

# ASHISH AGRAWAL

Toronto, ON | LinkedIn: [Insert URL] | GitHub: [Insert URL] | Portfolio: [Insert URL]

## PROFESSIONAL SUMMARY

Systems & Machine Learning Engineer executing a strategic career pivot from 12+ years of global operational leadership—most recently at Amazon—to low-level systems programming. Expert in bridging the gap between hardware optimization (C++ / Linux Kernel) and predictive intelligence (AI / ML). Leveraging a decade of high-stakes problem-solving to architect automated, scalable architectures for High-Frequency Trading (HFT) and OS Kernel environments.

## TECHNICAL SKILLS

- **Languages:** C++ (STL, Templates, Smart Pointers), C (Memory Management), Python (NumPy, Pandas, Scikit-Learn), Bash, Assembly (x86).
- **Systems Engineering:** Multithreading (std::thread, atomics, mutex), Inter-Process Communication (IPC), OS Kernel fundamentals, Device Drivers, Memory Management (Stack vs Heap, Cache Locality).
- **AI & Machine Learning:** Neural Networks (Feed-Forward, Backpropagation), NLP Fundamentals, Computer Vision (OpenCV concepts), LLM Integration, Predictive Modeling, Regression Analysis.
- **Tools & Environment:** Linux, Make/CMake, Git, Docker, VS Code, SQL, Tableau, Excel (Advanced).

## PROJECTS

### 1. Driver\_Forge | Automated Kernel Driver Generator

- **Objective:** Automating the identification of unknown hardware to generate functional C-language kernel drivers.
- **Implementation:** Designing a system to interface with camera input for component recognition, scraping datasheets, and utilizing LLMs to synthesize driver code structures.
- **Tech Stack:** C, C++, Linux Kernel Modules, LLMs (Ollama/Llama), Computer Vision (OpenCV), System Calls, Bash.

### 2. High-Frequency Logistics Simulator | Low-Latency Systems (C++)

- **Concurrency:** Implemented a **Producer-Consumer** architecture using std::mutex and std::condition\_variable to synchronize high-volume concurrent threads without race conditions.
- **Optimization:** Optimized buffer memory constraints to handle "burst" data ingestion, preventing overflows and ensuring thread safety under heavy load.
- **Tech Stack:** C++20 (Smart Pointers), POSIX Threads (pthreads), std::mutex, GDB, Valgrind, Make.

### 3. Neural Network Framework from Scratch | C++ (No External Libs)

- **Performance:** Manually implemented Forward/Backward Propagation using matrix operations, optimizing memory allocation for weight matrices to maximize **L1/L2 CPU cache hits** and reduce execution time.
- **Tech Stack:** C++17, Linear Algebra, Memory Management (Manual Allocation), SIMD (Optimization concepts), CMake.

## PROFESSIONAL EXPERIENCE

**Amazon Air** | Senior Program Manager *Ontario, Canada* | Aug 2022 – Sept 2023

- **ML & Automation:** Directed the implementation of internal **ML-based automation** models to optimize volume capacity planning across North American sites by partnering with Data Scientists and Software Engineers to train predictive algorithms on historical load data.
- **Data Engineering:** Engineered capacity analysis frameworks to resolve critical throughput bottlenecks by utilizing SQL queries to deep-dive massive Amazon Air datasets and collaborating with BIEs to visualize utilization gaps.
- Overhauled operational planning protocols to accelerate the adoption of new research capabilities by executing internal "Go-to-Market" strategies and change management frameworks for tool deployment.

**Amazon Logistics** | Site Operations Manager *Ontario, Canada* | *Aug 2020 – July 2022*

Managed high-volume operations for a 500,000 sq. ft. facility, leveraging analytical tools to drive a 22% productivity increase and over \$2.5M in projected cost savings. Architected network-level logistics programs and orchestrate critical load planning, achieving region-leading throughput (51.2 TPH) through dynamic resource allocation and system stability modeling.

**Prior Operational Management Experience**

*Includes roles at Fresh Start Foods, Maxxam Analytics, and Vikram Laboratories* Successfully handled operations across manufacturing and lab environments with a focus on process efficiency and fault tolerance. Refactored scheduling logic to eliminate bottlenecks, increasing output by 77% and uptime by 90%. Enforced rigorous QC standards to maintain zero data integrity failures in high-volume workflows and re-engineered procedures to cut setup times by 20%.

**EDUCATION**

**Bachelor of Science (Honours), Computer Science** Trent University, Peterborough, ON | Expected April 2027

- *Distinction:* Dean's Honour Roll.
- *Key Coursework:* High Performance Computing, Operating Systems, Systems Programming, Computer Networks, Computer Organization, LLMs & NLP, Applied AI, Data Mining, Probability 1, Linear Algebra, Calculus I/II.

**Bachelor of Technology, Biotechnology** Rai Foundation Engineering College, India