

Xin Zhang

PH.D. STUDENT IN STATISTICS

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RESEARCH INTERESTS	Distributed Optimization, Deep Machine Learning, Reinforcement Learning, Differential Privacy.
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EDUCATION	Iowa State University , Ames, IA <i>Ph.D. student</i> , Statistics Advisors: Prof. Zhengyuan Zhu (STAT Dept.) and Prof. Jia Liu (CS Dept.) 08/2016 - 05/2021
	Fudan University , Shanghai, China <i>Bachelor of Science</i> , Mathematics and Applied Mathematics 09/2012 - 06/2016

PROFESSIONAL EXPERIENCE	Facebook, Inc. , Menlo Park, CA <i>Software Engineer Intern</i> , Machine Learning 05/2020 - 08/2020
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RESEARCH PROJECTS	Distributed Methods for Large-Scale Machine Learning Models <i>Supervisor : Prof. Jia Liu</i> 12/2017 - Current <ul style="list-style-type: none">- Improved distributed machine learning algorithms for large-scale parallel computing and optimization.- Developed asynchronous stochastic algorithms to utilize the stale information.- Proposed a multi-stage sign operator to reduce communication cost and increase system robustness.- Adopted the coordinate-wise median in message aggregation to mitigate Byzantine attacks. Network Optimization: Efficient Communication and Data Privacy <i>Supervisor : Prof. Jia Liu</i> 06/2018 - Current <ul style="list-style-type: none">- Developed message compression algorithms in network to reduce the communication cost.- Designed a novel compression operator to maximally reduce the communication load.- Developed differential private network algorithms to protect data privacy.- Developed stochastic variance reduction method in network to reduced the computation complexity. Spatial Coefficient Clustering Analysis for Remote Sensing Data <i>Supervisors : Prof. Zhengyuan Zhu</i> 01/2019 - Current <ul style="list-style-type: none">- Applied clustering models to the remote sensing data (MODIS Data) to identify the spatial groups.- Proposed the forest/tree-based lasso penalties for simultaneous estimation and clustering.- Improved the spatial non-parametric estimation by adopting the bivariate spline method.- Designed parallel computing algorithm to speed up the estimation.
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CONFERENCE PAPERS	<ol style="list-style-type: none">1. Zhang, X., Liu, J. and Zhu, Z., 2020. Taming Convergence for Asynchronous Stochastic Gradient Descent with Unbounded Delay in Non-Convex Learning. In <i>Proc. IEEE CDC 2020</i>.2. Yang, H., Zhang, X., Fang M. and Liu J. Adaptive Multi-Hierarchical signSGD for Communication-Efficient Distributed Optimization. In <i>Proc. IEEE SPAWC 2020</i>.3. Zhang, X., Fang, M., Liu, J. and Zhu, Z. Private and Communication-Efficient Edge Learning: A Sparse Differential Gaussian-Masking Distributed SGD Approach. In <i>Proc. ACM Mobihoc 2020</i>. (acceptance rate: 15%)
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4. **Zhang, X.**, Liu, J., Zhu, Z., and Bentley, E. S. Communication-Efficient Network Distributed Optimization with Differential-Coded Compressors. In *Proc. IEEE INFOCOM 2020*. (acceptance rate: 19.8%)
5. Yang, H., **Zhang, X.**, Fang M. and Liu J. Byzantine-Resilient Stochastic Gradient Descent for Distributed Learning: A Lipschitz-Inspired Coordinate-wise Median Approach. In *Proc. IEEE CDC 2019*.
6. **Zhang, X.**, Liu, J., Zhu, Z. and Bentley, E.S. Compressed Distributed Gradient Descent: Communication-Efficient Consensus over Networks. In *Proc. IEEE INFOCOM 2019*. (acceptance rate: 19.7%)

JOURNAL ARTICLES

1. **Zhang, X.**, Li, L., Ng, M.K. and Zhang, S., 2017. Drug-target interaction prediction by integrating multiview network data. *Computational biology and chemistry*, 69, pp.185-193.
2. **Zhang, X.**, Gao, W.G. and Su, Y., 2015. Electricity consumer archetypes study based on functional data analysis and k -means algorithm. *Power System Technology*, 39, pp.3153-3162.

IN PREPARATION

- **Zhang, X.**, Liu J. and Zhu, Z.. Distributed Linear Model Clustering over Networks: A Tree-Based Fused-Lasso ADMM Approach. arXiv preprint arXiv:1905.11549 (2019).
- **Zhang, X.**, Liu, J. and Zhu, Z. GT-STORM: Taming Sample and Communication Complexities in Decentralized Optimization.
- **Zhang, X.**, Wang, X. and Zhu, Z. Homogeneity Pursuit of Spatial Partial Linear Model: A Joint Approach of Bivariate Spline and Forest Lasso.
- Liu, Z., **Zhang, X.** and Liu, J. On Convergence and Generalization of Asynchronous SpiderBoost for Non-Convex Optimization

TEACHING EXPERIENCE

Graduate Student Mentor

Dr. Jia (Kevin) Liu's Research Group, Ames, IA

01/2019 - Current

- Haibo Yang (topic: Distributed learning with Byzantine attack)
- Zhuqing Liu (topic: Distributed stochastic variance reduction method)

Teaching Assistant

Dept. Statistics, Iowa State University, Ames, IA

08/2016 - 05/2017

- STAT 341(Spring 2017), Instructor: Dr.Kevin Kasper
- STAT 430(Fall 2016), Instructor: Dr. Kris De Brabanter
- STAT 341(Fall 2016), Instructor: Dr.Kevin Kasper

AWARDS

- **The Holly C. and E. Beth Fryer Award**, Department of Statistics, Iowa State University, 2018. This award is for a top second-year Ph.D. student in the department.
- **Outstanding Graduate of Fudan University**, Fudan University, 2016.
- **First Prize of the scholarship for Outstanding Students at Fudan University** (5%), Fudan University, 2015.
- **Third Prize of the scholarship for Outstanding Students at Fudan University**, Fudan University, 2013-2014.

SKILLS

Projects in: R, Python, C++, PHP, SQL, Matlab, LATEX, Markdown.
Familiar with: Unix shell, SAS, HTML, Microsoft Office, Pytorch, Tensorflow.
Language: Proficient in English. Native in Chinese.