

OSAZEE ERO

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Applied ML / AI Engineer | GenAI, RAG & Production ML Systems | PhD

PROFESSIONAL SUMMARY

Applied ML / AI Engineer with 6+ years of experience building machine learning, computer vision, simulation, and GenAI systems for manufacturing, materials R&D, and technical workflows. PhD-trained in applied machine learning for process monitoring, with practical experience delivering RAG pipelines, LLM-assisted engineering tools, FastAPI inference services, Dockerized deployments, AWS model serving, and high-throughput data pipelines. Skilled at translating research into production-ready ML systems through reliable evaluation, scalable deployment, and strong software engineering practices.

TECHNICAL SKILLS

- **AI / GenAI Engineering:** RAG, LangChain, LlamaIndex, Pinecone, vector databases, OpenAI API, prompt orchestration, tool/function calling, LLM evaluation, LoRA/QLoRA fine-tuning, agentic workflows, MCP fundamentals.
- **Machine Learning / Deep Learning:** PyTorch, scikit-learn, XGBoost, U-Net, autoencoders, ConvLSTM, anomaly detection, segmentation, time-series modeling, sensor fusion, model evaluation.
- **Production AI / MLOps:** FastAPI, REST APIs, Docker, AWS ECS, S3, Lambda, SageMaker, MLflow, GitHub Actions, CI/CD, logging, monitoring, testing, model serving.
- **Data Engineering:** Python, pandas, NumPy, SQL, MongoDB/NoSQL, ETL pipelines, batch processing, data validation, large image/video/sensor datasets.
- **Software / Full Stack:** Git, Linux, API design, Streamlit, React, Next.js, TypeScript, Tailwind CSS.
- **Currently Building:** Advanced MCP workflows, production-grade agent systems, QLoRA/LoRA deployment workflows, Kubernetes, cloud-ready full-stack GenAI applications.

PROFESSIONAL EXPERIENCE

Machine Learning Engineer/Researcher — Simulation & Materials AI

Phaseshift Technologies / PhaseShift AI | **Oct. 2024 – Present**

Leveraging machine learning and Generative AI to support materials discovery, simulation workflows, and technical knowledge access.

- Designed and deployed a Retrieval-Augmented Generation pipeline using LangChain and Pinecone to improve search across internal technical documentation, reducing information retrieval time by 40%.
- Built LLM-assisted workflows for simulation code generation and parameter configuration, translating research prompt logic into reproducible Python services.
- Developed RESTful inference APIs with FastAPI and Docker and deployed models to AWS ECS for scalable access by engineering and research users.
- Partnered with domain experts to convert physical constraints into model loss functions and validation checks, improving simulation accuracy by 15%.
- Applied LLM evaluation, logging, and model iteration practices to improve answer quality, reliability, and traceability in technical workflows.

Machine Learning Research Associate — Computer Vision

Multi-Scale Additive Manufacturing Lab | **Sep. 2024 – Oct. 2025**

Developing real-time computer vision and deep learning systems for industrial IoT, process monitoring, and high-throughput manufacturing data.

- Developed a spatiotemporal deep learning model using ConvLSTM for in-situ video monitoring, achieving 96% accuracy in detecting process deviations.
- Optimized computer vision models using quantization and pruning to support sub-50 ms inference latency for real-time monitoring scenarios.
- Automated ETL pipelines for high-throughput sensor logs, integrating SQL databases with on-premise storage for reproducible experiments and continuous model retraining.

- Built pipeline components for large image and video datasets with validation checkpoints to preserve data integrity during ingestion, preprocessing, and model evaluation.

Lead Software Developer / ML Engineer

Optifab Technologies | Jan. 2023 – Jun. 2024

Led engineering of AI-driven optimization software for advanced manufacturing and simulation workflows.

- Designed a modular Python codebase for simulation and optimization workflows, improving maintainability through unit testing, CI/CD practices, version control, and reusable engineering standards.
- Managed the full lifecycle of an ML-enabled software product from algorithm design to containerized Docker delivery for client installation.
- Implemented performance-focused model and simulation workflows supporting reliable batch execution, reproducible outputs, and easier troubleshooting for users.

Machine Learning Ph.D. Researcher — Deep Learning & Sensor Fusion

University of Waterloo | Sep. 2020 – Jul. 2024

Researched machine learning, computer vision, optical tomography, and sensor fusion methods for in-situ anomaly detection and quality prediction in additive manufacturing.

- Built full-stack ML pipelines processing large-scale optical tomography images and time-series sensor data for industrial anomaly detection and quality prediction.
- Developed custom U-Net and autoencoder architectures for unsupervised defect segmentation where labeled training data was limited.
- Applied XGBoost and probabilistic methods to correlate sensor telemetry with quality outcomes, identifying key process features and improving model interpretability.
- Mentored 5+ junior engineers and researchers on Python best practices, data annotation strategy, experiment design, and model evaluation.

SELECTED AI / ML SYSTEMS PROJECTS

- **Production RAG Assistant:** Built a LangChain/Pinecone RAG system with FastAPI, Docker, and AWS ECS for internal technical documentation search.
- **LLM Simulation Workflow:** Developed LLM-assisted Python/FastAPI services for simulation code generation, parameter setup, and validation.
- **Industrial Monitoring Pipeline:** Built data and model evaluation pipelines for large-scale image, video, and sensor-based anomaly detection.
- **Computer Vision Deployment:** Optimized PyTorch/OpenCV models with quantization and pruning for sub-50 ms real-time inference.

EDUCATION

Ph.D., Mechanical and Mechatronics Engineering – University of Waterloo, Canada, Jul. 2024

Thesis: Machine Learning & Optical Tomography for In-Situ Anomaly Detection.

M.Sc., Systems Engineering – University of Lagos, Nigeria, Jun. 2016

B.Eng., Electrical/Electronic Engineering – University of Benin, Nigeria, Nov. 2011

CERTIFICATIONS & PROJECT-BASED TRAINING

- AI Engineer Core Track: LLM Engineering, RAG, QLoRA, Agents — Udemy
- AI Engineer Agentic Track: The Complete Agent & MCP Course — Udemy
- AI Engineer Production Track: Deploy LLMs & Agents at Scale — Udemy
- Machine Learning Engineer Nanodegree — Udacity
- AWS Certified Machine Learning - Specialty — In Progress
- OpenCV AI Competition Phase 1 Winner | 2021

SELECTED PUBLICATIONS

1. *Optical tomography and machine learning for in-situ defects detection in laser powder bed fusion: A self-organizing map and U-Net based approach. Additive Manufacturing, 2023.*
2. *An Integrated Fuzzy Logic and Machine Learning Platform for Porosity Detection using Optical Tomography Imaging during Laser Powder Bed Fusion. International Journal of Extreme Manufacturing, 2024.*