Kai Yi (William)

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EDUCATION

King Abdullah University of Science and Technology (KAUST) Dec 2021 - Present
Ph.D. Candidate supervised by Prof. Peter Richtárik
Research Interests: LLM Compression, Federated Learning, Distributed Optimization

King Abdullah University of Science and Technology (KAUST) Sep 2020 - Dec 2021
M.S. of Vision-CAIR, supervised by Prof. Mohamed Elhoseiny
Research Interests: Zero-Shot Learning, Vision and Language
Thesis: Domain-Aware Continual Zero-Shot learning

Xi'an Jiaotong University (XJTU), Xi'an, China Aug 2015 - Jun 2019
B.S. of Software Engineering, Overall GPA: 85.49/100
Thesis: Accurate Object Detection and Weakly-Supervised Perception in Complex Scenes, supervised by Prof. Nanning Zheng and rated as A+ (Top 1%)

RESEARCH EXPERIENCE

SonyAI Jun 2023 - Sep 2023
Research Intern, supervised by Dr. Nidham Gazagnadou and Dr. Lingjuan Lyu Tokyo, Japan
- Federated learning for one-for-all foundation models.

Vector Institute May 2023 - Sep 2023
Research Intern, supervised by Prof. Yaoliang Yu Remote
- Federated stochastic bilevel optimization and Newton methods for bilevel optimization.

Tencent AI Lab Dec 2020 - Apr 2021
Research Intern, supervised by Dr. Jiaxiang Wu Shenzhen, China
- Develop machine learning algorithms for bioinformatic data.

Carnegie Mellon University Feb 2020 - Dec 2020
Research Intern, supervised by Prof. Min Xu Remote
- Interpret and analyze cryo-ET data by using machine learning.

National University of Singapore Apr 2019 - Sep 2019
Research Intern, advised by Prof. Angela Yao Singapore
- Develop sequential methods for single RGB image based 3D pose estimation in videos.

Sensetime Group Limited Mar 2019 - Jun 2019
Research Intern with Dr. Wentao Liu Beijing, China
- Develop accurate & fast object detection methods for commercial embedded chips.

Institute of Artificial Intelligence and Robotics Jul 2017 - Feb 2019
Research and Engineering Intern with Prof. Nanning Zheng Xi'an, China
- Cognition-based accurate small object detection for autonomous driving.

HIGHLIGHTED PUBLICATIONS

[1] Cohort Squeeze: Beyond a Single Communication Round per Cohort in Cross-Device Federated Learning. **Kai Yi**, Timur Kharisov, Igor Sokolov, Peter Richtárik. *arXiv*, 2024.

[2] FedP3: Federated Personalized and Privacy-friendly Network Pruning under Model Heterogeneity. **Kai Yi**, Nidham Gazagnadou, Peter Richtárik, Lingjuan Lv. *ICLR*, 2024.

[3] A Unified Theory of Error Feedback and Variance Reduction Mechanisms for Controlling Biased and Unbiased Gradient Compressors in Distributed Optimization. Laurent Condat, **Kai Yi**, Peter Richtárik. *NeurIPS*, 2022.

[4] Exploring Hierarchical Graph Representation for Large-Scale Zero-/Few-Shot Image Classification. **Kai Yi**, Xiaoqian Shen, Yunhao Gou, Mohamed Elhoseiny. *ECCV*, 2022.

[5] VisualGPT: Data-efficient Adaptation of Pretrained Language Models for Image Captioning. Jun Chen, Han Hao, **Kai Yi**, Boyang Li, Mohamed Elhoseiny. *CVPR*, 2022.

OTHER PUBLICATIONS

[1] PV-Tuning: Beyond Straight-Through Estimation for Extreme LLM Compression. Vladimir Malinovskii, Denis Mazur, Ivan Ilin, Denis Kuznedelev, Konstantin Pavlovich Burlachenko, **Kai Yi**, Dan Alistarh, Peter Richtárik. *arXiv*, 2024.

[2] Prune at the Clients, Not the Server: Accelerated Sparse Training in Federated Learning. Georg Meinhardt, **Kai Yi**, Laurent Condat, Peter Richtárik. *arXiv*, 2024.

[3] FedComLoc: Communication-Efficient Distributed Training of Sparse and Quantized Models. **Kai Yi**, Georg Meinhardt, Laurent Condat, Peter Richtárik. *arXiv*, 2024.

[4] Efficient Fully Single-Loop Variance Reduced Methods for Stochastic Bilevel Optimization. **Kai Yi**, Yaoliang Yu. *Under review*, 2023.

[5] Continual Zero-Shot Learning through Semantically Guided Generative Random Walks. Wenxuan Zhang, Paul Janson, **Kai Yi**, Ivan Skorokhodov, Mohamed Elhoseiny. *ICCV*, 2023.

[6] Domain-Aware Continual Zero-Shot Learning. **Kai Yi**, Paul Janson, Wenxuan Zhang, Mohamed Elhoseiny. *ICCV OOD-CV Workshop*, 2023.

[7] Explicit Personalization and Local Training: Double Communication Acceleration in Federated Learning. **Kai Yi**, Laurent Condat, Peter Richtárik. *arXiv*, 2023.

[8] Variance Reduced ProxSkip: Algorithm, Theory and Application to Federated Learning. Grigory Malinovsky, **Kai Yi**, Peter Richtárik. *NeurIPS*, 2022.

[9] Language-Guided Imaginative Walks: Generative Random Walk Deviation Loss for Unseen Class Recognition using Text Descriptions. **Kai Yi**, Divyansh Jha, Ivan Skorokhodov, Mohamed Elhoseiny. *CVPR L3D-IVU Workshop*, 2022.

[10] Creative Walk Adversarial Networks: Novel Art Generation with Probabilistic Random Walk Deviation from Style Norms. Divyansh Jha, **Kai Yi**, Ivan Skorokhodov, Mohamed Elhoseiny. *ICCC*, 2022.

[11] Learning To Disentangle Semantic Features From cryo-ET with 3D Spatial Generative Network. **Kai Yi**, Yungeng Zhang, Jianye Pang, Xiangrui Zeng, Min Xu. *Technical Report*, 2021.

[12] Unsupervised Domain Alignment based Open Set Structural Recognition of Macromolecules Captured by Cryo-Electron Tomography. Yuchen Zeng, Xiangrui Zeng, **Kai Yi**, Jie Jin, Jing Zhang, Yi-Wei Chang, Yang Ge, Min Xu. *ICIP*, 2021.

[13] CIZSL++: Creativity Inspired Generative Zero-Shot Learning. Mohamed Elhoseiny*, **Kai Yi***, Mohamed Elfeki*. *T-PAMI Major Revision*, arXiv.

[14] Experimental Analysis of Legendre Decomposition in Machine Learning. Jianye Pang, **Kai Yi**, Wanguang Yin, Min Xu. *Technical Report*, 2020.

[15] Feature Selective Small Object Detection via Knowledge-based Recurrent Attentive Network. **Kai Yi**, Zhiqiang Jian, Shitao Chen, Nanning Zheng. *Technical Report*, 2019.

[16] Affine LBG for Codebook Training of Univariate Linear Representation. Tiannan Dong, Jianji Wang, Meng Yang, **Kai Yi**, Nanning Zheng. *IEEE Global Conference on Signal and Information Processing (GlobalSIP)*, 2018.

[17] Cognition-based Deep Learning: Progresses and Perspectives. **Kai Yi**, Shitao Chen, Yu Chen, Chao Xia, Nanning Zheng. *Artificial Intelligence Applications and Innovations (AIAI)*, 2018 (Oral).

PROJECTS

[1] Continual Zero-Shot Learning with Neural-Augmented Variational AutoEncoder. **Kai Yi**. ECE354: Introduction to Computer Vision, Final Project, 2021.

[2] Learning Unseen Classes with Deviation Losses. **Kai Yi**. CS394D: Comteporary Topics in Machine Learning, Final Project, 2020.

[3] Hierarchical Conceptual Rotation of Mental Knowledge Representation. **Kai Yi**, Feng Yu, Liang Zhao, Tingting Han. *Project: Final-term Paper of Social Psychology*, 2018.

[4] Personalized Speech Synthesis System for Alleviating Loneliness of Old People (CN). **Kai Yi**, Xinyu Jiang, Shuanghe Yu, Jianye Pang. *Project: National Undergraduates Innovation Project, rated as* "Excellent", 2018

TEACHING & SERVICES

Conference Reviewer:

Conference on Neural Information Processing Systems (NeurIPS): 2022-2024
International Conference on Learning Representations (ICLR): 2023-2025
International Conference on Machine Learning (ICML): 2022-2024
International Conference on Artificial Intelligence and Statistics (AISTATS): 2023
Computer Vision and Pattern Recognition Conference (CVPR): 2022-2024
International Conference on Computer Vision (ICCV): 2023
European Conference on Computer Vision (ECCV): 2022, 2024
AAAI Conference on Artificial Intelligence (AAAI): 2022-2024
IEEE/CVF Winter Conference on Applications of Computer Vision (WACV): 2021-2025
British Machine Vision Conference (BMVC): 2020-2023
IEEE Intelligent Transportation Systems Conference (ITSC): 2020-2021
IEEE Intelligent Vehicles Symposium (IV): 2018-2021

Journal Reviewer:

IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI)
International Journal of Computer Vision (IJCV)
Computer Vision and Image Understanding (CVIU)
IEEE Transactions on Image Processing (T-IP)
IEEE Transactions on Signal Processing (T-SP)
IEEE Transactions on Neural Networks and Learning Systems (T-NNLS)

Teaching Assistant:

CS283: Deep Generative Modeling (KAUST)
Introduction to Machine Learning, Computer Architecture (XJTU)

TALKS

- Invited talk at SonyAI presenting our federated pruning project. 2023.09.29
- Invited talk at SonyAI-PPML talking about Accelerated LT Methods in FL. 2023.08.23
- Invited talk at Vector Institute Demo Day talking "Optimal and Efficient Variance Reduced Methods for Stochastic Bilevel Optimization" 2023.08.17
- Invited presenter at KAUST VCC Open House 2023 talking ProxSkip-VR. 2023.03.02

- Spotlight talk of EF-BV at KAUST Rising Stars in AI Symposium 2023. 2023.02.21
- Representing our group to present ProxSkip-VR at KAUST VCC Showcase Event. 2023.01.29
- Invited speaker at ECCV2022-AI TIME talking about our HGR-Net. 2022.12.07
- Spotlight talk of CIZSL++ at KAUST Conference on Artificial Intelligence. 2021.04.28

AWARDS & HONORS

- KAUST Graduate Scholarship 2020-
- Outstanding Graduates of XJTU (top 5%) 2019
- Zeng Xianzi Scholarship (37/4100, top 0.9%) 2016-2018
- Candidate of 6th Excellent Student Model of XJTU (3/37) 2018
- Outstanding Leader of the Students' Union (top 2%) 2016
- Excellent Student Award (top 5%) of XJTU 2016-2018

ACTIVITIES

- KAUST Orientation Leader 2022 Fall
- KAUST CEMSE Student Ambassador Sep 2021 - Now
- Member of SIAM, IEEE, CVF
- Volunteer of ICML 2021; NeurIPS 2020, 2021.

ADDITIONAL INFORMATION

Skills: Proficient in Python, Pytorch, and Android Developments, Master TensorFlow, C++
Hobbies: Fond of long-distrance running and hiking