

Zheng Chai

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EDUCATION

George Mason University

Fairfax, VA

Ph.D. in Computer Science (GPA: 4.0)

Aug. 2018 – present

Research Interests: Distributed machine learning systems, federated learning, high-performance computing, storage systems

Georgetown University

Washington, D.C.

Master in Computer Science

Aug. 2016 – May 2018

Beijing Jiaotong University

Beijing, China

B.E. in Software Engineering

Sep. 2005 – July 2009

EXPERIENCE

Graduate Research Assistant

Dec. 2019 – Present

Computer Science, George Mason University

- Federated Learning: developed Tier based Federated Learning and Asynchronous Federated Learning frameworks, which could mitigate the impact of stragglers and achieve higher performance for learning on edge devices.
- Model Parallelism: Gradient-free ADMM based framework for Deep Neural Networks, which could achieve large speedup for training large-scale deep neural networks, and outperforms most of the comparison methods.
- Flash Cache(Working on): A machine learning based cache algorithm for online data. It is expected to beat state-of-the-art SSD caching algorithms (e.g., RIPQ).

Graduate Teaching Assistant

Aug. 2018 – Dec. 2019

Computer Science, George Mason University

- Courses: Object-Oriented Programming(Java), Analysis of Algorithms

Software Test Engineer

Aug. 2015 – Aug. 2016

KangSeed Tech LTD.

Beijing, China

- Responsible for developing and executing test plans to ensure the delivery of quality software application.
- Responsible for testing Pregnancy Health Management Application on iOS and Android.
- Collected and analyzed data for software process evaluation and improvement.

Software Test Engineer

Mar. 2014 – Aug. 2015

AutoNavi Holding LTD.(Alibaba Group)

Beijing, China

- Collaborated with software developer and project manager to develop the Auto-Navi Map on iOS; responsible for the functional test, navigation test, activity page test, interface test and offline map test.
- Responsible for testing business management software on both desktop PCs and mobile phones, including functional test and performance test.

Quality Assurance Engineer

May 2012 – Mar. 2014

Asiainfo-Linkage Inc.

Beijing, China

- Developed and executed system test protocols in 6 different cities of China, and monitored the operation center with analysis on the test results.
- Managed a test group in China Telecom with six people, developed test protocol, executed tests, analyzed test reports, bugs and provided possible solutions.

Software Test Engineer

July 2009 – May 2012

China Chengxin Credit Management Co., LTD.

Beijing, China

- Tested softwares used in technical assets management system and financial information terminal.
- Performed analysis on the bugs reports and provided possible solutions.

PUBLICATIONS

- **Zheng Chai**, Yujing Chen, Liang Zhao, Yue Cheng and Huzefa Rangwala. *FedAT: A Communication-Efficient Federated Learning Method with Asynchronous Tiers under Non-IID Data*. Under Review.
- Junxiang Wang, **Zheng Chai**, Yue Cheng, Liang Zhao. *Toward Model Parallelism for Deep Neural Network based on Gradient-free ADMM Framework*. 20th IEEE International Conference on Data Mining (ICDM). IEEE, 2020. (Acceptance Rate: 9.8%)
- Yujing Chen, Yue Ning, **Zheng Chai**, and Huzefa Rangwala. *Federated Multi-task Hierarchical Attention Model for Sensor Analytics*. In 2020 International Joint Conference on Neural Networks (IJCNN). IEEE, 2020.
- Junxiang Wang, **Zheng Chai**, Yue Cheng, Liang Zhao. *Tunable Subnetwork Splitting for Model-parallelism of Neural Network Training*. Workshop on "Beyond first-order methods in ML systems" of the 37 th International Conference on Machine Learning(PMLR). 2020.
- **Zheng Chai**, Ahsan Ali, Syed Zawad, Stacey Truex, Ali Anwar, Nathalie Baracaldo, Yi Zhou, Heiko Ludwig, Feng Yan, Yue Cheng. *TiFL: A Tier-Based Federated Learning System*. In Proceedings of the 29th International Symposium on High-Performance Parallel and Distributed Computing(HPDC). ACM, 2020. (Acceptance Rate: 22%)
- **Zheng Chai**, Hannan Fayyaz, Zeshan Fayyaz, Ali Anwar, Yi Zhou, Nathalie Baracaldo, Heiko Ludwig, Yue Cheng. *Towards taming the resource and data heterogeneity in federated learning*. Conference on Operational Machine Learning (OpML 19). USENIX, 2019.
- Yue Cheng, **Zheng Chai**, Ali Anwar. *Characterizing co-located datacenter workloads: An alibaba case study*. Proceedings of the 9th Asia-Pacific Workshop on Systems (APSys). ACM, 2018.

TECHNICAL SKILLS

Languages: Python, Java, C++, Go, bash scripting

AWARDS

2019 Research Initiation Award

George Mason University, May 2019