

RESEARCH INTERESTS

Machine Learning, Computer Vision, Image Processing, Heterogeneous data modeling/analysis.

Current research focuses on the development and application of novel machine learning and computer vision algorithms to analyze histopathological images.

EDUCATION

- 2010 TO 2014 **Ph.D** in Electrical and Computer Engineering, **Northeastern University**, Boston.
Dissertation: "Bayesian Nonparametrics and Marked Poisson Processes"
Advisor: Prof. [Jennifer Dy](#) | **GPA:** 3.93/4.0
- 2008 TO 2010 **Masters** in Electrical and Computer Engineering, **Texas Tech University**, Lubbock.
Thesis: "Highway Steel Bridge Coating Assessment by Developing a Digital Image Processing System".
Advisor: Prof. [Tanja Karp](#) | **GPA:** 3.9/4.0
- 2004 TO 2008 **B.E** in Electrical and Electronics Engineering, **GITAM**, Visakhapatnam, AP, India.
Major: Electrical Machines and Power Systems | **Distinction with GPA:** 8.7/10

EXPERIENCE

Current Postdoctoral Fellow	Beth Israel Deaconess Medical Center, Harvard Medical School (BIDMC) -Developed algorithms for clinical research automation: <ul style="list-style-type: none">• Segmentation of epithelium and stromal in breast cancer immunohistological images using texture features.• Core extraction from Tissue Micro Array (TMA) images using a probabilistic appearance model in combination with angular distortion correction.• Classification of healthy and cancer nuclei from digital pathology images of breast cancer by utilizing deep neural networks.
2010-2014 Research Assistant: Advisor: Dr. Jennifer Dy	Northeastern University - Developed a novel non-parametric Bayesian latent marked Poisson Process that takes uncertainty in number, location, shape and appearance into account for pattern detection. - Designed an efficient Gibbs inference strategy that can handle varying model order. - Accomplished detection/segmentation of objects of interest such as: <ul style="list-style-type: none">• Pedestrians, cars in traffic surveillance data.• Cell nuclei from 2D stained microscope images.• Dermis-epidermis in 3D reflectance confocal microscopic images of the human skin.
Advisor: Dr. Ralf Birken	Versatile Onboard Traffic Embedded Roaming Sensors (VOTERS): Worked on the video sensor mounted on a moving vehicle as a part of the VOTERS system right from acquisition to algorithm development to assess surface defects of pavements. -Developed an algorithm for the automated detection and classification of pavement cracks according to their types (alligator, transverse and longitudinal) and presence of manholes etc. using Bayesian multinomial logistic regression. - Developed an unsupervised mode of crack detection and classification that uses Hessian-based multi-scale filters at different scales, inspired from techniques in biomedical image processing. -Designed and implemented a software trigger for the camera based on distance traveled by the moving vehicle using C++ on a Linux platform.
2008-2010 Advisor: Dr. Tanja Karp	Texas Tech University Research Assistant: Developed an algorithm based on wavelet theory and pattern recognition to detect rust and eliminate illumination variations in images of highway steel bridge coating. Teaching Assistant: Electromagnetic Fields; Introduction to Electrical and Computer Engineering.

PUBLICATIONS

1. Ghanta, S., Dy, J., Jordan, M. "Bayesian Nonparametric Latent Marked Poisson Process with Applications to Object Segmentation", *submitted to International Society for Bayesian Analysis*.
2. Ghanta, S., Jordan, M., Brooks, D., Rajadhyaksha, M., Dy, J., "A Marked Poisson Process Driven Latent Shape Model for 3D Segmentation of Reflectance Confocal Microscopy Image Stacks", *submitted to IEEE Journal of Selected Topics in Signal Processing*.
3. Ghanta, S., Shamshabadi, S.S, Birken, R., Dy, J., "Automatic Detection of Crack Types from Pavement Images using Hessian-based Multi-scale filtering", *submitted to Journal of Computing in Civil Engineering (JCCV)*.
4. *Oh, E-Y, *Christensen, S.M., *Ghanta, S., *Jeong, J.C., et al. "Extensive Rewiring of Epithelial-stromal Co-expression Networks in Breast Cancer", *Genome Biology*, 16(1):128, Jun. 2015. *Co-first authors.
5. Ghanta, S., S., Shamshabad, Birken, R., Dy, J., "A Hessian-based Methodology for Automatic Surface Crack Detection and Classification from Pavement Images", in *Proc. SPIE 9437, Structural Health Monitoring and Inspection of Advanced Materials, Aerospace, and Civil Infrastructure*, pp.94371Z-11, Mar. 11-14, 2015.
6. Ghanta, S., Birken, R., Dy, J., "Automatic Road Surface Defect Detection from Grayscale Images", in *Proc. SPIE 8347, Nondestructive Characterization for Composite Materials, Aerospace Engineering, Civil Infrastructure, and Homeland Security*, pp.83471E-12, Mar. 12-15, 2012.
7. Ghanta, S., Karp, T., Lee, S., "Wavelet Domain Detection of Rust in Steel Bridge Images", in *Proc. Acoustics, Speech and Signal Processing (ICASSP)*, pp. 1033-1036, May. 22-27, 2011.
8. Lee,S, Ghanta,S., Karp,T., "Comparative Study of Retrospective Methods to Reduce Non-uniform Illumination Effects to Bridge Coating", *Automation in Construction*, (22) 537-544, Mar. 2012.

POSTER PRESENTATIONS

1. Ghanta, S., Jordan, M., Brooks, D., Rajadhyaksha, M., Dy, J., "Latent Space and Shape Model for 3D Segmentation of the Dermis/Epidermis in Reflectance Confocal Microscopy Images", *Communications and Digital Signal Processing (CDSP) Workshop*, Northeastern University, Mar. 2014.
2. Ghanta, S., Birken, R., Dy, J., "Surface Video Analysis for Defects (SVAD)", *National Institute of Standards and Technology (NIST)*, Stearns, Northeastern University, Boston, Mar. 2014.
3. Ghanta, S., Birken, R., Dy, J., "Crack detection from images", *National Institute of Standards and Technology (NIST)*, Stearns, Northeastern University, Boston, Mar. 2013.
4. Ghanta, S., Birken, R., Dy, J., "Automatic Road Surface Defect Detection from Grayscale Images", *Women in Machine Learning (WiML)*, Lake Tahoe, Mar. 12-15 2012.
5. Ghanta, S., Birken, R., "Automatic Crack Detection Algorithm from Pavement Surface Images", in *Proc. American Society of Civil Engineers (EMI)*, Jun. 2011.

PROFESSIONAL ACTIVITY - PEER REVIEWS

1. Association for the Advancement of Artificial Intelligence (AAAI)
2. Neural Information Processing Systems (NIPS)
3. Journal of Computing in Civil Engineering (ASCE)
4. SIAM International Conference on Data Mining (SDM)
5. SIAM Undergraduate Research Online (SIURO)

AWARDS

Northeastern University: [Fall 2014 Dissertation Completion Fellowship](#).

Texas Tech University: Departmental Scholarship, Electrical & Computer Engineering, 2008-2010.

SKILLS

OS: Linux, Windows
Programming: C, MATLAB, Python, R