Matthew Faw

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Research Interests

Stochastic Optimization, Sequential Decision-Making, Fairness in Online Learning

Education

The University of Texas at Austin **Austin, TX**
Ph.D. ECE (Thesis: Adaptive Algorithms for Stochastic Optimization and Bandit Learning), *2018–Present*
Advisors: Sanjay Shakkottai, Constantine Caramanis.

Duke University **Durham, NC**
B.S.E. Electrical & Computer Engineering, B.S. Computer Science, A.B. Math, *2013–2017*
Advisors: Nick Buchler, Richard Fair, Benjamin C. Lee

Selected Publications (Full List on Google Scholar)

Working Papers

NeurIPS 2023 Workshop (Submitted, ICML 2024): "On Mitigating Unconscious Bias through Bandits with Evolving Biased Feedback", **F**, C. Caramanis, S. Shakkottai, J. Hoffmann (*UT Austin, Google Research Paris*)
Algorithms and new lower bounds for regret of decision-making with unconscious biases.

Conference Papers

COLT 2023: "Beyond Uniform Smoothness: A Stopped Analysis of Adaptive SGD", **F**$^{=}$, L. Rout$^{=}$, C. Caramanis, S. Shakkottai (*UT Austin*)
First algorithm which converges at order-optimal rate under a generalized smoothness assumption in standard noise regime.

COLT 2022: "The Power of Adaptivity in SGD: Self-Tuning Step Sizes with Unbounded Gradients and Affine Variance", **F**$^{=}$, I. Tziotis$^{=}$, C. Caramanis, A. Mokhtari, S. Shakkottai, R. Ward (*UT Austin*)
Resolved an open problem on convergence of AdaGrad-Norm for smooth stochastic non-convex optimization.

SIGMETRICS 2022: "Learning To Maximize Welfare with a Reusable Resource", **F**$^{=}$, O. Papadigenopoulos$^{=}$, C. Caramanis, S. Shakkottai (*UT Austin*)
Optimal prophet inequalities, learning variants, and lower bounds for prophet inequalities with dynamic constraints.

SODA 2022: "Single-Sample Prophet Inequalities via Greedy-Ordered Selection", C. Caramanis, P. Dütting, **F**, P. Lazos, S. Leonardi, O. Papadigenopoulos, E. Pountourakis, R. Reiffenhäuser (alphabetical order, *UT Austin, Google Switzerland, Sapienza University of Rome, Drexel*)
Improved single-sample prophet inequalities for nearly all combinatorial settings considered in prior work.

NeurIPS 2020: "Mix and Match: An Optimistic Tree-Search Approach for Learning Models from Mixture Distributions", **F**, R. Sen, K. Shanmugam, C. Caramanis, S. Shakkottai (*UT Austin, IBM Research*)
Optimistic bandit tree-search for multi-source domain adaptation.

Industry Experience

Verato **McLean, VA**
Software Engineer (Full-time) *June 2017-July 2018*
Co-designed and built a custom CI system using Kubernetes. Created software for entity search, updates, and analysis.

MathWorks **Natick, MA**
Software Engineering Intern, Stateflow Semantics *May-August 2016*
Co-designed + implemented proof-of-concept architectural change to code generation process to improve extensibility and performance.

Awards + Honors

2023: Dr. Brooks Carlton Fowler Endowed Presidential Graduate Fellowship in ECE, 2023-2024 academic year

2022: Top 10% reviewer for NeurIPS'22 and AISTATS'22, Highlighted reviewer for ICLR 2022

2020: NXP Foundation Fellowship, 2020-2021 academic year

2017: Cum Laude Graduation Honors, Duke University

2016: Member, Tau Beta Pi and Eta Kappa Nu Honor Societies, Duke University

2014: Gold medal, International Genetically Engineered Machine Competition

Talks and Poster Presentations

Upcoming Invited Talks

March 2024: Georgia Tech ARC Colloquium, Atlanta, GA: "The Power of Adaptivity in SGD"

Talks

July 2023: COLT 2023, Bangalore, India: "Beyond Uniform Smoothness: A Stopped Analysis of Adaptive SGD"

April 2023: IFML Workshop, UW "Beyond Uniform Smoothness: A Stopped Analysis of Adaptive SGD"

July 2022: COLT 2022, London, UK: "The Power of Adaptivity in SGD: Self-Tuning Step Sizes with Unbounded Gradients and Affine Variance"

June 2022: SIGMETRICS 2022, IIT Bombay, Mumbai, IN: "Learning To Maximize Welfare with a Reusable Resource"

April 2022: Machine Learning Lab Research Symposium, UT Austin: "The Power of Adaptivity in SGD: Self-Tuning Step Sizes with Unbounded Gradients and Affine Variance"

January 2022: SODA 2022, Virtual: "Single Sample Prophet Inequalities via Greedy-Ordered Selection"

Poster Presentations

October 2022: Joint IFML/Data-Driven Decision Processes Workshop, Simons Institute, UC Berkeley, "The Power of Adaptivity in SGD: Self-Tuning Step Sizes with Unbounded Gradients and Affine Variance"

December 2020: NeurIPS 2020, Virtual, "Mix and Match: An Optimistic Tree-Search Approach for Learning Models from Mixture Distributions"

November 2019: Texas Wireless Summit, UT Austin, "Mix and Match: An Optimistic Tree-Search Approach for Learning Models from Mixture Distributions"

Conference Reviewing

AISTATS, ALT, ICLR, ICML, JMLR, NeurIPS

Teaching Experience

UT Austin: EE 460J Data Science Lab TA

Duke: CS 308 Software Design and Implementation TA, ECE 280 Signals & Systems TA, Synthetic Biology House Course Co-Instructor

Technical Skills

Programming: Java, Python (PyTorch, Sklearn), C/C++, JavaScript

Infrastructure: Kubernetes, AWS, Google Cloud, Mongo, Solr

References

Sanjay Shakkottai (Advisor) sanjay.shakkottai@utexas.edu

Constantine Caramanis (Advisor) constantine@utexas.edu

Aryan Mokhtari (Collaborator) mokhtari@austin.utexas.edu