ANKIT KARKI
Machine Learning & Robotics Engineer | Controls, Embedded AI & Mechatronics
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EDUCATION

Bachelor of Science in Mechanical Engineering
University of Texas, Arlington | Arlington, Texas
Expected Graduation: 2027
Focus: Control Systems, Machine Learning, Embedded Systems, Edge AI

TECHNICAL SKILLS

Machine Learning & AI: PyTorch, scikit-learn, Reinforcement Learning (PPO, TRPO, SAC), LSTM, Autoencoders, Isolation Forest, CNN, Anomaly Detection, Model Quantization, ONNX

Scientific Computing & Simulation: NumPy, SciPy, JAX, Pandas, MATLAB

MLOps & Deployment: Docker, MLflow, FastAPI, CI/CD, systemd, Configuration Management (YAML)

Control & Estimation: PID, MPC, Kalman Filter, Extended Kalman Filter, Differentiable EKF, State Estimation

Embedded Systems & Hardware: Raspberry Pi, IMU Sensors (MPU6050), I2C Protocol, Real-Time Data Pipelines, Edge AI

Mechanical Design & CAD: SolidWorks, Prototyping, Precision Mechanical Design

Programming & Tools: Python, Linux, Git

PROJECT EXPERIENCE

Industrial Fault Detection System – Python, PyTorch, LSTM, FastAPI, Docker

- Developed ensemble anomaly detection system combining LSTM autoencoder with attention mechanism and Isolation Forest for 6-axis IMU sensors.
- Built FastAPI service with automated deployment, logging, and model versioning.

- Processed multivariate sensor data for root cause analysis.

Industrial Reinforcement Learning Framework – Python, JAX, PyTorch, Docker, CI/CD

- Built modular RL framework implementing PPO, TRPO, and SAC with hybrid PID/MPC controllers.
- Designed environments for continuous/discrete actions with configurable reward shaping.
- Containerized pipelines with logging, monitoring, and CI/CD workflows.
- Applied to robotics control tasks requiring stable, reproducible policy learning.

Physics-Based IMU Intelligence System – Python, Raspberry Pi, ONNX, NumPy, SciPy

- Edge-deployed anomaly detection system extracting physics-based features from IMU data.
- Implemented Kalman filtering for sensor fusion and noise reduction (100–1000 Hz sampling).
- Optimized LSTM autoencoder using ONNX quantization for low-latency on-device inference.

Differentiable Extended Kalman Filter – JAX, JIT Compilation, Neural Networks

- Implemented fully differentiable EKF with JIT compilation for real-time state estimation.
- Integrated neural network module for learned bias correction.
- Used quaternion representation for numerical stability on embedded hardware.

Computer Vision: MNIST Classification System – PyTorch, CNN, scikit-learn

- Trained convolutional neural network for MNIST digits with modular pipeline including data loading, training loop, evaluation metrics, visualization, and model persistence.

ContractML – Runtime ML Inference Validation – Python, Pydantic, YAML, FastAPI, ONNX

- Built schema-based validation system for ML inference pipelines.
- Implemented versioning, input/output validation, drift detection, and multi-model A/B deployment workflows.

INTERESTS

Robotics · Autonomous Systems · Differentiable Physics · Quantum Mechanics · Agentic Systems

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ADDITIONAL INFORMATION

- F-1 Student Visa – Authorized to work in the US with CPT/OPT
- Available for full-time positions in Summer 2026