

Ivan Torriani

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EDUCATION

California Polytechnic State University, San Luis Obispo

San Luis Obispo, CA

B.S. Computer Science (AI/ML Concentration)

May 2028

- Dean's List; TS Research Grant Recipient; CTW Engineering Scholarship Winner; 3.8 GPA

EXPERIENCE

Computer Vision Research Assistant

Sep. 2024 – Present

Machine Learning Guided Variable Rate Sprayer for Vineyards

San Luis Obispo, CA

- Trained and optimized 10+ **YOLO** object-detection models on **Google Cloud** GPUs across a 1,000+ image dataset, achieving 30% mAP improvement via confusion-matrix and precision-recall analysis
- Integrated **MiDaS** monocular depth-estimation to produce real-time depth heatmaps and background blur, delivering a 100% cheaper alternative to LiDAR (\$5k-\$15k hardware eliminated)
- Boosted **Jetson Nano** OpenCV pipeline running 2 models from 2 to 15 FPS ($7.5\times$ speedup) by creating custom metric-distance algorithms that allowed us to use smaller (100-150MB) MIDAS models.

Computer Vision / Machine Learning Research Team Lead

Sep. 2024 – Present

Autonomous Vehicle Navigation with Meta Learning for Disaster Zones

San Luis Obispo, CA

- Developing a 4-phase autonomous navigation system using meta-learning and few-shot adaptation to enable vehicles to operate in out-of-domain environments (disaster zones, rural areas) where standard models fail
- Built an open-set object detection pipeline using **OpenCV** that classifies known objects with ~90% confidence and flags unknowns in real-time, routing to a multimodal model that outputs structured **JSON** traversability assessments in under 2 seconds
- Implemented **ROS2** + **AprilTag** navigation with obstacle recovery logic and an **asyncio/WebSockets** human-in-the-loop handoff that continuously polls for reconnection to a human operator upon signal recovery

Software Engineering Intern

Sep. 2024 – Aug. 2025

Surfrider Foundation

San Luis Obispo, CA

- Built an interactive Shared Socioeconomic Pathway (SSP) climate calculator in **React/Next.js** that models projected mortality rates and baseline warming scenarios for environmental advocacy
- Implemented backend logic in **TypeScript** with **MongoDB**, designing ~8 REST API endpoints for dynamic data storage and retrieval supporting real-time SSP projections
- Deployed full-stack application to production (*surfrider.vercel.app*), serving 1,000+ monthly visitors across the Surfrider Foundation's coastal advocacy network

PROJECTS

fAIr Farming | Computer-Vision Based Crop Health Analysis

Jan. 2025 – Jun. 2025

- Won \$5,000 at the annual CTW Engineering competition out of 10+ teams
- Replaced \$10-\$70 lab soil testing with a camera-based **OpenCV** pipeline that maps vegetation color signatures to nitrogen content in real-time, eliminating per-sample costs across large-scale field analysis
- Implemented CSIRO color-ratio modeling in OpenCV YOLO segmentation pipeline to map vegetation color signatures to estimated nitrogen content, validated across 500+ crop samples

Story Generation LLM | From-scratch Large Language Model

Jun. 2025 – Dec. 2025

- Built a ~150M parameter Transformer from scratch implementing causal multi-head attention and positional embeddings per *Attention Is All You Need*
- Trained 3 checkpoints (600-700MB) on 80GB+ text data achieving perplexity of ~45 after 12hrs of GPU training
- Documented methodology, results, and checkpoints on my *HuggingFace Repository*

TECHNICAL SKILLS

Languages: Python, Java, C++, TypeScript, SQL

Frameworks: PyTorch, TensorFlow, Keras, YOLOv8, React, Next.js

Developer Tools: Git, Google Colab, Jupyter Notebook, Anaconda, MongoDB

Relevant Coursework: Calculus I-IV, Physics I-III, Linear Analysis, Data Structures, Statistics for Engineers, Computer Organization, Project-Based Programming, Discrete Structures, Systems Programming