Zhenning Yang

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Education

University of Michigan *08/2024 – present*

Ph.D. in Computer Science and Engineering

University of Michigan *08/2022 – 05/2024*

M.S. in Computer Science and Engineering - **GPA**: **4.0/4.0**

University of Tennessee *08/2018 – 05/2022*

B.S. in Computer Science; Minor in Mathematics - **GPA**: **3.99/4.0**

Publications

Oobleck: Resilient Distributed Training for Large Models.

Insu Jang, **Zhenning Yang**, Zhen Zhang, Xin Jin, Mosharaf Chowdhury.

ACM Symposium on Operating Systems Principles (SOSP), 2023

SmarCyPad: A Smart Seat Pad for Cycling Fitness Tracking Leveraging Low-cost Conductive Fabric Sensors.

Yi Wu, Luis González, **Zhenning Yang**, Gregory Croisdale, Çağdaş KARATAŞ, Jian Liu.

ACM Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT), 2023

A Fast Neural Network-Based Approach for Joint Mid-IR and Far-IR Surface Spectral Emissivity Retrieval.

Zhenning Yang, Xiuhong Chen, Xianglei Huang, Tristan L'Ecuyer, Brian Drouin.

IEEE International Geoscience and Remote Sensing Symposium (IGARSS), 2023

Chasing Low-carbon Electricity for Practical and Sustainable DNN Training.

Zhenning Yang, Luoxi Meng, Jae-Won Chung, Mosharaf Chowdhury.

ICLR workshop: Tackling Climate Change with Machine Learning, 2023

Manuscripts

SLRNet: Semi-Supervised Semantic Segmentation Via Label Reuse for Human Decomposition Images.

Sara Mousavi, **Zhenning Yang**, Kelley Cross, Dawnie Steadman, Audris Mockus.

arXiv preprint, 2022

Pseudo Pixel-level Labeling for Images with Evolving Content.

Sara Mousavi, **Zhenning Yang**, Kelley Cross, Dawnie Steadman, Audris Mockus.

arXiv preprint, 2022

Research Experience

UseSys Lab, University of Michigan *08/2024 – present*

Graduate Research Assistant, advised by Prof. Ang Chen

- Exploring AI agents and their applications, specializing in AI-driven solutions for cloud management.

Huang Research Group, University of Michigan *10/2022 – 08/2024*

Graduate Research Assistant, advised by Prof. Xianglei Huang

- **ML4Remote-sensing** Developed NN models for fast emissivity retrieval, analyzed the model noise-robustness and assessed feature importance using Shapley values. Integrate the retrieval solution into the production pipeline for an upcoming satellite mission.

SymbioticLab, University of Michigan *10/2022 – 06/2023*

Graduate Research Assistant, advised by Prof. Mosharaf Chowdhury

- **Fault-tolerant Distributed Training** Contributed to a hybrid-parallel training framework for large DNN models, optimizing for both fast failure recovery and high throughput.
- Led experiments; evaluating our systems against alternative solutions across various scenarios, utilizing both simulated controlled failure environments and traces from realistic spot instances.
- **Carbon-aware DNN Training** Originated a carbon-aware DNN training framework that reduces the carbon footprint of DNN training while maintaining high throughput.
- Proposed a carbon-aware DNN training solution that forecasts carbon intensity and finds the optimal GPU configuration in real-time, minimizing the carbon footprint of DNN training without relocating or postponing tasks. Won the 2nd Best Overall Solution in Carbon Hack 22.

Mockus's Research Group and Forensic Anthropology Center, University of Tennessee *08/2020 – 05/2022*

Undergraduate Research Assistant, advised by Prof. Audris Mockus

- **ML4Forensic-medicine** Engineered ML models and annotation tools to assist forensic researchers in analyzing human body decomposition.
- Devised regression models to predict the Post Mortem Interval (PMI) from decomposition imagery.
- Designed and developed a cloud-based image annotation platform for forensic researchers to efficiently manage and annotate image data.

CURENT, University of Tennessee *05/2019 – 08/2020*

Undergraduate Research Assistant, advised by Prof. Audris Mockus and Dr. Chien-fei Chen

- **ML4Social-media-analysis** Employed natural language processing techniques to analyze the real-time responses of residents before, during, and after natural disasters through tweets.
- Built DNN models to perform tweet classification and utilized active learning for iterative performance enhancement.
- Programmed Python toolkits for streamlined data scraping, cleaning, and preprocessing, which significantly enhanced automation efficiency.

Teaching Experience

REU Student Mentor *University of Tennessee*

Research Experiences for Undergraduates (REU) Program *Summer 2020*

Teaching Assistant *University of Tennessee*

Finite Mathematics (Math 123) *Summer 2019*

Math Tutor *University of Tennessee*

Pre-calculus, Calculus, Differential Equation, Abstract Mathematics *09/2018 – 06/2019*

Projects (Selected)

Energy-Efficient ML Compiler, University of Michigan *01/2023 – 05/2023*

Team Lead, advised by Prof. Scott Mahlke

- Enhanced the TVM autotuner with an energy efficiency feature, focusing on optimizing GFlops/Watt during the autotuning phase of the compilation.
- Observed the benefits of complex operations for power optimization and the paradox that some operator implementations can consume more energy despite being faster.

EcoCAR Mobility Challenge, University of Tennessee *08/2021 – 05/2022*

Team Lead, advised by Prof. Hairong Qi and Prof. David Irick

- Enhanced the radar-camera fusion architecture for UT's hybrid electric vehicle, decreasing radar 'Ghost Targets' and boosting mAP by 15%.
- Generated a 2-step solution for efficient adaptive cruise control (ACC) systems: first an agent mimics the PID controller through imitation policy, then fine-tuned in an RL setting to optimize fuel economy and energy consumption.
- Presented the UT EcoCAR CAVs system at the Year-4 EcoCAR Mobility Challenge in Phoenix, Arizona.

Skills

Programming C/C++, Python, Wolfram Language, Linux, Bash, LaTeX.

Frameworks PyTorch, TensorFlow, Pandas, NumPy, Matplotlib, Jupyter, Docker, Git, Anaconda.

Languages English, Mandarin, Cantonese.

Honors and Awards (Selected)

2023 **Dean's List all semesters**, UMich

2022 **2nd Best Solution**, Carbon Hack '22

2022 **Dean's List all semesters**, UT

2020 **Christopher J. and Michelle R. Gentry Scholarships**, UT

2020 **Leonard and Betty Shealy Scholarships**, UT

2020 **Exemplary Research Award**, CURENT, UT

2018 **International Undergraduate Merit Scholarships**, UT