LONGHUI YU

PhD/Internship Application

(+86) 15521443439 | yulonghui@stu.pku.edu.cn | yulonghui.github.io | Scholar(94 Citations)

"Focus on some problems which are really practical and valuable."

Research Interests

My past research mainly focuses on reliable and efficient machine learning against distribution shifts, especially for label distribution shifts. To explore a robust machine learning model, I have conducted several research on Continual Learning, Long-tailed Learning, Semi-supervised Learning, Neural Collapse, and Out-of-Distribution Detection. Meanwhile, I also pay attention to new technologies, such as AI Alignment, AI Safety, Scalable Oversight, Large Language Models, Large Action Models, AI Agent and Model Merging.

I am curious and passionate about any research topic that has the potential to hold immense value for human society.

Education Backgrounds

Peking University — *China*

M.E. In Computer Science — *Sep. 2020 - June. 2023*

- Supervisor: Prof. Yuesheng Zhu.
- Co-Supervisor: Dr. Weiyang Liu & Dr. Lanqing Hong.

South China University of Technology — *China*

B.E. In Automation — *Sep. 2016 - June. 2020*

- Research Award: The First Prize of National Smart Car Competition.
- GPA: 3.80/4.00.

Submissions

MetaMath: Bootstrap Your Own Mathematical Questions for Large Language Models — *In Submission*

Longhui Yu*, Weisen Jiang*, Han Shi, Jincheng Yu, Zhengying Liu, Yu Zhang, James T. Kwok, Zhenguo Li, Adrian Weller, Weiyang Liu — *Aug. 2023*

- Underreviewing at top-tier conferences (top 1% score)
- The best mathematical reasoning LLMs trained for both forward reasoning and backward reasoning

Parameter-Efficient Orthogonal Finetuning via Butterfly Factorization — *In Submission*

Weiyang Liu*, Zeju Qiu*, Longhui Yu**, Yao Feng**, Yuliang Xiu**, Yuxuan Xue**, Haiwen Feng, Zhen Liu, Juyeon Heo, Songyou Peng, Yandong Wen, Michael J. Black, Adrian Weller, Bernhard Schölkopf — *Aug. 2023*

- ** equal contributions
- Using Butterfly Factorization to fine-tune more powerful Foundation Models with less parameters.

Backward Reasoning in Large Language Models for Verification — *In Submission*

Weisen Jiang, Han Shi, Longhui Yu, Zhengying Liu, Yu Zhang, Zhenguo Li, James T. Kwok — *Aug. 2023*

- Combing Forward Reasoning and Backward Reasoning to improve the reasoning ability .

MaskNeRF: Masked Neural Radiance Fields for Sparse View Synthesis — *In Submission*

Shoukang Hu, Kaichen Zhou, Longhui Yu, Lanqing Hong, Tianyang Hu, Gim Hee Lee, Zhenguo Li — *Oct. 2022*

- We found the different optimization difficult of different pixels and further propose two kinds of mask to learn the hard-optimized pixels.

Publications (Accepted)

Continual Learning by Modeling Intra-Class Variation — *Transactions on Machine Learning Research (TMLR)*

Longhui Yu, Tianyang Hu, Lanqing Hong, Zhen Liu, Adrian Weller, Weiyang Liu — *Oct. 2022*

- We model the representation variation for old-class and diversify the collapsed gradients. All positive Reviews. **LINK**

Generalizing and Decoupling Neural Collapse via Hyperspherical Uniformity Gap — *ICLR 2023*

Weiyang Liu*, Longhui Yu*, Adrian Weller, Bernhard Schölkopf — *Oct. 2022*

- We decouple Neural Collapse into minimal intra-class variability and maximal inter-class separability and unify them via hyperspherical uniformity. **LINK**

Dual-Curriculum Teacher for Domain-Inconsistent Object Detection in Autonomous Driving — *BMVC 2022*

Longhui Yu, Yifan Zhang, Lanqing Hong, Fei Chen, Zhenguo Li — *Dec. 2021*

- We propose the dual-curriculum strategy to help existing semi-supervised object detection methods learn autonomous driving data efficiently and effectively. **LINK**

Multi-Teacher Knowledge Distillation for Incremental Implicitly-Refined Classification — *ICME 2022 (Oral)*

Longhui Yu, Zhenyu Weng, Yuqing Wang, Yuesheng Zhu — *Oct. 2021*

- We propose Multi-Teacher Knowledge Distillation to help existing incremental learning methods better maintain super-class knowledge. **LINK**

Memory Replay with Data Compression for Continual Learning — *ICLR 2022*

Liyuan Wang*, Xingxing Zhang*, Kuo Yang, Longhui Yu, Chongxuan Li, Lanqing Hong, Shifeng Zhang, Zhenguo Li, Yi Zhong, Jun Zhu — *Oct. 2021*

- We propose to utilize compressing methods to reserve the memory buffer effectively.
- We further propose a DPP-based method to determine the optimal compression rate. **LINK**

DeepVecFont-v2: Exploiting Transformers to Synthesize Vector Fonts with Higher Quality — *CVPR 2023*

Yuqing Wang, Yizhi Wang, Longhui Yu, Yuesheng Zhu, Zhouhui Lian — *Aug. 2022*

- We explore the potential of Transformer to synthesize vector fonts with higher quality.

Style Expansion without Forgetting for Handwritten Character Recognition — *ICANN 2023*

Jie Ruan, Zhenyu Weng, Jian Zhang, Yuqing Wang, Longhui Yu, Qiankun Gao, Yuesheng Zhu — *Nov. 2022*

- We explore the potential of Transformer to synthesize vector fonts with higher quality.

Research Internships

University of Cambridge — *England*

Research Assistant — *Jan. 2022 - Feb. 2023*

- Work in Representation Learning & Distribution Shifts.
- Work with Dr. Weiyang Liu & Prof. Adrian Weller & Prof. Bernhard Schölkopf.

National University of Singapore — *Singapore*

Research Assistant — *June. 2021 - Jan. 2022*

- Work in Autonomous Driving & Distribution Shifts.
- Work with Dr. Lanqing Hong & Prof. Jiashi Feng.

Professional Services

Reviewer **CVPR 2024**, IEEE Conference on Computer Vision and Pattern Recognition
Reviewer **NeurIPS 2023**, Neural Information Processing Systems
Reviewer **CVPR 2023**, IEEE Conference on Computer Vision and Pattern Recognition
Reviewer **ICCV 2023**, IEEE International Conference on Computer Vision
Reviewer **ACML 2022**, Asian Conference on Machine Learning

Honors & Awards

2020 **Outstanding Graduate**, The Outstanding Graduate of South China University of Technology — *China*
2019 **The First Prize**, The 14th National University Students' Smart Car Competition — *China*
2019 **Scholarship**, The Scholarship of South China University of Technology — *China*
2018 **Scholarship**, The Scholarship of South China University of Technology — *China*
2017 **Scholarship**, The Scholarship of South China University of Technology — *China*

Skills

Coding Python, Pytorch, C, Arm, Ros, Matlab, Latex
Hobbies Basketball, Football, Sing