

Ziqing Wang

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Github | Last updated: 08/20/2023

Education

Sun Yat-sen University

Bachelor of Engineering in Microelectronics

Zhuhai, China

Sep. 2018 – Jun. 2023

- Major GPA: 3.9/4.0
- Main Courses: Machine Learning in Python, Advanced Programming, Embedded System, Digital Circuit, Analog Circuit, Analog Integrated Circuits Design,

Publications

Ziqing Wang, et al., *Masked Spiking Transformer* (Accepted to ICCV 2023)

Jiahang Cao*, **Ziqing Wang***, et al., *Spiking Denoising Diffusion Probabilistic Models* (Under Review at WACV 2023)

Ziqing Wang, et al., *AutoST: High-performance and Energy-efficient Spiking Transformer Architecture Search* (Under Review at NeurIPS 2023)

Ziqing Wang, et al., *AMD-DBSCAN: An Adaptive Multi-density DBSCAN for datasets of extremely variable density*, IEEE International Conference on Data Science and Advanced Analytics (Accepted to DSAA2022)

Professional Services

Program Committee Member:

- AAAI 2024, KDD 2023, AAAI 2023

Research Experience

Spiking Denoising Diffusion Probabilistic Models

May. 2023 – Aug. 2023

Team Leader

HKUST

- We propose SDDPM, which is the first work that employs a spiking neural network on diffusion models.
- We put forward threshold guidance, which can further improve the performance of SDDPM by changing the threshold in SNN neurons without any finetuning.
- Extensive experiments show that our model achieves state-of-the-art performance among SNN-based generative models in low latency.

Neural Architecture Search for Spiking Transformer

Feb. 2023 – May 2023

Team Leader

NCSU

- We propose AutoST, a training-free NAS to search for superior Spiking Transformer architectures.
- We utilize FLOPs as a performance metric, effectively tackling the challenges inherent to SNNs, leading to a stronger correlation with performance.
- Extensive experiments show that our searched models outperform state-of-the-art SNNs on both static and neuromorphic datasets.
- To achieve a balance between performance and energy efficiency, we leverage activation patterns to estimate the energy consumption of Spiking Transformer architectures during initialization.

Masked Spiking Transformer

Oct. 2022 – Feb. 2022

Team Leader

HKUST

- Implemented self-attention in Spiking Neural Networks (SNNs) to leverage both self-attention capability and biological properties of SNNs to achieve high performance with low power consumption.
- Inspired by the missing information mechanisms in the nervous system, I proposed a masked spiking Transformer (MST) enabled by partial information, which uses only part of the input information.
- Our MST can outperform the state-of-the-art SNN model in terms of accuracy and the number of time steps on static and neuromorphic datasets. In particular, the proposed MST model achieves 78.5% top-1 accuracy on the ImageNet dataset.
- As the first author, *Masked Spiking Transformer* is submitted to ICCV2023.

Bug Injection in Cloud System

Jun. 2022 – Sep. 2022

Research Intern

Purdue University

- Joined Purdue University's summer research team to study natural language processing and bug injection algorithms.
- Converted the buggy source code into Abstract syntax tree (AST), and use GNN algorithm to implement data representation on AST.
- Finetuned the CodeBERT(MLM) to generate buggy source code that can be used to evaluate the performance of the famous automated program repair tools in cloud system.

Multi-density DBSCAN Clustering

Jan. 2022 – May 2022

Team Leader

SYSU

- Improved the existing DBSCAN parameter adaptive algorithm so that it can adapt two parameters at the same time and speed up this adaptive process.
- Proposed a new multi-density DBSCAN (AMD-DBSCAN) algorithm, which adapts multiple pairs of parameters for multi-density datasets, so that the algorithm can achieve excellent performance.
- Our AMD-DBSCAN improves accuracy by 24.7% on average over the state-of-the-art algorithm on Multi-density datasets, while having no performance loss in Single-density scenarios.
- As the first author, *AMD-DBSCAN: An Adaptive Multi-density DBSCAN for datasets of extremely variable density* is published in DSAA 2022 (CCF-C).

Brain Inspired LSTM

Nov. 2021 – May 2022

Research Intern

HKUST

- Joined the HKUST brain-inspired research team to study SNN-related algorithms.
- In-depth study of the LSTM and SNN algorithms, mainly focusing on using individual LIF neurons to simulate LSTM neurons.
- Proposed the BioLSTM model, which leverages the high performance of LSTM and the biological plausibility of SNN.

Self-supervised Object Detection

Sep. 2020 – Sep. 2021

Main Member

SYSU

- Learned the self-supervised object detection task and the contrastive learning model.
- Independently designed a new data augmentation method suitable for extracting features for self-supervised object detection tasks.
- Proposed a novel DBSCAN clustering algorithm based on a k-dimensional tree, which makes it possible to cluster billions of feature data by dividing small partitions.

Professional Experience

Allwinner Technology

Jul. 2021 – Sep. 2021

Software Develop Engineer Intern

Zhuhai

- Realized a network streaming media system that can adjust video encoder parameters in real-time by effectively combining multimedia software modules.
- Developed an automated software testing system to realize automated parameter testing of video encoding.
- Built a network transmission video decoding system using the UDP, RTP, and RTCP protocols to meet the company's decoding time requirements.

Guangzhou Shengkai Haojin Investment Management Co., Ltd

Jul. 2020 – Sep. 2020

Data Analysis Intern

Guangzhou

- Skillfully used Python to clean data and perform abnormal value processing on millions of project data and completed visual analysis.
- Used Python script to perform rapid data analysis and processing of nearly one million pieces of data from over 2000 projects.
- Optimized the company's ERP system UI interface and interactive logic using JavaScript.

Honors

Summa Cum Laude of Sun Yat-sen University

Sun Yat-sen University Scholarship for Academic Excellence Student (2020 & 2021 & 2022)

Second prize in the 2021 MathorCup Mathematical Modeling Competition

Second prize in the 2021 Mathematical Contest In Modeling (MCM)

Technical Skills

Languages: Python, C/C++, Java, JavaScript, HTML/CSS

Language

TOEFL (104), GRE (327), French (B2)