Darshan Thaker

Curriculum Vitae

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Education

2020- **PhD, Computer Science**, *University of Pennsylvania*, Philadelphia, PA.
Advisor: Dr. René Vidal. Research Interests: Adversarial Robustness, Deep Generative Models, Inverse Problems, Non-Convex Optimization

2018-2019 **Master of Science, Computer Science**, *Columbia University*, New York, NY, *GPA: 3.83 / 4.0*.
MS Thesis Track advised by Dr. John Wright

2014–2018 **Bachelor of Science, Computer Science**, *The University of Texas at Austin*, Austin, TX, *GPA: 3.81 / 4.0*.
Turing Scholars Honors Student

2014–2018 **Bachelor of Science, Mathematics**, *The University of Texas at Austin*, Austin, TX, *GPA: 3.81 / 4.0*.
Concentration in Pure Mathematics

Publications

WS = Workshop, TR = Technical Report, CF = Conference.

6. **D. Thaker**, P. Giampouras, and R. Vidal. *A Linearly Convergent GAN Inversion-based Algorithm for Reverse Engineering of Deceptions*. In Submission, 2023.(CF).
arXiv:2306.04756.
5. **D. Thaker***, P. Giampouras*, and R. Vidal. *Reverse engineering ℓ_p attacks: A block-sparse optimization approach with recovery guarantees*. International Conference on Machine Learning (ICML), 2022.(CF).
arXiv:2203.04886.
4. Q. Ma, S. Ge, D. He, **D. Thaker**, and I. Drori. *Combinatorial Optimization by Graph Pointer Networks and Hierarchical Reinforcement Learning*. AAAI Workshop on Deep Learning on Graphs: Methodologies and Applications, 2020.(WS).
arXiv:1911.04936.
3. I. Drori, **D. Thaker**, A. Srivatsa, D. Jeong, Y. Wang, L. Nan, F. Wu, D. Leggas, J. Lei, W. Lu, W. Fu, Y. Gao, S. Karri, A. Kannan, A. Moretti, C. Keasar, and I. Pe'er. *Accurate protein structure prediction by embeddings and deep learning representations*. Machine Learning in Computational Biology, 2019. (WS).
arXiv:1911.05531.
2. **D. Thaker**. *Understanding the Convergence of Adversarial Training for Overparameterized Linear Neural Networks*. Columbia University Masters Thesis, 2019. (TR).
1. **D. Thaker**. *Generating Synthetic Question-Answer Pairs for Transfer Learning in Biomedical Question Answering*. UT Austin Undergraduate Honors Thesis, 2018. (TR).

Work Experience

Fall 2023 **Teaching Assistant**, University of Pennsylvania, Philadelphia, PA.
- Teaching Assistant for *Deep Generative Models* course taught by Prof. René Vidal.

Spring 2020 **Research Intern**, Salesforce Research, Palo Alto, CA.
- Mentor: Dr. Yu Bai.
- Worked on obtaining a better understanding of feature learning in deep neural networks and a theoretical understanding of transfer learning.

2019 **Course Assistant**, Columbia University, New York, NY.
- Spring 2019: Course Assistant for *Deep Learning* taught by Prof. Iddo Drori. Responsibilities included holding office hours, grading and helping to design homeworks, and advising 5 groups of students with their final projects throughout the semester
- Fall 2019: Course Assistant for *Analysis of Algorithms* taught by Prof. Alexandr Andoni. Recipient of CA Fellowship with full tuition waiver for excelling as a Course Assistant

Summer 2018 **Research Intern**, The Curious AI Company, Helsinki, Finland.
- Researched techniques for modeling uncertainty in model-based reinforcement learning applied to factory control
- Trained various uncertainty models such as Bayesian neural network models for quantifying prediction uncertainty

Summer 2017 **Software Engineering Intern**, Facebook Inc., Menlo Park, CA.
- Worked on WPR (Whole Page Ranking) for Facebook Search on improving ranking of modules (Pages, Groups, People, etc.)
- Introduced new C++ API for module interleaving that allows quick prototyping of different strategies to interleave modules on the Search Engine Result Page
- Trained new result-level ranking machine learning models and integrated them into the Search pipeline to rank and split modules using this ranker

Summer 2016 **Software Engineering Intern**, Google Inc., Menlo Park, CA.
- Worked on the Location team on online segmentation of location data
- Set up a pipeline to tune hyper-parameters of the segmentation algorithm
- Adapted the algorithm from a heuristic-based clustering approach to one that uses machine learning
- Created an efficient C++ pipeline that allowed generation of training data, modular feature computation, evaluation in model, and evaluation of results

Summer 2015 **Machine Learning Intern**, Symantec: Center for Advanced Machine Learning, Mountain View, CA.
- Collaborated with a mentor to develop a robust machine learning classifier using gradient boosted decision trees to identify targeted malicious e-mail attacks
- Explored feature engineering steps such as using spectral clustering for identifying clusters of criminal networks sending out similar email attachments
- Project selected as one of top 12 company-wide projects from a group of $\approx$ 200 interns

Selected Coursework

- EN 601.674 - Statistical Learning Theory (Dr. Raman Arora)
- COMS 4771 - Machine Learning (Dr. Daniel Hsu)
- COMS 4995 - Algorithms for Massive Data (Dr. Alexandr Andoni)
- COMS 4252 - Computational Learning Theory (Dr. Rocco Servedio)
- ELEN 6998 - Sparse Representations and High-Dimensional Geometry (Dr. John Wright)
- EE 381K - Convex Optimization (Dr. Constantine Caramanis)

Honors and Awards

- Course Assistant Fellowship, Columbia University Fall 2019
- Turing Scholar Honors, UT Austin 2018
- University Honors, UT Austin 2014-2018