

# AMIT SETHI

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## OBJECTIVE

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To obtain a challenging research and development position in the industry.

## CURRENT RESEARCH

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Machine Learning, Pattern Recognition, Algorithms and Data Structures, Computer Vision.

## EDUCATION

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1999–2005 University of Illinois at Urbana-Champaign

- Ph.D., Electrical and Computer Engineering, GPA 3.91/4.00 (expected, Nov. 2005).
- M.S., General Engineering, GPA 4.00/4.00

1995–1999 Indian Institute of Technology, New Delhi

- B.Tech., Electrical Engineering, GPA 8.05/10.00

Relevant Coursework

Pattern Recognition, Probability and Stochastic Processes, Artificial Intelligence, Genetic Algorithms, Image Processing, Computer Vision, Geometry and Computer Vision, Data Structures, Combinatorial Algorithms, Multimedia Systems, Computer Graphics, Signal Processing, Operating Systems.

## EXPERIENCE

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2001–2005 Electrical and Computer Engineering, University of Illinois at Urbana-Champaign

- Solved video processing and video understanding problems using machine learning techniques for surveillance-related applications as a PhD candidate. Came up with a generic and widely applicable framework called V/M-Graphs, which uses processing modules as computational approximations in graphical models, and an online EM-type algorithm for learning. Problems addressed included human and vehicle tracking, audio-visual scene analysis, trajectory prediction, and event detection. This work continues to lead to more research, publications, and funding for the group.
- Wrote research grant proposals, organized site-visits, and delivered performance reports to government agencies such as [NSF](#), [NIH](#), [NIMA](#) and [ARDA](#), and private companies such as [Proximex](#) and [NEC](#) for [Professor T.S. Huang](#).
- Reviewed papers submitted to conferences in my research area such as [ICIP](#) and [ICPR](#).
- Supervised junior students, led development teams on projects, and delivered lectures in graduate-level courses.
- Previously, developed an object recognition system based on silhouettes of the object extracted from its images with [Professor D.J. Kriegman](#). Co-developed the same theory to solve structure from motion problem for smooth textureless objects. This work led to several

publications.

2002–2005 Department of Psychology, University of Illinois at Urbana-Champaign

- Working on an interdisciplinary project with Professors [L. Loschky](#) and [D. Simons](#) to come up with a new computational model of scene gist perception. Responsible for engineering advice and programming. Also writing research grant proposals and publications.
- Was involved in developing a proactive computer that teaches science concepts to school children. Responsible for vision-based estimator for the state of Lego™ gears that children play with while learning about gears.

2003 NEC Labs America, Cupertino, CA

- Developed a system to track multiple humans and monitor their activities in indoor scenes as a visiting researcher to NEC Labs in spring 2003. The system was based on human detection, multi-hypothesis tracking, and rule-based event detection. The work led to filing of a patent, a conference publication, and the launch of [Vidient Inc.](#)
- Developed a vehicle tracking system based on robust feature-point detection and motion clustering as an intern in summer 2003. The work was subsequently taken over by [Vidient Inc.](#)

1999–2001 General Engineering, University of Illinois at Urbana-Champaign

- Developed a system to control a cold roll threader for miniature bolts for MS thesis with [Professor H.L.M. dos Reis](#). Replaced existing die assembly with redesigned and actively controlled die assembly. Interfaced it with a computer, which ran the control software on a real time kernel and had a GUI to set the parameters and monitor the performance. The thread quality on the bolts improved considerably and the results helped in continued funding of the [NDT&E Research Lab](#) by [Textron Fastening Systems](#).
- Developed a self-navigating, fire-fighting robot that could explore unseen indoor surroundings while looking for fires to be extinguished with two other people. Entered the robot in [Trinity College Fire Fighting Home Robot Contest](#). A [local newspaper](#) covered the project.

1995–1999 Electrical Engineering, Indian Institute of Technology, New Delhi

- Worked on various research and development projects on a wide range of topics such as video processing, neural networks, robotics, circuit design, digital signal processing, and Surface Acoustic Wave devices as a B.Tech. candidate at [IIT New Delhi](#).
- Worked on explaining the success of turbo codes using Pearl's Belief Propagation Algorithm with [Professor B. Sundar Rajan](#) of [Indian Institute of Science](#).

Summer 1998 ABB, Bangalore, India

- Programmed a robot for automated painting of cathode ray tubes and worked on designing DC motor drives as an intern at [ABB](#), Bangalore.

## COMPUTER SKILLS

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C/C++, MATLAB, VisualBasic, OpenCV, DirectX, .NET, Linux/UNIX, HTML/XML, AutoCAD, assembly languages, Prolog, Lisp.

## PUBLICATIONS

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### Journals

- "Robust Structure and Motion from Outlines of Smooth Curved Surfaces", Y. Furukawa, A. Sethi, J. Ponce, D. J. Kriegman. To be published in IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI), 2005. [ [PDF](#) ]
- "Curve and Surface Duals and the Recognition of Curved 3D Objects from their Silhouettes", A. Sethi, D. Renaudie, J. Ponce, D. J. Kriegman. International Journal of Computer Vision (IJCV), Vol. 58: No. 1, June 2004. [ [PDF](#) ]

### Conferences

- "Variable Module Graphs: A Framework for Inference and Learning in Modular Vision Systems", A. Sethi, M. Rahrkar, T. S. Huang. International Conference on Image Processing (ICIP), 2005. [ [PDF](#) ]
- "Robust Speaker Tracking by Fusion of Complementary Features from Audio and Video Modalities", M. Rahrkar, A. Sethi, T. S. Huang. Workshop on Image Analysis for Multimedia Interactive Services (WIAMIS), 2005. [ [PDF](#) ]
- "A Detection-Based Multiple Object Tracking Method", M. Han, A. Sethi, Y. Gong. International Conference of Image Processing (ICIP), 2004. [ [PDF](#) ]
- "Structure from Motion for Smooth Textureless Objects", Y. Furukawa, A. Sethi, J. Ponce, D. J. Kriegman. European Conference of Computer Vision (ECCV), 2004. [ [PDF](#) ]
- "On Pencils of Tangent Planes and the Recognition of Smooth 3D shapes from Silhouettes", S. Lazebnik, A. Sethi, C. Schmid, D. J. Kriegman, J. Ponce, M. Hebert. European Conference of Computer Vision (ECCV), 2002. [ [PDF](#) ]

### In preparation

- "A V/M-Graph based solution for audio-visual tracking", A. Sethi, M. Rahrkar, T. S. Huang
- "Distributed Learning in Graphical Models as an Instance of EM-Algorithm", A. Sethi, T. S. Huang
- "Comparison between learning and inference in V/M Graphs and Variational Methods, Minimizing Contrastive Divergence, and Wake Sleep Algorithm", A. Sethi, T. S. Huang

## AWARDS AND ACHIEVEMENTS

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### Academic

- Silver, Regional Mathematics Olympiad, Uttar Pradesh (India), 1993
- Silver, Regional Physics Olympiad, Delhi (India), 1995
- Bronze, Regional Mathematics Olympiad, Delhi (India), 1995
- All India Rank 167 among 100,000+ aspirants in Joint Entrance Examination for admission to Indian Institutes of technology, 1995

### Non-Academic

- Featured in "The Best Poems and Poets of 2003" by [Poetry.com](#).
- Certificate of completion, [International City Bank Marathon](#), Long Beach, CA, 2003

- Medal of completion, [LaSale Bank Marathon](#), Chicago, IL, 2004

#### ACTIVITIES AND INTERESTS

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- President, projects coordinator, events coordinator, marathon team trainer and organizer for [Asha for Education](#) at Urbana-Champaign (2000-2004).
- Organized the rock competition and concert in IIT-Delhi's cultural festival (1998).
- Editor and writer for [Suniti.org](#).
- Co-founder and active member of [SamudaiBharati.org](#).
- Sports such as soccer, squash, swimming, running, indoor rock climbing.
- Outdoor activities such as camping, hiking, rafting.
- Poetry, photography, guitar, reading non-fiction.

#### REFERENCES

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Available upon request.