

Ameya Joshi

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EDUCATION

JAN 2020 - Present	Doctor of Philosophy (PhD) in ELECTRICAL ENGINEERING New York University (GPA: 3.83/4) Advisor: Dr. Chinmay Hegde
AUG 2018 -DEC 2019	Doctor of Philosophy (PhD) in ELECTRICAL ENGINEERING (TRANSFERRED TO NYU) Iowa State University (GPA: 3.78/4) Advisors: Dr. Chinmay Hegde, Dr. Soumik Sarkar
AUG 2010 -MAY 2014	Bachelor of Engineering (Hons.) in ELECTRICAL AND ELECTRONICS ENGINEERING BITS Pilani University , India

RESEARCH INTERESTS

Robust Algorithms for multimodal models, Adversarial Attacks and Defenses for Deep Learning, Generative Models for Structured Data, Physics Informed Generative Models, Generative Adversarial Networks, Computer Vision

WORK EXPERIENCE

JAN 2020 -Present	Graduate Research Assistant at NYU Tandon School of Engineering , New York City, NY Adversarial Attacks and Defenses for Deep Models, Physics Informed Generative Models, Neural PDE Solvers, Generalization Theory for Neural Networks
MAY 2021 -AUG 2021	Machine Learning Research Intern at Bosch Center for AI , Pittsburgh, PA Certified Adversarial defenses on video classifiers.
AUG 2018 -DEC 2019	Graduate Research Assistant at Iowa State University , Ames, Iowa Adversarial Attacks and Defenses for Deep Models, Physics Informed Generative Models, Neural PDE Solvers.
MAY 2016 -JUL 2018	Lead Computer Scientist at SigTuple Inc. , Bengaluru, India Worked on building ML informed systems for pathology and ophthalmology. Led a team of 5 data scientists. Two papers published at ISBI'18. One patent granted by Indian PTO.
FEB 2015 -MAY 2016	Member of Technical Staff at Tonbo Imaging , Bengaluru, India Developed and deployed robust embedded systems (including linux kernel dev.) for night vision and IR devices for long range surveillance. Contributed to deployment of tracking and detection algorithms for IR imaging.
JUL 2014 -FEB 2015	Computer Vision Engineer at Ducere Technologies , Hyderabad, India Developed a computer vision system for obstacle detection used for navigation by the visually impaired. Also conceptualised and prototyped an image-to-Braille device for the visually impaired.

PUBLICATIONS

Journal Articles

1. G. Jagatap, **A. Joshi**, A. B. Chowdhury, S. Garg, and C. Hegde, "Adversarially robust learning via entropic regularization," *Frontiers in Artificial Intelligence*, 2021
2. X. Lee, J. R. Waite, C.-H. Yang, B. Pokuri, **A. Joshi**, A. Balu, C. Hegde, B. Ganapathysubramanian, and S. Sarkar, "Fast inverse design of microstructures via generative invariance networks," *Nature Computational Science*, 2020

Conferences

1. M. Cho, **A. Joshi**, S. Garg, B. Reagen, and C. Hegde, "Selective network linearization for efficient private inference," in *ICML*, 2022
2. M. Cho, A. Balu, **A. Joshi**, A. D. Prasad, B. Khara, S. Sarkar, B. Ganapathysubramanian, A. Krishnamurthy, and C. Hegde, "Differentiable spline approximations," in *NeurIPS*, 2021
3. M. Cho, **A. Joshi**, and C. Hegde, "ESPN: Extremely sparse pruned networks," in *IEEE Data Science Learning Workshop (DSLW 2021)*, vol. arXiv:2006.15741, 2020
4. **A. Joshi**, B. Khara, S. Sarkar, B. Ganapathysubramanian, and C. Hegde, "Solving linear PDEs with generative models," in *Asilomar Conf. on Signals, Systems and Computers*, 2020
5. **A. Joshi**, M. Cho, V. Shah, B. Pokuri, S. Sarkar, B. Ganapathysubramanian, and C. Hegde, "Invnet: Encoding geometric and statistical invariances in deep generative models," in *Asso. of Adv. of Artif. Intell. (AAAI)*, 2020
6. **A. Joshi**, A. Mukherjee, S. Sarkar, and C. Hegde, "Semantic adversarial attacks: Parametric transformations that fool deep classifiers," in *Int. Conf. on Computer Vision (ICCV)*, 2019
7. S. Athar, A. Vahadane, **A. Joshi**, and T. Dastidar, "Weakly supervised fluid filled region localization in retinal oct scans," in *ISBI*, IEEE, 2018
8. A. Vahadane, **A. Joshi**, K. Madan, and T. Dastidar, "Detection of diabetic macular edema in optical coherence tomography scans using patch based deep learning," in *ISBI*, IEEE, 2018
9. A. Mahurkar, **A. Joshi**, N. Nallapareddy, P. Reddy, M. Feigin, A. Kadambi, and R. Raskar, "Selective visualization of anomalies in fundus images via sparse and low rank decomposition," in *ACM SIGGRAPH 2014 Posters*, ser. SIGGRAPH '14, 2014

Selected Workshop Papers

1. B. Khara, A. Balu, **A. Joshi**, A. Krishnamurthy, S. Sarkar, C. Hegde, and B. Ganapathysubramanian, "Field solutions of parametric pdes," in *AAAI Symp. on Machine Learning for Physical Sciences (AAAI-MLPS)*, 2021
2. S. Botelho, **A. Joshi**, B. Khara, S. Sarkar, C. Hegde, S. Adavani, and B. Ganapathysubramanian, "Deep generative models that solve PDEs: Distributed computing for training large data-free models," in *Int. Conf. of High Perf. Comput., Netw., Storage and Analy.(SC) Workshop on ML in HPC (MLHPC)*, vol. arXiv:2007.12792, 2020
3. A. Mukherjee, **A. Joshi**, S. Sarkar, and C. Hegde, "Semantic domain adaptation for deep classifiers via gan-based data augmentation," in *NeurIPS Workshop on ML for Autonomous Driving (ML4AD)*, 2019
4. **A. Joshi**, V. Shah, S. Ghosal, B. Pokuri, S. Sarkar, B. Ganapathysubramanian, and C. Hegde, "Generative models for solving nonlinear partial differential equations," in *NeurIPS Workshop on ML for Physical Sciences (ML4PS)*, 2019

Preprints

1. **A. Joshi**, M. Pham, M. Cho, L. Boytsov, F. Condessa, J. Z. Kolter, and C. Hegde, "Smooth-reduce: Leveraging patches for improved certified robustness," *arXiv preprint arxiv:2205.06154*, 2022
2. **A. Joshi**, G. Jagatap, and C. Hegde, "Adversarial token attacks on vision transformers," *arXiv preprint, arxiv:2110.04337*, 2021

Patents

1. **A. Joshi et al.**, "Method and system for detecting disorders in retinal images," US patent pending, Indian Patent 313571, 2018

PROGRAMMING LANGUAGES AND FRAMEWORKS

Python, C, C++, Shell, TensorFlow, PyTorch, JAX, OpenCV, CUDA, Matlab, MongoDB, NodeJS, ReactJS

GRADUATE COURSES

New York University

Statistical Learning Theory, Advanced Machine Learning, Image Processing, Algorithmic Machine Learning and Data Science, ML for Cybersecurity, Reinforcement Learning and Optimal Control

Iowa State University

Deep Learning, Optimization for Machine Learning, Random Processes, Special Topics on Stat. Machine Learning

SCHOLARSHIPS AND AWARDS

2018	2nd Place, MRS OpenData Challenge, Material Research Society
2010 - 14	Merit-cum-Need Scholarship, BITS Pilani
2007	National Talent Search Scholar (Top 1000 students) , NCERT , India

REVIEWING RESPONSIBILITIES

1. Computer Vision and Pattern Recognition (CVPR), 2022
2. International Conf. on Learning Representations, 2021, 2022
3. AAAI Conference on Artificial Intelligence, 2021
4. CVPR Workshop on ML for Autonomous Driving, 2020, 2021, 2022.
5. Plant Phenomics, Science partner journal, 2020
6. Asilomar Conference on Signals, Systems, and Computers, 2020