Timothy Lee Grant

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GitHub | LinkedIn | Portfolio

WORK EXPERIENCE

Curtiss-Wright

Software Engineer - Dec 2023 - Present

- Architected and developed **distributed C#/.NET** application stack on a **Raspberry Pi** running **embedded Linux** for **telemetry collection**, **device orchestration**, and power-aware **automated shutdown** of provisioned VMs and servers across the local network under low-battery conditions.
- Implemented **REST API** services with **SQLite**-backed state persistence, designed **P/Invoke** interop layer with native **C libraries** for low-level hardware communication, and built **PowerShell**-based operational tooling for monitoring and control workflows.
- Brought up and validated **Linux**-based **NVIDIA edge AI** systems for industrial deployment, including OS provisioning, firmware/driver integration, and thermal/power benchmarking under production **AI inference** workloads.
- Drove firmware project lifecycle from **requirements gathering** through delivery: analyzed electrical schematics with hardware engineering team, defined project requirements, and implemented **embedded C** firmware using **I2C** communication protocols to query sensor telemetry and control peripheral devices.
- Maintained and extended **embedded C** firmware powering production devices shipped in **3,000+ units** across multiple product lines.

Biotronik

Engineer Intern - April 2019 - Sep 2020

- Developed **Python**-based automated **test automation** framework integrating with electrical tester **APIs** to generate schematic-driven validation plans, configure relay/switch matrices, execute **connectivity tests**, and produce **diagnostic reports** for circuit verification and fault detection.
- Built **containerized** remote firmware flashing and **debugging** platform using **Docker**, **GCC** toolchains, **Raspberry Pi**, **GDB**, and **USART** interfaces, enabling engineers to remotely compile, deploy, and debug embedded software on physical **microcontroller** hardware.

PROJECTS

LLM Observability & Orchestration Platform (LLM_Monitor) - GitHub

- Architecting a **microservices** LLM platform: a **C#/ASP.NET Core API gateway** routes chat requests to a **Python LangChain/LangGraph** orchestration service backed by **Ollama** local inference and **PostgreSQL/pgvector**, containerized via **Docker Compose**.
- Implementing a **LangGraph** state-machine pipeline with **prompt-injection/policy guardrails**, **RAG** retrieval over pgvector, bounded **tool calling**, and checkpointer-based **conversation memory**.
- Designed a **mock/live model-factory seam** for low-compute development and **observability**-first telemetry (per-node latency, tokens, decisions) with **correlation-ID** propagation across services.

Local LLM Voice Assistant - GitHub

- Developed a **low-latency** voice AI assistant on **Jetson Orin Nano** integrating **Qwen 2.5 (7B)** for conversational logic, **Whisper.cpp** for speech-to-text, and **Piper TTS** for bilingual audio synthesis (**English/Mandarin Chinese**).
- Designed **intent classification** and **tool-use pipeline** routing conversational data without hardcoded keyword matching.

Advertisement Delivery and Bidding Pipeline - GitHub

- Built a **.NET backend API** for targeted ad delivery with **PostgreSQL**, **Entity Framework**, and **Redis** caching to optimize **real-time bidding** and retrieval performance.
- Added **semantic recommendation engine** using **pgvector** embeddings to improve ad relevance scoring.
- Implemented **CI/CD** with **GitHub Actions**; deployed cloud-hosted infrastructure on **AWS RDS** and **EC2** with containerized services via **Docker Compose**.

CONTENT & COMMUNITY

- Technical content creator: **570+ engineering tutorial videos** across two YouTube channels (**9.7K combined subscribers**) - Engineering Channel
- **Mandarin Chinese** language channel (**6.84K subscribers**) - all content filmed and presented in **Mandarin** - Chinese Channel

SKILLS

Languages: Python, C#, Java, SQL, C, Assembly, Mandarin Chinese

Frameworks & Libraries: .NET, Entity Framework, Avalonia UI, Spring Boot, Node.js, Express, NumPy/Pandas

Cloud & Databases: AWS (RDS, EC2, PostgreSQL), Redis, MongoDB, pgvector, SQLite

Systems & Infrastructure: Docker, Docker Compose, GitHub Actions CI/CD, Git, Linux, PowerShell

AI & Agentic Development: LangChain, LangGraph, RAG Pipelines, Ollama, Guardrails/Prompt-Injection Defense, Hugging Face Transformers, Claude Code, GitHub Copilot, Cursor

Embedded Platforms: Raspberry Pi, NVIDIA Jetson, ESP32, STM32, I2C, USART

EDUCATION

Oregon State University, Corvallis, OR - B.Sc. Electrical and Computer Engineering, Minor in Computer Science - GPA: **3.83/4.00** - June 2023