

Allen Y. Yang

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RESEARCH INTERESTS

Computer Vision: motion segmentation and multiple-view geometry.

Machine Learning: algebraic and statistical estimation of hybrid models.

Image Processing: image representation, segmentation, and retrieval.

Robotics: vision-guided robot navigation and humanoid robot manipulation.

ACADEMIC BACKGROUND

University of Illinois at Urbana-Champaign, Urbana, IL.

Ph.D., Electrical and Computer Engineering, October, 2006.

Dissertation: *Estimation of Subspace Arrangements: Its Algebra and Statistics.*

Advisor: Yi Ma. Co-advisor: Robert M. Fossum.

University of Illinois at Urbana-Champaign, Urbana, IL.

M.S., Mathematics, August, 2005.

University of Illinois at Urbana-Champaign, Urbana, IL.

M.S., Electrical Engineering, August, 2003.

Thesis: *Geometric Segmentation of Perspective Images based on Symmetry Groups.*

Advisor: Yi Ma.

University of Science and Technology of China, Hefei, China.

B.Eng., Computer Science, May, 2001.

HONORS AND AWARDS

- C. R. Allen International Student Award, Department of ECE, University of Illinois at Urbana-Champaign, 2005.
- Beckman Institute AI/Cognitive Science Fellowship, University of Illinois at Urbana-Champaign, 2005.
- Beckman Institute AI/Cognitive Science Fellowship, University of Illinois at Urbana-Champaign, 2004.
- Computational Science and Engineering Fellowship, Center for Simulation of Advanced Rockets, University of Illinois at Urbana-Champaign, 2004.
- Henry Ford II Scholar Award, College of Engineering, University of Illinois at Urbana-Champaign, 2003.
- Distinguished Graduate Award, Special Class for Gifted Young, University of Science and Technology of China, 2001.
- Best Bachelor's Thesis, Special Class for Gifted Young, University of Science and Technology of China, 2001.

TEACHING ACTIVITIES

Teaching Assistant Fall, 2005
Department of Mathematics, University of Illinois at Urbana-Champaign. Assisted in teaching a senior level course on Abstract Algebra.

Teaching Assistant Spring, 2005
Department of ECE, University of Illinois at Urbana-Champaign. Assisted in teaching a graduate level course on Advanced Topics in Computer Vision.

Teaching Assistant Spring, 2004
Department of ECE, University of Illinois at Urbana-Champaign. Assisted in teaching a graduate level course on Digital Signal Processing (DSP).

Teaching Assistant Fall, 2003
Department of ECE, University of Illinois at Urbana-Champaign. Assisted in teaching a graduate level course on Linear Control Systems.

Peer Advising Board Member Fall, 2003
Department of ECE, University of Illinois at Urbana-Champaign.

RESEARCH EMPLOYMENT

Graduate Research Assistant August, 2001 to August, 2006
Department of ECE, University of Illinois at Urbana-Champaign, Urbana, IL.

Intern Summer, 2004
Honda Research, Mountain View, CA. Developed *RoboTalk*, a unified robot command interface to control general robot arms, bases, and humanoids.

Intern August, 2000 to April, 2001
National Laboratory of Pattern Recognition, Chinese Institute of Automation, Beijing, China. Developed a model-based highway vehicle surveillance system.

Research Assistant September, 1998 to May, 2000
Image Processing Center, University of Science and Technology of China, Hefei, China.

INVENTIONS & SOFTWARE

Interface for Robot Motion Control. US patent application No. 11/296,174.
Demonstration website: <http://perception.csl.uiuc.edu/demos/RoboTalk/>

Generalized principal component analysis toolbox for MATLAB.
UIUC copyrighted software.
Available to academia: <http://perception.csl.uiuc.edu/gpca>

Symmetry-based 3-D scene reconstruction from perspective images.
UIUC copyrighted software.

Invited Talks

1. *Robust Estimation of Hybrid Subspace Models in Modeling and Segmenting Mixed Data.* Berkeley Computer Vision Seminar, 2006.
2. *RoboTalk: Controlling Arms, Bases and Androids through A Single Motion Interface.* International Conference on Advanced Robotics (ICAR), 2005.

3. *An Algebraic-Geometric Approach to Hybrid Linear Model Selection with Applications to Computer Vision*. UIUC Computational Science and Engineering Symposium, 2005.
4. *Sparse Representation of Images with Hybrid Linear Model*. Honda Research, 2004.

PUBLICATIONS

Journals

1. **Allen Yang**, Shankar Rao, Kun Huang, Wei Hong, and Yi Ma. *Symmetry-based 3-D reconstruction from perspective images*, Computer Vision and Image Understanding (CVIU), 2005.
2. Wei Hong, **Allen Yang**, and Yi Ma. *On symmetry and multiple-view geometry: structure, pose, and calibration from a single image*. International Journal of Computer Vision (IJCV), 2004.

Conferences

1. **Allen Yang**, Shankar Rao, and Yi Ma. *Robust statistical estimation and segmentation of multiple subspaces*. Computer Vision and Pattern Recognition (CVPR) Workshop on 25 Years of RANSAC, 2006.
2. **Allen Yang**, Shankar Rao, Andrew Wagner, Robert Fossum, and Yi Ma. *Hilbert functions and applications to the estimation of subspace arrangements*. International Conference on Computer Vision (ICCV), 2005.
3. Shankar Rao, **Allen Yang**, Andrew Wagner, and Yi Ma. *Segmentation of hybrid motions via hybrid quadratic surface analysis*. International Conference on Computer Vision (ICCV), 2005.
4. **Allen Yang**, Hector Gonzalez-Banos, Victor Ng-Thow-Hing, and James Davis. *RoboTalk: controlling arms, bases and androids through a single motion interface*. International Conference on Advanced Robotics (ICAR), 2005.
5. **Allen Yang**, Shankar Rao, Andrew Wagner, and Yi Ma. *Segmentation of a piece-wise planar scene from perspective images*. Computer Vision and Pattern Recognition (CVPR), 2005.
6. Kun Huang, **Allen Yang**, and Yi Ma. *Sparse representation of images using hybrid linear models*. International Conference on Image Processing (ICIP), 2004.
7. Kun Huang, **Allen Yang**, Wei Hong, and Yi Ma. *Large-baseline matching and reconstruction from symmetry cells*. International Conference on Robotics and Automation (ICRA), 2004.
8. **Allen Yang**, Shankar Rao, Kun Huang, Wei Hong, and Yi Ma. *Geometric segmentation of perspective images based on symmetry groups*. International Conference on Computer Vision (ICCV), 2003.
9. **Allen Yang**, Wei Hong, and Yi Ma. *Structure and pose from single images of symmetric objects with applications to robot navigation*, International Conference on Robotics and Automation (ICRA), 2003.
10. Yi Ma, Kun Huang, and **Allen Yang**. *Classification of rank conditions for multiple views of dynamic scenes*. Workshop on Dynamic Scenes, European Conference on Computer Vision (ECCV), 2002.

Work in Preparation

1. Yi Ma, **Allen Yang**, Harm Derksen, and Robert Fossum. *Estimation of subspace arrangements with applications in modeling and segmenting mixed data*. Submitted to SIAM Review.