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# Zedong Wang

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Citations: 72, H-index: 4

Contribute: 3, Stars: 1.1k

## Short Biography

I am a Hong Kong-born AI researcher. I completed 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 Network Backbone Architecture Design (**Network-level**); (iii) Generative Models, e.g., VQ, Diffusion, etc. (**Framework-level**). Currently, I am a visiting student in CAIRI AI Lab under Chair Prof. Stan Z. Li (IEEE Fellow, IAPR Fellow) at Westlake University. I am also a research intern at MMLab@NTU advised by Dr. Chenyang Si. Previously, I worked on few-shot semantic segmentation fortunately supervised by Prof. Xinggang Wang at HUST. Before that, I was a visiting student at MMLab@SIAT, Shenzhen Institute of Advanced Technology (SIAT), Chinese Academy of Sciences (CAS). Before that, I conducted an internship 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 (Links are provided)

- Jan. 2024 **Please View My Homepage for The Latest Updates!**
- Jan. 2024 **Invited as a Reviewer for ICLR 2024 TinyPapers, ICML 2024 and ICPR 2024.**
- 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** (representation learning, ai4science), *CAIRI AI Lab (Chair Prof. Stan Z. Li Lab), Westlake University.*
- (i) Mixup Augmentation and Label-Efficient Learning. | **SemiReward (ICLR 2024); SAMix; OpenMixup (539 stars).**
  - (ii) Efficient Network Backbone Architecture Design on Vision and Beyond. | **MogaNet (ICLR 2024, 110 stars).**
  - (iii) Framework-level Representation Learning. | **OpenSTL (NeurIPS 2023, 492 stars); Survey on Masked Modeling.**
  - (iv) Vector Quantized Representation Learning on Vision and Beyond. | **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)

### 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 in CVPR 2023, One Strong Accept rating in ICCV 2023, 6668 in ICLR 2024**

### 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.

### Arxiv 2023 **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 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.

### 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 ICML 2024 **Unleashing the Power of Vector Quantization for Multi-Species Genomic Sequence Modeling.**

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