.

3. Image Parsing: Segmentation, Detection and Recognition

X. Chen, Z. Tu, A.L. Yuille, S.C. Zhu. Pages 18–25.

4. Computing Geodesics and Minimal Surfaces via Graph Cuts

Yuri Boykov, Vladimir Kolmogorov. Pages 26–33.

5. Epitomic Analysis of Appearance and Shape

Nebojsa Jovic, Brendan Frey, Anitha Kannan. Pages 34–41. See the CD-ROM for a [video](#) and the [epitome webpage](#) for examples, comparisons and software.

Lunch Break : 12:20 – 14:30

Session 2. Posters and Demos I : 14:30 – 17:15

1. Segmenting Foreground Objects from a Dynamic, Textured Background via a Robust Kalman Filter

Jing Zhong, Stan Sclaroff. Pages 44–50.

2. Ranking Prior Likelihood Distributions for Bayesian Shape Localization Framework

Shuicheng Yan, Mingjing Li, Hongjiang Zhang, Qiansheng Cheng. Pages 51–58.

3. Efficient, Robust and Accurate Fitting of a 3D Morphable Model

Sami Romdhani, Thomas Vetter. Pages 59–66.

4. Statistical Background Subtraction for a Mobile Observer

Eric Hayman, Jan-Olof Eklundh. Pages 67–74.

5. Joint Region Tracking with Switching Hypothesized Measurements

Yang Wang, Tele Tan, Loe Kia-Fock. Pages 75–82.

6. The Local Projective Shape of Smooth Surfaces and their Outlines

Svetlana Lazebnik, Jean Ponce. Pages 83–89.

7. Active Concept Learning for Image Retrieval in Dynamic Databases

Anlei Dong, Bir Bhanu. Pages 90–95.

8. Video Input Driven Animation (VIDA)

Meng Sun, Allan Jepson, Eugene Fiume. Pages 96–103.

9. Automatic Video Summarization by Graph Modeling

Chong-Wah Ngo, Yufei Ma, Hong-Jiang Zhang. Pages 104–109.

10. A Non-Iterative Greedy Algorithm for Multi-frame Point Correspondence

Khurram Shafique, Mubarak Shah. Pages 110–115.

11. Variational Frameworks for DT-MRI Estimation, Regularization and Visualization

David Tschumperlé, Rachid Deriche. Pages 116–121.

12. Counting People in Crowds with a Real-Time Network of Simple Image Sensors

Danny B. Yang, Hector H. González-Baños, Leonidas J. Guibas. Pages 122–129.

13. Fragmentation in the Vision of Scenes

Jan-Mark Geusebroek, Arnold W. M. Smeulders. Pages 130–135.

14. Eye Gaze Estimation from a Single Image of One Eye

Jian-Gang Wang, Eric Sung, Ronda Venkateswarlu. Pages 136–143.

15. Calibrating Pan-Tilt Cameras in Wide-Area Surveillance Networks

James Davis, Xing Chen. Pages 144–149.

16. Calibration of a Hybrid Camera Network

Xilin Chen, Jie Yang, Alex Waibel. Pages 150–155.

17. Image Registration with Global and Local Luminance Alignment

Jiaya Jia, Chi-Keung Tang. Pages 156–163.

18. Highlight Removal by Illumination-Constrained Inpainting

Tan Ping, Stephen Lin, Long Quan, Heung-Yeung Shum. Pages 164–169.

19. Surface Reflectance Modeling of Real Objects with Interreflections

Takashi Machida, Naokazu Yokoya, Haruo Takemura. Pages 170–177.

20. Variable Bandwidth QMDPE and Its Application in Robust Optical Flow Estimation

Hanzi Wang, David Suter. Pages 178–183.

21. Surface Reconstruction from Feature Based Stereo

Camillo J. Taylor. Pages 184–190.

22. Gaze Manipulation for One-to-one Teleconferencing

Antonio Criminisi, Jamie Shotton, Andrew Blake, Philip Torr. Pages 191–198.

23. Preemptive RANSAC for Live Structure and Motion Estimation

David Nistér. Pages 199–206. See the CD-ROM for a [description of the demo](#).

24. Multiple-View Structure and Motion From Line Correspondences

Adrien Bartoli, Peter Sturm. Pages 207–212.

25. Modeling Textured Motion: Particle, Wave and Sketch

Yizhou Wang, Song-Chun Zhu. Pages 213–220.

26. Circular Motion Geometry by Minimal 2 Points in 4 Images

Guang Jiang, Long Quan, Hung-Tat Tsui. Pages 221–227.

27. A Cylindrical Surface Model to Rectify the Bound Document Image

Huaigu Cao, Xiaoqing Ding, Changsong Liu. Pages 228–233.

28. Edit Distance From Graph Spectra

Antonio Robles-Kelly, Edwin Hancock. Pages 234–241.

29. Minimum Risk Distance Measure for Object Recognition

Shyjan Mahamud, Martial Hebert. Pages 242–248.

30. A Multi-scale Generative Model for Animate Shapes and Parts

Alexandra Dubinskiy, Song-Chun Zhu. Pages 249–256.

31. Recognition with Local Features: the Kernel Recipe

Christian Wallraven, Barbara Caputo, Arnulf Graf. Pages 257–264.

32. Images as Bags of Pixels

Tony Jebara. Pages 265–272.

33. Context-based Vision System for Place and Object Recognition

Antonio Torralba, Kevin P. Murphy, William T. Freeman, Mark A. Rubin. Pages 273–280.

34. Object Recognition with Informative Features and Linear Classification

Michel Vidal-Naquet, Shimon Ullman. Pages 281–288.

35. Meshfree Particle Method

Huafeng Liu, Pengcheng Shi. Pages 289–296.

36. Minimally-supervised Classification using Multiple Observation Sets

Chris Stauffer. Pages 297–304.

37. Learning How to Inpaint from Global Image Statistics

Anat Levin, Assaf Zomet, Yair Weiss. Pages 305–312.

38. Multiclass Spectral Clustering

Stella X. Yu, Jianbo Shi. Pages 313–319.

39. Graph Partition by Swendsen-Wang Cuts

Adrian Barbu, Song-Chun Zhu. Pages 320–327.

40. Image Spaces and Video Trajectories: Using Isomap to Explore Video Sequences

Robert Pless. Pages 1433–1440.

Session 3. Tracking : 17:15 – 18:45**1. Obstacle Detection Using Projective Invariant and Vanishing Lines**

Ryuzo Okada, Yasuhiro Taniguchi, Kenji Furukawa, Kazunori Onoguchi. Pages 330–337. See the CD-ROM for a [description](#) and [video](#) of this onboard surveillance system.

2. Using Temporal Coherence to Build Models of Animals

Deva Ramanan, D.A. Forsyth. Pages 338–346.

3. On-Line Selection of Discriminative Tracking Features

Robert T. Collins, Yanxi Liu. Pages 346–352.

4. A Sparse Probabilistic Learning Algorithm for Real-Time Tracking

Oliver Williams, Andrew Blake, Roberto Cipolla. Pages 353–360.

Reception. Espace Rhodes : 19:00 – 21:00

Tuesday 14 October

Session 4. Clustering and Feature Selection : 9:00 – 10:30

1. Dominant Sets and Hierarchical Clustering

Massimiliano Pavan, Marcello Pelillo. Pages 362–369.

2. Applying the Information Bottleneck Principle to Unsupervised Clustering of Discrete and Continuous Image Representations

Shiri Gordon, Hayit Greenspan, Jacob Goldberger. Pages 370–377.

3. Feature Selection for Unsupervised and Supervised Inference: the Emergence of Sparsity in a Weighted-based Approach

Lior Wolf, Amnon Shashua. Pages 378–384.

4. Learning a Locality Preserving Subspace for Visual Recognition

Xiaofei He, Shuicheng Yan, Yuxiao Hu, Hong-Jiang Zhang. Pages 385–392.

Coffee Break : 10:30 – 11:00

Session 5. Features and Tracking : 11:00 – 12:30

1. A Model-Based Approach for Automated Feature Extraction in Fundus Images

Huiqi Li, Opas Chutatape. Pages 394–399.

2. Information Theoretic Focal Length Selection for Real-Time Active 3-D Object Tracking

Joachim Denzler, Matthias Zobel, Heinrich Niemann. Pages 400–407.

3. Shape Gradients for Histogram Segmentation using Active Contours

Stephanie Jehan-Besson, Michel Barlaud, Gilles Aubert, Olivier Faugeras. Pages 408–415.

4. Fast Intensity-based 2D-3D Fluoroscopy-to-CT Registration of Clinical Data Using Light Fields

Daniel B. Russakoff, Torsten Rohlfing, Calvin R. Maurer Jr.. Pages 416–422.

Lunch Break : 12:30 – 14:30**Session 6. Posters and Demos II : 14:30 – 17:15****1. Integrated Edge and Junction Detection with the Boundary Tensor**

Ullrich Koethe. Pages 424–431.

2. Space-Time Interest Points

Ivan Laptev, Tony Lindeberg. Pages 432–439.

3. Good Continuations in Digital Image Level Lines

Frederic Cao. Pages 440–447.

4. On the Use of Marginal Statistics of Subband Images

Joshua Gluckman. Pages 448–455.

5. Mean Shift Based Clustering in High Dimensions: A Texture Classification Example

Bogdan Georgescu, Ilan Shimshoni, Peter Meer. Pages 456–463.

6. Improved Fast Gauss Transform and Efficient Kernel Density Estimation

Changjiang Yang, Ramani Duraiswami, Nail A. Gumerov, Larry Davis. Pages 464–471.

7. Unsupervised Image Translation

Romer Rosales, Kannan Achan, Brendan Frey. Pages 472–478.

8. On Exploiting Occlusions in Multiple-view Geometry

Paolo Favaro, Alessandro Duci, Yi Ma, Stefano Soatto. Pages 479–486.

9. An Efficient Image Similarity Measure Based on Approximations of KL-Divergence Between Two Gaussian Mixtures

Jacob Goldberger, Shiri Gordon, Hayit Greenspan. Pages 487–493.

10. Machine Learning and Multiscale Methods in the Classification of Bivalve Larvae

Sanjay Tiwari, Scott Gallager. Pages 494–501.

11. Automatic Segmentation of Contrast-Enhanced Image Sequences

Junhwan Kim, Ramin Zabih. Pages 502–509.

12. Reinforcement Learning for Combining Relevance Feedback Techniques in Image Retrieval

Peng-Yeng Yin, Bir Bhanu, Kuang-Cheng Chang, Anlei Dong. Pages 510–515.

13. Automatically Labeling Data Using Multi-class Active Learning

Rong Yan, Jie Yang, Alex G. Hauptmann. Pages 516–523.

14. Fast Vehicle Detection with Probabilistic Feature Grouping and Its Application to Vehicle Tracking

ZuWhan Kim, Jitendra Malik. Pages 524–531.

15. An Automatic Drowning Detection Surveillance System for Challenging Outdoor Pool Environments

How-Lung Eng, Kar-Ann Toh, Alvin H. Kam, Junxian Wang, Wei-Yun Yau. Pages 532–539.

16. The Catchment Feature Model for Multimodal Language Analysis

Francis Quek. Pages 540–547.

17. Cumulative Residual Entropy, A New Measure of Information and its Application to Image Alignment

F. E. Wang, B. C. Vemuri, M. Rao, Y. Chen. Pages 548–553.

18. Nonmetric Lens Distortion Calibration: Closed-form Solutions, Robust Estimation and Model Selection

Moumen El-Melegy, Aly Farag. Pages 554–559.

19. Determining Reflectance and Light Position from a Single Image Without Distant Illumination Assumption

Kenji Hara, Ko Nishino, Katsushi Ikeuchi. Pages 560–567.

20. Phenomenological Eigenfunctions for Image Irradiance

Peter Nillius, Jan-Olof Eklundh. Pages 568–575.

21. Dealing with Textureless Regions and Specular Highlights — A Progressive Space Carving Scheme Using a Novel Photo-consistency Measure

Ruigang Yang, Marc Pollefeys, Greg Welch. Pages 576–584.

22. Outlier Correction in Image Sequences for the Affine Camera

D. Q. Huynh, R. Hartley, A. Heyden. Pages 585–590.

23. Voxel Carving for Specular Surfaces

Thomas Bonfort, Peter Sturm. Pages 591–596.

24. Variational Stereovision and 3D Scene Flow Estimation with Statistical Similarity Measures

Jean-Philippe Pons, Renaud Keriven, Olivier Faugeras, Gerardo Hermosillo. Pages 597–602.

25. Two-Frame Wide Baseline Matching

Jiangjian Xiao, Mubarak Shah. Pages 603–609.

26. Fast Stereo Matching Using Reliability-Based Dynamic Programming and Consistency Constraints

Minglun Gong, Herbert Yang. Pages 610–617.

27. Shape and Motion under Varying Illumination: Unifying Multiview Stereo, Photometric Stereo, and Structure from Motion

Li Zhang, Brian Curless, Aaron Hertzmann, Steven M. Seitz. Pages 618–625.

28. Unsupervised Improvement of Visual Detectors using Co-Training

Anat Levin, Paul Viola, Yoav Freund. Pages 626–633.

29. Selection of Scale-Invariant Parts for Object Class Recognition

György Dorkó, Cordelia Schmid. Pages 634–640.

30. Inferring 3D Structure with a Statistical Image-based Shape Model

Kristen Grauman, Greg Shakhnarovich, Trevor Darrell. Pages 641–648.

31. Affine-Invariant Local Descriptors and Neighborhood Statistics for Texture Recognition

Svetlana Lazebnik, Cordelia Schmid, Jean Ponce. Pages 649–655.

32. Shape Representation via Harmonic Embedding

Alessandro Duci, Anthony Yezzi, Sanjoy Mitter, Stefano Soatto. Pages 656–662.

33. Learning Pedestrian Models for Silhouette Refinement

Lily Lee, Gerald Dalley, Kinh Tieu. Pages 663–670.

34. A Bayesian Network for Relational Shape Matching

A. Rangarajan, J.M. Coughlan, A.L. Yuille. Pages 671–678.

35. Unified Subspace Analysis for Face Recognition

Xiaogang Wang, Xiaoou Tang. Pages 679–686.

36. Face Sketch Synthesis and Recognition

Xiaoou Tang, Xiaogang Wang. Pages 687–694.

37. Dynamic Stroke Information Analysis for Video-Based Handwritten Chinese Character Recognition

Feng Lin, Xiaoou Tang. Pages 695–700.

38. Surface Classification using Conformal Structures

Xianfeng Gu, Shing-Tung Yau. Pages 701–708.

39. Boosting Chain Learning for Object Detection

Rong Xiao, Long Zhu, Hongjiang Zhang. Pages 709–715.

40. Texture Segmentation by Multiscale Aggregation of Filter Responses and Shape Elements

Meirav Galun, Eitan Sharon, Ronen Basri, Achi Brandt. Pages 716–723. See the CD-ROM for a [color version](#).

Session 7. Tracking : 17:15 – 18:45

1. Recognizing Action at a Distance

Alexei A. Efros, Alexander C. Berg, Greg Mori, Jitendra Malik. Pages 726–733.

2. Detecting Pedestrians using Patterns of Motion and Appearance

Paul Viola, Michael J. Jones, Daniel Snow. Pages 734–741.

3. Recognition of Group Activities using a Dynamic Probabilistic Network

Shaogang Gong, Tao Xiang. Pages 742–749.

4. Fast Pose Estimation with Parameter-Sensitive Hashing

Gregory Shakhnarovich, Paul Viola, Trevor Darrell. Pages 750–757.

PAMI Meeting. Athena Amphitheatre : 19:00 – 20:30

| |
|-----------------------------|
| Wednesday 15 October |
|-----------------------------|

Session 8. Calibration and Reconstruction : 9:00 – 10:30**1. Towards Gauge Invariant Bundle Adjustment: A Solution Based on Gauge Dependent Damping**

Adrien Bartoli. Pages 760–765.

2. Mirrors in Motion: Epipolar Geometry and Motion Estimation

Christopher Geyer, Kostas Daniilidis. Pages 766–773.

3. Autocalibration of Projector-Screen-Camera System: Theory and Algorithm for Screen-to-Camera Homography Estimation

Takayuki Okatani, Koichiro Deguchi. Pages 774–781.

4. Camera Calibration using Spheres: A Semi-definite Programming Approach

Motilal Agrawal, Larry Davis. Pages 782–789.

Coffee Break : 10:30 – 11:00**Session 9. Applications : 11:00 – 12:30****1. Gamut Constrained Illuminant Estimation**

Graham D. Finlayson, Steven D. Hordley, Ingeborg Tasl. Pages 792–799.

2. Appearance Sampling for Obtaining a Set of Basis Images for Variable Illumination

Imari Sato, Takahiro Okabe, Yoichi Sato, Katsushi Ikeuchi. Pages 800–807.

3. A Theory of Multiplexed Illumination

Yoav Y. Schechner, Shree K. Nayar, Peter Belhumeur. Pages 808–815.

4. Incorporating the Torrance and Sparrow Model of Reflectance in Uncalibrated Photometric Stereo

Athinodoros S. Georghiades. Pages 816–823.

Lunch Break : 12:30 – 14:30**Session 10. Posters and Demos III : 14:30 – 17:15****1. “Perspective Shape from Shading” and Viscosity Solutions**

Emmanuel Prados, Olivier Faugeras. Pages 826–831.

2. The Beltrami Flow over Implicit Manifolds

Nir Sochen, Rachid Deriche, Lucero Lopez-Perez. Pages 832–839.

3. Image Statistics and Anisotropic Diffusion

Hanno Scharr, Michael J. Black, Horst W. Haussecker. Pages 840–847.

4. Combining Gradient and Albedo Data for Rotation Invariant Classification of 3D Surface Texture

Jiahua Wu, Mike Chantler. Pages 848–855.

5. Reflectance-based Classification of Color Edges

Theo Gevers. Pages 856–861.

6. A New Perspective [on] Shape-from-Shading

Ariel Tankus, Nir Sochen, Yehezkel Yeshurun. Pages 862–869. See the [poster](#) on the CD-ROM for newer examples than the proceedings.

7. Separating Reflection Components of Textured Surface using a Single Image

Robby T. Tan, Katsushi Ikeuchi. Pages 870–877.

8. Robust Regression with Projection Based M-estimators

Haifeng Chen, Peter Meer. Pages 878–885.

9. Variational Space-Time Motion Segmentation

Daniel Cremers, Stefano Soatto. Pages 886–893.

10. How to Deal with Point Correspondences and Tangential Velocities in the Level Set Framework

Jean-Philippe Pons, Gerardo Hermosillo, Renaud Keriven, Olivier Faugeras. Pages 894–899.

11. Comparison of Graph Cuts with Belief Propagation for Stereo, using Identical MRF Parameters

Marshall F. Tappen, William T. Freeman. Pages 900–907.

12. Controlling Model Complexity in Flow Estimation

Zoran Duric, Fayin Li, Harry Wechsler, Vladimir Cherkassky. Pages 908–914.

13. Model-Based Multiple View Reconstruction of People

J. Starck, A. Hilton. Pages 915–922.

14. Landmark-based Shape Deformation with Topology-Preserving Constraints

Song Wang, Jim Xiuquan Ji, Zhi-Pei Liang. Pages 923–930.

15. Reliable Recovery of Piled Box-like Objects via Parabolically Deformable Superquadrics.

Dimitrios Katsoulas. Pages 931–938.

16. View-invariant Alignment and Matching of Video Sequences

Cen Rao, Alexei Gritai, Mubarak Shah, Tanveer Syeda-Mahmood. Pages 939–945.

17. High Resolution Terrain Mapping using Low Altitude Aerial Stereo Imagery

Il-Kyun Jung, Simon Lacroix. Pages 946–951.

18. Tracking Across Multiple Cameras With Disjoint Views

Omar Javed, Zeeshan Rasheed, Khurram Shafique, Mubarak Shah. Pages 952–957.

19. Facial Expression Decomposition

Hongcheng Wang, Narendra Ahuja. Pages 958–965.

20. Plane-based Calibration Algorithm for Multi-camera Systems via Factorization of Homography Matrices

Toshio Ueshiba, Fumiaki Tomita. Pages 966–973.

21. Tales of Shape and Radiance in Multiview Stereo

Stefano Soatto, Anthony J. Yezzi, Hailin Jin. Pages 974–981.

22. Polarization-based Inverse Rendering from a Single View

Daisuke Miyazaki, Robby T. Tan, Kenji Hara, Katsushi Ikeuchi. Pages 982–987.

23. On the Epipolar Geometry of the Crossed-Slits Projection

Doron Feldman, Daphna Weinshall, Tomas Pajdla. Pages 988–995.

24. Spectral Partitioning for Structure from Motion

Drew Steedly, Irfan Essa, Frank Dellaert. Pages 996–1003.

25. Scene Modeling Based on Constraint System Decomposition Techniques

Marta Wilczkowiak, Gilles Trombettoni, Christophe Jermann, Peter Sturm, Edmond Boyer. Pages 1004–1010.

26. Combinatorial Constraints on Multiple Projections of a Set of Points

Tomas Werner. Pages 1011–1016.

27. Multiview Reconstruction of Space Curves

Fredrik Kahl, Jonas August. Pages 1017–1024.

28. What Does Motion Reveal About Transparency?

Moshe Ben-Ezra, Shree K. Nayar. Pages 1025–1032.

29. Visual Correspondence Using Energy Minimization and Mutual Information

Junhwan Kim, Vladimir Kolmogorov, Ramin Zabih. Pages 1033–1040.

30. Entropy-of-likelihood Feature Selection for Image Correspondence

Matthew Toews, Tal Arbel. Pages 1041–1047.

31. A Caratheodory-Fejer Approach to Robust Multiframe Tracking

Octavia I. Camps, Hwasup Lim, Maria Cecilia Mazzaro, Mario Sznajder. Pages 1048–1055.

32. Tracking Objects using Density Matching and Shape Priors

Tao Zhang, Daniel Freedman. Pages 1056–1062.

33. Filtering Using a Tree-Based Estimator

Bjorn Stenger, Arasanathan Thayananthan, Philip Torr, Roberto Cipolla. Pages 1063–1070.

34. Constraining Human Body Tracking

David Demirdjian, Teresa Ko, Trevor Darrell. Pages 1071–1078.

35. A Background Layer Model for Object Tracking through Occlusion

Yue Zhou, Hai Tao. Pages 1079–1085.

36. Bayesian Clustering of Optical Flow Fields

Jesse Hoey, James J. Little. Pages 1086–1093.

37. Tracking Articulated Body by Dynamic Markov Network

Ying Wu, Gang Hua, Ting Yu. Pages 1094–1101.

38. Tracking Articulated Hand Motion with Eigen-Dynamics Analysis

Hanning Zhou, Thomas S. Huang. Pages 1102–1109.

39. Maintaining Multi-Modality through Mixture Tracking

Jaco Vermaak, Arnaud Doucet, Patrick Pérez. Pages 1110–1116.

40. Using Prior Shape and Intensity Profile in Medical Image Segmentation

Yunmei Chen, Feng Huang, Hemant D. Tagare, Murali Rao, David Wilson, Edward A. Geiser. Pages 1117–1124.

Session 11. Applications : 17:15 – 18:45**1. A New Paradigm for Recognizing 3-D Object Shapes from Range Data**

Salvador Ruiz Correa, Linda G. Shapiro, Marina Melia. Pages 1126–1133.

2. A Bayesian Approach to Unsupervised One-shot Learning of Object Categories

Li Fei-Fei, Rob Fergus, Pietro Perona. Pages 1134–1141.

3. An Affine Invariant Deformable Shape Representation for General Curves

Anders Ericsson, Kalle Åström. Pages 1142–1149.

4. Discriminative Random Fields: A Discriminative Framework for Contextual Interaction in Classification

Sanjiv Kumar, Martial Hebert. Pages 1150–1157.

Banquet. Marineland Antibes : Depart 19:15, return 23:30

| |
|----------------------------|
| Thursday 16 October |
|----------------------------|

Session 12. Sensing devices and IBR : 9:00 – 10:30**1. Eye Design in the Plenoptic Space of Light Rays**

Jan Neumann, Cornelia Fermüller, Yiannis Aloimonos. Pages 1160–1167.

2. Adaptive Dynamic Range Imaging: Optical Control of Pixel Exposures Over Space and Time

Shree K. Nayar, Vlad Branzoi. Pages 1168–1175.

3. Image-based Rendering using Image-based Priors

Andrew Fitzgibbon, Yonatan Wexler, Andrew Zisserman. Pages 1176–1183.

4. Photo-Consistent 3D Fire by Flame-Sheet Decomposition

Samuel W. Hasinoff, Kiriakos N. Kutulakos. Pages 1184–1191. For **example videos**, see the CD-ROM or visit www.cs.toronto.edu/hasinoff/fire.

Coffee Break : 10:30 – 11:00**Session 13. 3D and 2D Reconstruction : 11:00 – 12:30****1. Dense Matching of Multiple Wide-Baseline Views**

Christoph Strecha, Tinne Tuytelaars, Luc Van Gool. Pages 1194–1201.

2. Dense Shape Reconstruction of a Moving Object under Arbitrary, Unknown Lighting

Denis Simakov, Darya Frolova, Ronen Basri. Pages 1202–1209.

3. Linear Multi-View Reconstruction of Points, Lines, Planes and Cameras using a Reference Plane

Carsten Rother. Pages 1210–1217.

4. Recognising Panoramas

Matthew Brown, David Lowe. Pages 1218–1225.

Lunch Break : 12:30 – 14:30**Session 14. Posters and Demos IV : 14:30 – 17:15****1. A Mathematical Theory of Primal Sketch and Sketchability**

Cheng-En Guo, Song-Chun Zhu, Yingnian Wu. Pages 1228–1235.

2. Dynamic Texture Segmentation

Gianfranco Doretto, Daniel Cremers, Paolo Favaro, Stefano Soatto. Pages 1236–1242.

3. Learning and Inferring Image Segmentations using the GBP Typical Cut Algorithm

Noam Shental, Assaf Zomet, Tomer Hertz, Yair Weiss. Pages 1243–1250.

4. Geometric Segmentation of Perspective Images Based on Symmetry Groups

Allen Yang, Shankar Rao, Wei Hong, Yi Ma. Pages 1251–1258.

5. Natural Image Statistics for Natural Image Segmentation

Matthias Heiler, Christoph Schnörr. Pages 1259–1266.

6. Unsupervised Non-parametric Region Segmentation Using Level Sets

Timor Kadir, Michael Brady. Pages 1267–1274.

7. Computing MAP Trajectories by Representing, Propagating and Combining PDFs over Groups

Paul Smith, Tom Drummond, Kimon Roussopoulos. Pages 1275–1282.

8. Markov-Based Failure Prediction for Human Motion Analysis

Shiloh L. Dockstader, Nikita S. Imennov, A. Murat Tekalp. Pages 1283–1288.

9. SVM-based Nonparametric Discriminant Analysis, an Application to Face Detection

Rik Fransens, Jan De Prins, Luc Van Gool. Pages 1289–1296.

10. Facial Expression Understanding in Image Sequences Using Dynamic and Active Visual Information Fusion

Yongmian Zhang, Qiang Ji. Pages 1297–1304.

11. Background Modeling and Subtraction of Dynamic Scenes

Antoine Monnet, Anurag Mittal, Nikos Paragios, Visvanathan Ramesh. Pages 1305–1312.

12. Surface Reconstruction by Integrating 3D and 2D Data of Multiple View

Maxime Lhuillier, Long Quan. Pages 1313–1320.

13. Recovery of Epipolar Geometry as a Manifold Fitting Problem

Liran Goshen, Ilan Shimshoni, Padmanabhan Anandan, Daniel Keren. Pages 1321–1328.

14. Assessing Accuracy Factors in Deformable 2D/3D Medical Image Registration Using a Statistical Pelvis Model

Jianhua Yao, Russell Taylor. Pages 1329–1334.

15. Stochastic Refinement of the Visual Hull to Satisfy Photometric and Silhouette Consistency Constraints

John Isidoro, Stan Sclaroff. Pages 1335–1342.

16. Capturing Subtle Facial Motions in 3D Face Tracking

Zhen Wen, Thomas S. Huang. Pages 1343–1350.

17. Catadioptric Camera Calibration Using Geometric Invariants

Xianghua Ying, Zhanyi Hu. Pages 1351–1358.

18. Paracatadioptric Camera Calibration using Lines

Joao P. Barreto, Helder Araujo. Pages 1359–1365.

19. Multiple-cue Illumination Estimation in Textured Scenes

Yuanzhen Li, Stephen Lin, Hanqing Lu, Heung-Yeung Shum. Pages 1366–1373.

20. A Novel Approach For Texture Shape Recovery

Jing Wang, Kristin J. Dana. Pages 1374–1380.

21. Polarization-based Transparent Surface Modelling from Two Views

Daisuke Miyazaki, Masataka Kagesawa, Katsushi Ikeuchi. Pages 1381–1386.

22. A Class of Photometric Invariants: Separating Material from Shape and Illumination

Srinivasa G. Narasimhan, Visvanathan Ramesh, Shree K. Nayar. Pages 1387–1394.

23. Towards Direct Recovery of Shape and Motion Parameters from Image Sequences

Stephen Benoit, Frank P. Ferrie. Pages 1395–1402.

24. Real-Time Simultaneous Localisation and Mapping with a Single Camera

Andrew J. Davison. Pages 1403–1410.

25. Binocular Helmholtz Stereopsis

Todd Zickler, Jeffrey Ho, David Kriegman, Jean Ponce, Peter Belhumeur. Pages 1411–1417.

26. Camera Calibration with Known Rotation

Jan-Michael Frahm, Reinhard Koch. Pages 1418–1425.

27. Globally Convergent Autocalibration

Arrigo Benedetti, Alessandro Busti, Michela Farenzena, Andrea Fusiello. Pages 1426–1432.

28. 3D Tracking = Classification + Interpolation

Carlo Tomasi, Slav Petrov, Arvind Sastry. Pages 1441–1448. See the CD-ROM for some [demo video clips](#).

29. Fusion of Static and Dynamic Body Biometrics for Gait Recognition

Liang Wang, Huazhong Ning, Tieniu Tan, Weiming Hu. Pages 1449–1454.

30. Large-Scale Event Detection Using Semi-Hidden Markov Models

Somboon Hongeng, Ramakant Nevatia. Pages 1455–1462.

31. Recognizing Human Action Efforts: An Adaptive Three-Mode PCA Framework

James W. Davis, Hui Gao. Pages 1463–1469.

32. Video Google: A Text Retrieval Approach to Object Matching in Videos

Josef Sivic, Andrew Zisserman. Pages 1470–1477.

33. Probabilistic Bilinear Models for Appearance-Based Vision

David B. Grimes, Aaron P. Shon, Rajesh P.N. Rao. Pages 1478–1485.

34. Real Time Pattern Matching Using Projection Kernels

Yacov Hel-Or, Hagit Hel-Or. Pages 1486–1493.

35. Weighted and Robust Incremental Method for Subspace Learning

Danijel Skocaj, Ales Leonardis. Pages 1494–1501.

36. Conditional Feature Sensitivity: A Unifying View on Active Recognition and Feature Selection

Xiang Sean Zhou, Dorin Comaniciu, Arun Krishnan. Pages 1502–1509.

Session 15. Specularities and Color : 17:15 – 18:00**1. Using Specularities for Recognition**

Margarita Osadchy, David Jacobs, Ravi Ramamoorthi. Pages 1512–1519.

2. Color Edge Detection by Photometric Quasi-Invariants

J. van de Weijer, Th. Gevers, J-M. Geusebroek. Pages 1520–1525.

ICCV 2003 Demonstrations

Monday 13 – Thursday 16 October, during poster sessions and breaks.

Rhodes 10 and 11

Academic demos run for a single day, commercial ones for 1–3 days. See the CD-ROM under demos/author-surname for descriptions and videos.

Demo Session 1. Monday 13 October

1. REALVIZ: Computer-vision for professional content creators

Luc Robert, REALVIZ.

2. A range of real time video processing on a dedicated low power video processor

David Sinclair.

3. High-speed motion tracking by direct access of a CMOS Sensor

Ulrich Muhlmann, Miguel Ribo, Axel Pinz.

4. 3D L-S Recon: A fast level-set approach to surface modeling from unorganized sample points

Marco Marcon, Luca Piccarreta, Augusto Sarti, Stefano Tubaro.

5. Real-time position and orientation estimation with a monocular camera and motion sensors over a structured, planar surface

Marco Grimm, Rolf-Rainer Grigat.

6. Active camera system

Nobuhiro Kondoh, Ryuzo Okada, Junji Oaki, Daisuke Yamamoto, Hiroshi Miyazaki, Kouki Uesugi, Jiro Amemiya, Kenji Shirakawa, Atsushi Kunimatsu.
See CD-ROM for a [video](#).

7. A real-time face tracking system based on morphable 3D model fitting

Kazuhiro Hiwada, Atsuto Maki, Akiko Nakashima. See the CD-ROM for a [video](#).

8. Real-time pose and position estimation of a camera with fish-eye lens

Nobuyuki Kita, Francois Berenger, Andrew Davison. See the CD-ROM for a [video](#).

9. boujou and SteadyMove

Philip Pritchett, 2D3.

Demo Session 2. Tuesday 14 October

1. REALVIZ: Computer-vision for professional content creators

Luc Robert, REALVIZ.

2. A range of real time video processing on a dedicated low power video processor

David Sinclair.

3. Live ego-motion estimation

David Nister.

4. 3D wand: A handheld 3D digitizing device

Hiroyuki Aritaki, Ryo Furukawa, Hiroshi Kawasaki, Masao Sakauchi. See the CD-ROM for a [video](#).

5. Onboard surveillance system for automobiles using image processing LSI

Ryuzo Okada, Yasuhiro Taniguchi, Kenji Furukawa, and Kazunori Onoguchi. See the CD-ROM for a [video](#).

6. Real-time tracking with EM algorithms

Arthur E.C. Pece, Dan W. Hansen. See the CD-ROM for [cluster tracker](#) and [iris tracker](#) videos.

7. A fast 360-degree rotation invariant face detection system

Shihong Lao, Toshiyuki Kozuru, Takuya Okamoto, Takayoshi Yamashita, Naohiro Tabata, Masato Kawade. See the CD-ROM for a [video](#).

8. A real-time face tracking system based on morphable 3D model fitting

Kazuhiro Hiwada, Atsuto Maki, Akiko Nakashima. See the CD-ROM for a [video](#).

9. boujou and SteadyMove

Philip Pritchett, 2D3.

10. Automatic 2D to 3D footage conversion for 3D glasses-free display systems

Juliang Shao, Julien Flack, Simon Fox, Phil Harman. See the CD-ROM for videos of [horses](#) and [crowd](#) scenes.

Demo Session 3. Wednesday 15 October

1. REALVIZ: Computer-vision for professional content creators

Luc Robert, REALVIZ.

2. 3D human head modeling from un-calibrated images

Reza Hassanpour, Volkan Atalay.

3. Image recognition of small humanoid robot SDR-4X II

Kohtaro Sabe. See the CD-ROM for [reflex](#) and [navigation](#) videos.

4. 3D wand: A handheld 3D digitizing device

Hiroyuki Aritaki, Ryo Furukawa, Hiroshi Kawasaki, Masao Sakauchi. See the CD-ROM for a [video](#).

5. Onboard surveillance system for automobiles using image processing LSI

Ryuzo Okada, Yasuhiro Taniguchi, Kenji Furukawa, and Kazunori Onoguchi. See the CD-ROM for a [video](#).

6. Camera document recognition system

Kye Kyung Kim, Su Young Chi, Soo Hyun Cho, Won Pil Ru, Yun Koo Chung, Jin Ho Kim.

7. CAMcal: A program for camera calibration using checkerboard patterns

Chang Shu, Alan Brunton, Mark Fiala. See the CD-ROM for a [video](#).

8. Digital technology for ordinary whiteboards

Zhengyou Zhang, Li-wei He.

9. boujou and SteadyMove

Philip Pritchett, 2D3.

10. Automatic 2D to 3D footage conversion for 3D glasses-free display systems

Juliang Shao, Julien Flack, Simon Fox, Phil Harman. See the CD-ROM for videos of [horses](#) and [crowd](#) scenes.

Demo Session 4. Thursday 16 October

1. City guide

M. Ribo, Ch. Stock, H. Siegl, H. Ganster, A. Pinz.

2. Bayesian face annotation in family albums

Lei Zhang, Longbin Chen, Mingjing Li, Hongjiang Zhang.

3. Image recognition of small humanoid robot SDR-4X II

Kohtaro Sabe. See the CD-ROM for [reflex](#) and [navigation](#) videos.

4. 3D wand: A handheld 3D digitizing device

Hiroyuki Aritaki, Ryo Furukawa, Hiroshi Kawasaki, Masao Sakauchi. See the CD-ROM for a [video](#).

5. Fully automated real-time augmented reality

Vincent Lepetit, Luca Vacchetti, Julien Pilet, Pascal Fua. See the CD-ROM for a [video](#).

6. Shadow elimination and occluder light suppression for switched multi-projector displays

Matthew Flagg, Jay Summet, Ramswaroop Somani, James M. Rehg, Rahul Sukthankar, Tat-Jen Cham. See the CD-ROM for a [video](#).

7. 3D surface acquisition from single images

Antonio Robles-Kelly, Edwin R. Hancock. See the CD-ROM for videos [1](#) and [2](#).

8. Image-based walkthroughs of real-world environments

Matt Uyttendaele, Sing-Bing Kang, Antonio Criminisi, Simon Winder, Rick Szeliski.

9. An image-based anisotropic reflection modeling of textile fabrics based on the extended KES method

Yuki Takeda, Shinsaku Toyoda, Yu Matsuda, Hiromi T. Tanaka. See the CD-ROM for a [video](#).

10. Automatic 2D to 3D footage conversion for 3D glasses-free display systems

Juliang Shao, Julien Flack, Simon Fox, Phil Harman. See the CD-ROM for videos of [horses](#) and [crowd](#) scenes.

Course 1. PDE-LSM: PDE's and Level Sets Methods in Imaging Sciences

09:00 – 12:45 Saturday 11 October 2003

Gallieni 3

Ron Fedkiw (Stanford University), Stanley Osher (UCLA), and Guillermo Sapiro (University of Minnesota)

Course Content

This short course will introduce the audience to the basic concepts of level-set methods and partial differential equations and their use to develop state of the art algorithms in computer vision, image processing, and computer graphics. We will present the basic derivation of level-sets techniques, fundamental numerical analysis and computational approaches, and cover topics such as image segmentation and classification, image segmentation, image inpainting, image decomposition, and modeling of natural phenomena. The course will be based on the books of instructors and new material developed by leaders in the area.

- Welcome (5 minutes)
- The basic equations of level-set methods: Embedding the evolution (Osher, 20 minutes)
- Some basic numerical implementations of level-set methods (Osher, 20 minutes)
- PDEs and level set methods for image modeling (Osher, 10 minutes)
- PDEs and level set methods for image segmentation, image inpainting, and shape statistics (Sapiro, 40 minutes)
- PDEs and level set methods beyond image processing: there is a world in n-D (Sapiro, 10 minutes)
- PDEs and level set methods for simulating natural phenomena: Fire, water, cloth, smoke (Fedkiw, 50 minutes)

Biographies

Ron Fedkiw received his Ph.D. in Mathematics from UCLA in 1996 and did postdoctoral studies both at UCLA in Mathematics and at Caltech in Aeronautics before joining the Stanford Computer Science Department. He was awarded a Packard Foundation Fellowship, a Presidential Early Career Award for Scientists and Engineers (PECASE), a Sloan Research Fellowship, an Office of Naval Research Young Investigator Program Award (ONR YIP), a Robert N. Noyce Family Faculty Scholarship, two distinguished teaching awards, etc. Currently he is on the editorial board of the Journal of Scientific Computing and the IEEE Transactions on Visualization and Computer Graphics, and participates in the reviewing process of a number of journals and funding agencies. He has published approximately 40 research papers in computational physics, computer graphics and vision, as well as a new book on level set methods. For the past two years, he has been a consultant with Industrial Light + Magic.

Stanley Osher received his Ph.D. from New York University, 1966, M.S. from New York University, 1964, and B.S. from Brooklyn College, 1962. He is currently a Professor at UCLA, Department of Mathematics and Director of Special Projects, Institute for Pure and Applied Mathematics, UCLA. His honors include Japan Society of Mechanical Engineers Computational Mechanics Award, (2002) Invited Speaker, International Congress of Mathematicians, 1994, NASA Public Service Group Achievement Award, 1992, US-Israel BSF Fellow, 1986, SERC Fellowship (England), 1982, Alfred P. Sloan Fellow, 1972-1974, and Fulbright Fellow, 1971. His work has been cited frequently by the national and international media, most recently in Science News, v155, April 1999, "Computing at the Edge", and Die Zeit, v16, Sept. 1999, "Flutwellen aus dem Computer". From 1988-1995 he was Co-Founder, Co-CEO of Cognitech, Inc, CA. This company has been recognized professionally and by the media for its innovative and successful nonlinear partial differential based approach to image and video processing. From 1998-present, Founder, CEO of Level Set Systems, Inc., Pacific Palisades, CA. His research consists of developing innovative numerical methods to solve partial differential equations, especially those whose solutions have steep gradients, analysis of these algorithms and the underlying P.D.E.'s and applications to various areas of Engineering, Physics and recently, image processing. He is a pioneer in numerical methods for shock capturing and one of the inventors of the famous level-sets methods. He wrote some of the first papers on PDE's based image processing and developed or co-developed some of the fundamental numerical methods used in image processing and

computer vision. He was the recipient of the ICIAM Pioneer Prize (2003) and the Japan Society of Mechanical Engineers Computational Mechanics Award (2002). In addition, he is an ISI Original Highly Cited Researcher.

Guillermo Sapiro was born in Montevideo, Uruguay, on April 3, 1966. He received his B.Sc. (summa cum laude), M.Sc., and Ph.D. from the Department of Electrical Engineering at the Technion, Israel Institute of Technology, in 1989, 1991, and 1993 respectively. After post-doctoral research at MIT, Dr. Sapiro became Member of Technical Staff at the research facilities of HP Labs in Palo Alto, California. He is currently with the Department of Electrical and Computer Engineering at the University of Minnesota. G. Sapiro works on differential geometry and geometric partial differential equations, both in theory and applications in computer vision, computer graphics, medical imaging, and image analysis. He recently co-edited a special issue of IEEE Image Processing in this topic and a second one in the Journal of Visual Communication and Image Representation. He has authored and co-authored numerous papers in this area and has written a book published by Cambridge University Press, January 2001. G. Sapiro was awarded the Gutwirth Scholarship for Special Excellence in Graduate Studies in 1991, the Ollendorff Fellowship for Excellence in Vision and Image Understanding Work in 1992, the Rothschild Fellowship for Post-Doctoral Studies in 1993, the Office of Naval Research Young Investigator Award in 1998, the Presidential Early Career Awards for Scientist and Engineers (PECASE) in 1988, and the National Science Foundation Career Award in 1999. G. Sapiro is a member of IEEE and SIAM.

Course 2. Omnidirectional Vision

09:00 – 12:45 Saturday 11 October 2003

Gallieni 6

Christopher Geyer (University of California, Berkeley), Tomas Pajdla (Czech Technical University, Prague), and Kostas Daniilidis (University of Pennsylvania)

Course Content

In robotics it is essential for many tasks to have complete awareness of the environment. For example, in order for aerial or ground robots to avoid obstacles, evade enemies, or generally to perceive and plan in an environment, it is very useful to have vision sensors capable of seeing in all directions. In this short course we present an introduction to the growing field of omnidirectional vision. Below is an outline of some of the topics we plan to cover:

1. Introduction to omnidirectional cameras
 - Motivation
 - Dioptric (lens) and catadioptric (mirror/lens)
 - Central catadioptric systems
2. Models of central catadioptric cameras
 - Image formation
 - Parabolic, elliptical, and hyperbolic mirrors
 - Equivalence with spherical model
 - Duality of parabolic and perspective cameras
 - Conformal cameras
3. Feature representations for catadioptric with parabolic mirrors
 - Linear representation
 - Complex plane
 - Homographies and other image transformations
 - The image of the absolute conic
 - Linearized projection
4. Multiple-view geometry for uncalibrated parabolic mirrors
 - Discrete and differential cases
 - Self-calibration
 - Motion estimation algorithms
 - Stereo rectification
 - SFM by convolution

5. Models of non-central cameras
 - Caustics
 - Plucker cameras
 - Radial distortion
6. Epipolar geometries of non-central cameras
 - Stereo with oblique cameras
 - Concentric mosaics and x-slit cameras
 - Camera calibration and motion estimation
7. Panoramic image processing
 - Images as homogeneous spaces
 - Attitude estimation
 - Template matching

Biographies

Christopher Geyer is currently a post-doc at the University of California, Berkeley. He received his PhD from the University of Pennsylvania under the supervision of Kostas Daniilidis, and received the Rubinoff award for an outstanding dissertation that has resulted in or could lead to innovative applications of computer technology. His interests are in applications of omnidirectional cameras to scene reconstruction and the control of autonomous aerial and ground vehicles. He is also the winner of the A. Atwater Kent Prize in Electrical Engineering from the University of Pennsylvania.

Tomas Pajdla (MSc, PhD from the Czech Technical University in Prague) is an Assistant Professor at the Czech Technical University in Prague, and a lecturer of computer vision and robotics. In 1994-1995, prior to his current appointment, he worked with Luc Van Gool at Katholieke Universiteit Leuven. T. Pajdla works on panoramic imaging since 1996. He coauthored works that introduced epipolar geometry of panoramic cameras, investigated the use of panoramic images for robot localization, contributed to studies of panoramic mosaics, and he proposed to study omnidirectional cameras that do not have a center of projection but have a generalized epipolar geometry. He is a Member of IEEE, ACM, and Czech Pattern Recognition Society. He was awarded the best paper Prize at OAGM'1998. In 2002 he received the award for the best scientific paper at BMVC'2002. He serves as the programme committee chair of ECCV 2004.

Kostas Daniilidis is Associate Professor of Computer and Information Science at the University of Pennsylvania where he was Assistant Professor from

1998 to 2003. He is a member of the interdisciplinary GRASP laboratory. He obtained his MSE (Diploma) in Electrical Engineering from the National Technical University of Athens, 1986, and his PhD (Dr.rer.nat.) in Computer Science from the University of Karlsruhe, 1992, under the supervision of Hans-Hellmut Nagel. Prior to his current appointment, he has been with the University of Kiel. His research interests are in space and motion perception with machines, with focus on omnidirectional vision and new camera technologies. He was the chair of the 2000 IEEE Workshop on Omnidirectional Vision and co-editor of the Special Issue of the IEEE Robotics and Automation Magazine on Panoramic Robotics. He is Associate Editor of the IEEE Trans. Pattern Analysis and Machine Intelligence. He was the 2001 recipient of the Ford Motor Company Award for Best Faculty Advising at the University of Pennsylvania.

Course 3. Efficient Algorithms for Matching

14:45 – 18:30 Saturday 11 October 2003

Gallieni 6

Dan Huttenlocher (Cornell University) and Phil Torr (Microsoft Research)

See CD-ROM for course slides, [part 1](#) and [part 2](#).

Course Content

This course will provide an introduction into some practically useful techniques for matching of sets of features, points, or lines. Matching is fundamental to the solution of many problems in vision, including the recovery of structure and motion, and object recognition. We shall outline matching strategies where there is a strong parametric transformation relating the two sets of images, and when the transformation is slightly weaker, e.g., only imposing local smoothness.

1. Matching features with strong parametric models using random sampling, a review of 23 years of RANSAC fun!
 - RANSAC: Comparison with other robust algorithms, work of Torr on feature matching with F.
 - LMS: Work of Zhang on epipolar geometry estimation, to bucket or not? Relation to Hausdorff, rank or chamfer the error? Relation to computational geometry.
 - MINPRAN.
 - MLESAC/MAPSAC, a Bayesian cost function, matcher, and optimizer.
 - Work of Tordoff on jump out and improvements on matching.
 - Work of Matas et al.: Randomized RANSAC, Hi Lo RANSAC.
2. InterMezzo ICP
 - Definition.
 - Outliers a problem, so look at work of Fitzgibbon.
3. Distance transforms for matching point and line features
 - Definition of distance transform: Distance at each location to nearest "distinguished" point. Formulation as min distance. Relationship to Voronoi diagrams and Delaunay triangulations.
 - Chamfer and Hausdorff distances: How to compute them. Computational speedups. Hausdorff, maximally separating hyperplanes and

perceptron learning algorithm. Pros and cons of Chamfer vs. Hausdorff.

4. Applications of dynamic programming to matching
 - DP as applied to Markov Chains, e.g., snakes: Viterbi. Forward backward.
 - DP for articulated objects, pictorial objects.
 - DP for stereo.

Biographies

Dan Huttenlocher received his bachelors degree from the University of Michigan, and his masters and doctoral degrees from M.I.T. He has been a faculty member in the Computer Science department at Cornell University since 1988, where he currently holds a joint appointment with the Johnson Graduate School of Management. His research interests are in computer vision, geometric algorithms, electronic collaboration tools, financial trading systems, and the principles of software development. In addition to teaching and research, Dr. Huttenlocher has considerable experience managing software-development efforts in corporate and academic settings. He is chief technical officer of Intelligent Markets, a provider of advanced trading systems. He also spent more than ten years at Xerox PARC, directing work that led to the ISO JBIG2 image-compression standard, and serving as part of the senior management team.

Philip Torr graduated from Southampton with a degree in mathematics and obtained a DPhil from Oxford in Engineering (Computer Vision). After more fun as a postdoc in the robotics research group he was given the Marr Prize for work on matching. He then moved to Microsoft Research in Redmond where he worked for two years before moving to Microsoft Research in Cambridge (UK) to help establish the lab. After six highly enjoyable years at Microsoft he plans to return to academia to set up a new vision research lab at Oxford Brookes University in Oxford England and welcomes and encourages all eager potential PhD students or postdocs to email him now!

Course 4. Learning & Inference in Vision: Generative Methods

09:00 – 12:45 Sunday 12 October 2003

Gallieni 6

Bill Freeman (MIT AI Lab) and Andrew Blake (Microsoft Research Cambridge)

Course web page: <http://www.ai.mit.edu/people/wtf/learningvision> — check here for course notes, materials and useful pointers.

Course Content

0. Introduction: roadmap for learning & inference in vision

1. Introduction to Bayesian inference

- *Integration of sensory data*
- *Applications*: color constancy, Bayes Matte

2. Learning & inference in temporal & spatial Markov processes

2.1. PCA, FA, TCA

- *Inference*: linear (Wiener) filter
- *Learning*: by Expectation Maximization (EM); (tutorial: EM for 2-line fitting)
- *Applications*: face simulation, denoising, Weiss's intrinsic images
- *And furthermore*: Active Appearance Models, Simoncelli, ICA & non-Gaussianity, filter banks

2.2. Markov chains & HMM's

- *Inference*: MAP by Dynamic Programming, Forward and Forward-Backward (FB) algorithms;
- *Learning*: by EM, Baum-Welch
- *Representations*: pixels, patches
- *Applications*: stereo vision
- *And furthermore*: gesture models (Bobick-Wilson)

2.3. AR models

- *Inference*: Kalman-Filter, Kalman Smoother, Particle Filter
- *Learning*: by EM-FB
- *Representations*: patches, curves, chamfer maps, filter banks
- *Applications*: tracking (Isard-Blake, Black-Sidenbladh, El Maraghi-Jepson-Fleet); Fitzgibbon-Soatto textures
- *And furthermore*: EP

2.4. MRF's

- *Inference*: ICM, Loopy Belief Propagation (BP), Generalised BP, Graph Cuts
- *Parameter learning*: Pseudolikelihood maximisation
- *Representations*: color pixels, patches
- *Applications*: Texture segmentation, super resolution (Freeman-Pasztor), distinguishing shading from paint
- *And furthermore*: Gibbs sampling, Discriminative Random Field (DRF)

2.5. Bayes networks

- *Inference*: Belief Propagation (BP)
- *Parameter learning*: Pseudolikelihood maximisation
- *Applications*: scene context analysis: combine top down with bottom up (Murphy et al)

2.6. Markov networks

- *Inference*: MCMC
- *Applications*: low level segmentation (Zhu et al)

3. Summary and finish

Biographies

Bill Freeman is an Associate Professor of Electrical Engineering and Computer Science at the Computer Science and Artificial Intelligence Laboratory (CSAIL) at MIT. From 1992–2001 he worked at Mitsubishi Electric Research Labs (MERL), and from 1981–1987, he worked at the Polaroid Corporation, both in Cambridge, MA. He obtained his PhD in computer vision in 1992 from MIT.

His current research interests include machine learning applied to computer vision, Bayesian models of visual perception, and interactive applications of computer vision. In 1997, he received the Outstanding Paper prize at the

Conference on Computer Vision and Pattern Recognition for work on applying bilinear models to “separating style and content”. Previous research topics include steerable filters and pyramids, the generic viewpoint assumption, color constancy, and computer vision for computer games. He holds 22 patents.

Homepage: www.ai.mit.edu/people/wtf

Andrew Blake has served on the on the faculty of Computer Science at the University of Edinburgh and as a Royal Society Research Fellow from 1983-7 and then on the faculty of the Department of Engineering Science in the University of Oxford, where he ran the Visual Dynamics Research Group, became a Professor in 1996, and was a Royal Society Senior Research Fellow for 1998-9. In 1999 he moved to Microsoft Research Cambridge as Senior Researcher working in Machine Learning and Perception, while continuing with the University of Oxford as Visiting Professor of Engineering. He has published several books including “Visual Reconstruction” with A. Zisserman (MIT press), “Active Vision” with Alan Yuille (MIT Press) and “Active Contours” with Michael Isard (Springer-Verlag). He has twice won the prize of the European Conference on Computer Vision, with R. Cipolla in 1992 and with M. Isard in 1996, and was awarded the IEEE David Marr Prize (jointly with K. Toyama) in 2001. He has served as programme chairman for the International Conference on Computer Vision in 1995 and 1999, and is on the editorial boards of the journals “Image and Vision Computing”, the “International Journal of Computer Vision” and “Computer Vision and Image Understanding”. He was elected a Fellow of the Royal Academy of Engineering in 1998.

Homepage: www.research.microsoft.com/~ablake

Course 5. Dense Multiview Stereo

09:00 – 12:45 Sunday 12 October 2003

Risso 8

Steve Seitz (University of Washington), Richard Szeliski (Microsoft Research) and Ramin Zabih (Cornell University)

Course Content

While the classical vision problem of 2-camera stereo has been studied for decades, in the last few years there has been a surge of interest in dense shape reconstruction from multiple views. The course will begin with an introduction to stereo matching, setting up the problem as one of finding correspondences among multiple images and constructing a 3D model. After a short discussion of rectification, we will give a taxonomy of dense stereo algorithms into local and global algorithms. We will then introduce issues pertaining to baseline (tradeoff accuracy vs. search) to motivate multi-baseline stereo. This naturally leads to the issue of visibility, which we analyze within a volume-based framework. We will cover the concepts of photo-consistency and visual hulls, and several multiview algorithms including voxel coloring, space carving, and level sets. Finally, we will discuss in some detail a recent group of algorithms, based on graph cuts, that allow the incorporation of spatial smoothness into dense multiview stereo.

Biographies

Steve Seitz is an Associate Professor in the Department of Computer Science and Engineering at the University of Washington. He received his B.A. in computer science and mathematics at the University of California, Berkeley in 1991 and his Ph.D. in computer sciences at the University of Wisconsin, Madison in 1997. Following his doctoral work, he spent one year visiting the Vision Technology Group at Microsoft Research, and subsequently two years as an Assistant Professor in the Robotics Institute at Carnegie Mellon University. He joined the faculty at the University of Washington in July 2000. He was twice awarded the David Marr Prize for the best paper at the International Conference of Computer Vision, and has received an NSF Career Award, an ONR Young Investigator Award, and an Alfred P. Sloan Fellowship.

Richard Szeliski is a Senior Researcher in the Interactive Visual Media Group at Microsoft Research, where he is pursuing research in 3-D computer vision,

video scene analysis, and image-based rendering. He received a Ph. D. degree in Computer Science from Carnegie Mellon University, Pittsburgh, in 1988. Dr. Szeliski has published over 100 research papers in computer vision, computer graphics, medical imaging, neural nets, and parallel numerical algorithms, as well as the book *Bayesian Modeling of Uncertainty in Low-Level Vision*. He is on the editorial board of the *International Journal of Computer Vision*, and served as Program Chair for ICCV'2001, organizer of the ICCV'99 Workshop on Vision Algorithms, and Associate Editor of the *IEEE Transactions on Pattern Analysis and Machine Intelligence*.

Ramin Zabih is an Associate Professor in the Computer Science Department at Cornell University. He received undergraduate degrees in computer and in mathematics, and a master's in computer science, at MIT, followed by a Ph.D. in computer science from Stanford in 1994. His research has focused on the use of graph algorithms to solve problems in low-level vision. He organized the ICCV'99 Workshop on Graph Algorithms and Computer Vision, and co-edited a special issue of the *IEEE Transactions on Pattern Analysis and Machine Intelligence* on this topic. He shared the best paper award at the European Conference on Computer Vision in 2002 for a pair of papers describing the use of graph algorithms to compute dense multiview stereo.

Course 6. Learning & Inference in Vision: Discriminative Methods

14:45 – 18:30 Sunday 12 October 2003

Gallieni 6

Christopher Bishop (Microsoft Research) and Paul Viola (Microsoft Research)

Course Content

1. Foundations:
 - Inference and decision
 - Discriminative versus generative approaches to classification and regression
 - Bayesian methods
 - Feature selection
2. Algorithms, architectures, and techniques:
 - Multilayer neural networks
 - Gaussian processes
 - Support vector machines
 - Decision trees
 - Adaboost
 - Memory based classification/estimation and locally-weighted regression
 - Estimating generalization: Cross-validation and ROC curves
 - Building fast classifiers
3. Applications:
 - Face and object detection
 - Recognition: Characters/faces/objects
 - Body pose estimation

Biography

Chris Bishop graduated from Oxford with B.A. in Physics, and obtained a PhD in Theoretical Physics from the University of Edinburgh a thesis on quantum field theory. After several years working on the theory of magnetically confined plasmas for the fusion programme, he developed an interest in

pattern recognition, and became Head of the Applied Neurocomputing Centre at AEA Technology. In 1993 he was elected to a Chair in the Department of Computer Science and Applied Mathematics at Aston University, where he was a member of the Neural Computing Research Group. He then took a sabbatical to be principal organiser of the six month international research programme on Neural Networks and Machine Learning at the Isaac Newton Institute for Mathematical Sciences in Cambridge, which ran from July to December 1997.

After completion of the Newton Institute programme he joined the Microsoft Research Laboratory in Cambridge, where he is Assistant Director. At the same time he was elected to a Chair of Computer Science at the University of Edinburgh where he is a member of the Institute for Adaptive and Neural Computation in the Division of Informatics. He is also a Fellow of Darwin College, Cambridge.

His research is concerned with the development and application of probabilistic methods for inference and learning.

Paul Viola: Before moving to Microsoft, Paul Viola was a researcher at MERL and an Associate Professor of Computer Science and Engineering at the Massachusetts Institute of Technology. He also spent two years as a visiting scientist in the Computational Neurobiology of the Salk Institute in San Diego. Paul has a broad background in advanced computational techniques, publishing in the fields of computer vision, machine learning, medical imaging, neurobiological vision, mobile robotics, and automated drug design. Paul was a recipient of a National Science Foundation Career award in 1998.

Course 7. Image-based Rendering

14:45 – 18:30 Sunday 12 October 2003

Risso 8

Brian Curless (University of Washington), Harry Shum (Microsoft Research Asia), and Richard Szeliski (Microsoft Research)

Course Content

This course is an introduction to the field of image-based rendering, which is an emerging area in computer graphics concerned with rendering real-world (and sometimes synthetic) images from large collections of captured or pre-rendered images. This area spans the fields of computer graphics, computer vision, and image processing, and is currently a very active inter-disciplinary research area in all of these communities.

1. Introduction to light fields (Richard Szeliski)
 - View interpolation
 - Epipolar plane images
 - The Lightfield and the Lumigraph
 - Impostors and sprites
2. Lower-dimensional lightfields and sampling (Harry Shum)
 - Concentric Mosaics
 - Manifold hopping
 - Plenoptic sampling
 - Pop-up lightfield
3. Surface lightfields and environment mattes (Brian Curless)
 - Surface lightfields
 - Environment mattes
 - Video and shadow matting
4. Video-based rendering (Richard Szeliski)
 - Video textures
 - Video-based environment modeling

Biographies

Brian Curless is an associate professor of Computer Science and Engineering at the University of Washington. He received the B.S. degree in Electrical Engineering from the University of Texas at Austin, and, after working for

a year at SRI International as a research engineer, he earned his M.S. and Ph.D. degrees in Electrical Engineering from Stanford University. Curless received a university-wide Outstanding Teaching Award while at Stanford, has been nominated for Washington's university-wide teaching award, and has co-organized and co-taught courses on 3D Photography at CVPR and SIGGRAPH. His research interests span several areas of computer vision and graphics, with emphasis on capturing and modeling shape and appearance.

Harry Shum received his Ph.D. in robotics from the School of Computer Science, Carnegie Mellon University in 1996. He worked as a researcher for three years in the vision technology group at Microsoft Research Redmond. In 1999, he moved to Microsoft Research Asia where he is currently a senior researcher and the assistant managing director. His research interests include computer vision, computer graphics, human computer interaction, pattern recognition, statistical learning and robotics. He is the General Co-Chair of Tenth International Conference on Computer Vision (ICCV 2005 Beijing).

Richard Szeliski is a Senior Researcher in the Interactive Visual Media Group at Microsoft Research, where he is pursuing research in 3-D computer vision, video scene analysis, and image-based rendering. He received a Ph. D. degree in Computer Science from Carnegie Mellon University, Pittsburgh, in 1988. Dr. Szeliski has published over 100 research papers in computer vision, computer graphics, medical imaging, neural nets, and parallel numerical algorithms, as well as the book *Bayesian Modeling of Uncertainty in Low-Level Vision*. He is on the editorial board of the *International Journal of Computer Vision*, and served as Program Chair for ICCV'2001, organizer of the ICCV'99 Workshop on Vision Algorithms, and Associate Editor of the *IEEE Transactions on Pattern Analysis and Machine Intelligence*.

Workshop 1. VS-PETS: Joint IEEE International Workshop on Visual Surveillance and Performance Evaluation of Tracking and Surveillance

Saturday 11 – Sunday 12 October 2003

Gallieni 2

This program is provisional. See vspets.visualsurveillance.org for the final program. Colour proceedings are available for purchase at ICCV.

Saturday 11 October

Opening Remarks : 09:15–09:30

Session 1: Calibration : 09:30–10:30

1. Robust Automated Planar Normalization of Tracking Data

C. Stauffer, K. Tieu, L. Lee.

2. Ground Plane Rectification by Tracking Moving Objects

B. Bose, W. E. L. Grimson.

Coffee : 10:30–11:00

Session 2: Scene Modelling, Learning, Human Body Modelling, Pose Estimation and Tracking : 11:00–13:00

1. On the Structure of Bayesian Networks for Complex Scene Modelling

T. Xiang, S. Gong.

2. Human Posture Recognition in Video Sequence

B. Boulay.

3. Real-Time Articulated Human Body Tracking using Silhouette Information

A. Senior.

4. Model-Based Pose Determination using Bayesian Classification Error

Q. Liu, J. Lou, W. Hu, T. Tan.

Lunch Break : 13:00–15:00

Session 3: Applications I : 15:00–16:30

1. Review of Surveillance Images using Classification Techniques in a Relevance Feedback Context

C. Versino, E. Stringa, J. Goncalves.

2. Supporting Real-Time Active Visual Surveillance in Wireless Network

C. K. H. Chiu.

3. Adaptive Integration of Visual Tracking Modalities for Sentient Computing

C. Town.

Coffee : 16:30–17:00

Session 4: Object Classification and Tracking I : 17:00–18:30

1. Spatiotemporal Blocks-Based Moving Objects Identification and Tracking

D. Pokrajac.

2. Three Brown Mice: See How They Run

K. M. Branson, S. Belongie.

3. A Cooperative Distributed Vision Algorithm for Wide Area Vehicle Tracking

C. Motamed.

Sunday 12 October

Session 5: Object Classification and Tracking II : 09:30–10:30

1. Learning to Use Scene Context for Object Classification in Surveillance

B. Bose, W.E.L. Grimson.

2. Utilizing Learned Motion Patterns to Robustly Keep Track of Peoples Positions

M. Bennewitz, W. Burgand, G. Cielniak .

Coffee : 10:30–11:00**Session 6: Performance Evaluation : 11:00–13:00****1. A Perturbation Method for Evaluating Background Subtraction Algorithms**

T. H. Chalidabhongse, K. Kim, D. Harwood, L. Davis.

2. Consistency Checking for Vision Tasks

M. Middendorf, H-H. Nagel.

3. A Novel Method for Video Tracking Performance Evaluation

J. Black, T. Ellis, P. Rosin.

4. Gait Energy Image Representation: Comparative Performance Evaluation on USF HumanID Database

J. Han, B. Bhanu.

Lunch Break : 13:00–15:00**Session 7: Applications II : 15:00–16:30****1. Video-CRM: Detection and Tracking People in Stores**

I. Haritaoglu, D. Beymer, M. Flickner.

2. Automatic Detection and Tracking of Abandoned Objects

M. Spengler, B. Schiele.

3. Fast and Robust Face Finding via Local Context

H. Kruppa, M. Castrillon, B. Schiele.

Coffee : 16:30–17:00**Session 8: Multiple Cameras : 17:00–18:00****1. Learning a Multi-Camera Topology**

T. J. Ellis, D. Makris, J. K. Black.

2. Soccer Playing Tracking Across Uncalibrated Views

J. Kang.

Workshop 2. VLSM: 2nd IEEE Workshop on Variational, Geometric and Level Set Methods in Computer Vision

11th (afternoon) and 12th October 2003

Gallieni 3

The papers are available on the CD-ROM and from www.scr.siemens.com/vlsm03

| |
|----------------------------|
| Saturday 11 October |
|----------------------------|

Opening : 14:30–15:30

1. Opening Remarks

Olivier Faugeras.

2. Invited Talk: Sparse Geometrical Representations with Bandelets

S. Mallat.

Poster Presentations : 15:30–18:30 (coffee break 16:30–17:00)

Shape :

1. Dynamic Shapes Average

P. Maurel, G. Sapiro.

2. Second-order models for Computing Distance Transforms

S. Manay, A. Yezzi.

Image Reconstruction :

1. Inpainting by Correspondence Maps

L. Demanet, B. Song, T. Chan.

2. Feature preserving Variational smoothing of terrain data

T. Tasdizen, R. Whitaker.

3. Image Enhancement And Denoising Under Max/Min Flow Framework

H. Yu, C.S. Chua.

4. Texture Preserving Variational Denoising Using an Adaptive Fidelity Term

G. Gilboa, N. Sochen, Y. Zeevi.

5. Restoration of wavelet coefficients by minimizing a specially designed objective function

M. Nikolova.

Segmentation :**1. Fast Evolution of Image Manifolds for Segmentation**

T. Deschamps, R. Malladi.

2. Initialization and Termination of Active Contours Level Set Evolutions

M. Weber, A. Blake, R. Cipolla.

3. A Pseudo Distance for Shape Priors in Level Set Segmentation

D. Cremers, S. Soatto.

4. Vector Field Segmentation Using Active Contours: Regions Of Vectors With The Same Direction

T. Roy, M. Barlaud, E. Debreuve, G. Aubert.

5. Intensity and Morphology-Based Energy Minimization for Automatic Segmentation of the Myocardium

A. Pednekar, I. Kakadiaris, R. Muthupillai, S. Flamm.

Motion Analysis and Grouping :**1. Spatio-temporal Active Region Model for Simultaneous Segmentation and Motion Estimation of the Left Ventricle**

A. Wong H. Hui, A. Sinusas , P. Shi.

2. A variational framework for affine registration and segmentation with shape prior: application in echocardiographic imaging

I. Dydenko, D. Friboulet, I. Magnin.

3. Non-Parametric Clustering, Visual Grouping and Implicit Representations towards Recovery and Reconstruction of Motion Layers

R. Zhang, N. Paragios, D. Metaxas.

Registration/Fusion :

1. Visual Acuity in Day for Night

G. Haro, M. Bertalmio, V. Caselles.

Stereo and Reconstruction :

1. Distance Functions and Geodesics on Point Clouds

F. Memoli, G. Sapiro.

2. Fast Constrained Surface Extraction by Minimal Paths

R. Ardon, L. Cohen.

3. A Snake Approach for High Quality Image-based 3D Object Modeling

C. Hernandez Esteban, F. Schmitt.

4. A Fast Level-set Approach to Surface Modeling from Unorganized Sample Points

M. Marcon, L. Picarreta, A. Sarti, S. Tubaro.

5. Tensor Field Visualization with PDE's and Application to DT-MRI Fiber Visualization

D. Tschumperle, R. Deriche.

Sunday, October 12th

Invited Talk : 09:30–10:30

1. A Differential Geometric Model for Contour-Based Stereo

S. Zucker.

Coffee Break : 10:30–11:00

Modeling Session : 11:00–12:15

1. Geometric Analysis of Constrained Curves for Image Understanding

A. Srivastava, W. Mio, X. Liu, E. Klassen.

2. A Multiphase Variational Level Set Approach for Modeling Human Eggs

U. Damgaard Pedersen, O.F. Olsen, N.H. Olsen.

3. Geodesic re-meshing and parameterization using front propagation

G. Peyre, L. Cohen.

Lunch Break : 12:15–14:15**Segmentation Session : 14:15–15:05****1. Stochastic Mean Curvature Motion in Computer Vision: Stochastic Active Contours**

O. Juan, R. Keriven, G. Postelnicu.

2. Generalized Voronoi Tessellations for Vector-Valued Image Segmentation

P. Arbelaez, L. Cohen.

Regularization/Fusion Session : 15:05–16:20**1. Variational Model for P+XS Image Fusion**

C. Ballester, V. Caselles, B. Rouge, and J. Verdera.

2. Level Set Methods for Tensor-Valued Images

C. Feddern, J. Weickert.

3. A method for estimating brain nerve bundles, by restoring and filtering intra-voxel information in Diffusion Tensor MRI data

A. Ramírez-Manzanares, M. Rivera.

Coffee Break : 16:20–16:50**3D/Implicit Surfaces Session : 16:50–17:35****1. Solving Variational Problems and Partial Differential Equations Mapping into General Target Manifolds**

F. Memoli, G. Sapiro, S. Osher.

2. Higher Order Active Contours and their Application to the Detection of Line Networks in Satellite Imagery

M. Rochery, I. Jermyn, J. Zerubia.

Best Paper / Adjourn : 17:35–17:45

Workshop 3. SCTV: 3rd International Workshop on Statistical and Computational Theories of Vision

Sunday 12 October 2003

Rhodes 9a

For further details, see department.stat.ucla.edu/yuille/meetings/2003_workshop.php.

Selected papers will appear in a special issue of IJCV.

Session 1: Statistics of Natural Imagery and Robust Estimation : 09:00 – 10:30

1. Exploiting Spatial and Spectral Image Regularities for Color Constancy

B. Singh, W.T. Freeman.

2. Whitening for Photometric Comparison of Smooth Surfaces under Varying Illumination

M. Osadchy, M. Lindenbaum, D. Jacobs.

3. On Incremental and Robust Subspace learning

Y. Li, L-Q. Xu, J. Morphet, R. Jacobs.

Coffee Break : 10:30 – 10:45

Session 2: Statistical Models for Motion : 10:45 – 12:15

1. Pixelwise-Adaptive Blind Estimation of Motion assuming Non-Stationary Statistics

H. Foroosh.

2. Deterministic and Statistical Properties of Multi-Resolution 3D Modeling

A. Roychowdhury, H. Liu, R. Chellappa.

3. An Information Fusion Framework for Robust Shape Tracking

X.S. Zhou, D. Comaniciu, K. Sriram.

Lunch Break : 12:15 – 14:30**Session 3: Poster Session : 14:30 – 16:15****1. Bayesian Articulated tracking Using Single Frame Pose Sampling**

L. Taycher, T. Darrell.

2. How are Statistical Methods for Geometric Inference Justified?

K. Kanatani.

3. A Model-Based Range Image Segmentation Algorithm Using a Novel Robust Estimator

H. Wang, D. Suter.

4. Kurtosis and the Phase Structure of Images

J. Gluckman.

5. A Probabilistic Network Model for Inferring Direction of Figure from Multiple Cues

K. Baek, P. Sajda.

6. Uncertainty in 3D Shape Estimation

H. Ji, C. Fermuller.

7. A Particle Filtering Approach to Abnormality Detection in Nonlinear Systems and its Application

N. Vaswani, R. Chellappa.

8. How Heuristics Expedite Markov Chain Search?

R. Maciucca, S.C. Zhu.

9. Efficient Graph Cuts for Unsupervised Image Segmentation using Probabilistic Sampling and SVD-based approaches

J. Keuchel, C. Schnorr.

10. Parameter Estimation from Optical Flow without Nuisance Parameters

N. Ohta.

11. Surround Statistics and the Perception of Intensity and Color

J.J. Clark, D. Hernandez.

12. Unsupervised Clustering of Images using their Joint Segmentation

Y. Seldin, S. Starik, M. Werman.

13. Exploiting the Sparse Derivative Prior for Super-Resolution and Image Demosaicing

M.F. Tappen, B.C. Russell, W.T. Freeman.

14. The Kalman-EM Contour Tracker

A.E.C. Pece.

Coffee Break : 16:15 – 16:30

**Session 4: Discriminative Methods and Algorithms : 16:30
– 18:00**

1. Scale-Invariance of Support Vector Machines based on the Triangular Kernel

F. Fleuret, H. Sahbi.

2. Fast Color Image Retrieval via Embeddings

P. Indyk, N. Thaper.

3. Learning a Rare Event Detection Cascade by Direct Feature Selection

J. Wu, J.M. Rehg, M.D. Mullin.

Workshop 4. CPMCV: IEEE Workshop on Color and Photometric Methods in Computer Vision

Sunday 12 October 2003

Rhodes 9b

For further details, see www.sogang.ac.kr/cvision/cpmcv. The papers are available on the CD-ROM.

Opening : 09:00 – 09:15

Session 1 : 09:15 – 10:45

1. Convex Programming Color Constancy

G.D. Finlayson, R.Xu.

2. On the Interaction between object recognition and colour constancy

Stepan Obdrzalek, Jiri Matas, Ondrej Chum.

3. Color-Shape Context for Object Recognition

Aristeidis Diplaros, Theo Gevers, Ioannis Patras.

Coffee Break : 10:45 – 11:00

Session 2 : 11:00 – 12:00

1. Reflection Components Separation based on Chromaticity and Noise Analysis

Robby T. Tan, Ko Nishino, Katsushi Ikeuchi.

2. Recovery of Chromaticity Image Free from Shadows via Illumination Invariance

Mark S. Drew, Graham D. Finlayson, Steven D. Hordley.

Lunch Break : 12:00 – 14:00

Session 3 : 14:00 – 15:00

1. Interactive Deweathering of an Image using Physical Models

Srinivasa G. Narasimhan, Shree K. Nayar.

2. Surface Registration with a Helmholtz Reciprocity Image Pair

Peter Tu, Paulo R. S. Mendonca, James Ross, James Miller.

Break : 15:00 – 15:15

Session 4 : 15:15 – 16:15

1. Multiple Directional Illuminant Estimation from a Single Image

Yang Wang, Dimitris Samaras.

2. Estimating Chromaticity of Multicolored Illuminations

Robby T. Tan, Katsushi Ikeuchi.

Coffee Break : 16:15 – 16:30

Session 5 : 16:30 – 18:00

1. High Dynamic Range from Multiple Images: Which Exposures to Combine?

Michael D. Grossberg, Shree K. Nayar.

2. Color Super Resolution from a Single-CCD

Tomomasa Gotoh, Masatoshi Okutomi.

3. Image Specific Color Representation

Ido Omer, Michael Weman.

Workshop 5. PROCAMS: IEEE International Workshop on Projector-Camera Systems

Sunday 12 October

Rhodes 9c

The papers and videos are available on the CD-ROM and on www.procams.org

Opening and Introduction : 09:00 – 09:30

Keynote Address 1 : 09:30 – 10:30

1. Projecting Usage as Well as Displays: Ecological Considerations in ProjVis Systems

Bill Buxton.

Coffee Break : 10:30 – 10:45

Podium Session 1. Human Computer Interaction : 10:45 – 11:45

1. Projecting Rectified Images in an Augmented Environment

Stanislaw Borkowski, Olivier Riff, James L. Crowley.

2. Applications of Steerable Projector-Camera Systems

Claudio Pinhanez, Rick Kjeldsen, Anthony Levas, Gopal Pingali, Mark Podlaseck, Noi Sukaviriya.

3. Increasing the Usability of Virtual Rear Projection Displays

Jay Summet, Matthew Flagg, James M. Rehg, Gregory M. Corso, Gregory D. Abowd. See CD-ROM for a [video](#).

Podium Session 2. Geometry : 11:45 – 12:45

1. Online 3D Acquisition and Model Integration

Tobias Jaeggli, Thomas P. Koninckx, Luc Van Gool. See CD-ROM for videos [1](#) and [2](#).

2. Efficient Dense Correspondences using Temporally Encoded Light Patterns

Nelson L. Chang.

3. Super-Resolution Composition in Multi-Projector Displays

Christopher Jaynes, Divya Ramakrishnan.

Lunch Break : 12:45 – 14:30**Podium Session 3. Compensation : 14:30 – 15:30****1. Invited Talk: Aware Projectors**

Ramesh Raskar.

2. A Projection System with Radiometric Compensation for Screen Imperfections

Shree K. Nayar, Harish Peri, Michael D. Grossberg, Peter N. Belhumeur. See CD-ROM for videos [1](#), [2](#) and [3](#).

3. Using a Camera to Capture and Correct Spatial Photometric Variation in Multi-Projector Displays

Aditi Majumder, David Jones, Matthew McCrory, Michael E. Papka, Rick Stevens.

Poster Session and Break : 15:30 – 16:30**1. Enhanced Shape Recovery with Shuttered Pulses of Light**

James Davis, Hector Gonzalez-Banos.

2. Local Methods for Measuring Tiled Display Alignment

Mark Hereld.

3. PixelFlex2: A Comprehensive, Automatic, Casually-Aligned Multi-Projector Display

Andrew Raji, Gennette Gill, Aditi Majumder, Herman Towles, Henry Fuchs.

4. Framework for Designing Catadioptric Projection and Imaging Systems

Rahul Swaminathan, Shree K. Nayar, Michael D. Grossberg.

5. Generating a Multiresolution Display by Integrating Multiple Projectors

Yu-Pao Tsai, Yian-Nien Wu, Yi-Ping Hung.

6. Method for Increasing Apparent Amplitude Resolution, and Correcting Luminance Nonuniformity in Projected Displays

Robert Ulichney.

7. DeskAlign: Automatically Aligning a Tiled Windows Desktop

Grant Wallace, Han Chen, Kai Li. See CD-ROM for a [video](#).

8. Projector-Camera Based System for Fast Object Modeling

Guanghui Wang, Zhanyi Hu, Fuchao Wu, Hung-Tat Tsui.

Podium Session 4. Interactive Projected Displays : 16:30 – 17:30

1. The Magic Table: Computer-Vision Based Augmentation of a Whiteboard for Creative Meetings

Francois Berard. See CD-ROM for a [video](#).

2. Steady-State Feedback Analysis of Tele-Graffiti

Naoya Takao, Simon Baker, Jianbo Shi. See CD-ROM for a [video](#).

3. Experiences Implementing and Using Personal Projected Displays

Mark Ashdown, Peter Robinson. See CD-ROM for a [video](#).

Keynote Address 2 : 17:30 – 18:30

1. Instant Immersion Environments

Myron Krueger.

Closing : 18:30 – 18:35

Workshop 6. WOMTEC: International Workshop on Multimedia Technologies in E-Learning and Collaboration

Friday 17th of October
Gallieni 2

For further details, see research.microsoft.com/workshops/WOMTEC. The papers are available on the CD-ROM.

Opening : 09:00 – 09:10

Multimedia Meeting Capture : 09:10 – 10:40

1. Capturing Interactions in Meetings with Omnidirectional Cameras

Rainer Stiefelhagen, Xilin Chen, Jie Yang.

2. A Mixed-State I-Particle Filter for Multi-Camera Speaker Tracking

Daniel Gatica-Perez, Guillaume Lathoud, Iain McCowan, Jean-Marc Odobez.

3. Self Localization of acoustic sensors and actuators on Distributed Platforms

Vikas Raykar, Igor Kozintsev, Rainer Lienhart.

Break : 10:40 – 11:10

Panel Discussion : 11:10 – 12:30

1. Panel

Zhengyou Zhang (chair), James Crowley, Jean-Luc Dugelay, Francis Quek, Rahul Sukthankar, Vladimir Uskov .

Lunch : 12:30 – 14:30

Group Collaboration : 14:30 – 16:00

1. Gesture Recognition for Remote Collaborative Physical Tasks Using Tablet PCs

Jiazhi Ou, Xilin Chen, Jie Yang.

2. Seamless Integration of Group Communication into an Adaptive On-line Exercise System

Hans Christian Liebig, Wolfgang Effelsberg.

3. Intelligent Headsets for Supporting Digital Lecture Halls

Christoph Trompler, Erwin Aitenbitchler, Guido Robling.

Break : 16:00 – 16:30

E-Learning Technologies : 16:30 – 18:00

1. Searching Learning Objects from Virtual Universities

Juha Puustjärvi, Paivi Poyry.

2. Tailoring Learning Management Systems and Learning Contents for the SCORM Model

Xin Xiang, Ling Guo, Yuanchun Shi.

3. Stepping-in Presentation

Akinnori Yoshino, Kenji Miyamoto, Hiroshi Mitshumata.

Workshop 7. TEXTURE: 3rd International Workshop on Texture Analysis and Synthesis

Friday 17 October 2003

Gallieni 3

The papers are available on the CD-ROM and from www.macs.hw.ac.uk/texture2003

Welcome and Session 1: Synthesis : 09:00–10:30

1. Deformable Texture: the irregular-regular-irregular cycle

Y. Liu, S. Lin.

2. Model-based Estimation of Texels and Placement Grids for Fast Realistic Texture Synthesis

D. Zhou, G.L. Gimel'farb.

3. Comparison of Five 3D Surface Texture Synthesis Methods

J. Dong, M.J. Chantler.

Coffee : 10:30–11:00

Session 2: Synthesis and Classification : 11:00–12:15

1. Synthesis of Reflectance Function Textures from Examples

Y. Hel-Or, T. Malzbender, D. Gelb.

2. Acquisition, Compression, and Synthesis of Bidirectional Texture Functions

M.L. Koudelka, S. Magda, P.N. Belhumeur, D.J. Kriegman.

3. Visual Training and Classification of Textured Outdoor Scene Images

M. Turtinen, M. Pietikainen.

Lunch Break : 12:15–13:45

Session 3: Classification : 13:45–15:00

1. Recognition of Dynamic Textures using Impulse Responses of State Variables

K. Fujita, S.K. Nayar.

2. Image Texture Classification Based on Finite Gaussian Mixture Models

Y. Wu, K.L. Chan, Y. Huang.

3. Multiresolution Histograms and their Use for Texture Classification

E. Hadjidemetriou, M. Grossberg, S.K. Nayar.

Posters : 15:00–16:30 (coffee 16:00–16:30)**1. On Capturing 3D Isotropic Surface Texture using Uncalibrated Photometric Stereo**

A.D. Spence, M.J. Chantler.

2. Texture Description based on Subtexture Components

A. Salvatella, M. Vanrell, J.J. Villanueva.

3. Periodic Textures in Wide Baseline Stereo

D. Chetverikov, Z. Janko.

4. Towards Plenoptic Dynamic Textures

G. Doretto, S. Soatto.

5. A Scale-Space Analysis of Multiplicative Texture Processes

J.M. Geusebroek.

6. Bidirectional Imaging and Modeling of Skin Texture

O.G. Cula, K.J. Dana, F.P. Murphy, B.K. Rao.

7. Simulation of Rain in Videos

S. Starik, M. Werman.

8. Land Cover Change Detection Using Gabor Filter Texture

F. Yang, R. Lishman.

9. Cut-primed Smart Copying

A. Neubeck, A. Zalesny, L. Van Gool.

10. Optimal Illumination for Three-image Photometric Stereo Acquisition of Surface Texture

A.D. Spence, M.J. Chantler.

11. A New Similarity Matching Measure: Application to Texture-based Image Retrieval

N. Abbadeni.

12. Fast BTF Texture Modelling

M. Haindl, J. Filip.

Close : 16:30–16:40

Workshop 8. HLK: IEEE International Workshop on Higher-Level Knowledge in 3D Modeling and Motion Analysis

Friday 17 October

Gallieni 5

For further details, see www.cc.gatech.edu/dellaert/workshop. The papers are available on the CD-ROM.

Opening : 09:00 – 09:15

Session I : 09:15 – 10:30

1. Extraction, Matching and Pose Recovery based on Dominant Rectangular Structures

Wei Zhang, Jana Kosecka.

2. A Model-Based Method for Building Reconstruction

Konrad Schindler, Joachim Bauer.

3. Bayesian Reconstruction of 3D Shapes and Scenes From A Single Image

Feng Han, Song-Chun Zhu.

Coffee Break : 10:30 – 11:00

Session II : 11:00 – 12:30

1. Invited Talk

Camillo J. Taylor.

2. Symmetry-Based Photo Editing

Kun Huang, Wei Hong, Yi Ma.

3. Interactive 3D Building Modeling Using a Hierarchical Representation

Sung Chun Lee, Ram Nevatia.

Lunch Break : 12:30 – 14:30

Session III : 14:30 – 16:00

1. Invited Talk

Song-Chun Zhu.

2. Reconstruction of Objects with Jagged Edges through Rao-Blackwellized Fitting of Piecewise Smooth Subdivision Curves

Michael Kaess, Frank Dellaert.

3. A Unified Linear Fitting Approach for Singular and Non-Singular 3D Quadrics from Occluding Contours

Kongbin Kang.

Coffee Break : 16:00 – 16:30

Session IV : 16:30 – 17:45

1. Regularized 3D Morphable Models

Curzio Basso, Thomas Vetter, Volker Blanz.

2. Generic Deformable Implicit Mesh Models for Automated Reconstruction

Slobodan Ilic, Pascal Fua.

3. Pose-Based Clustering in Action Sequences

Gareth Loy, Stefan Carlsson, Josephine Sullivan.

Closing : 17:45

Workshop 9. AMFG: IEEE International Workshop on Analysis and Modeling of Faces and Gestures

Friday 17 October 2003

Gallieni 6

For further details, see brigade.umiacs.umd.edu/iccv2003. AMFG is a joint workshop formed by merging RATFG and WAMMFR.

Opening Remarks : 08:45 – 08:50

Orals: Faces I : 08:50 – 10:10

1. Invited Talk: Facing the Future

S. Pentland.

2. Discriminant Analysis of Stochastic Models and Its Application to Face Recognition

L. Chen, H. Man .

3. Rank Constrained Recognition under Unknown Illuminations

K. Zhou, R. Chellappa.

Posters I / Coffee : 10:10 – 11:20 (Coffee 10:30 – 11:00)

1. Sequential Monte Carlo Tracking of Body Parameters in a Sub-Space

T. Moeslund, E. Granum.

2. Absolute Head Pose Estimation From Overhead Wide-Angle Cameras

Y. Tian, L. Brown, J. Connell, S.Pankanti, A. Hampapur, A. Senior, R. Bolle.

3. Using similarity scores from a small gallery to estimate recognition performance for larger galleries

A. Johnson. J. Sun, A. Bobick.

4. Illumination Modeling and Normalization for Face Recognition

H. Wang, S. Li, Y. Wang, W. Zhang.

5. Human Body Tracking with Auxiliary Measurements

M. Lee, I. Cohen.

6. Component-based LDA Method for Face Recognition with One Training Sample

J. Huang, P. Yuen, W. Chen, J. Lai.

7. PCA-Based Face Recognition in Infrared Imagery: Baseline and Comparative Studies

X. Chen, P. Flynn, K. Bowyer.

8. Multi-Modal Face Tracking Using Bayesian Network

F. Liu, X. Lin, S. Li, Y. Shi.

9. Shape and appearance models of talking faces for model-based tracking

M. Odisio, G. Bailly.

10. Advances In Component Based Face Detection

S. Bileschi, B. Heisele.

Orals: Faces II : 11:20 – 12:35

1. Model-Based 3D Face Capture with Shape-from-Silhouettes

B. Moghaddam, J. Lee, H. Pfister, R. Machiraju.

2. Manifold of Facial Expression

Y. Chang, C. Hu, M. Turk.

3. Human Recognition of Familiar and Unfamiliar People in Naturalistic Video

D. Roark, A. O'Toole, H. Abdi.

Lunch : 12:35 – 13:35

Demo Session : 13:35 – 14:45

1. Face Modeling and Recognition in 3-D

G. Medioni, R. Waupotitsch.

2. Avoiding Replay-Attacks in a Face Recognition System using Head-Pose Estimation

R. Frischholz, A. Werner.

3. CSLDS: Chinese Sign Language Dialog System

Y. Chen, W. Gao, G. Fang, C. Yang, Z. Wang.

4. Home Front Door Access Control System

Jaywoo Kim (Samsung).

5. Robust Face Alignment

Lei Zhang, Yi Zhou, Hong-Jiang Zhang (Microsoft).

6. FaceVACS-Entry

Frank Weber (Cognitec).

Orals: Faces III : 14:45 – 16:05**1. Invited Talk: Face Recognition Vendor Test 2002**

J. Phillips, P. Grother, R. Micheals, D. Blackburn, E. Tabassi, M. Bone.

2. Pose Estimation using 3D View-Based Eigenspaces

L.-P. Morency, P. Sundberg, T. Darrell.

3. Is Face Recognition in Pictures Affected by the Center of Projection?

C.H. Liu.

Posters II / Coffee : 16:05 – 17:15 (Coffee 16:05 – 16:30)**1. Illumination Normalization for Robust Face Recognition against Varying Lighting Conditions**

S. Shan, W. Gao, B. Cao, D. Zhao.

2. Automatic Face Classifications by Self-organization for Face Recognition

Y. Sato, I. Yoda, K. Sakaue .

3. Efficient Active Appearance Model for Real-Time Head and Facial Feature Tracking

F. Dornaika, J. Ahlberg.

4. Extraction of 3D Hand Shape and Posture from Image Sequences for Sign Language Recognition

H. Fillbrandt, S. Akyol, K. Kraiss.

5. Multi-Modal 2D and 3D Biometrics for Face Recognition

K. Chang, K. Bowyer, P. Flynn.

6. Fully Automatic Upper Facial Action Recognition

A. Kapoor, Y. Qi, R. Picard.

7. Head Pose Estimation using Fisher Manifold Learning

L. Chen, L. Zhang, Y. Hu, M. Li, H. Zhang.

8. Iris Contour with Feature Free Contours

D. Hansen, A. Pece.

9. Real-time View-based Face Alignment using Active Wavelet Networks

C. Hu, R. Feris, M. Turk.

10. A Quantified Study of Facial Asymmetry in 3D Faces

Y. Liu, J. Palmer.

Orals: Gestures : 17:15 – 18:30

1. Probabilistic Tracking and Recognition of Non-Rigid Hand Motion

H. Fei, I. Reid.

2. Boosted Audio-Visual HMM for Speech Reading

P. Yin, I. Essa, J. Rehg.

3. Inference of Human Postures by Classification of 3D Human Body Shape

I. Cohen, H. Li.

ICCV 2003 — Overview and Timetable

| Day | Room | Morning (coffee 10:30–11:00) | Afternoon (coffee 16:30–17:00) | |
|--------|---------------|--|--|--|
| Sat 11 | Gallieni 2 | W1. VS-PETS Workshop 09:15–13:00 | W1. VS-PETS Workshop 15:00–18:30 | |
| | Gallieni 3 | C1. PDE-VLS Course 09:00–12:45 | W2. VLSM Workshop 14:30–18:30 | |
| | Gallieni 6 | C2. Omnidirectional Course 09:00–12:45 | C3. Matching Course 14:45–18:30 | |
| Sun 12 | Gallieni 2 | W1. VS-PETS Workshop 09:30–13:00 | W1. VS-PETS Workshop 15:00–18:00 | |
| | Gallieni 3 | W2. VLSM Workshop 09:30–12:15 | W2. VLSM Workshop 14:15–17:45 | |
| | Gallieni 6 | C4. Generative Course 09:00–12:45 | C6. Discriminative Course 14:45–18:30 | |
| | Risso 8 | C5. Stereo Course 09:00–12:45 | C7. IBR Course 14:45–18:30 | |
| | Rhodes 9a | W3. SCTV Workshop 09:00–12:15 | W3. SCTV Workshop 14:15–17:45 | |
| | Rhodes 9b | W4. CPMCV Workshop 09:00–12:00 | W4. CPMCV Workshop 14:00–18:00 | |
| | Rhodes 9c | W5. PROCAMS Workshop 09:00–12:45 | W5. PROCAMS Workshop 14:30–18:35 | |
| | Mon 13 | Athens/Rhodes ICCV Sessions 1 | 10:20–12:20 ICCV Sessions 2–3 | 14:30–18:45 ICCV Reception (Rhodes) |
| | Tue 14 | Athens/Rhodes | ICCV Sessions 4–5 09:00–12:30 | ICCV Sessions 6–7 14:30–18:45 PAMI Meeting (Athens) 19:00–20:30 |
| Wed 15 | Athens/Rhodes | ICCV Sessions 8–9 09:00–12:30 | ICCV Sessions 10–11 14:30–18:45 ICCV Banquet (Marineland) 19:15–23:30 | |
| Thu 16 | Athens/Rhodes | ICCV Sessions 12–13 09:00–12:30 | ICCV Sessions 14–15 14:30–18:00 | |
| Fri 17 | Gallieni 2 | W6. WOMTEC Workshop 09:00–12:30 | W6. WOMTEC Workshop 14:30–18:00 | |
| | Gallieni 3 | W7. TEXTURE Workshop 09:00–12:15 | W7. TEXTURE Workshop 13:45–16:40 | |
| | Gallieni 5 | W8. HLK Workshop 09:00–12:30 | W8. HLK Workshop 14:30–17:45 | |
| | Gallieni 6 | W9. AMFG Workshop 08:45–12:35 | W9. AMFG Workshop 13:35–18:30 | |

Coffee breaks are in Rhodes Central from Sun. 12 to Thurs. 16 Oct. and in Agora 2 on Sat. 11 and Fri. 17 Oct.

