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:

SLB (Schlumberger) Aug - present 2025

Full-Stack Software Developer | Remote Intern *Houston, Texas*

- **Full-stack** developing a FastAPI-based **cloud deployed** web application for multi-model pressure vessel calculations.

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** and **hardware-testing tools**, including **OS-layer logic** and **GUI interfaces**.
- Consolidated test data and updated departmental **databases** to support **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.

SLB Proxy Modeling Platform – Web-Based Pressure Vessel Analysis App -- *Team Leader*

- Enabled **multi-user management** and **FastAPI server** communication through **JWT authentication** and **bcrypt hashing**.
- Implemented a **calculation engine** in **Python 3.12**, providing real-time computations, evaluations, and dynamic plotting.
- Built a responsive **JavaScript/HTML/CSS frontend** with dynamic unit conversion, result visualization, and file export.
- Cloud deployed using **Gunicorn + Uvicorn** on **Azure App Service**, with **Azure MySQL Flexible Server** storing user credentials and calculation history.

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**, **LR**, **SVM**, **FNN**, and **DT** 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