Zachary Pricz

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Education

University of California, Berkeley Dec 2025

Bachelor of Science in Electrical Engineering and Computer Sciences

Courses: Deep Neural Networks, Machine Learning, Computer Vision, Natural Language Processing, Signals and Systems, Operating Systems, Optimization Models in Engineering, Robotics

Experience

ML Engineer Intern Jun 2025 – Aug 2025

MRSL Real-Time Systems Laboratory *Monterey, CA*

- Developed and trained a custom loss function convolutional neural network (CNN) for RF spectrogram classification, achieving above **85%** testing accuracy across diverse SNR levels.
- Built a signal preprocessing pipeline (STFT, normalization, AWGN augmentation) to transform raw IQ data into spectrograms for model input.
- Benchmarked CNN performance against autoencoder baseline, demonstrating an average **10%** testing accuracy improvement.
- Implemented real-time IQ sample PUB/SUB system using ZeroMQ, enabling live testing of preprocessing and model prediction.

Deep Learning Researcher Sep 2024 – Jun 2025

UCSF Berkeley Ganguly Lab *Berkeley, CA*

- Optimized CNN architectures for ECoG signal classification in robotic prosthetics, achieving a **10%** improvement in accuracy for real-time signal interpretation.
- Streamlined data pipelines and redesigned data formats, reducing training time by **50%** while maintaining model performance and scalability.
- Investigated decision boundary drift in brain-signal classifiers by analyzing embedding space shifts, producing visualizations to better understand model stability in non-stationary neural data.

Projects

Instrumental Goal Interpretability | *Llama 3.1, PyTorch, Hugging Face, Transformers* Oct 2025 – Dec 2025

- Investigated the mechanistic interpretability of **Llama 3.1 8B** by training linear probes on residual stream activations to identify and validate internal representations of instrumental goal pursuit.
- Developed an automated experimental pipeline to generate contrastive synthetic datasets and implemented an **LLM-as-a-judge** evaluation framework to quantify the shift in model agency and behavior.
- Validated the causal role of internal representations through activation steering with **Linear Discriminant Analysis (LDA)**, achieving a statistically significant **26.8%** reduction in instrumental goal pursuit for the Instruct model and an **18.2%** reduction for the Base model, while maintaining model fluency.

NeRF : Neural Residence Fields | *Pytorch, OpenCV, Python* Oct 2025 - Nov 2025

- Developed a Neural Radiance Field (NeRF) model in PyTorch, implementing ray sampling, MLP-based scene representation, and volumetric rendering to synthesize photorealistic novel views from multi-view images.
- Optimized 3D reconstruction fidelity by tuning network hyperparameters and positional encoding, systematically improving training convergence and achieving high-quality novel view synthesis validated by **Peak Signal-to-Noise Ratio (PSNR)** metrics.
- Engineered an end-to-end 3D capture pipeline, utilizing OpenCV for camera calibration and pose estimation to successfully train and render NeRF models on custom-captured 3D object scans.

Poolbot | *Robotics, OpenCV, ROS* Aug 2024 – Dec 2024

- Led the development of motion control algorithms for a Sawyer 6-DOF robotic manipulator, enabling precise linear trajectory navigation and achieving shot accuracy of over **95%** in a pool game.
- Implemented object detection and localization using OpenCV, mapping ball positions from the camera frame to the robot's base frame with a positional error of less than **2 cm**, ensuring accurate target alignment.
- Spearheaded controls development efforts, contributing to the successful completion of the project ahead of schedule, while mentoring peers on trajectory planning techniques.

Technical Skills

Languages: Python, Java, C/C++, MySQL, JavaScript, MATLAB

Technologies/Frameworks: Pytorch, Hugging Face, OpenCV, scikit-learn, Linux, GNU Radio, Git, Numpy, ROS