Jinsong Zhang

jinsongzhang@ucsb.edu | +1 (805) 9719834 | cam2024.github.io | github.com/Cam2024

Education

University of California, Santa Barbara — Santa Barbara, USA
M.S. in Computer Engineering; GPA: 3.78/4.0 — *Sep 2024 – Present*

University of Liverpool — Liverpool, UK
B.Eng. in Electrical and Electronic Engineering; GPA: 3.7/4.0 — *Sep 2022 – Jun 2024*

Xi'an Jiaotong-Liverpool University — Suzhou, China
B.Eng. in Electronic Science and Technology; GPA: 3.5/4.0 — *Sep 2020 – Jun 2022*

Skills

Programming: C/C++, Verilog, Python (PyTorch, OpenCV), MATLAB, Assembly, HTML, CSS
Software: Vivado, Quartus, Vitis, Cadence, VS Code, PyCharm, Multisim

Publications

J. Zhang, M. Li, J. Tian, J. Lu, Z. Zhang. "Comprehensive Design Space Exploration for Tensorized Neural Network Hardware Accelerators." *Submitted to Design Automation Conference (DAC) 2026* (Under Review). Available at *arXiv preprint arXiv:2511.17971*, 2025.

Research Experience

Comprehensive DSE for Tensorized Neural Network Accelerators — Jan 2025 – Nov 2025
Research Assistant (First Author), University of California, Santa Barbara — *Santa Barbara, USA*

- Proposed a comprehensive Design Space Exploration (DSE) framework that jointly optimizes tensor contraction paths, hardware core partitioning, and dataflow mappings for efficient TNN deployment.
- Developed a global latency-driven search algorithm with MAC-guided path pruning to identify Pareto-optimal configurations, bridging the gap between algorithmic compression and hardware efficiency.
- Designed a parameterizable FPGA accelerator featuring a streaming Tensor Train (TT) contraction kernel and configurable systolic GEMM engine using Vitis HLS on Xilinx VU9P.
- Achieved 3.28x–4.00x inference and 3.42x–3.85x training latency speedups with 19.19 GOPS/W energy efficiency compared to dense baselines across ResNet-18 and ViT benchmarks.

YOLOv5s-Powered Vision System for Robot Swarms — Jun 2023 – Sep 2023
Researcher, Westlake University — *Hangzhou, China*

- Developed an innovative vision system integrating the YOLOv5s model with ROS for real-time object detection within a distributed robot swarm.
- Curated a comprehensive object detection dataset by leveraging ROS in conjunction with cameras; conducted model training with a custom dataset.
- Optimized inference latency by **migrating** image preprocessing pipelines and ROS topic publishing from Python to **C++**, achieving significantly higher frame rates for real-time control.
- Implemented object detection for a swarm of robots, enhancing overall intelligence and coordination capabilities.

Real-time Slope Perception Module for UAV — May 2023 – Jul 2023
Researcher, Westlake University — *Hangzhou, China*

- Designed a perception module integrating multiple laser distance sensors and an IMU for real-time terrain monitoring.
- Implemented a **Moving Average Filter** algorithm to mitigate sensor noise, ensuring stable and accurate slope estimation on inclined surfaces.
- Integrated the system with the microcontroller via efficient serial communication, enabling the UAV to visualize slope data and adapt to terrain changes.

Projects

Custom 32-bit 5-Stage Pipelined RISC-V Processor | *Verilog, Cadence Virtuoso* — Sep 2024 – Dec 2024

- Designed a 5-stage pipelined processor in Verilog, implementing **Forwarding** and **Stalling** mechanisms to resolve data and control hazards.
- Constructed a **transistor-level implementation** of the processor datapath using Cadence, verifying logic correctness through waveform simulation.
- Conducted cross-verification between the RTL and the transistor-level schematic to ensure design consistency.

RNN based Aircraft Trajectory Prediction | *Final Year Project* — Oct 2023 – May 2024

- Implemented Recurrent Neural Networks (RNNs) using PyTorch, specifically focusing on LSTM and GRU models, to predict aircraft trajectories based on ADS-B data.
- Processed the Aircraft Localization Competition dataset by handling data imputation, cleaning, and structuring to ensure high-quality inputs.
- Designed and tested both single-feature and multi-feature input-output models to assess the impact of feature selection on prediction accuracy.