

COLIN COMMANS

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EDUCATION

University of California, San Diego

BS Mathematics-Computer Science *GPA: 3.952; magna cum laude*

La Jolla, CA

Sep 2022 - Jun 2025

PROJECTS

Climate Prediction Model

[GitHub](#)

Implemented Fourier Neural Operator to predict temperature & precipitation over time for a Kaggle challenge.

- Used SpectralConv2d layers to learn global patterns via FFT, frequency filtering, & residual connections.
- Trained on lat-lon grid data of CO₂/CH₄/SO₂; forecasted decadal climate with spatial precision.
- Scored 0.9528 on Kaggle's area-weighted RMSE & MAE metric; beat CNN & ViT baselines.

Image Colorization cGAN

[GitHub](#)

Built a U-Net-based cGAN to colorize any grayscale image input trained using COCO subset.

- Trained on 10k COCO images with class-label & edge-map conditioning; used adversarial & L1 losses.
- Reached peak validation SSIM 0.6977 & PSNR 14.19 over 40 epochs.
- Deployed model via Streamlit [demo](#) for interactive comparisons.

Handwritten Symbol Recognition

[GitHub](#)

Developed a PyTorch CNN to classify hand-drawn symbols into LaTeX-mapped classes.

- Trained on HASyV2 (168k images, 369 classes) with elastic-transform augmentation for rarer symbols.
- Designed a lightweight 3-layer CNN with dropout to balance accuracy, speed, and generalization.
- Achieved 96.6% validation accuracy; built app to sketch symbols on 32 × 32 canvas with live inference.

LSGAN Framework Evaluation

[GitHub](#)

Re-implemented Least Squares GAN to study training stability & texture generation across diverse datasets.

- Applied LSGAN to EMNIST, KTH-TIPS & Tiny ImageNet; replaced BCE with least-squares for loss.
- Monitored FID & loss curves; observed smoother convergence & reduced mode collapse.
- Generated high-fidelity samples with smooth latent-space interpolations; documented findings in report.

Predictive Model: Sentiment Analysis

[GitHub](#)

Built an end-to-end pipeline to classify any input text as positive or negative.

- Processed 10k Amazon reviews; trained TF-IDF features with SVM classifier using scikit-learn.
- Optimized model via GridSearch to reach F1 score of 0.82.
- Packaged model & vectorizer with pickle and deployed a Flask app for real-time inference.

SKILLS

Programming Languages: Python, Java, C/C++, MATLAB, SQL

Developer Tools: Git, VS Code, Jupyter Notebook

Libraries: PyTorch, Scikit-learn, Matplotlib, Numpy, Pandas

Frameworks: Streamlit, Flask, JUnit

MS Office: Word, Excel, Powerpoint

RELEVANT COURSEWORK

- Deep Learning (ECE 176, CSE 151B)
- Machine Learning (DSC 140A)
- Statistical Learning (ECE 175A)
- Optimization Theory (MATH 173A/B, ECE 174)
- Probability & Statistics (MATH 180A)
- Algorithms & Graph Theory (CSE 101, MATH 154)
- Data Structures (CSE 12, CSE 100)
- Differential Geometry (MATH 150A/B)
- Topology (MATH 190A/B)
- Analysis (MATH 140A/B/C, MATH 120A/B)