IAN RYAN

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

SUMMARY

Computer Science graduate specializing in Computer Vision, Machine Learning, and Data Engineering. Junior Machine Learning Engineer with hands-on experience in training Convolutional Neural Networks (CNNs), building custom pattern recognition pipelines, and deploying models to constrained hardware environments. Python, PyTorch, and computer vision, with experience building end-to-end pipelines and optimizing model performance. Passionate about using ML to improve user-facing product features and performance at scale.

EDUCATION

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

Bachelor of Science: Computer Science

- 3.5 / 4.0 GPA
- 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)

SKILLS

Programming Languages: Python, C++ (relearning), C (basic), SQL (relearning), bash

Machine Learning & AI: PyTorch, Amazon SageMaker, Scikit-learn, NumPy, Feature Engineering, Model Evaluation

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

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

Other Skills: Data Preprocessing, Hyperparameter Tuning, Independent Research, Public Speaking, Adaptability, Communication, Technical Writing, Experimentation (A/B testing awareness)

RELEVANT PROJECT EXPERIENCE

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

- Designed and built a **multi-class CNN** model pipeline 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.
- **GitHub + blog documentation available.**

Machine Learning Engineer | Watermark Removal Deep Learning Model via Self-Supervised Data Generation

- Inspired by Lin et al., 2024 (arXiv:2403.05807), A self-supervised CNN for image watermark removal.
- Designed and trained a **U-Net-based deep learning pipeline** in **PyTorch** to remove **synthetically generated**

watermarks, guided by dynamic mask-aware hybrid losses and perceptual quality metrics.

- Designed a **synthetic watermark generation** system combining **diverse multilingual text overlays** with **alpha blending** and **occlusion masks** for **robust training without human-labeled data**.
- Integrated a **Color Aware Loss Hybrid** combining **L1**, **SSIM**, **perceptual (VGG)**, and **Laplacian** edge-preserving components with adaptive masking to focus learning on corrupted regions.
- Achieved **28.67 dB PSNR**, **0.72 SSIM**, and a final training loss of **1.10** with the custom Color Aware Loss on held out synthetic validation sets; **evaluated performance via residual heatmaps**, **local PSNR/SSIM maps**, and **histogram visualizations**.
- Built a modular training pipeline with **mixed precision (AMP), warmup phase, OneCycle learning rate scheduler,** checkpointing, and early stopping for stable convergence and reproducibility.
- Visualized model behavior using **residual histograms**, **local PSNR/SSIM maps**, **attention heatmaps**, **decoder activations**, and **error maps** to support interpretability, diagnosis, and iterative refinement.
- **GitHub available**.

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

- Developed an initial Convolutional Neural Network (**CNN**) in **PyTorch** for 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.
- **GitHub available.**
- 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

PERSONAL INTERESTS/ACCOMPLISHMENTS

- I am a bodybuilding enthusiast and from December 04. 2023 - June 04, 2024, I did a bodybuilding “cut” from 217 lbs to 167 lbs.
- I earned my B.S. while working full time grocery for 7 years.
- I enjoy hiking around Southern California and camping whether it be in BLM land or at the beach.
- I am an avid baker and enjoy baking for my friends, their kids, and you potentially if you hire me.
- A Nerd for analog synthesizers and virtual synthesizers. It was a big hobby of mine at one point.
- Collecting research papers that I want to read but never get around to reading.