Juncheng WU

510 Porter-Kresge Road, Santa Cruz, CA, 95064
Email: jwu418@ucsc.edu Tel: (+1)831-227-8970

EDUCATION

Tongji University 09/2020-06/2024
Bachelor's Degree in Computer Science and Technology

- **Overall GPA**: 3.97/4.00.
- **Scholarships & Titles**: Scholarship of Tongji University 12/2021, Elite Student of Tongji University 01/2022, and Outstanding Graduate of Tongji University 06/2024.

University of California, Santa Cruz 06/2024-Present
Ph.D Student in Computer Science and Engineering

- **Scholarships & Titles**: UCSC Regents Award

RESEARCH EXPERIENCES

Real-world Low-level Vision - *Project Leader, Supervisor: Zhangkai Ni and Yuyin Zhou* 10/2022-08/2024

- Worked on **building metrics and models for real-world low-level computer vision tasks.**
- Designed and implemented **multi-modal** algorithms for low-level vision.
- One paper accepted by **CVPR 2024.**
- One paper accepted by **NeurIPS 2024.**
- One paper in submission to **AAAI 2025.**

Foundation Model for Biomedical- *Key Participant,, Supervisor: Yuyin Zhou* 04/2024-Present

- Worked on **benchmarks for biomedical foundation models.**
- Proposed a pipeline to generate multigranular annotations for unpaired medical image.
- Benchmarked performance of Large Language Models (LLMs) as biomedical foundation models.
- Two papers in submission to **ICLR 2025.**

Foundation Model for single cell ATAC-seq- *Project Leader, Supervisor: Yuyin Zhou* 08/2024-Present

- Worked on **foundation model for single-cell biology.**
- Preprocessed single-cell ATAC-seq data for model training.
- Designed and implemented an unsupervised training framework for single cell ATAC-seq.

PUBLICATIONS

DDR: Exploiting Deep Degradation Response as Flexible Image Descriptor
Juncheng Wu, Zhangkai Ni, Hanli Wang, Wenhan Yang, Yuyin Zhou, Shiqi Wang.
Accepted to the Thirty-Eighth Annual Conference on Neural Information Processing Systems **(NeurIPS 2024)**.
TL;DR: We propose a novel image descriptor based on deep degradation response. We use pre-trained CLIP model to fuse text-guided degradation into image deep features. Our method demonstrates promising results on low-level tasks on opinion-unaware BIQA, image deblurring, and real-world image super-resolution.

A Preliminary Study of o1 in Medicine: Are We Closer to an AI Doctor?
Yunfei Xie*, **Juncheng Wu***, Haoqin Tu*, Siwei Yang*, Bingchen Zhao, Yongshuo Zong, Qiao Jin, Cihang Xie, Yuyin Zhou.
In Submission to the Thirteenth International Conference on Learning Representations **(ICLR 2025).**
TL;DR: We conduct comprehensive evaluation of OpenAI o1 and other Large Language Models (LLMs) on different medical scenarios. Our evaluation encompasses 6 tasks using data from 37 medical datasets, including two newly constructed question-answering (QA) datasets based on professional medical quizzes from the New England Journal of Medicine and The Lancet.

MedTrinity-25M: A Large-scale Multimodal Dataset with Multigranular Annotations for Medicine
Yunfei Xie*, Ce Zhou*, Lang Gao*, **Juncheng Wu***, Xianhang Li, Hong-Yu Zhou, Sheng Liu, Lei Xing, James Zou, Cihang Xie, Yuyin Zhou
In Submission to the Thirteenth International Conference on Learning Representations **(ICLR 2025).**
TL;DR: We propose the first automated pipeline that scales up multimodal data by generating multigranular visual and texual annotations. Based on our pipeline, we introduce MedTrinity-25M, a comprehensive, large-scale multimodal dataset for medicine, covering over 25 million images across 10 modalities, with multigranular annotations for more than 65 diseases.

Restorer: Removing Multi-Degradation with All-Axis Attention and Prompt Guidance
Jiawei Mao, **Juncheng Wu**, Yuyin Zhou, Xuesong Yin, Yuanqi Chang.
In Submission to the Thirty-Ninth AAAI Conference on Artificial Intelligence **(AAAI 2025).**
TL;DR: We introduce Restorer, a novel Transformer-based all-in-one image restoration model. We propose All-Axis Attention (AAA) to simultaneously model long-range dependencies across both spatial and channel dimensions. Additionally, we introduce

textual prompts to incorporate explicit task priors, enabling the removal of specific degradation types based on user instructions.

Misalignment-Robust Frequency Distribution Loss for Image Transformation
Zhangkai Ni, **Juncheng Wu**, Zian Wang, Wenhan Yang, Hanli Wang, Lin Ma
Accepted to the IEEE/CVF Conference on Computer Vision and Pattern Recognition 2024 **(CVPR 2024).**
TL;DR: We propose a novel Frequency Distribution Loss (FDL) for image transformation models trained with misaligned data. Extensive experimental evaluations, focusing on image enhancement and super-resolution tasks, demonstrate that FDL outperforms existing misalignment-robust loss functions.

ACADEMIC SERVICES

Reviewer for NeurIPS 2024, ICLR 2025, AISTATS 2025, CVPR 2025