

CS 6550 Computer Vision Theory

Final Class Project

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General Guideline

- 1-2 students form a group
- Select a topic, which can be based on one or more papers, for the class project.
- The project consists of four stages
 - Project proposal
 - Project presentation w/o demo
 - Project report

Leading Journals & Conferences

- International Journal of Computer Vision (IJCV)
- Pattern Analysis and Machine Intelligence (PAMI)
- IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR)
- International Conference on Computer Vision (ICCV)
- European Conference on Computer Vision (ECCV)
- SIGGRAPH

Annotated Computer Vision Bibliography web site:
<http://iris.usc.edu/Vision-Notes/bibliography/contents.html>

CVPR 2010

- Detecting and Sketching the Common, S. Bagon, O. Brostovski, M. Galun, M. Irani
- High Performance Object Detection by Collaborative Learning of Joint Ranking of Granule Features, C. Huang, R. Nevatia
- 3D Scene Priors for Road Detection, J. M. Alvarez, T. Gevers, A. M. Lopez
- Fast Globally Optimal 2D Human Detection with Loopy Graph Models, T.P. Tian, S. Sclaroff
- Learning Appearance in Virtual Scenarios for Pedestrian Detection, F. M. Tur, D. Vazquez, D. Geronimo, A. M. Lopez
- Motion Detail Preserving Optical Flow Estimation, L. Xu, J. Jia, Y. Matsushita
- A Content-Aware Image Prior, T. S. Cho, N. Joshi, L. Zitnick, S. B. Kang, R. Szeliski, W. Freeman
- Direct Image Alignment of Projector-Camera Systems with Planar Surfaces, S. Audet, M. Okutomi, M. Tanaka
- Object-to-Object Color Transfer: Optimal Flows and SMSP Transformations, D. Freedman, P. Kisilev
- Non-uniform Deblurring for Shaken Images, O. Whyte, J. Sivic, A. Zisserman, J. Ponce
- RASL: Robust Alignment by Sparse and Low-rank Decomposition for Linearly Correlated Images, Y. Peng, A. Balasubramanian, J. Wright, M. Yi
- Generalized Simultaneous Registration and Segmentation, P. Ghosh, M. E. Sargin, B.S. Manjunath
- Anomaly Detection in Videos Using Mixtures of Dynamic Textures , V. Mahadevan, W. Li, V. Bhalodia, N. Vasconcelos
- Fast pattern matching using orthogonal Haar transform, W. Ouyang, R. Zhang, C. Wai-Kuen

ICCV 2009

- Globally Optimal Affine Epipolar Geometry from Apparent Contours, G. Li, Y. Tsin
- Semi-Automatic Stereo Extraction From Video, M. Guttman, L. Wolf, D. Cohen-Or
- Shift-Map Image Editing, Y. Pritch, E. Kav-Venaki, S. Peleg
- An efficient algorithm for Co-segmentation, D. S. Hochbaum, V. Singh
- Image Segmentation with A Bounding Box Prior, V. Lempitsky, P. Kohli, C. Rother, T. Sharp
- Local Distance Functions: A Framework, New Algorithms, and an Evaluation, D. Ramanan, S. Baker
- Compact Signatures for High-Speed Interest Point Description and Matching, M. Calonder, V. Lepetit, P. Fua, K. Konolige, J. Bowman, P. Mihelich
- Attribute and Simile Classifiers for Face Verification, N. Kumar, A. C. Berg, P. N. Belhumeur, S. K. Nayar
- Fast and Robust Earth Mover's Distances, Ofir Pele, Michael Werman
- Kernel Active Contour Shan Tan, Ioannis A. Kakadiaris
- Video Object Segmentation by Tracking Regions, W. Brendel, S. Todorovic
- Learning Based Digital Matting, Y. Zheng, C. Kambhamettu
- Background Subtraction for Freely Moving Cameras, Y. Sheikh, O. Javed, T. Kanade
- Non-Iterative Approach for Fast and Accurate Vanishing Point Detection, J.-P. Tardif

CVPR 2009

- Contextual Flow, Y. Wu, J. Fan, CVPR 2009
- Image Registration by Minimization of Residual Complexity, A. Myronenko, X. Song
- Human Age Estimation Using Bio-inspired Features, G. Guo, G. Mu, Y. Fu, T. Huang
- Half-integrality based algorithms for Cosegmentation of Images, L. Mukherjee, V. Singh, C. R. Dyer
- Efficient Planar Graph Cuts with Applications in Computer Vision, F. R. Schmidt, E. Töppe, D. Cremers
- Single Image Haze Removal Using Dark Channel Prior, K. He, J. Sun, X. Tang
- Mutual Information-based Stereo Matching Combined with SIFT Descriptor in Log-chromaticity Color Space, Y. S. Heo, K. M. Lee, S. U. Lee
- Spatiotemporal Stereo via Spatiotemporal Quadric Element (Stequel) Matching, M. Sizintsev, R. Wildes
- Shape Constrained Figure-Ground Segmentation and Tracking, Z. Yin, R. Collins
- Cooperative Mapping of Multiple PTZ Cameras in Automated Surveillance Systems, C.-H. Chen, Y. Yao, A. Drira, A. Koschan, M. Abidi
- A Compressive Sensing Approach for Expression-Invariant Face Recognition, P. Nagesh, B. Li
- Fast Human Detection in Crowded Scenes by Contour Integration and Local Shape Estimation, C. Beleznai, H. Bischof

CVPR 2008

- *Beyond Sliding Windows: Object Localization by Efficient Subwindow Search*, C. H. Lampert, M. B. Blaschko, T. Hofmann, *CVPR 2008*
 - Variable Baseline/Resolution Stereo, D. Gallup, J.-M. Frahm, P. Mordohai, M. Pollefeys, *CVPR 2008*
- Fast Image Search for Learned Metrics, P. Jain, B. Kulis, K. Grauman, *CVPR 2008*
- A Fast Local Descriptor for Dense Matching, E. Tola, V. Lepetit, P. Fua, *CVPR 2008*
- Polynomial-Time Algorithms for Matching, Registration and Reconstruction Problems with Outliers, *CVPR 2008*
- A conditional random field for automatic photo editing, M. Brand, P. Pletscher, *CVPR 2008*
- Fast and Robust Numerical Solutions to Minimal Problems for Cameras with Radial Distortion, Martin Byröd, Z. Kukelova, K. Josephson, T. Pajdla, K. Aström, *CVPR 2008*
- View Invariant Action Recognition Using Fundamental Ratios, Y. Shen, H. Foroosh,
- Large-Scale Manifold Learning, A. Talwalkar, S. Kumar and H. Rowley, *CVPR 2008*
- 3D Model Matching with Viewpoint Invariant Patches (VIPs), C. Wu, B. Clipp, X. Li, J.-M. Frahm, M. Pollefeys, *CVPR 2008*
- Motion from Blur, S. Dai, Y. Wu, *CVPR 2008*
- Constant Time $O(1)$ Bilateral Filtering, F. Porikli, *CVPR 2008*

ECCV 2008

- Learning to Localize Objects with Structured Output Regression, M. B. Blaschko, C. H. Lampert, ECCV 2008
- Robust Integration of Silhouettes and Stereo: A Convex Formulation, K. Kolev, D. Cremers
- Robust Real-Time Visual Tracking using Pixel-Wise Posteriors, C. Bibby, I. Reid, ECCV'08
- Semi-supervised Dense Matching of Two Uncalibrated Images, J. Xiao, J. Chen, D.-Y. Yeung, L. Quan, ECCV 2008
- Learning Optical Flow, D. Sun, S. Roth, M. Black , ECCV 2008
- Histogram-based Image Segmentation in the Presence of Shadows and Highlights, E. Vazquez, J. van de Weijer, R. Baldrich , ECCV 2008
- Image Segmentation by Branch-and-Mincut, V. Lempitsky, A. Blake, C. Rother , ECCV'08
- What is a Good Image Segment? A Unified Approach to Segment Extraction, S. Bagon, O. Boiman, M. Irani, ECCV 2008
- Viewpoint Invariant Pedestrian Recognition with an Ensemble of Localized Features, D. Gray, H. Tao , ECCV 2008
- Human Activity Recognition with Metric Learning, D. Tran, A. Sorokin , ECCV 2008
- Background Subtraction on Distributions, T. Ko, S. Soatto, D. Estrin , ECCV 2008
- A Linear Time Histogram Metric for Improved SIFT Matching, O. Pele, M. Werman, ECCV'08
- Making Background Subtraction Robust to Sudden Illumination Changes, J. Pilet , C. Strecha , P. Fua, ECCV 2008

ICCV 2007

- *Learning Graph Matching*, T. Caetano, L. Cheng, Q. Le, A. Smola, ICCV 2007
- *Learning Globally-Consistent Local Distance Functions for Shape-Based Image Retrieval and Classification*, A. Frome, Y. Singer, F. Sha, J. Malik, ICCV 2007
- *Learning to Extract Object Boundaries using Motion Cues*, A. Stein, D. Hoiem, M. Hebert, ICCV 2007
- *A Seeded Image Segmentation Framework Unifying Graph Cuts And Random Walker Which Yields A New Algorithm*, A. K. Sinop, L. Grady, ICCV 2007
- *Joint Affinity Propagation for Multiple View Segmentation*, J. Xiao, J. Wang, P. Tan, L. Quan, ICCV 2007
- *A rank minimization approach to video inpainting*, T. Ding, M. Sznajder, O. Camps, ICCV 2007
- *Multi-View Stereo for Community Photo Collections*, M. Goesele, N. Snavely, B. Curless, H. Hoppe, S. M. Seitz, ICCV 2007
- *Real-Time Visibility-Based Fusion of Depth Maps*, P. Merrell et al., ICCV 2007
- *Integrating Appearance and Motion Cues for Simultaneous Detection and Segmentation of Pedestrians*, V. S., J. W. Davis, ICCV 2007
- *Plane-based self-calibration of radial distortion*, J.-P. Tardif, P. Sturm, S. Roy, ICCV 2007

List Of Suggested Papers

- L. Wolf and A. Shashua, On Projection Matrices and their Applications in Computer Vision, ICCV, 2001 ((Honorable Mention for 2001 Marr Prize)
- E. Shechtman, Y. Caspi, and M. Irani, "Increasing Space-Time Resolution in Video," ECCV, 2002. (best-paper award)
- Y. Wexler, E. Shechtman, and M. Irani, "Space-Time Video Completion," CVPR 2004 (best-poster award)
- K. Okuma, A. Taleghani, N. de Freitas, J. J. Little, and D. G. Lowe, A Boosted Particle Filter: Multitarget Detection and Tracking, ECCV 2004 (Best paper in cognitive vision)
- V. Cheung, B. Frey, and N. Jojic. "Video Epitomes" , CVPR 2005. (Honorable Mention for Best Paper Award)
- J. Pilet, V. Lepetit, and P. Fua, "Real-Time Non-Rigid Surface Detection." CVPR 2005 (Best Paper Award)
- P. Viola, M.J. Jones, and Daniel Snow, "Detecting Pedestrians using Patterns of Motion and Appearance," ICCV 2003 (Marr prize)
- Andrew Fitzgibbon, Yonatan Wexler, and Andrew Zisserman, Image-based Rendering using Image-based Priors, ICCV 2003 (Marr prize)
- Zhuowen Tu, Xiangrong Chen, Alan L. Yuille, and Song-Chun Zhu, Image Parsing: Unifying Segmentation, Detection and Recognition, , ICCV 2003 (Marr prize)
- V. Kolmogorov and R. Zabih "Multi-camera Scene Reconstruction via Graph Cuts," ECCV 2002 (best paper award)
- R. Vidal and Y. Ma "A Unified Algebraic Approach to 2-D and 3-D Motion Segmentation," ECCV 2004 (best paper award)

Schedule

- 12/23 Project proposal due in class (project title, project goal, team members, references)
- 12/30, 1/4,6 Project paper presentation in class
- 1/11,13 Project presentation/demo and final project report due (資電館639)