

OLGA VEKSLER

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Education:

- CORNELL UNIVERSITY, ITHACA, NY
Ph.D. candidate in Computer Science (expected completion: Spring 1999)
Major: Computer Vision, Minor: Statistics
Advisor: Prof. Ramin Zabih (Computer Science)
- CORNELL UNIVERSITY, ITHACA, NY
Master of Science in CS, January 1999.
- NEW YORK UNIVERSITY, NEW YORK
Bachelor of Arts, 1995.
Majors: Computer Science and Mathematics

Research Activities:

Low level vision, image restoration, visual correspondence, image segmentation, graph algorithms

Ph.D. Dissertation: "Efficient graph-based energy minimization methods in computer vision". My Ph.D. thesis takes energy minimization approach to low level vision problems such as visual correspondence and image restoration. This powerful approach is severely limited by high computational cost. We develop a number of efficient algorithms for several important classes of energy functions that model pairwise pixel interactions. Minimizing these energies can be justified by MAP estimation of certain Markov random fields. When pixel interactions are modeled by a linear function, we find the global minimum of the energy. When pixel interactions are represented by a simple model allowing discontinuities (the Potts model) we find a solution within a factor of two from the optimum. For a more general case (the semi-metric model) we also obtain an answer with certain interesting optimality guarantees. All algorithms are based on graph cuts. The results on data with ground truth show a significant improvement over standard methods.

Referred Journal Papers:

- Y. BOYKOV, O. VEKSLER, R. ZABIH, *A Variable Window Approach to Early Vision*. In IEEE Transactions on Pattern Analysis and Machine Intelligence, vol. 20, no. 12, 99.1283-1294, 1998

Referred Conference Papers:

- Y. BOYKOV, O. VEKSLER, R. ZABIH, *A New Algorithm for Energy Minimization with Discontinuities*. In the International Workshop on Energy Minimization Methods in Computer Vision and Pattern Recognition, to appear, 1999
- Y. BOYKOV, O. VEKSLER, R. ZABIH, *Markov Random Fields with Efficient Approximations*. In IEEE Computer Vision and Pattern Recognition Conference, pp. 648-655, 1998
- Y. BOYKOV, O. VEKSLER, R. ZABIH, *Disparity Component Matching for Visual Correspondence*. In IEEE Computer Vision and Pattern Recognition Conference, pp. 470-475, 1997.

Technical Reports and Submitted Papers:

- Y. BOYKOV, O. VEKSLER, R. ZABIH, *Energy Minimization with Discontinuities*. Submitted to The International Journal on Computer Vision, 1998
- Y. BOYKOV, O. VEKSLER, R. ZABIH, *Fast Approximate Energy Minimization via Graph Cuts*. Submitted to the International Conference on Computer Vision, 1999
- Y. BOYKOV, O. VEKSLER, R. ZABIH, *Efficient Restoration of Multicolor Images with Independent Noise*. Document ID ncsrl.cornell/TR98-1712, Cornell University, Computer Science, 1998.

Work Experience:

- FALL 1998 - PRESENT, CORNELL UNIVERSITY, ITHACA, NY
Research assistant under Prof. Ramin Zabih:
Developing algorithms for efficient minimization of certain energy functions. Applying energy minimizations algorithms to stereo, motion, visual correspondence, edge detection.
- SUMMER 1995, BELL-LABS, MURRAY HILL, NJ
Intern at the Statistics Department:
Worked on properties of majority rule algorithm for speech recognition.
- FALL 1993 - SPRING 1995, NEW YORK UNIVERSITY, NEW YORK
Tutor at the Department of Mathematics

Honors and Awards:

- NSF/GEE Fellowship, 1995-1998
- Diploma with honors in Mathematics and Computer Science from New York University
- 1995 Math Prize, New York University
- 1994 Math Prize, New York University

References:

- Prof. Ramin Zabih, rdz@cs.cornell.edu
- Prof. Daniel Huttenlocher, dph@cs.cornell.edu
- Prof. Eva Tardos, eva@cs.cornell.edu
- Prof. John Kleinberg, kleinber@cs.cornell.edu