

Guanghao Xu

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EDUCATION:

University of Illinois Urbana-Champaign, Grainger College of Engineering

Master of Electrical & Computer Engineering (GPA 3.67)

Jan 2025 - Present

- Applied Parallel Programming, Artificial Intelligence, Computer Vision, Communication Networks, Cloud Infrastructure.

University of Illinois Chicago, College of Engineering

Bachelor of Computer Science (GPA 3.78)

Aug 2021 - May 2024

- Operating System, Machine Learning, OOP, Systems Programming, Computer Algorithm, Software Engr, User Interface.

WORK EXPERIENCE:

Yangtze Delta Region Institute of Tsinghua University, Zhejiang

Aug - present 2025

Software Engineer | Remote Part-time

- Engaged by client to continuously upgrade backend systems and develop **AI-driven** functionality for 8-axis probe station.

Clounix Technology Limited

May - Aug 2025

System Development Engineer | Intern

Shanghai, China

- Developed the **control system** for an 8-axis probe station validating PCB boards with integrated in-house switch chips.
- Coordinated different teams and applied **TDD** to define feature specifications and optimize the chip verification process.
- Developed multi-axis **motion algorithms**, including calibration, collision-avoidance, and emergency-stop mechanisms.

Newland AIDC

Jun - Aug 2023

Software Engineer | Intern

Fuzhou, China

- Developed **B2B verification software**, focusing on OS application-layer and frontend **GUI**.
- Designed monitoring software for hardware testing and meet departmental verification requirements.
- Consolidated test data and updated the department **database** for performance analysis.

Projects :

Clounix - Multi-Axis Probe Station for PCB Verification in Chip Integration -- Team Core member

- Implemented X/Y/Z/R multi-axis motor control via **Modbus RTU**, integrating **PID-based** auto-calibration, optical/pressure sensor feedback, collision detection, and emergency stop for robust closed-loop operation.
- Designed a **layered architecture** supporting **simulation-hardware dual-mode**, **multithreading**, and **asynchronous scheduling**; developed comprehensive **unittest** suites to ensure stability and reliability.
- Designed and implemented **full-stack** solutions, including secure **RESTful APIs** over **HTTP** using the **FastAPI Web framework**, incorporating **middleware management** for authentication, logging, and error handling. Designed a **user-friendly GUI** enabling interaction with backend services for runtime configuration, task scheduling, and data management.
- **Computer Vision integration**: applied **OpenCV** for image-based probe positioning, alignment and zero-point calibration.

CUDA-Optimized Convolutional Neural Network -- Individual Project

- Accelerated convolutions via tiled matrix multiplication with **input unrolling**, **shared memory**, and **kernel fusion**, reducing global memory load from **84.9% → 23.6%**. Applied **Tensor Cores** (TF32 WMMA), **CUDA Streams** with **pinned memory overlap**, and **FP16 arithmetic** for high-throughput execution.
- Profiled with **Nsight Systems** and **Nsight Compute** to guided targeted memory and compute optimizations, achieving end-to-end inference speedup from **1623 ms → 52 ms (batch size 10,000)** while maintaining accuracy.

Breast Cancer Tumor Classification -- Team Leader

- Developed and compared **KNN**, **Logistic Regression**, **SVM**, **Feedforward Neural Network**, and **Decision Tree** models using the Breast Cancer Wisconsin dataset.
- Applied **normalization and PCA**; tuned **hyperparameters** with grid search and **5-fold cross-validation**.
- Achieved **98.25%** test accuracy with SVM and **93.86%** with KNN; tracked **precision**, **recall**, **F1-score**, and **visualized confusion matrices**. Measured inference latency and memory to evaluate real-time feasibility.

Newland AIDC – Embedded Scanner Diagnostics & Telemetry Tool -- Team Member

- Developed a **user-friendly GUI** with **PyQt5**, **Qt Designer** for real-time visualization and control of diagnostic metrics.
- Built backend services with **Node.js (Express.js)** and **MongoDB**, designing **RESTful APIs** for multi-user login, data management, and seamless integration with the database.
- Processed test results with **Pandas** and conducted **KPI analysis** to identify bottlenecks.

Technical Skills & Knowledge:

- **Development Framework**: Scrum, DevOps, Kanban, XP, Lean, Refactoring.
- **Electrical Engineering**: Circuit Design, Digital Circuits, Analog Circuits, Signal Integrity Verification