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# Zedong Wang

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Citations: 67, H-index: 4

Contribute: 2, Stars: 981

## Short Biography

I am an HK-born researcher. I obtained my B.Eng. in Electronic and Information Engineering from [HUST](#). My research interests center around **visual representation learning** from 3 aspects: (i) Data mixing augmentation and label efficient learning (**Data-level**); (ii) Efficient deep network architecture design (**Network-level**); (iii) Vector Quantized representation learning and generation (**Framework-level**). Moreover, I am also interested in AI for Genomics applications. Currently, I am a visiting student in [CAIRI AI Lab](#) under [Chair Prof. Stan Z. Li](#) (IEEE Fellow, IAPR Fellow) at [Westlake University](#). Previously, I worked on few-shot semantic segmentation fortunately supervised by [Prof. Xinggang Wang](#) at [HUST](#). I was a visiting student at [MMLab](#), Shenzhen Institute of Advanced Technology ([SIAT](#)), Chinese Academy of Sciences (CAS) in 2021 summer. Before that, I conducted a research internship remotely at [Key Lab of Digital Earth Science](#), CAS, 2020.

## Education and Degrees

- 2019 – 2023 **B.Eng. in Electronic and Information Engineering**, *Huazhong University of Science and Technology*.
- Multiple High Quality Computer Vision Research Experience | **Undergrad Supervisor: Prof. Xinggang Wang**.
  - Graduation Thesis**: Efficient Visual Backbone Architecture Design | **Grade: 92/100 (First-Tier, Full Novelty Scores)**  
**Advisor: Prof. Xinggang Wang** | **Co-advisor: Chair Prof. Stan Z. Li**
  - High GPA in **AI-related** core courses (**90.0/100 in Average**): Introduction to Green Communications (**95/100**), Engineering Training (**94/100**), Multimedia Retrieval (**93/100**), Graduation Thesis (**92/100**), Software Project (**92/100**), Principles and Applications of Sensors (**90/100**), Python programming (**87/100**), Capstone Project in Machine Intelligence (**87/100**), Deep Learning and Computer Vision (**87/100**), Machine Learning (**85/100**) etc.

## Research Experience

- Dec. 2023 **Ph.D. Offer**, *Advisor: Chair Prof. Stan Z. Li, AI Division, School of Engineering, Westlake University*.
- Jun. 2023 **China Society of Image and Graphics (CSIG) Student Member**, *CSIG*
- Dec. 2022 **Ph.D. Offer** (fail to enroll due to my HK origin), *AI Division, School of Engineering, Westlake University*.
- Sep. 2022 – Present **Visiting Student** (visual representation learning), *CAIRI AI Lab (Chair Prof. Stan Z. Li Lab), Westlake University*.
- (i) Mixup Augmentation and label-efficient learning. | Co-first author: **SAMix**; Maintenance: **OpenMixup (531 stars on GitHub)**.
  - (ii) Efficient Network Backbone Architecture Design for Vision & Life Science. | Co-first author: **MogaNet (95 stars on GitHub)**.
  - (iii) Vector Quantization-based Representation Learning and Generation. | **SemiReward**; **OpenSTL (NeurIPS 2023)**.
  - (iv) Genomic Sequence Pre-training with Vector Quantization Network. | **VQDNA**
- Jul. 2022 – Sep. 2022 **Summer Research Studentship**, *School of Engineering, Westlake University*.
- Advisor: Chair Prof. Stan Z. Li (only 2 selected out of 100+ applicants)** | **Research Topic**: Representation Learning.
- Sep. 2021 – Jun. 2022 **Research Intern**, *HUST Vision Lab, School of EIC, Huazhong University of Science and Technology*.
- Advisor: Prof. Xinggang Wang** | **Research Topic**: Efficient Visual Recognition & Few-shot Semantic Segmentation.
- Jul. 2021 – Sep. 2021 **Visiting Student**, *MMLab, Shenzhen Institute of Advanced Tech. (SIAT), Chinese Academy of Sciences*.
- Advisor: Dr. Bin Fu** | **Research Topic**: Semantic Segmentation.
- Sep. 2020 – Apr. 2021 **Research Intern**, *Key Lab of Digital Earth Science, Chinese Academy of Sciences*.
- Advisor: Dr. Xiaoping Du** | **Research Topic**: High Resolution Remote Sensing Building Semantic Segmentation.

## Languages and Strengths

Chinese (native), English (fluent). **IELTS 7.5 (2023)** overall grades, **CET-4 646** overall grades.  
Python DL Libraries, PyTorch, Git, Anaconda, Linux (basic),  $\text{\LaTeX}$ , All-round Research Skills.  
Great Research **Taste**, **Enthusiasm**, Recognized **Writing & Story Telling** Skills.

## Publications (\*: Equivalent Contribution. †: Corresponding Author. Links are provided)

### NeurIPS 2023 **OpenSTL: A Comprehensive Benchmark of Spatio-Temporal Predictive Learning.**

Cheng Tan, Siyuan Li, Zhangyang Gao, Wenfei Guan, **Zedong Wang**, Zicheng Liu, Lirong Wu, Stan Z. Li<sup>†</sup>

- **The first** comprehensive benchmarking study for spatio-temporal predictive learning that categorized prevalent approaches into recurrent-based and recurrent-free models.
- **The first** modular and extensible framework implementing various state-of the art methods. Impartial evaluations and analysis are conducted across various domains, including synthetic moving object trajectory, human motion, driving scenes, traffic flow, weather forecasting.
- Surprisingly, we find that recurrent-free models achieve a good balance between efficiency and performance than recurrent models.
- **All positive ratings in NeurIPS 2023 (6,6,7,7) | Accepted as Poster by NeurIPS 2023**

### to ICLR 2024 **MogaNet: Multi-order Gated Aggregation Network.**

Siyuan Li\*, **Zedong Wang**\*, Zicheng Liu, Cheng Tan, Haitao Lin, Di Wu, Zhiyuan Chen, Jiangbin Zheng, Stan Z. Li<sup>†</sup>

- **The first** network backbone design through the lens of multi-order game-theoretic interaction, which portrays inter-variable interaction effects w.r.t. varying scale of context via game theory.
- The most representative interaction strengths are emphasized by the proposed spatial gated aggregation and channel reallocation module, leading to better representation learning quality.
- Impressive scalability and superior performance with a more efficient use of model parameters than state-of-the-art ViTs and ConvNets on various computer vision benchmarks.
- **Spontaneously forwarded by world-wide media (Twitter, Zhihu, Wechat) with high appraisal.**
- **Two Weak Accept ratings in CVPR 2023, One Strong Accept rating in ICCV 2023.**

### to CVPR 2024 **Boosting Discriminative Visual Representation Learning with Scenario-Agnostic Mixup.**

Siyuan Li\*, Zicheng Liu\*, **Zedong Wang**\*, Di Wu, Zihan Liu, Stan Z. Li<sup>†</sup>

- A unified online-optimizable mixup framework that **first addresses the two remaining critical issues** at once: **(i)** Drastic performance variation over different scenarios caused by trivial solutions; **(ii)** Self-supervised learning (SSL) dilemma for online-optimizable mixup policies.
- To reduce the computational cost from online training, a pre-trained version is presented.
- Exceptional performance and generalizability across **12 SL and SSL** image benchmarks.

### to ICLR 2024 **OpenMixup: Open Mixup Toolbox for Visual Representation Learning.**

Siyuan Li\*, **Zedong Wang**\*, Zicheng Liu\*, Di Wu, Stan Z. Li<sup>†</sup>

- **The first** comprehensive mixup visual classification benchmark. where 16 representative mixup algorithms are impartially evaluated from scratch across 12 visual classification datasets, ranging from classical iconic scenarios to fine-grained, long-tail, and scenic cases.
- **The first** standardized mixup-based vision model design and training codebase framework OpenMixup for customized visual classification.
- **Interesting observations** are derived through extensive empirical analysis on various scenarios.
- **Spontaneously retweeted by Prof. Sebastian Raschka (Twitter) with high appraisal.**
- **Spontaneously reported by Lightning AI official account (Twitter) as 'weakly highlights in AI'. (the same session as pytorch's departure of facebook)**

### to ICLR 2024 **SemiReward: A General Reward Model for Semi-supervised Learning.**

Siyuan Li\*, Weiyang Jin\*, **Zedong Wang**, Fang Wu, Zicheng Liu, Cheng Tan, Stan Z. Li<sup>†</sup>

- **The first** online-optimizable reward model that predicts reward scores to filter out high-quality pseudo labels for semi-supervised representation learning (both classification and regression).
- State-of-the-art across **12 classification and regression** semi-supervised learning benchmarks.