ISIDOROS TZIOTIS

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EDUCATION

Ph.D. in Electrical and Computer Engineering *2017 - May 2023(expected)*
University of Texas at Austin, USA, Advisor : Prof. Aryan Mokhtari
Master of Science in Logic, Algorithms and Computation (MPLA) *2014 - 2016*
National Kapodistrian University of Athens, Greece
Bachelor of Science in Informatics and Telecommunications *2007- 2013*
National Kapodistrian University of Athens, Greece

RESEARCH INTERESTS

- Federated Learning, Decentralized Optimization
- Adaptive Methods, Non-Convex Optimization
- Game Theory, Combinatorial Optimization, Approximation Algorithms

INDUSTRY EXPERIENCE

Summer 2022: Amazon - Applied Scientist Intern

- Developing scalable federated algorithms with robust performance in heterogeneous regimes.

PUBLICATIONS AND PREPRINTS

Isidoros Tziotis, Zebang Shen, Ramtin Pedarsani, Hamed Hassani, Aryan Mokhtari.
Straggler-Resilient Personalized Federated Learning; Adaptive Node Selection and Representation Learning. *Transactions on Machine Learning Research (TMLR), 2023.*

· We propose SRPFL, a federated meta-algorithm that handles simultaneously system and data heterogeneity and enjoys provable speedup guarantees over state-of-the-art baselines.

Matthew Faw, Isidoros Tziotis [1], Constantine Caramanis, Aryan Mokhtari, Sanjay Shakkottai, Rachel Ward.
The Power of Adaptivity in SGD: Self-Tuning Step Sizes with Unbounded Gradients and Affine Variance. *Conference on Learning Theory (COLT), 2022.*

· The first paper that brigdes the gap between SGD and adaptive methods. We prove that Adagrad-Norm, exhibits optimal convergence rates in the same exact setting as SGD (without additional assumptions).

Amirhossein Reisizadeh, Isidoros Tziotis, Hamed Hassani, Aryan Mokhtari, Ramtin Pedarsani.
Straggler-Resilient Federated Learning: Leveraging the Interplay Between Statistical Accuracy and System Heterogeneity. *IEEE JSAIT, 2022.*

· We propose *FLANP*, a novel straggler-resilient federated learning method that incorporates statistical characteristics of the clients' data to adaptively select clients in order to speedup the learning procedure.

Amirhossein Reisizadeh, Isidoros Tziotis, Hamed Hassani, Aryan Mokhtari, Ramtin Pedarsani.
Adaptive Node Participation in Straggler-Resilient Federated Learning. *IEEE ICASSP,2022.*

Isidoros Tziotis, Constantine Caramanis, Aryan Mokhtari.
Achieving Second Order Optimality in Decentralized Non-Convex Optimization via Perturbed Gradient Tracking. *Neural Information Processing Systems (NeurIPS), 2020.*

· We propose *PDGT*, the first algorithm with non-asymptotic guarantee for achieving second-order optimality in decentralized optimization under standard smoothness assumptions.

[1] Equal Contribution.

PROJECTS

Inferring Economic Implications of Covid-19 *Oct 2020-Dec 2020*
Course Project : Data Mining (UT Austin)

- Analyzed different health datasets related to Covid-19 utilizing a variety of prepossessing techniques.
- Inferred future behavior of economic indicators using time series analysis on health data.

Federated Learning method with Adaptive Node Participation *Jul 2019-Dec 2019*
Supervisor: Prof. Aryan Mokhtari (UT Austin)

- Simulated the behavior of a novel federated meta-algorithm, FLANP and compared it to state of the art federated schemes, such as FedAvg, FedNova, FedGATE and SCAFFOLD.
- Observed seed up gains on various different datasets and Neural Networks.

Perturbed Decentralized Gradient Tracking *Feb 2019-June 2019*
Supervisor: Prof. Aryan Mokhtari (UT Austin)

- Simulated novel Perturbed Decentralized Gradient Tracking algorithm and compared it to state of the art benchmarks in a distributed, non-convex environment.
- Provided theoretical and experimental results showing that PDGT is the first decentralized algorithm able to escape saddle points and converge to second order stationary points with polynomial rate.

Perturbed Gradient Descent *March 2019-May 2019*
Course Project : Large Scale Optimization (UT Austin)

- Simulated Perturbed Gradient Decent algorithm, analyzed its behavior around critical points and compared to more traditional benchmarks unable to escape saddle points.

TECHNICAL STRENGTHS

Programming Languages	Python, C/C++, Java, HTML, PHP
Software & Tools	Matlab, Latex

RELEVANT GRADUATE COURSEWORK

Large Scale Optimization, Convex Optimization, Data Mining, Statistical Machine Learning, Online Learning, Combinatorial Optimization, Randomized Algorithms, Probability and Stochastic Process,

HONORS AND AWARDS

Gerondelis Foundation Scholarship for Graduate Studies *2019*
Award for exceptional academic performance.

Cockrell School of Engineering Merit-based Recruiting Fellowship *2018*
Award for exceptional grades and academic performance.

Cockrell School of Engineering Merit-based Recruiting Fellowship *2017*
Award for exceptional grades and academic performance.

Eurobank EFG Scholarship *2007*
Award for top 10 students accepted at the department of Computer Science and Telecommunications.

TEACHING ASSISTANTSHIP

National University of Athens

- Design and Analysis of Algorithms, Fall 2016
- Algorithmic Game Theory, Spring 2017

The University of Texas at Austin

- Design and Analysis of Algorithms, Fall 2017, Spring 2018 and Fall 2019
- Advanced Topics in Algorithmic Game Theory, Spring 2019