Zheng Chai

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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

Graduate Research Assistant — Dec. 2019 – 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 – Dec. 2019
Computer Science, George Mason University
- Courses: Object-Oriented Programming(Java), Analysis of Algorithms

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

- **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.

Awards

2019 Research Initiation Award — George Mason University, May 2019