**Juncheng WU**

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**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