Allen Zou

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Education

Graduated: June 2022

University of California, San Diego — Cum Laude

Bachelor of Science Computer Science — Overall GPA: 3.881 Major GPA: 3.895

Research Interests

Machine Learning, Artificial Intelligence, Neural Networks, Deep Learning, Big Data, Graph Structures, Optimization

Skills

Programming Languages: Java, C/C++, Python/Jupyter Notebook
Systems: Windows and Linux/Unix
Environments and Programs: Anaconda, Git, GitHub, Microsoft Excel, Microsoft Word, VSCode

Work Experience

Post-baccalaureate fellow: led by Dr. Esmond Ng, Lawrence Berkeley National Laboratory — August 2022 – August 2023

- Worked with Pieter Ghysels to design a HGNN model for DC blocker placement in Geomagnetic Disturbances.
- Created a dataset from power systems data provided by PowerModelsGMD that's compatible with PyTorch Geometric.
- Evaluated the HGNN model and used DeepHyper to optimize hyper-parameter search with Hongwei Jin.
- Collaborated with Dr. Arthur Barnes to merge his group's PowerModelsGMD optimizer into our ML pipeline.
- Co-authored a paper (worked on data generation and analysis) submitted to PSCC'24.

Undergraduate Research Experience

Research Assistant for Professor Wotao Yin at the University of California, Los Angeles — July 2021 – December 2021

- Assisted Dr. Daniel Mckenzie and Dr. HanQin Cai by extending the ZORO optimizer into a Finite-Sum setting.
- Merged various Finite-Sum gradient descent strategies such as SGD, SVRG, SPIDERBoost, and SAGA with ZORO.
- Applied OOP practices, documented code, and reworked various parts of the codebase to make ZORO's code robust.
- Modified Finite-Sum ZORO to be used in an adversarial attack setting, evaluating neural networks trained on MNIST.
- Co-authored a work-in-progress paper, mainly working on problem setting and proving gradient descent convergence.

Research Assistant for Professor Wotao Yin at the University of California, Los Angeles — July 2020 – October 2020

- Participated in the NeurIPS competition with Dr. Mckenzie and Dr. Cai, investigating Bayesian Optimization (BO).
- Built on the Bayesmark framework and tweaked various aspects of SkOpt's API such as the initial sampling point framework, acquisition function, and acquisition optimizer.
- Discovered that using the LBFGS acquisition optimizer increased SkOpt's convergence rate in the problem setting.
- Conducted and observed most of the experiments (both local and on NeurIPS's website) for our group.

Personal Projects

Gender Recognition (Java) — July 2019 – September 2019

- Implemented a CNN using backpropagation, kernels, and feed-forward networks to identify gender given an image.
- Used over 500,000 images to adjust kernel weights and biases to minimize a cost function.
- Utilized MATLAB to assist with extracting images and metadata to create a more convenient format for input data.
- Included more features to improve accuracy such as ReLU functions and the binary cross-entropy loss formula.

Handwriting Digits Reader (Java) — June 2019 – July 2019

- Implemented a feed-forward neural network using backpropagation to train a program to read handwritten digits.
- Used over 60,000 points of training data to help the program adjust weights and biases to minimize a cost function.
- Planned and designed a debug graphic that enables the user to select nodes and see information about neural network.
- Applied skills learned from Multivariable Calculus, Linear Algebra, and Statistical Methods to independently derive formulas required for machine learning.
- Achieved peak recognition accuracy of around 93%.