Mohamed Affan Dhankwala

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Embedded and aerospace software engineer (3+ years) with an M.S. in Artificial Intelligence and hands-on ML work in RAG, real-time computer vision, and reinforcement learning — comfortable from low-level FPGA and firmware to model evaluation. Seeking roles at the intersection of systems engineering and applied AI/ML.

PROFESSIONAL EXPERIENCE

Software Engineer | Raytheon (RTX) Sept 2023 – Present

- Supported the autopilot algorithm team in developing modern aerospace guidance algorithms; implemented FPGA-based unit tests and maintained CMake build configurations to enable requirements verification and strengthen CI/CD.
- Enabled parallel software development in hardware-limited environments by simulating firmware interactions with memory-mapped I/O on Linux, letting developers test bare-metal register transactions and device behavior without physical hardware.
- Modernized a legacy PATRIOT missile-borne computer with new software designs and FPGA-based hardware, improving performance, robustness, and maintainability to meet customer needs.
- Developed, integrated, and debugged C/C++ software and Linux device drivers on a PolarFire SoC, partnering with firmware, FPGA, quality, and safety teams to validate safety-critical memory maps; delivered a stakeholder demo that secured approval for further development.
- Built and maintained CI/CD pipelines to enforce code quality and design correctness; created a Python tool to convert IOX memory maps to DDR-backed memory, unblocking hardware-constrained development.

Software Engineer Intern | Microsoft May – Aug 2018

- Designed, developed, and demoed a Kendo UI video and text highlighting plugin for MOOCs on the Worldwide Learning team; ran user interviews to iteratively refine usability and boost content interaction and learner engagement.
- Designed and implemented global and local databases enabling collaborative user annotations to improve the MOOC learning experience.
- Delivered a fully documented solution with 95% unit-test coverage, reviewed and demoed to senior engineers and management; drove work through agile sprints from planning to deployment.

PROJECTS

Textwave — Retrieval-Augmented Generation (RAG) System Jan – Feb 2025

- Processed and encoded a large document corpus with multiple chunking strategies and trained FAISS sequential re-rankers to improve retrieval quality.
- Used a pretrained Mistral LLM to generate contextually grounded answers to natural-language queries; ran offline evaluation and error analysis for accuracy, grounding, and robustness.

Techtrack — Real-Time Image/Video Recognition Service Feb – Mar 2025

- Built a multithreaded AI video-streaming service for real-time object detection and classification using YOLO, rendering bounding boxes for multiple objects and people while minimizing latency.
- Optimized the processing pipeline for high-performance, low-latency inference.

Reinforcement Learning Agents & Environments 2024 – 2025

- Implemented custom Q-learning and SARSA agents in Python across grid navigation, continuous control, and turn-based environments with configurable state representations, reward functions, and exploration strategies; evaluated learning dynamics via reward trends and policy-convergence analysis across algorithmic variants.

Bionic Arm — Distributed Embedded System Mar – May 2023

- Built a distributed dual-Arduino system communicating over Bluetooth for real-time motion mirroring; wrote firmware processing flex-sensor inputs from a wearable 3D-printed glove to actuate a custom 3D-printed robotic claw, and debugged timing, signal-noise, and calibration for stable, repeatable operation.

EDUCATION

M.S., Artificial Intelligence | Johns Hopkins University Dec 2025

B.S., Computer Engineering (Minor in Mathematics) | University of Washington Jun 2023

RESEARCH

M. A. Dhankwala, “A comparative study on hybrid genetic algorithm–boids as evolutionary algorithms,” 2025.

M. A. Dhankwala, “Comparison of hierarchical navigable small world (HNSW) querying variants,” 2025.

SKILLS

Languages: Python, C++, C, C#, Java, JavaScript, Bash

ML/AI: PyTorch, scikit-learn, FAISS, YOLO, RAG / LLMs, reinforcement learning, model evaluation & benchmarking

Tools & Platforms: Git, Docker, Linux, CMake, GDB, AWS EC2, Azure DevOps, VxWorks, DOORS, PyTest

Practices: CI/CD, unit & integration testing, requirements traceability