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# Zedong Wang

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Citations: 46, H-index: 3

Contribute: 2, Stars: 589

## Short Biography

I obtained my B.Eng. in Electronic and Information Engineering at [HUST](#). My research interests center around **visual representation learning** from 3 levels: (i) Data mixing augmentation (**Data-level**); (ii) Efficient network architecture design (**Network-level**); (iii) Semi-supervised learning and Vector Quantization based pre-training (**Framework-level**), and AI for Life Science (long genomic sequence modeling). Currently, I am [CSIG](#) student member and a visiting student in [CAIRI AI Lab](#) supervised by [Chair Prof. Stan Z. Li](#) ([IEEE Fellow](#), [IAPR Fellow](#)) at [Westlake University](#). Previously, I worked on efficient visual recognition and few-shot semantic segmentation under my undergrad supervisor [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. I also conducted research internship at [Key Lab of Digital Earth Science](#), CAS, in 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 (Top Tier, Full Novelty Marks)** | **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

- Jun. 2023 **China Society of Image and Graphics (CSIG) Student Member** (recommended by Prof. Wenyu Liu), [CSIG](#)
- Dec. 2022 **Ph.D. Pre-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) Data Mixing for visual representation learning. | Co-first author: [SAMix](#); Maintenance: [OpenMixup](#) (**499 stars on GitHub**).
- (ii) Efficient Network Architecture Design for visual representation learning. | Co-first author: [MogaNet](#) (**90 stars on GitHub**).
- (iii) Semi-supervised Learning & Vector Quantized Self-supervised Learning. | [SemiReward](#); [OpenSTL](#) ([NeurIPS2023](#))
- (iv) Genomic Sequence Pre-training with Vector Quantization Network.
- Jul. 2022 – Sep. 2022 **Summer Research Studentship**, [School of Engineering, Westlake University](#).
- Advisor: [Chair Prof. Stan Z. Li](#) (**2 selected out of 100+ applicants**) | **Research Topic**: Visual 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 7.0**(2019) 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 **Efficient 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 ICLR 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.