SHREYAS PADHY

AI Resident | Google Brain

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EDUCATION

Johns Hopkins University   **August 2017 - May 2019**
MSE in Biomedical Engineering
Overall GPA: 4.0

Indian Institute of Technology Delhi   **July 2013 - May 2017**
B.Tech in Engineering Physics
Overall GPA: 8.871/10 (DR 4)

RESEARCH EXPERIENCE

AI Resident, Google Brain, Cambridge   **August 2019 - present**
Under mentorship of Balaji Lakshminarayanan and Jasper Snoek, Google Brain

· Worked on distance-based loss functions for improved uncertainty and robustness in deep learning methods under distribution shift and on out-of-distribution data.
· Worked on Spectral-normalized Neural Gaussian Process SNGP), a competitive single-model approach on prediction, calibration and out-of-domain detection that encodes input distance awareness.
· Working on large scale kernel methods in the infinite-width limit.

Graduate Research Assistant, Center for Imaging Science   **December 2017 - February 2019**
Under supervision of Dr. Michael Miller, Center for Imaging Science, Johns Hopkins University

· Implemented Siamese networks on the Biocard and ADNI Datasets for the detection of Alzheimer's disease to learn feature embeddings to quantify & detect asymmetry across brain volumes..
· Performed longitudinal shape analysis on sub-cortical structures in the human brain involved with schizophrenia
· Used the Large Deformation Diffeomorphic Metric Mapping algorithm to generate time-dependent flows of surfaces of various sub-cortical structures to study the rate of atrophy of neuronal tissue.

Research Assistant, Center for Medical Image Computing, UCL   **June 2016 - August 2016**
Under supervision of Dr. Simon Arridge, Director, Centre for Medical Image Computing, University College London

· Formulated a-posteriori error & adaptive meshing algorithms for 2 and 3-dimensional diffuse optical tomography.
· Developed adaptive meshing and a-posteriori error calculation routines for the TOAST++ software package for diffuse optical tomography.

PUBLICATIONS

Conferences

· Jeremiah Zhe Liu, Zi Lin, Shreyas Padhy, Dustin Tran, Tania Bedrax-Weiss, and Balaji Lakshminarayanan, "**Simple and principled uncertainty estimation with deterministic deep learning via distance awareness.**, *to appear in Advances in Neural Information Processing Systems 2020.*

Journals

· Uday K. Khankhoje and Shreyas Padhy, "**Stochastic Solutions to Rough Surface Scattering using the finite element method**, *IEEE Transactions on Antennas and Propagation,* (Vol 65, No 08), 2017. DOI: 10.1109/TAP.2017.2715366
· Chin-fu Liu*, Shreyas Padhy* et. al, "**Using Deep Siamese Neural Networks for Detection of Brain Asymmetries Associated with Alzheimer's Disease and Mild Cognitive Impairment**", *Magnetic resonance imaging 64 (2019): 190-199.*, 2019.

Workshops

* denotes equal contribution

- Shreyas Padhy, Zachary Nado, Jie Ren, Jeremiah Liu, Jasper Snoek, and Balaji Lakshminarayanan, "**Revisiting One-vs-All Classifiers for Predictive Uncertainty and Out-of-Distribution Detection in Neural Networks.**, *ICML 2020 Workshop on Uncertainty and Robustness in Deep Learning.* 📕
- Zachary Nado, Shreyas Padhy, D. Sculley, Alexander D'Amour, Balaji Lakshminarayanan, and Jasper Snoek, "**Evaluating prediction-time batch normalization for robustness under covariate shift.**, *ICML 2020 Workshop on Uncertainty and Robustness in Deep Learning.* 📕

Graduate Thesis

- Shreyas Padhy, "**Analyzing shape and residual pose of subcortical structures in brains of subjects with schizophrenia**, *Masters Thesis, Master of Science in Engineering, Department of Biomedical Engineering, Johns Hopkins University.* 📕

TECHNICAL PROJECTS

Uncertainty Baselines and Uncertainty Metrics ⬡   **August. 2020 - current**
Core contributor, Google Brain

Convolutional Networks with Recurrent Encoding for Segmentation ⬡   **Sept. 2017 - Dec. 2017**
Course Project, Under supervision of Dr. Najim Dehak, Johns Hopkins University

RESEARCH EXPOSURE

Neurohackademy Summer Institute 2018   **July - August 2018**
University of Washington, Seattle eScience Institute

- Created `easyhcp`, an open-source software package for easy and efficient querying of data from the Human Connectome Project using AWS Buckets and Boto.
- Attended a two week course on open and reproducible practises in neuroscience.

UCL Medical Image Computing Summer School   **July 2016**
Conducted by Centre for Medical Image Computing, University College London

- Worked on image segmentation of brain MRI samples using global and local voting techniques under the supervision of Dr. Jorge Cardoso, CMIC.
- Attended a five day course on Image Acquisition, Reconstruction, Modelling, Optimizations, and Pipelines.

TEACHING ASSISTANTSHIPS

Machine Learning for Signal Processing, Fall 2018 : *Graduate Course, by Dr. Najim Dehak, JHU*
Developing weekly assignments and homeworks, and grading for 50+ students.
Intro. to Computational Medicine, Fall 2018 : *Graduate Course, by Dr. Michael Miller, JHU*
Developing homeworks and course notes, extended codebase to Python, and grading for 60+ students.
Gateway Computing: Python, Spring 2019 : *Undergraduate Course, by Dr. Kwame Kutten, JHU*
Developing homeworks, weekly assignments and programming assignments in Python.

AWARDS AND ACHIEVEMENTS

Summer Undergraduate Research Award 2015: For undergraduate research in adaptive meshing techniques for microwave imaging.
Top 7% GPA Merit Scholarship: In 2013, 2014, 2015, and 2016 Fall Semesters for exceptional performance at the Indian Institute of Technology Delhi.

TECHNICAL STRENGTHS

DL Frameworks	PyTorch, Keras, Tensorflow
Computer Languages	Python, C++, Verilog
Medical Imaging	TOAST++, FSL, SPM, Freesurfer
Computational EM	Meep (FDTD), Cubit (Meshing)
Mathematical Computing	MATLAB