Anupam Siwakoti

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Education

Lamar University, MS in Computer Science
GPA: 4.0 • Coursework: Machine Learning, Computer Vision, Data Science, Data Structures and Algorithms, Cloud Computing — Aug 2023 – May 2025

Leeds Beckett University, BSc(Hons) in Computing
GPA: 3.8 • Coursework: Advanced Database Systems, Advanced Software Engineering, Computing Mathematics, Digital Security — Sept 2018 – May 2022

Skills

Languages: Python, C, C++, Java, SQL (MySQL, PostgreSQL), PL/SQL

Machine Learning / Data: TensorFlow, PyTorch, Scikit-learn, HuggingFace, Pandas, NumPy, OpenCV, TensorNetwork (MPS), Optuna, XGBoost

Frameworks / Tools: FastAPI, Django (DRF), Docker, Redis, Kafka, Celery, Grafana, Tableau, AWS, GCP (VertexAI, BigQuery), GitHub, JIRA

Awards and Certifications

Machine Learning Specialization (Andrew Ng, Stanford) • Google Cloud ML Engineer Professional Certificate

Experience

Software Developer, Center for Midstream Management and Science (CMMS), Lamar University – Beaumont, TX

- Spearheading interdisciplinary projects bridging machine learning, environmental science, and IoT for methane leak detection and midstream data intelligence.
- Designed multiple **benchmarking pipelines** to evaluate anomaly detection across classical deep learning (LSTM, CNN) and quantum-inspired **tensor network models (MPS)**, achieving improved robustness on Tennessee Eastman Process (TEP) synthetic datasets.
- Built full-stack embedded Linux solutions on **Octavo OSD32MP1-BRK** platform, integrating SparkFun Babysitter, Murata Cat-M1/NB-IoT, and I2C-based sensors into a cohesive system.
- Programmed **TGS 8410 methane sensors** using STM32CubeIDE and ARM Cortex-M4 firmware, implementing precise heating cycles and calibrated ADC sampling for accurate methane concentration measurement.
- Developed a **Yocto/Buildroot-based embedded Linux package** for STM32MP1, managing kernel drivers, Device Tree overlays, and PMIC configurations for reliable sensor orchestration and IoT telemetry.
- Authored optimized embedded C for real-time data acquisition, power management, and IoT connectivity, with CI/CD cross-compilation pipelines for firmware deployment.
- Integrated ML-based analytics at the edge, enabling on-device detection and reduced cloud dependency for real-time methane monitoring.

Graduate Research Assistant, Lamar University – Beaumont, TX
Collaboration with Jefferson Lab, Virginia

- Built ML pipeline with **Optuna + PyTorch** for HPO of DNNs on GlueX detector data, improving particle-ID accuracy by 25%.
- Developed modular PyTorch MLP framework with schedulers, gradient monitoring, and diagnostics, reducing training/eval cycles by 40%.
- Enhanced high-energy physics analysis with ML-based particle categorization, improving scientific insights.
- Deployed PID models in C++ within HallD software, enabling real-time nuclear physics data analysis.

Software Engineer, Codavatar – Kathmandu, Nepal

- Backend engineer for Dialaxy, creating secure authorization modules (OSO + Python) and Twilio-powered APIs.
- Built full-stack solution (GraphQL, Pandas, FastAPI, Docker) for developer performance analytics, completing 50% faster than planned.
- Designed REST APIs with Django REST Framework (DRF) for Entegra, enhancing system functionality.
- Developed asynchronous API with FastAPI and secure token management for authentication.
- Built web app with Django + PostgreSQL, responsive frontend (HTML, CSS, JS), and async ops with AJAX.

Projects

Tennessee Eastman Process (TEP) Anomaly Detection and Benchmarking
C++17, Eigen, HDF5, OpenMP, TensorFlow, Pandas, NumPy. Built synthetic-data generator and anomaly detection pipeline using statistical (T^2, Q) and ML (MPS, neural) methods; benchmarked multivariate faults with ROC/PR/confusion matrices; optimized features with Eigen+OpenMP for **35%** runtime reduction.

AI-Powered Real-Time Anomaly Detection
FastAPI, Docker, Kafka, Redis, WebSockets, PostgreSQL, Nginx, ML, Prometheus, Grafana. Real-time service with Kafka/WebSockets; DDD design; Redis caching, PostgreSQL + Alembic migrations; Grafana/Prometheus monitoring; **200+** GitHub clones, ∼10 daily visitors.