Gauri Jagatap

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EDUCATION

JAN 2020 -*Present*	Doctor of Philosophy (PhD) in ELECTRICAL ENGINEERING **New York University** (GPA: 3.83/4)
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 **Birla Institute of Technology and Science**, India (GPA: 8.69/10)

PROGRAMMING LANGUAGES AND FRAMEWORKS

Python, PyTorch, TensorFlow, MATLAB, C

RESEARCH INTERESTS

Deep Neural Networks, Adversarial Attacks, Generative Models, Computational Imaging, Deep Learning

WORK EXPERIENCE

MAY 2021 -AUG 2021	Research Intern at **Google Research**, New York, New York. Using external knowlegde for improving language models.
MAY 2020 -AUG 2020	Data Science Research Intern at **Adobe Research**, San Jose, California. Lossless image compression.
MAY 2018 -AUG 2018	Research Intern at **Mitsubishi Electric Research Laboratories (MERL)**, Cambridge, Massachusetts. Multi-modal active imaging.

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**, 2019. (Paper).
AUG 2019	**G. Jagatap**, Z. Chen, S. Nayer, C. Hegde and N. Vaswani, "Sample efficient Fourier ptychography for structured data", **IEEE Transactions on Computational Imaging**, 2019. (Paper)

CONFERENCE PUBLICATIONS

JUL 2021	**G. Jagatap**, A. Chowdhury, S. Garg and C. Hegde, "Adversarially robust learning via entropic regularization", ICML Workshop on Adversarial Machine Learning, 2021. (Paper).
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).

PREPRINTS

OCT 2021	A. Joshi, **G. Jagatap** and C. Hegde, "Adversarial token attacks on vision transformers", *under review*, 2021.
FEB 2021	T. Nguyen, **G. Jagatap** and C. Hegde, "Provable compressed sensing with generative priors via langevin dynamics", *under review*, 2021. (Paper)

RESEARCH PROJECTS

- Adversarial attacks and defenses on deep networks.
  - Developed a block sparsity based token attack to highlight sensitivity of vision transformers to specially structured attacks.
  - Devised a new algorithm for training neural networks robust to adversarial perturbation, with better generalization properties, using entropy and stochastic gradient langevin dynamics.
- Provable inverse imaging using deep trained and untrained generative priors. [code]
  - Introduced a new provably convergent algorithm for solving inverse problems such as compressed sensing with pre-trained generative priors using stochastic gradient langevin dynamics.

- Used deep untrained CNNs as priors for inverse imaging problems such as compressed sensing, phase retrieval and HDR imaging, showed superior empirical performance. Provided theoretical guarantees for convergence of gradient descent based solution.
- 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 algorithms for super-resolution of multiplexed microscopic images by using sparsity and low rank priors.

Graduate Courses

Iowa State University

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

New York University

Machine Learning, Advanced Machine Learning, Digital Signal Processing, Medical Imaging

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.

New York University

May 2020	Designing adversarial attacks on Inception Network.

Scholarships and Awards

2021	Outstanding Reviewer for CVPR 2021
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**

Reviewing

Journal articles:

IEEE Transactions on Image Processing (TIP), 2020.
Elsevier Neural Networks, 2020.
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, 2020, 2021.
IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2021.
International Conference on Learning Representations (ICLR), 2020.
International Conference on Machine Learning (ICML), 2020.
International Conference on Signal Processing and Communications (SPCOM), 2018.
Women in Machine Learning (WiML) Workshop, 2017, 2019.

updated on October 18, 2021