Pranav Reddy

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EDUCATION

University of California, San Diego **September 2021 – June 2025**
B.S. Mathematics GPA 3.96
B.S. Electrical Engineering
IEEE-Eta Kappa Nu, Society of Undergraduate Mathematics Students

PROJECTS

Dual-Tone Multiple Frequency Detector **November 2023**
- Designed a **digital signals processing** system for detecting dial tones representing alphanumeric characters from a given input waveform. Used 11 Chebyshev Type 2 filters to successfully filter and detect signals and separate noise.
- Lead and managed a team of 3 people over a period of 3 weeks to write 9000 of lines of code in **MATLAB**.
- Wrote testing scripts to ensure validity and stability of **digital filters** in both time and frequency domain. Verified correctness of design with both infinite and finite impulse response filters.

Image Classification Network **November 2023**
- Employed advanced **optimization** techniques, with a focus on the Levenberg-Marquardt algorithm, to enhance the neural network's ability to generalize and perform well on unseen data.
- Designed and executed rigorous **robustness** testing protocols to evaluate **machine learning** model performance under noisy conditions, systematically introducing varied levels of noise and assessing the model's ability to maintain accuracy and reliability in real-world, less-than-ideal scenarios.

Bird Classification Convolutional Neural Network **October 2021 – January 2022**
- Trained a **convolutional neural network** using **TensorFlow** with the Fashion MNIST dataset (60000 images), and transitioned to a dataset with images of different species of birds (45000 images).
- Experimented with training, weights and network sizes to optimize classification for imagery of bird species.
- Produced a CNN with **70% accuracy** on test set of 4000 images, outperforming all other groups of students. Presented our results to other students at the end of the quarter.

RESEARCH

Scalable Optimization and Control Lab **June 2023 – Present**
- Conducted research with Professor Yang Zheng into developing spectral bundle methods for **semidefinite programs** arising from **polynomial optimization** problems.
- Currently investigating applications of the Performance Estimation Problem framework to analysis of first-order methods for **optimization** and **machine learning**.
- Successfully implemented provably faster first-order algorithms for **weakly convex optimization**.

WORK EXPERIENCE

Mathematics Department, UC San Diego **September 2022 – Present**
Instructional Assistant *San Diego, CA*
- Tutored students and graded assignments for foundational and advanced mathematics courses, including: **Calculus III**, **Honors Multivariable Calculus**, **Honors Vector Calculus**, and **Numerical Analysis**.
- Currently have a **100% recommendation rate** from professors' TA evaluations.

theCoderSchool **October 2021 – Present**
Programming Instructor *San Diego, CA*
- Instructed private and group online coding lessons in **Python**, **Java**, and **C/C++** to students ranging from elementary to high school.
- Designed curriculum for multiple lessons including an AP Computer Science A preparation course and an Introduction to Python course.
- Developed lesson plans and assignments tailored to individual students in 1-on-1 sessions.

TECHNICAL SKILLS

Languages: Python, MATLAB, Java, JavaScript, C, C++, Bash, Unix, SystemVerilog, ARM32, R
Circuit Design: Static Timing Analysis, Digital Design, PSpice, LTSpice, Cadence, Quartus Prime, ModelSim
Technologies/Frameworks: NumPy, pandas, PyTorch, TensorFlow, Keras, MongoDB, Git, Excel, Agile
Hardware: Oscilloscopes, Digital Multimeters, Function Generators