Yutong Dai

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Education

Lehigh University, PA, USA — Sept.2019 – Dec.2023
Ph.D. in Industrial and Systems Engineering

University of Illinois at Urbana-Champaign, IL, USA — Sept.2017 – May.2019
M.S. in Statistics

Sichuan University, Chengdu, China — Sept.2013 – Jun.2017
B.S. in Mathematics with honors (concentration in Statistics)

Publications

Local-Global Knowledge Distillation in Heterogeneous Federated Learning 2021
Collaborators: Lichao Sun et. al.
- Proposed a new learning algorithm (FedGKD) to address the data heterogeneity in federated learning via the knowledge distillation and proved FedGKD's sub-linear convergence rate
- Conducted extensive experiments on various CV and NLP datasets to valid the FedGKD's superior performance compared with five state-of-the-art methods

Inexact Proximal Gradient Methods with the Certified Support Identification Property 2021
Collaborators: Daniel P. Robinson Submitted to *Optimization Methods and Software*
- Proposed adaptive termination conditions for inexact proximal gradient subproblems by monitoring reduction in the function value and optimality measure
- Proved the algorithm's certified ability to find a stationary point with structured sparsity patterns
- Conducted extensive experiments to validate algorithms' support identification property and its superior performance over the state-of-the-art inexact proximal gradient algorithms

A Subspace Acceleration Method for Minimization Involving a Group Sparsity-Inducing Norm [Link] 2022
Collaborators: Daniel P. Robinson and Frank E. Curtis Accepted by *SIAM Journal on Optimization*
- Proposed a new optimization paradigm (GroupFaRSA) for minimizing a class of composite functions with the structured sparse solutions by by utilizing support identification, domain decomposition, and subspace acceleration techniques
- Proved GroupFaRSA's super-linear local convergence rate
- Conducted extensive numerical experiments on solving large scale group-ℓ_1 regularized logistic regression and linear regression problems to validate GroupFaRSA's superior performance over four state-of-the-art methods

Convergence Rate Analysis of Parallel Block Coordinate Descent Method [Link] 2020
Collaborators: Yang Weng Accepted by *Journal of System Science and Complexity*
- Proposed synchronous parallel block coordinate descent algorithms for minimizing a class of composite functions with sub-linear convergence rate
- Conducted extensive numerical experiments on solving large scale problems to validate the algorithms' scalability

Internship

Salesforce Research May.2022 – Aug.2022
Position: Research Intern *Manager: Ran Xu* Palo Alto, CA
- Proposed a novel method to tackle data heterogeneity with the class imbalance in personalized Federated Learning by combining the uniformity and semantics of class prototypes
- Developed a unified and extensible framework to test the state-of-the-art Federated Learning algorithms
- Submitted the work to and accepted by AAAI 2023 conference
- Filed a non-provisional patent

Anheuser-Busch InBev Jan.2018 – May.2019
Position: Data Scientist *Supervisor: Shang-Jen Yang & Hector Hernandez* Urbana, IL
- Provided analytics and benchmarks of farmer production performance for global agronomist and procurement teams to improve barley productivity
- Revised machine learning algorithms with agronomists' on field knowledge to formulate a global barley production environment model that accounts for complex weather and soil systems
- Developed predictive models to suggest optimal management packages that help growers to hit highest barley yield
- Designed Smart Barley UI/UX prototype in Rshiny to dynamically visualize analytic results, like growers' production performance and highest yield management packages, and delivered it to agronomist teams