QUANG DUONG

CONTACT INFORMATION

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RESEARCH INTERESTS

My research focuses on adapting machine learning approaches to improve performance over classical computer architecture predictors. Namely, I am interested in different techniques such as saliency, distillation, and compression to produce practical predictors from ML models for on-chip real-time inference.

EDUCATION

The University of Texas at Austin ..... Fall 2020 - Present

- Ph.D. in Computer Science
- Advisor: Calvin Lin
- Current GPA: 4.0000

The University of Texas at Austin ..... Fall 2015 - Spring 2020

- B.S./M.S. in Computer Science
- B.S. in Mathematics (Specialization in Scientific Computing)
- *Summa Cum Laude*
- Cumulative GPA: 3.9482

EXPERIENCE

Graduate Research Assistant ..... Spring 2021 - Present
Department of Computer Science at The University of Texas at Austin

- Utilized saliency information to adapt statically trained neural branch prediction models to allow for on-chip training
- Examining saliency and distillation techniques to prune existing neural data prefetchers to improve their practicality

Graduate Research Assistant ..... Fall 2019 - Summer 2020
Space and Geophysics Laboratory at Applied Research Laboratories

- Analyzed performance issues across different analyst workloads
- Proposed and implemented data format restructuring that yielded a 4-10x speedup in processing time
- Migrated code base from Python 2 to 3 and wrapped legacy C++ code into Python libraries with SWIG and Cython to streamline data analysis

Undergraduate Student Technician ..... Fall 2018 - Summer 2019
Space and Geophysics Laboratory at Applied Research Laboratories

- Leveraged clustering and reinforcement learning techniques to iteratively refine estimations of ionospheric model parameters competitive with commercial software
- Optimized run-time by adaptively executing physical simulations at different granularities based on approximations of the objective surface for real-time execution

Honors Scholar ..... Summer 2018
Space and Geophysics Laboratory at Applied Research Laboratories

- Reduced noise of raw ionosonde output with clustering techniques and adaptive thresholding for downstream processing
- Generated interdependent feasible ranges for the ionospheric model parameters from denoised ionosonde information via multi-layer perceptrons

Texas Institute for Discovery Education in Science Fellowship ..... Summer 2017
College of Natural Sciences at The University of Texas at Austin

- Analyzed different Pareto frontiers by weighting the objective function for the 3D model approximation genetic algorithm that traded off generated OpenSCAD code complexity with convergence and error rate to allow for downstream non-expert modification
- Implemented vectorized voxelization code to approximate expensive objective functions

Freshman Research Initiative Fellowship ..... Summer 2016
College of Natural Sciences at The University of Texas at Austin

- Adapted CPPN-NEAT algorithm to grow increasingly complex neural networks as functional approximations of 3D models
- Generated OpenSCAD's model descriptor language using the neural network output

TEACHING

CS 380P: Parallel Systems ..... Summer 2021
Teaching Assistant for Graduate Course

- Redesigned labs to more accurately reflect real-world situations
- Implemented new automatic grading scripts for the labs

CS 380P: Parallel Systems ..... Fall 2020
Teaching Assistant for Graduate Course

- Graded assignments and assisted students to develop intuition for parallel programming paradigms across several languages and standard libraries

CS 373: Software Engineering ..... Spring 2018
Proctor / Undergraduate Teaching Assistant for Undergraduate Course

- Lectured on web technologies and best practices, assisted students with course content, and graded assignments

CS 309: Computational Intelligence in Game Research FRI ..... Spring 2017
Freshman Research Initiative Mentor for Undergraduate Course

- Instructed students on the principles of machine learning, optimization, and neuroevolution in fun simulated game environments
- Directed incoming undergraduates on how to develop, record, and present their ideas and findings for reproducible research

ACTIVITIES

Machine Learning Data Prefetching Competition 2021
Organizing Member at ISCA / MLArchSys 2021

- Built framework on top of ChampSim trace-based simulator for evaluation of machine learning models for data prefetching

Association of Computing Machinery ..... Fall 2015 - Present
The University of Texas at Austin Chapter Member

- Participated in local competitions to improve skills in problem solving under specific algorithmic constraints

Machine Learning and Data Science Student Organization .... Spring 2016 - Spring 2018

- Attended walk-throughs and Kaggle-esque competitions to develop and gain experience with applying machine learning techniques effectively and to more real-world problems

Information and Systems Security Society ..... Fall 2015 - Spring 2017

- Competed in Capture-The-Flag events and attended workshops on various security topics

AWARDS

TIDES Advance Summer Research Fellowship ..... Summer 2017

- Awarded to undergraduate students working on advanced research with a research supervisor

Freshman Research Initiative Fellowship ..... Summer 2016

- Awarded to freshmen to continue with their research proposal from the FRI course with their research educator / principal investigator

Distinguished College Scholar / Students of High Academic Achievement .. 2017 - 2019

Kemp-Forman Memorial Endowed Presidential Scholarship ..... 2017 - 2018

Tracor/Frank McBee, Jr. Scholarship ..... 2016 - 2017

SKILLS

- **Languages**: Python, C/C++, Go, Rust, Java, Julia, MATLAB, Lua, HTML/CSS, JavaScript/JSX, x86 ASM, SQL, LaTeX
- **Libraries**: numpy, PyTorch, TensorFlow, sklearn, scipy, matplotlib/seaborn, React, Flask, OpenGL
- **Other Skills**: Unix Systems (Ubuntu, Debian, Arch Linux), Vietnamese