Zedong Wang

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Citations: **83**, 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 Multi-modal Learning, Multi-task Scene Perception and more. I am also interested in Computer Vision from 3 aspects: **(i)** Mixup augmentation and label-efficient learning (**Data-level**); **(ii)** Efficient deep network architecture design (**Network-level**); **(iii)** Generative Models, *e.g.*, Vector Quantization, Diffusion Models and more. (**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 research intern at HKUST advised by Prof. Dan Xu. At HUST, I was fortunate to work on few-shot semantic segmentation under Prof. Xinggang Wang. Prior to that, I interned at SIAT-MMLab, Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences (CAS).

▬▬▬ 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!*

Mar. 2024   **Research Intern**, *The Hong Kong University of Science and Technology (HKUST).*
Advisor: Prof. Dan Xu | **Research Topic:** Multi-modal Learning and Multi-task Learning on Scene Perception and Beyond.

Jan. 2024   **Invited as a Reviewer for ICML 2024, ECCV 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) Data Mixing and Label-Efficient Learning. | **SemiReward (ICLR 2024); SAMix; OpenMixup (549 GitHub stars)**.
(ii) Efficient Network Architecture Design on Vision and Beyond. | **MogaNet (ICLR 2024, 114 GitHub stars)**.
(iii) Representation Learning Framework. | **OpenSTL (NeurIPS 2023, 508 GitHub stars); Masked Modeling Survey**.
(iv) Vector Quantized Vocabulary Learning for Multi-Species DNA Foundation Model. | **VQDNA (to ICML2024)**.

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 ECCV 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†