# LONGHUI YU

PhD Applicant

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*"Do something really practical and valuable."*

## Research Interests

My research mainly focuses on reliable and efficient machine learning against distributions shifts, especially for the label distribution shifts. To explore a robust machine learning model, I have conducted several projects on Continual Learning, Long-tailed Learning, Semi-supervised Learning, Neural Collapse, and Out-of-Distribution Detection. Meanwhile, I also pay attention to the practical application of deep learning. I have conducted research on Autonomous Driving, Object Detection, Cross-modal Retrieval, Nerf, and Vector Font Synthesis.

## 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 Projects: Robotics and Intelligent Car.
- GPA: 3.80/4.00.

## Publications & Preprints

**Continual Learning by Modeling Intra-Class Variation**                               *In Submission (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.

**Generalizing and Decoupling Neural Collapse via Hyperspherical Uniformity Gap**       *In Submission (ICLR2023)*

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.

**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.

**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.

**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,                    *Oct. 2021*
Yi Zhong, Jun Zhu

- 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.

**MaskNeRF: Masked Neural Radiance Fields for Sparse View Synthesis**                *In Submission (ICLR 2023)*

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.

**DeepVecFont-v2: Exploiting Transformers to Synthesize Vector Fonts with Higher Quality**    *In Submission (AAAI 2023)*

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

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

**Focal-Global Distillation and Augmented Shortcut for Incremental Transformer-based Fine-grained Cross-modal Retrieval**                                  *In Submission*

Hᴀɴʟɪɴ Lɪ, Lᴏɴɢʜᴜɪ Yᴜ, Yᴜsʜᴇɴɢ Tᴀᴏ, Yᴜϙɪɴɢ Wᴀɴɢ, Zʜᴇɴʏᴜ Wᴇɴɢ, Yᴜᴇsʜᴇɴɢ Zʜᴜ                *Aug. 2022*

- We first propose the focal and global distillation to resist the catastrophic forgetting in the incremental fine-grained cross-modal retrieval.

## Professional Services

**Reviewer**    ACML 2022, BMVC 2022

## Honors & Awards

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| 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* |