
Sameer Sheorey

(previously Sameer Shirdhonkar)

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- Research Interests
- Computer Vision:** Object recognition and detection, image segmentation, medical image processing.
 - Scientific Computing:** Harmonic analysis (Fourier and Wavelet theory) and partial differential equations with applications to image processing and computer vision.
 - Machine Learning:** Belief propagation and conditional random fields.
- Education
- Ph.D.** Computer Science
Aug 2003 – Dec 2008 University of Maryland (UMD), College Park
Research Area: Computer Vision
Adviser: Prof. David Jacobs
Thesis title: Recognition and matching in the presence of deformation and lighting change.
GPA: 3.82/4.00
 - M.S. (Part of Ph.D.)** Computer Science
Aug 2003 – Jun 2006 University of Maryland, College Park
Major: Computer Vision Minor: Scientific Computing
Adviser: Prof. David Jacobs
Scholarly Paper: Non-negative lighting and specular object recognition.
 - B.Tech.** Electrical Engineering
Aug 1999 – Jun 2003 Indian Institute of Technology, Bombay
Project: Hand tracking and gesture recognition.
GPA: 9.14/10.00
- Work/Research Experience
- *Nov 2008–current* Research Assistant Professor at Toyota Technological Institute, Chicago (TTIC).
 - *2010–2011* Developed message passing for hybrid (discrete and continuous) problems, with application to 3D stereo reconstruction.
 - *2009–2010* Developed a more accurate low rank matrix completion method using low rank semidefinite programming.
 - *Aug 2004–Oct 2008* Research Assistant at UMIACS, University of Maryland, College Park.
 - *2007–2008* Fast approximation of earth mover’s distance using wavelets for comparing probability distributions.
 - *2005–2008* Development of an automatic hand-held plant species recognition system using leaf images. This was a collaborative project between the Smithsonian Institution, Columbia University and the University of Maryland. Our system recognizes any of about 250 species of trees from the Washington - Baltimore area.
 - *2006–2008* Developed a deformation invariant representation of images for image comparison.

- 2004–2005 Recognition of specular (shiny) objects. A new method for enforcing non-negativity of light during recognition of specular objects was proposed and its effectiveness studied.
- Summer (Jun–Sep) 2006 Internship at GE global research, Bangalore, India. Developed multiresolution compression for 3D medical image registration data using wavelets, and a new algorithm for Registration of 3D medical images using polynomial wavelets.
- Summer (Jun–Jul) 2005 at Apptis inc. Developed face recognition applications using two commercial SDKs and compared their performance with a Maryland algorithm with respect to age separated images.
- 2003 IIT Bombay. Tracking of hands and gesture recognition.
- Summer 2002 Internship at Computer Vision lab, Indian Institute of Science, Bangalore, India. Developed a system for camera control of pick and place robotic arm.
- Summer (Jun–Jul) 2001 Internship at EPFL, Lausanne, Switzerland. LDPC codes and belief propagation.

Publications

Peer Reviewed:

- Kaushik Mitra, Sameer Sheorey and Rama Chellappa, Large-Scale Matrix Factorization with Missing Data under Additional Constraints, *Advances in Neural Information Processing Systems 24, Vancouver, Canada, 2010*
- Peter N. Belhumeur, Daozheng Chen, Steven Feiner, David Jacobs, W. John Kress, Haibin Ling, Ida Lopez, Ravi Ramamoorthi, Sameer Sheorey, Sean White and Ling Zhang, Searching the World’s Herbaria: A System of Visual Identification of Plant Species, *European Conference on Computer Vision, Marseille, France, 2008*.
- Sameer Shirdhonkar and David Jacobs, Approximate earth mover’s distance in linear time, *IEEE International Conference on Computer Vision and Pattern Recognition, Anchorage, USA, 2008*.
- Gaurav Agarwal, Peter Belhumeur, Steven Feiner, David Jacobs, W. John Kress, Ravi Ramamoorthi, Norman A. Bourg, Nandan Dixit, Haibin Ling, Dhruv Mahajan, Rusty Russell, Sameer Shirdhonkar, Kalyan Sunkavalli, and Sean White First Steps Toward an Electronic Field Guide for Plants, *Taxon*, 55(3): 597-610, August, 2006
- Sameer Shirdhonkar and David Jacobs, Non-negative Lighting and Specular Object Recognition, *IEEE International Conference on Computer Vision, Beijing, China, 2005*.

Technical Reports:

- Sameer Shirdhonkar and David Jacobs, Approximate earth mover’s distance in linear time, *UMIACS Technical Report 2008-06*
- Sameer Shirdhonkar and David Jacobs, Non-negative Lighting and Specular Object Recognition, *UMIACS Technical Report 2005-39*

Talks

- Approximate earth mover’s distance in linear time, Monge-Kantorovich Optimal Transport – Theory and Applications workshop at Santa Fe, NM, USA (October 2009)
- Linear time approximation to the earth mover’s distance for comparing histograms. (April 2008) at TTI Chicago.
- Fourier series and Wavelets: A comparison. (Tutorial) (July 2006) at GE global research, Bangalore, India.

Teaching Experience **University of Maryland, College Park:** Teaching assistant for:
 CMSC 214 Computer Programming in C++ II (Fall 2003)
 CMSC 114 Computer Programming in C++ I (Spring 2004)

Awards

- **Dean's fellowship** (2008-09), Computer Science department, University of Maryland.
- 2006 University of Maryland **business plan competition**, (young alumni category) **Second** prize (team of 2) for VFore: a content based photo organizer.
- **Yantriki** 2002 (Autonomous level), the annual inter-collegiate robotics competition of IIT Bombay. **Second** prize (team of 4) for an autonomous robot that locates a target and drops the payload into it.
- **Technical Colour** 2001 (IIT Bombay) for various inter-hostel technical competitions.
- **Merit Cum Means scholarship** 1999–2003 from IIT Bombay

Technical Skills **Languages:** C, C++, Matlab, Shell scripting, Python
Others: OpenMP, OpenCV, Unix/Linux, Software revision control systems.

Software Releases **Self:**

- Belief propagation for hybrid (discrete & continuous) problems [C++, OpenMP]
- Low rank matrix completion [Matlab]
- Wavelet earth mover's distance [C++, Matlab]
- Non-negative spherical harmonic constraints for specular object recognition [Matlab]

Team:

- Plant species recognition from leaf images. [Matlab, C#]

Miscellaneous **Hobbies and interests:** Outdoor activities (Hiking, Bicycling), Reading science fiction and fantasy books, Science trivia, Following Green technologies and open source software.