Gauri Jagatap

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EDUCATION

JAN 2020 -Present	Doctor of Philosophy (PhD) in ELECTRICAL ENGINEERING **New York University**
AUG 2016 -DEC 2019	Master of Science (MS) in ELECTRICAL ENGINEERING **Iowa State University** (GPA: 3.92/4)
AUG 2010 -MAY 2015	Bachelor of Engineering (BE) in ELECTRICAL AND ELECTRONICS ENGINEERING Master of Science (MSc) in PHYSICS **BITS Pilani University**, India (GPA: 8.69/10)

PROGRAMMING LANGUAGES AND FRAMEWORKS

Python, MATLAB, C, TensorFlow, PyTorch

RESEARCH INTERESTS

Deep Neural Networks, Generative Models, Computational Imaging, Machine Learning, Signal Processing

WORK EXPERIENCE

AUG 2016 -Present	Research Assistant at **Iowa State University** and **New York University** | Advisor: Dr. Chinmay Hegde
	Inverse imaging: phase retrieval, compressed sensing, image super-resolution, high dynamic range imaging, compression.
	Neural networks: provable algorithms for regression with shallow neural networks, generative networks as priors.
MAY 2018 -AUG 2018	Research Intern at **Mitsubishi Electric Research Laboratories (MERL)**, Cambridge, Massachusetts.
	Multi-modal active imaging.
JUL 2015 -JUL 2016	Project Assistant at **Indian Institute of Science**, Bengaluru, India
	Axial super-resolution of ultrasound images using compressed sensing.

JOURNAL ARTICLES

JAN 2019	**G. Jagatap** and C. Hegde, "Sample-efficient algorithms for recovering structured signals from magnitude-only measurements", **IEEE Transactions on Information Theory**. (Paper).
AUG 2019	**G. Jagatap**, Z. Chen, S. Nayer, C. Hegde and N. Vaswani, "Sample efficient Fourier ptychography for structured data", *to appear*, **IEEE Transactions on Computational Imaging**. (Paper)

CONFERENCE PROCEEDINGS

MAY 2020	**G. Jagatap** and C. Hegde, "High dynamic range imaging using deep image priors", Proc. of IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), 2020. (Paper).
DEC 2019	**G. Jagatap** and C. Hegde,"Algorithmic guarantees for inverse imaging with untrained network priors", Adv. in Neural Information Processing Systems (NeurIPS), 2019. **(Acceptance rate: 21.18%)**. (Paper).
DEC 2019	**G. Jagatap** and C. Hegde, "Phase retrieval using untrained neural network priors", NeurIPS Workshop on Solving Inverse Problems with Deep Networks, 2019. (Paper).
JUL 2019	**G. Jagatap** and C. Hegde, "Linearly convergent algorithms for learning shallow residual networks", Proc. of IEEE International Symposium on Information Theory (ISIT), 2019. (Paper).
OCT 2018	**G. Jagatap**, Z. Chen, C. Hegde and N. Vaswani, "Model corrected low rank ptychography", Proc. of IEEE International Conference on Image Processing (ICIP), 2018. (Paper).
JUN 2018	**G. Jagatap** and C. Hegde, "Towards sample-optimal methods for solving random quadratic equations with structure", Proc. of IEEE International Symposium on Information Theory (ISIT), 2018. (Paper).
APR 2018	**G. Jagatap**, Z. Chen, C. Hegde and N. Vaswani, "Sub-diffraction imaging using Fourier ptychography and structured sparsity", Proc. of IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), 2018 **(Oral presentation)**. (Paper).
APR 2018	Z. Chen, **G. Jagatap**, S. Nayer, C. Hegde and N. Vaswani, "Low rank Fourier ptychography", Proc. of IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), 2018. (Paper).
DEC 2017	**G. Jagatap** and C. Hegde, "Fast, sample-efficient algorithms for structured phase retrieval", Adv. in Neural Information Processing Systems (NIPS), 2017. **(Acceptance rate: 20.93%)**. (Paper).

RESEARCH PROJECTS

- Inverse imaging using deep untrained generative network priors. [code]
  - Used deep untrained generators as priors for inverse imaging problems such as compressed sensing and phase retrieval, showed superior empirical performance. Provided guarantees for the performance of gradient descent based methods for this problem.
  - Used untrained neural priors for High Dynamic Range (HDR) imaging and demonstrated improved empirical performance.
- Inverse imaging from magnitude-only measurements using structured sparsity priors. [code]
  - Phase retrieval using structured sparsity: used underlying structure (such as block and tree sparsities) in images to develop fast and memory efficient algorithms to reconstruct images from absolute-valued measurements with theoretical guarantees.
- Image and video super-resolution via ptychography. [code]
  - Developed fast and memory efficient algorithm for super-resolution of multiplexed microscopic images by using sparsity priors.
  - Super-resolution for slowly changing microscopic videos, by utilizing low-rank priors.
- Optimization of shallow ReLU networks. [code]
  - Introduced a novel alternating minimization scheme for training shallow ReLU networks. Proved local linear convergence for learning shallow networks of ReLUs via alternating minimization and gradient descent.

Graduate Courses

Iowa State University

Deep Machine Learning, Data Analytics for ECpE, Optimization for Machine Learning, Convex Optimization, Nonlinear Programming, Detection and Estimation Theory, Steganography and Digital Image Forensics

Graduate Course Projects

Iowa State University

May 2017	Sparse PCA using truncated and inverse power methods; non-negative matrix factorization using orthogonal gradient method and successive projection method for topic extraction from text.
May 2018	Image in-painting for engineering datasets via deep projection models.
May 2019	ResNets for classifying natural and CGI images using Sensor Pattern Noise.

Scholarships and Awards

2017 - 19	Travel Awards for NIPS 2017, WiML 2017, ISIT 2019, NeurIPS 2019, WiML 2019
Aug 2016 -	Research Assistant, **Iowa State University** and **New York University**
2011 - 15	INSPIRE Scholarship, **Department of Science and Technology, Govt. of India**

Teaching Assistantships

Spring 2018	EE 525: Data Analytics for ECE, **Iowa State University**
Spring 2014	BITS C386: Quantum Information & Computing, **BITS Pilani University**
Fall 2012	PHY F110: Physics Laboratory, **BITS Pilani University**

Reviewing

Journal articles:

IEEE Signal Processing Letters (SPL), 2019.
IEEE Transactions on Information Theory (TIT), 2018.
IEEE Transactions on Signal Processing (TSP), 2018.

Conference articles:

Conference on Neural Information Processing Systems (NeurIPS), 2019.
International Conference on Signal Processing and Communications (SPCOM), 2018.
Women in Machine Learning (WiML) Workshop, 2017, 2019.

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