ANKUSH HOMMERICH-DUTT

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EXPERIENCE

Research Intern – Machine Learning
Cadence Design Systems - Special Projects Team

June 2019 – September 2019 San Jose, CA

- Worked with a team on accelerating convolutional neural network inference
- Developed entire software stack to obtain neural network from high-level ML frameworks, use quantization to reduce storage and bandwidth costs, and convert to a representation for the accelerator
- Helped design a 2D grid of processors on the accelerator, which involved writing the algorithms for the movement of data between processors for the various neural network layers (convolution, pooling, etc.)
- Wrote a scheduler to assign instructions to the grid of processors to optimize communication and timing constraints during inference

Research Intern – Distributed Computing
College of William and Mary

June 2018 – September 2018 Williamsburg, VA

- Researched into parallelizing a randomized SVD algorithm across a cluster by distributing the matrix multiplication and QR factorization operations
- Implemented the parallelized algorithm in the Apache Spark framework using its distributed data structures, with extensive work into optimizing code that runs on the Java Virtual Machine
- Work was part of an open-source eigensolver package name PRIMME
- Presented research at SURF Seminar Day at Caltech

Research Intern – Applied Math
NASA Langley Research Center

September 2016 – June 2017 Hampton, VA

- Analyzed the computational error of several finite difference approximation algorithms for the 1D heat equation to determine the optimal algorithm to use given a certain mesh spacing and time step
- Implemented many finite difference method algorithms for the Aircraft Noise Prediction Program (ANOPP2) software

PROJECTS

GPU Accelerated AI

- Developed an AI for the Gomoku board game and sped up the tree searching of the minimax algorithm by a factor of 90x on the GPU (compared to CPU)

ML Class Projects

- Deep Generative Models: Modified a variational autoencoder to help create an active map searching algorithm that optimizes bandwidth usage
- Kaggle: Examined survey data to predict voter turnout using random forests and gradient boosting, finished in top 20%
- ML applications: Used Hidden Markov Models and recurrent neural networks to generate Shakespeare poems with rap lyrics

EDUCATION

B.S. – Computer Science
Minor – Data Science
California Institute of Technology

2017-2021 Pasadena, CA

High School Valedictorian
Hampton High School / Governor's School for Science and Technology

2013-2017 Hampton, VA

LANGUAGES

Python, C, C++, MATLAB
Scala, SQL, OCaml, Verilog
Java, HTML, x86 Assembly

TECHNICAL SKILLS

Tensorflow | Pytorch | Keras | CUDA | Numpy | Scikit-learn | Linux | Bash | Apache Spark | Mathematica | MySQL | LaTeX | AWS | OpenCL

COURSEWORK

- ML Theory
- ML Applications
- GPU Programming
- Algorithms
- Data Structures
- Digital Electronics
- Complexity Theory
- Operating Systems
- Databases
- Networking
- Finance
- Computer Graphics
- Applied Linear Alg.
- Distributed Comp.

EXTRA-CURRICULAR

- Was ranked #1 in Virginia for speed-solving the Rubik's cube with an average of 9.24 seconds
- Co-organized 6 large-scale Rubik's Cube competitions at Old Dominion University (with an average attendance of 75 competitors)
- Tutoring high-schoolers in mathematics
- Playing racquetball, watching NBA basketball