Yuanhao Xiong

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EDUCATION

University of California, Los Angeles — **Los Angeles, USA**
Ph.D. student in Computer Science — *Sep. 2019 - Present*

Zhejiang University — **Hangzhou, China**
B.Eng. in Information Engineering — *Aug. 2015 - Jun. 2019*

RESEARCH INTERESTS

My research interests lie in efficient machine learning, including model (algorithm) efficiency, and data efficiency. In particular, I have developed automatic **optimizer search** algorithms to improve training of various tasks without too much hyperparameter tuning. On the other hand, I have also explored data efficiency from **self-supervised learning** and **dataset distillation**.

RESEARCH EXPERIENCE

Google — **Los Angeles, CA, U.S.**
Student Researcher, Advisor: Liangzhe Yuan — *June. 2022 - Present*

Multi-modal video-language pretraining

- Designed a spatiotemporal grounding loss to leverage fine-grained information behind videos and texts.
- Improved the ability to localize different actions in the temporal dimension by grouping cut-and-paste videos.

Amazon — **Remote**
Applied Scientist Intern, Advisor: Wei-Cheng Chang — *June. 2021 - Dec. 2021*

Self-Supervised Learning for Extreme Multi-label Classification

- Proposed a new and general setting for XMC, extreme zero-shot XMC (EZXMC), where no supervision is needed and merely raw texts of instances and labels are accessible.
- Developed an effective self-supervised method called MACLR, and demonstrated that MACLR could outperform its unsupervised counterparts significantly as well as the state-of-the-art supervised extreme classifiers when fine-tuned on a limited number of positive pairs.

University of California, Los Angeles — **Los Angeles, CA, U.S.**
Research Assistant, Advisor: Prof. Cho-Jui Hsieh — *Sep. 2019 - Present*

Federated Learning with Dataset Condenstation

- Formulated the problem of federated learning as a surrogate objective minimization via dataset distillation.
- Analyzed differential privacy guarantee of the proposed method with Gaussian mechanism.

Graph Network-based Scheduler

- Designed a novel Graph Network-based Scheduler (GNS) by constructing a directed graph for the underlying neural network of the target problem, to improve the optimization performance.
- Evaluated GNS on benchmarking datasets, Fashion-MNIST and CIFAR10 for image classification, and GLUE for language understanding.

Learning to Learn for Adversarial Training

- Leveraged a learning-to-learn (L2L) framework to train an optimizer with recurrent neural networks (RNN), providing update directions and steps adaptively for the inner problem.
- Improved robust accuracy of PGD-based adversarial training and TRADES throught co-training optimizer's parameters and model's weights.

Learning to Learn by Zeroth-Order Oracle

- Extended the learning to learn (L2L) framework from first-order to zeroth-order (ZO) optimization.
- Proposed a novel RNN optimizer architecture which learns both parameter update rule and Gaussian sampling rule for ZO optimization.

PUBLICATIONS

(* indicates equal contribution.)

[1] **Yuanhao Xiong**, Ruochen Wang, Minhao Cheng, Felix Yu, and Cho-Jui Hsieh. Feddm: Iterative distribution matching for communication-efficient federated learning. *arXiv:2207.09653*, 2022.

[2] Yunxiao Qin, **Yuanhao Xiong**, Jinfeng Yi, and Cho-Jui Hsieh. Training meta-surrogate model for transferable adversarial attack. *Proceedings of the 37th AAAI Conference on Artificial Intelligence (**AAAI**)*, 2023.

[3] Ruochen Wang, **Yuanhao Xiong**, Minhao Cheng, and Cho-Jui Hsieh. Efficient non-parametric optimizer search for diverse tasks. *Neural Information Processing Systems (**NeurIPS**)*, 2022.

[4] **Yuanhao Xiong** and Cho-Jui Hsieh. Learning to learn with smooth regularization. In *Proceedings of the European Conference on Computer Vision (**ECCV**)*, 2022.

[5] **Yuanhao Xiong**, Wei-Cheng Chang, Cho-Jui Hsieh, Hsiang-Fu Yu, and Inderjit Dhillon. Extreme zero-shot learning for extreme text classification. *Proceedings of NAACL-HLT (**NAACL**)*, 2022.

[6] **Yuanhao Xiong**, Li-Cheng Lan, Xiangning Chen, Ruochen Wang, and Cho-Jui Hsieh. Learning to schedule learning rate with graph neural networks. *Proceedings of the 10th International Conference on Learning Representations (**ICLR**)*, 2022.

[7] **Yuanhao Xiong** and Cho-Jui Hsieh. Improved adversarial training via learned optimizer. In *Proceedings of the European Conference on Computer Vision (**ECCV**)*, 2020.

[8] Yangjun Ruan, **Yuanhao Xiong**, Sashank Reddi, Sanjiv Kumar, and Cho-Jui Hsieh. Learning to learn by zeroth-order oracle. In *Proceedings of the 8th International Conference on Learning Representations (**ICLR**)*, 2020.

[9] Chacha Chen, Hua Wei, Nan Xu, Guanjie Zheng, Ming Yang, **Yuanhao Xiong**, Kai Xu, and Zhenhui Li. Toward a thousand lights: Decentralized deep reinforcement learning for large-scale traffic signal control. In *Proceedings of the 34th AAAI Conference on Artificial Intelligence (**AAAI**)*, 2020.

[10] **Yuanhao Xiong**, Guanjie Zheng, Kai Xu, and Zhenhui Li. Learning traffic signal control from demonstrations. In *Proceedings of the 28th ACM International Conference on Information and Knowledge Management (**CIKM**)*, 2019.

[11] Guanjie Zheng, **Yuanhao Xiong**, Xinshi Zang, Jie Feng, Hua Wei, Huichu Zhang, Yong Li, Kai Xu, and Zhenhui Li. Learning phase competition for traffic signal control. In *Proceedings of the 28th ACM International Conference on Information and Knowledge Management, (**CIKM**)*, 2019.

[12] **Yuanhao Xiong***, Liangchen Luo*, Yan Liu, and Xu Sun. Adaptive gradient methods with dynamic bound of learning rate. In *Proceedings of the 7th International Conference on Learning Representations (**ICLR**)*, 2019.

[13] Mengyuan Lee, **Yuanhao Xiong**, Guanding Yu, and Geoffrey Ye Li. Deep neural networks for linear sum assignment problems. *IEEE Wireless Communications Letters*, 7(6):962–965, 2018.