IAN RYAN

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LinkedIn | GitHub | ianhryan.com | Portfolio | Blog | Certificates

SUMMARY

Computer Science graduate specializing in Computer Vision, Machine Learning. Hands-on experience in training Convolutional Neural Networks (CNNs), building custom pattern recognition pipelines, and deploying models to constrained hardware environments. Skilled in deblurring techniques, real-time inference optimization, and image segmentation. Passionate about developing autonomous systems and deploying AI models for real-world applications.

SKILLS

Programming Languages: Python

Machine Learning & AI: PyTorch, Amazon SageMaker, TorchScript, YOLO (planned integration)

Computer Vision: Digital Image Processing, Image Segmentation, Pattern Recognition, Feature Extraction

Tools & Platforms: Jupyter Notebook, ImageJ, Linux (Pop!_OS), Linux Terminal/Unix, AWS SageMaker, CUDA, CuDNN, JMP Statistical Software

Other Skills: Data Preprocessing, Hyperparameter Tuning, Independent Research, Public Speaking, Adaptability, Communication

EDUCATION

California State University Channel Islands | Camarillo, CA | 12/2024

> **Bachelor of Science**: Computer Science
> - Member, Artificial Intelligence Club (2023-2025)
> - Member, Network Security Club (2023-2025)

Additional Education:
- **Associate Degrees** in Computer Science, Natural Sciences and Mathematics, and Liberal Studies (Moorpark College, Dean's List Fall 2020)

RELEVANT COURSEWORK

Introduction to Artificial Intelligence and Machine Learning, Digital Image Processing, Image Processing and Pattern Recognition, Analysis of Algorithms, Automaton Languages and Computations, Ethical and Societal Issues in Computing, Database Design and Theory, Software Engineering

RELEVANT PROJECT EXPERIENCE

Machine Learning Engineer | Multi-Class CNN with Severe Class Imbalance from Combined Datasets

- Designed and built a **multi-class CNN** model from scratch in **PyTorch**, training across a merged dataset (INRIA Person Detection and Animal Image Dataset) with extreme class imbalance (one class comprising 50% of the total samples).
- Engineered a full pipeline for dataset validation, label offsetting, augmentation (**MixUp**), and synthetic sample generation to address imbalance.
- Achieved 70%+ accuracy across training, validation, and testing sets, with macro **F1-scores** between 0.40 and 0.60, without the use of pretrained models.
- Transitioned the pipeline from **AWS SageMaker** cloud environment to a local **Linux** machine (Pop!_OS), optimizing **GPU memory management**, resource cleanup, and mixed precision training.
- Implemented custom soft-target focal loss, dynamic learning rate scheduling, and checkpointed training scripts for robust experimental reproducibility.

Computer Vision Researcher | Capstone Project: Initial CNN for Multi-Class Animal/Person Detection

- Developed an initial Convolutional Neural Network (**CNN**) in **PyTorch** for human vs. animal classification using

self-curated datasets.

- Conducted hyperparameter tuning and basic model evaluation using standard data augmentation techniques.
- Gained foundational exposure to **CNN architecture design**, overfitting mitigation strategies, and performance benchmarking.
- Lessons learned during the capstone directly inspired a full post-graduate overhaul to improve dataset handling, loss functions, and model stability.

Computer Vision Researcher | Seed Pattern Recognition Model

- Built a complete pattern recognition pipeline using self-captured images of weed, carrot, pumpkin, pea, and spinach seeds.
- Performed image segmentation and feature extraction (**circularity**, **solidity**, **aspect ratio**) using **ImageJ**, followed by statistical clustering via **K-Means** in **JMP**.
- Independently managed full dataset preparation, noise reduction, and manual validation to ensure robust feature engineering.

Image Processing Specialist | Deconvolution & Image Enhancement Project

- Conducted advanced deblurring of license plates, MRI scans, and vintage photos using **Wiener filters**, manual **PSF** generation, and iterative enhancement techniques.
- Overcame complex rotational and motion blur artifacts by constructing custom disc-shaped **PSFs** in **ImageJ**.
- Built custom macros to streamline segmentation and enhancement workflows, significantly improving image clarity and model training inputs.

CERTIFICATIONS
- [**AWS Academy MLU - Application of Deep Learning to Text and Images**](#)
- [**AWS Academy MLU - Machine Learning through Application**](#)

ADDITIONAL PROJECTS
- Blog Writer | https://ianhryan.com/blog.html - Documented the engineering journey of building and refining a multi-class CNN under extreme class imbalance, including dataset handling, augmentation strategies, and local deployment optimization.

TECHNICAL ENVIRONMENT
- Operating Systems: Pop!_OS (primary), Windows 11 (dual boot)
- Cloud Platforms: AWS SageMaker
- Software: ImageJ, Jupyter Notebook, Google Sheets, JMP Statistical Software