Parneet Kaur, Ph.D.

Senior Scientist

🖰 *http://parneetk.github.io/*

Summary

Researcher with demonstrated ability to deliver image analysis solutions using advanced computer vision and machine learning techniques; 10+ years of programming experience in academia and industry; Areas of Expertise: Machine Learning, Deep Learning, Computer Vision, Image Processing, Signal Processing.

Experience

Feb 2019 – Present
Senior Scientist, *Johnson & Johnson*, Skillman, NJ.

Feb 2018 – Feb 2019
Postdoctoral Scientist, *Johnson & Johnson*, Skillman, NJ.
- Developing machine learning methods for better understanding and computational analysis of skin and facial appearance.
- Innovating new image analysis pipelines to advance the scientific status quo.
- Using large existing clinical data to develop new deep learning methods.
- Supporting image analysis for claims substantiation and visualization.
- Mentored an intern for 6 months.

July 2017 – Oct 2017
Student Associate, *Vision and Learning Group, SRI International*, Princeton, NJ.
- Developed webly and weakly-supervised learning methods for image classification and object localization.
- Collected FoodX-251 dataset used for hosting iFood challenge at Fine-Grained Visual Classification workshop at CVPR in 2018 and 2019.

Oct 2011 – Oct 2017
Graduate Assistant, *Computer Vision Lab*, Rutgers University, NJ.
- Developed texture transfer technique for facial images using deep learning.
- Collaborated with Johnson & Johnson to develop computational models linking skin appearance and skin microbiome using multi-modal skin imaging and sparse coding.
- Developed hybrid deep learning method for automated classification of macroscopic and microscopic skin images.
- Analyzed ground penetrating radar (GPR) scans to generate bridge deck deterioration maps using Robotic Assessment Bridge Inspection Tool in collaboration with Federal Highway Administration. Integrated machine learning classification using image-based gradient features and robust curve fitting of the rebar hyperbolic signature to locate rebars in the GPR images.

May 2016 – Aug 2016
Student Associate, *Vision Systems Group, SRI International*, Princeton, NJ.
- Analyzed skin texture from smart-phone and specialized cameras for a major cosmetic company.
- Evaluated pre-trained convolutional neural networks (CNNs) as feature extractors, trained and fine-tuned CNNs by augmenting skin datasets.
- Compared existing techniques for melanoma lesion classification

Fall 2016 Summer 2013 Spring 2012
Teaching Assistant, *Department of Electrical and Computer Engineering*, Rutgers University, NJ.
- *Robotics & Vision*: Held TA office hours, graded assignments and projects. (40 students).
- *Programming Methodology I Lab*: Instructed, designed and graded programming assignments (15+ students).
- *Software Engineering*: Oversaw 12 semester-long projects, graded exams and project reports (70+ students).

Jun 2011 – Sep 2011
Intern, *Broadcom Corporation*, Yardley, PA.
- Developed a software prototype for video stabilization in high-definition televisions.
- Implemented visualization of various motion vector fields.

Oct 2007 – Sep 2009	**Software Engineer**, *Robert Bosch Engineering and Business Solutions Limited*, Bangalore, India.

- Developed software for real-time embedded systems deployed in automobile platforms.
- Conducted requirements analysis, software design and implementation, unit and integration testing, and software peer reviews.

Education

Oct. 2017	**Ph.D., Electrical and Computer Engineering**, *GPA: 3.79/4.0.*
	Rutgers University, Piscataway, NJ
	Thesis: Computational Appearance Models for Quantitative Dermatology
	Advisor: Dr. Kristin J. Dana
2013	**M.S., Electrical and Computer Engineering**, *GPA: 3.75/4.0.*
	Rutgers University, Piscataway, NJ
	Thesis: Automated bridge deck evaluation from ground penetrating radar scans
	Advisor: Dr. Kristin J. Dana
2007	**B.E., Electronics and Communication Engineering**, *Aggregate: 81%.*
	Visvesvaraya Technological University, Bangalore, India

Technical Skills

Programming Languages: Python, MATLAB, C++

Libraries/Tools: Pytorch, Tensorflow, Keras, OpenCV, scikit-learn, MatConvNet, VLFeat

Graduate Coursework

Machine Vision, Advanced Computer Vision, Machine Learning, Pattern Recognition, Convex Optimization, Regression Analysis, Digital Signals and Filters, Optimum Signal Processing, Stochastic Signals & Systems, Computer Architecture

Publications

P. Kaur, W. Wang, K. Sikka and A. Divakaran. "FoodX-251: A Dataset for Fine-grained Food Classification". (Submitted, May 2019)

L. K. Petersen, I. Seo, E. Zaleski, P. Kaur, K. Capone, M. Cettina, P. Zhang, R. J. Gambogi, A. Parikh-Das, "Clinical Evaluation of Microbial And Metabolite Changes in Minor Wound Healing." In Wound Repair and Regeneration (Vol. 27, No. 3, pp. A22-A22). (May 2019)

P. Kaur, H. Zhang and K. J. Dana, "Photo-realistic Facial Texture Transfer." Winter Applications in Computer Vision, 2019

P. Kaur, K. Sikka and A. Divakaran. "Combining Weakly and Webly Supervised Learning for Classifying Food Images." arXiv preprint arXiv:1712.08730 (2017)

P. Kaur, K. J. Dana, G. O. Cula and C. Mack, "Hybrid Deep Learning for Reflectance Confocal Microscopy Skin Images," 2016 23rd International Conference on Pattern Recognition, 2016.

P. Kaur, K. J. Dana and G. O. Cula, "From photography to microbiology: Eigenbiome models for skin appearance," 2015 IEEE Conference on Computer Vision and Pattern Recognition Workshops (CVPRW), Boston, MA, 2015, pp. 1-10.

P. Kaur, K. J. Dana, F. A. Romero and N. Gucunski, "Automated GPR Rebar Analysis for Robotic Bridge Deck Evaluation," in IEEE Transactions on Cybernetics, vol. 46, no. 10, pp. 2265-2276, Oct. 2016.

Posters

P. Kaur, K. J. Dana, G. O. Cula. *Computational models to link skin appearance and skin microbiome*. Women in Computer Vision Workshop, IEEE conference on Computer Vision and Pattern Recognition (CVPRW). (Jun 2016)

P. Kaur, K. J. Dana, F. A. Romero, N. Gucunski. *Computer vision for automated bridge deck evaluation from Ground Penetrating Radar Scans*. 3rd GNY Area Multimedia and Vision Meeting, The City College of New York, New York, USA. (Jun 2013)

P. Kaur, P. Prasanna, K. J. Dana. *Applications of Computer Vision in Civil Engineering*. First Multimedia and Vision Meeting for the Greater New York area, Stevens Institute of Technology New York, USA. (Feb 2012)

P. Kaur, P. Prasanna, K. J. Dana. *Real Time Hand Gesture Recognition and Blink Detection*. Rutgers Day-2010 (with demonstration). (Apr 2011)

Awards

- Women Techmakers travel grant for Tensorflow Dev Summit. (2018)
- Google Anita Borg Memorial Scholarship. (2016)
- Rutgers ECE Best TA Award. (2016)
- Rutgers ECE PhD Research Excellence Award. (2016)
- Google travel grant to attend Grace Hopper Conference for Women In Computing. (2016)
- IAPR travel stipend to present paper in International Conference on Pattern Recognition (2016)
- TA/GA Professional Development Fund Award, Rutgers University. (Summer 2017, Summer 2016, Spring 2016)
- Coached and designed a project for a middle school student, who received an honorable mention for a national level competition by ProjectCSGIRLS. (2015)
- Charles Pankow National Award for Innovation, awarded by the American Society of Civil Engineers (ASCE) to Robotic Assessment Bridge Inspection Tool. Contribution: analysis of GPR scans. (2014)

Extracurricular Activities

- Mentor, J&J WiSTEM2D. (2018-present)
- Co-organizer, Fine-Grained Visual Classification Workshop, CVPR. (2018, 2019)
- Co-founder and President, Novice-to-Expert coding club at Rutgers University. (2015 - 2017)
- Internal Vice President, Society of Women Engineers Graduate Chapter at Rutgers University. (2015 - 2017)
- Mentor for the 1000 Girls, 1000 Futures program from New York Academy of Sciences (2015-2016), The Academy at Rutgers for Girls in Engineering & Technology (2015) and ProjectCSGIRLS (2015).