“Tao” Uthaipon Tantipongpipat

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Summary

Graduating Georgia Tech PhD student (May 2020) in machine learning theory and optimization. Emphasis in mathematics and algorithmic foundations of data science. Hands-on implementations on real-world datasets. Enjoy public speaking. Experienced in leading extremely successful research projects.

Selected Projects

Multi-Criteria Optimization for Fair Dimensionality Reduction
Georgia Institute of Technology, GA, USA 2018-Present
Code publicly available at https://github.com/sdpforall/. In MATLAB and CVXOPT on Python.
Website: https://sites.google.com/site/ssamadi/fair-pca-homepage. Also appears at Georgia Tech news: https://www.scs.gatech.edu/news/628783/making-sure-computing-machines-dont-stereotype-people

- Initiated the study of bias in machine learning during dimensionality reduction preprocessing and identified such bias of commonly used algorithms in real-world datasets
- Developed new heuristics to minimize bias in dimensionality reduction that runs 10x-1000x faster than standard semi-definite programming solver
- Provided thought leadership in the mathematical structure of the optimization program solutions

Differentially Private Synthetic Data Generation
Georgia Institute of Technology, GA, USA 2018-Present
Code publicly available at https://github.com/DPautoGAN, in Python and Pytorch for neural networks.

- Improved privacy protection by 100x compared to a previous work by autoencoder and GAN architecture and new noise injection mechanism
- Developed new statistical and visual evaluation metrics for better understanding of synthetic data

Research Intern
Microsoft Research, Redmond, WA, USA 2019

- Implemented privacy guarantee on large-scale Natural Language Processing models (RNNs and LSTMs) to protect against personal deidentification due to model usage
- Developed novel correlation clustering algorithm with corresponding privacy analysis
- Researched private submodular optimization and surveyed literature for private stochastic gradient descent best for training deep learning models

Skills

Technical: Python, Pytorch, Pandas, CVXOPT, Java, C++, MATLAB, Mathematica, LaTeX, MS Word, MS Excel, MS PowerPoint

Communication: Public speaking – Toastmaster

Languages: Thai (native); English (full fluency)

Awards and Fellowships

Academic:

Best Reviewers (top 10%) of NeurIPS (top-tier machine learning conference) 2019
Robins Science Scholar, University of Richmond (merit scholarship covering full tuition, fees, accommodations, and meals for four years) 2012-2016
Phi Beta Kappa (most prestigious honor society for liberal arts and sciences) 2016

Programming Competitions:

1st Prize and People's Choice Awards ($20,000 total), Privacy Engineering Challenge, National Institute of Standards and Technology (NIST) 2018
Finalist, ITA Tech Challenge programming competition, Illinois Technology Association, IL 2016
2nd Place, Mid-Atlantic Regional ACM Programming Contest, Christopher Newport University 2015

Mathematics and Economic Competitions:

Honorable Mention (top 2.5%), William Lowell Putnam Mathematical Competition 2015
3-Year Finalist, International Mathematical Olympiad (IMO) selection, Thailand 2010-2012
Honorable Mention, Finance and Economics National Competition, National Bank of Thailand 2011
Bronze Medal and Honorable Mention, Asia-Pacific Mathematics Olympiad (APMO) 2010-2011

Education

Georgia Institute of Technology, Atlanta, GA, USA Expected May 2020
PhD in Algorithms, Combinatorics, and Optimization (ACO), School of Computer Science
Minor in Computational Learning Theory. GPA 4.00/4.00
Thesis: **Machine Learning under Budget and Fairness Constraints**

University of Richmond, Richmond, VA, USA 2012-2016
BS in Mathematics (Honors with Thesis in algebraic combinatorics and discrete geometry)
Minor in Computer Science. GPA: 3.97/4.00

University of Oxford, Oxford, UK 2014-2015
Study Abroad Program in Mathematics and Computer Science
Grade: first-class level (equivalent to A/A+)

Academic Publications

I have published several publications and delivered oral presentations at top-tier machine learning and theoretical computer science conferences: 3 in NeurIPS, 1 in COLT, and 1 in SODA. Please visit my website www.uthaipon.com or my Google Scholar page https://scholar.google.com/citations?user=nzO_5FMAAAAJ&hl for more details.

Academic Service

Reviewer of NeurIPS (Conference on Neural Information Processing Systems), FOCS (Symposium on Foundations of Computer Science), MAPR (Mathematical Programming Journal) 2018-Present
Co-organizer of ACO student seminar, Georgia Institute of Technology 2018