Zedong Wang

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Citations: **82**, H-index: **4** Contribute: **3**, Stars: **1.1k**

Short Biography

I am an HK-born AI researcher. I received my B.Eng. degree in Electronic and Information Engineering from Huazhong University of Science and Technology (HUST), in June, 2023. My research interests center around representation learning from 3 aspects: **(i)** Mixup Augmentation and Data-Efficient Learning (**Data-level**); **(ii)** Efficient Network Architecture Design (**Network-level**); **(iii)** Generative Models, *e.g.*, Vector Quantization, Diffusion Models, on Vision and Beyond. (**Framework-level**). Currently, I am a visiting student at Westlake University under Chair Prof. Stan Z. Li (IEEE Fellow, IAPR Fellow). I am also a remote research intern at MMLab@NTU, working with Dr. Chenyang Si. At HUST, I was fortunate to work on few-shot semantic segmentation under Prof. Xinggang Wang. In the summer of 2021, I was a research intern at SIAT-MMLab, Chinese Academy of Sciences (CAS). Previously, I have interned 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
- 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)

Feb. 2024 ***Please View My Homepage for The Latest Updates!***

Feb. 2024 **Invited as a Reviewer for ECCV 2024.**

Jan. 2024 **Invited as a Reviewer for ICML 2024, ICLR 2024 (TinyPapers), and ICPR 2024.**

Dec. 2022 **Ph.D. Offer**, *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` (543 GitHub stars).
(ii) Efficient Network Backbone Architecture Design on Vision and Beyond. | `MogaNet` (ICLR 2024, 114 GitHub stars).
(iii) Framework-level Representation Learning. | `OpenSTL` (NeurIPS 2023, 501 GitHub stars); **Masked Modeling Survey**.
(iv) Vector Quantized Vocabulary Learning for Multi-Species Genomic Sequence Modeling. | **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 Skills

Chinese (native), English (fluent). **IELTS 7.5 (2023)** overall grades, **CET-4 646** overall grades.
Python DL Libraries, PyTorch, Git, Anaconda, Linux (basic), LaTeX, All-round Research 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†

- **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 representative interactions are emphasized by the proposed spatial gated aggregation and channel reallocation architecture, leading to better representation learning capacity.
- Impressive scalability and superior performance with a more efficient use of model parameters than state-of-the-art ViTs and ConvNets scaling from 5M to 180M on various vision benchmarks.
- **Spontaneously forwarded by world-wide media (Twitter, Zhihu, Wechat) with high appraisal.**
- **Two Weak Accept in CVPR'23, One Strong Accept in ICCV'23, all positive ratings 6668 in ICLR'24**

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†

- **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.

To ICML 2024 **OpenMixup: Open Mixup Toolbox for Visual Representation Learning**.
Siyuan Li*, **Zedong Wang***, Zicheng Liu*, Di Wu, Stan Z. Li†

- **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†

- 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†

- **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 202 **Unleashing the Power of Vector Quantization for Multi-Species Genomic Sequence Modeling**.
Siyuan Li*, **Zedong Wang***, Zicheng Liu, Stan Z. Li†