Shraman Ray Chaudhuri

PERSONAL — Email: shraman [at] mit [dot] edu — Website: shraman-rc.github.io

RESEARCH INTERESTS — Computer Vision (scene understanding, 3D reconstruction, intuitive physics), Bayesian Machine Learning (nonparametrics, distributed inference, interpretability)

EDUCATION

Massachusetts Institute of Technology, Cambridge, MA — 09/2017 - 06/2018

Master of Engineering (M.Eng.), Electrical Engineering and Computer Science

- Relevant Coursework:
  - Computer Vision (6.869)
  - Bayesian Inference (6.882)
  - Advanced Algorithms (6.854)
  - Numerical Methods for PDEs (6.339)
  - Performance Engineering (6.172)

Bachelor of Science (S.B.), Computer Science and Engineering — 09/2013 - 06/2017
Minor in Mathematics

RESEARCH EXPERIENCE

Massachusetts Institute of Technology, Cambridge, MA — 06/2017 – Present

Graduate Research Assistant under Prof. Josh Tenenbaum
Supervised by Dr. Ilker Yildirim

- Exploring probabilistic generative models, deep learning, and Bayesian optimization to infer pose and 3D representation of objects from a single RGB image.
- Developed a sampling-based training algorithm to optimize neural networks via physical simulation.
- Developed various research tools for the lab including a Python/C++ library for physics simulation with FleX and Bullet, a framework for ConvNet feature analysis, and a distributed mesh rendering pipeline.

Massachusetts Institute of Technology, Cambridge, MA — 08/2016 – 06/2017

Undergraduate Research Assistant under Prof. Nir Shavit
Supervised by Dr. Alexander Matveev

- Explored deep learning methods to construct a connectivity map of the brain from cross-sectional EM images of brain tissue.
- Designed and implemented a multi-resolution ConvNet model based on U-Net, ResNet, and PixelCNN for membrane segmentation. Achieved state-of-the-art performance on various EM datasets.
- Designed and implemented parallel algorithms for a 2D/3D deep learning library on multicore CPUs.

INDUSTRY EXPERIENCE

D.E. Shaw Research, New York, NY — 05/2016 – 08/2016

Scientific Associate (SA) Intern, Software & Applied Math Group
Supervised by Dr. Charles Rendleman

- Designed, implemented, and optimized a particle-mesh Poisson solver to efficiently compute Hamiltonian energies in molecular dynamics simulations.
- Developed fast numerical integration and nonlinear optimization algorithms to increase simulation efficiency.

SpaceX, Hawthorne, CA — 05/2015 – 08/2015

Software Engineering Intern, Propulsion Research Team

- Developed an automated anomaly detection algorithm for rocket telemetry using multiresolution analysis (wavelet transforms), one-class SVMs, hierarchical clustering, and various feature extraction methods.
- Developed an adaptive wavelet-based algorithm to compress telemetry signals by several orders of magnitude.

PUBLICATIONS

D. Budden, A. Matveev, S. Santurkar, **S. Ray Chaudhuri**, N. Shavit. "Deep Tensor Convolution on Multicores." *Proceedings of the 34th International Conference on Machine Learning* (ICML), Sydney, Australia. (2017)

S. Ray Chaudhuri, A. Matveev, N. Shavit. "High-Performance ConvNets for Iterative Membrane Segmentation." *MIT EECScon.* (2017)

TEACHING

Design & Analysis of Algorithms (6.046)

Head Teaching Assistant — Fall 2017, Spring 2018
Teaching Assistant — Fall 2016, Spring 2017

- Teach recitation sections of 30-35 students; topics include Dynamic Programming, Max Flow, Linear Programs, [Randomized, Sublinear, Distributed] Algorithms, Convex Optimization, Complexity Theory, etc.
- Prepare homework/exam problems, organize review sessions, and handle various course logistics for over 300 students.
- Average Overall Rating (from course evaluations): 6.8/7.0

Intro to Deep Learning (6.S191)

Teaching Assistant — Winter 2018

- Design and run labs for a weeklong course on deep learning during MIT's Independent Activities Period (IAP). Topics include CNNs, GANs, LSTMs, and Deep RL.

HONORS

1st Place (out of 70+ submissions) at MIT EECScon 2017
MIT EECS Undergraduate Research and Innovation Scholar
IEEE Eta Kappa Nu (HKN) Honor Society

SKILLS

Programming Languages: C, C++, Python, Java, Lua, MATLAB
Research Tools: TensorFlow, Torch, Caffe, OpenCV, OpenGL, Bullet, FleX
Misc. Tools: CUDA, Cilk, ROS, gcc, Git, Linux/Bash