Zheng Chai

Google Scholar | Linkedin

Education

George Mason University — Fairfax, VA
Ph.D. in Computer Science (GPA: 4.0/4.0) — *Aug. 2018 – present*

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

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

Research Associate Intern — May 2021 – Aug 2021
Hewlett Packard Enterprise (HPE)

- Work on Application QoE modelling at Edge. In particular, conduct research on AI-driven application behavioral models to capture interconnection and dependence of controllers across infrastructure and application domains.

Graduate Research Assistant — Jan. 2020 – Present
Computer Science, George Mason University

- Federated Learning: developed Tier based Federated Learning and Asynchronous Federated Learning frameworks, mitigated the impact of stragglers and achieve higher performance for learning on large-scale IoT device data.
- Model Parallelism: Gradient-free ADMM based framework for Deep Neural Networks, which could achieve large speedup for training large-scale deep neural networks, and outperform 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 – Jan. 2020
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*

- Analyzed data for software evaluation, developed and executed tests to ensure the delivery of quality software application.

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 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*

- Designed system test protocols and monitored the operation center in 6 different cities of China.
- Leader of the test team in China Telecom, designed test protocols, analyzed test reports and provided solutions.

Software Test Engineer — July 2009 – May 2012
China Chengxin Credit Management Co., LTD. — *Beijing, China*

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

Technical Skills

Languages: Python, Java, C++, Go, bash scripting
Tools & Platforms: TensorFlow, Keras, PyTorch, AWS, Spark, Google Cloud Platform, GitHub, Scikit-learn, NumPy, Matplotlib

Publications

- Yujing Chen, **Zheng Chai**, Yue Cheng, Huzefa Rangwala. *Asynchronous Federated Learning for Sensor Data with Concept Drift.* 2021 IEEE International Conference on Big Data (Big Data).
- Junxiang Wang, Hongyi Li, **Zheng Chai**, Yongchao Wang, Yue Cheng, Liang Zhao. *Towards Quantized Model Parallelism for Graph-Augmented MLPs Based on Gradient-Free ADMM framework.* Under review.
- **Zheng Chai**, Yujing Chen, Ali Anwar, Liang Zhao, Yue Cheng and Huzefa Rangwala. *FedAT: A High-Performance and Communication-Efficient Federated Learning System with Asynchronous Tiers.* The International Conference for High Performance Computing, Networking, Storage, and Analysis (SC 2021).
- 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.

Awards

2019 Research Initiation Award George Mason University, May 2019

Professional Activities

EuroSys 2022 shadow PC