

# Justine-Louise S. Manning

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## Summary

Machine Learning Engineer with 6+ years of experience building, training, evaluating, and deploying computer vision models in Python. Experienced across the full ML lifecycle including data preprocessing, model training, evaluation, deployment, and monitoring using PyTorch, FastAPI, Docker, and Linux. Specialized in model evaluation, error analysis, explainable AI, and bias detection for safety-critical systems.

## Skills

**ML/CV:** Deep learning, CNNs (ResNet), Vision Transformers (ViT), CLIP, image classification, transfer learning, model evaluation, explainable AI (XAI), bias detection, data augmentation, data preprocessing, statistics, data visualization

**Frameworks/Tools:** PyTorch, TensorFlow, OpenCV, scikit-learn, HuggingFace, FastAPI, Docker, NumPy, Pandas, Matplotlib, Jupyter, CUDA, Git, Linux, Bash

**Languages:** Python, SQL, JavaScript, C, Java, R

## Experience

**Graduate Research Assistant** (Machine Learning / Computer Vision) *Washington, DC*  
2018 – 2024  
*George Washington University, Computer Science Department*

- Trained and deployed CNN classifiers (ResNet18/50) achieving 89% accuracy on 20K+ image dataset; developed framework for characterizing model failure modes using domain-specific distance metrics; engineered loss function to reduce error severity
- Built end-to-end ML pipeline for training, evaluation, and statistical comparison of deep learning models
- Developed explainability toolkit (saliency maps, t-SNE visualizations) to diagnose model failures and communicate bias analysis to non-technical stakeholders
- Built intentionally-biased CNN classifiers to evaluate XAI techniques; developed model explanations presented to DoD stakeholders for military procurement decision-making
- Benchmarked Vision Transformers and CLIP against CNN baselines; identified performance trade-offs for low-data and fine-grained classification scenarios
- Participated in NSF Research Traineeship in Trustworthy AI, focusing on responsible AI, bias detection, model robustness, and evaluation of safety-critical ML systems
- Built interactive web interface (HTML/JavaScript) for exploring classification results and model explanations

**Research Assistant** *Washington, DC*  
2017 – 2018  
*George Washington University, Computer Science Department*

- Built ResNet classifier to detect eating disorder content in social media images; developed data pipeline for image collection and preprocessing
- Co-authored and presented paper at AMIA 2017 (Social Media Mining for Health Workshop)

## Projects

**Dog Breed Classifier with Error Severity Analysis** [GitHub](#) | [Live Demo](#)

- Production-ready deep learning system classifying dog breeds while quantifying error severity using genetic distance; methodology applicable to safety-critical AI (medical, defense, autonomous vehicles)
- PyTorch, FastAPI, Docker | REST API for model inference with 89% accuracy and statistically significant error severity reduction ( $P=0.0002$ )

**Maggie: AI-Powered Research Paper Discovery** [GitHub](#)

- RAG-based system for semantic search over ArXiv papers with vector search and reranking
- Python, ChromaDB, Sentence-Transformers, Claude API

## Education

**MS in Computer Science** – George Washington University (*GPA: 3.94, 4.0 in CS*) *2024*

Focus: Machine Learning, Computer Vision

**BS in Psychology, Minor in Computer Science** – George Mason University *2016*

## Publications

J. Manning. “Explainability and Interpretability Methods for Image Classification.” *ResearchGate*, 2025. — J. Manning, R. Pless, Z. Szajnarfarber. “How Wrong is Wrong? Richer Characterization of AI Classification Error.” *AI4SE & SE4AI Workshop*, 2022. — R. Pless, et al. “Recognizing Images of Eating Disorders in Social Media.” *SMM4H, AMIA*, 2017.