ALEXANDER DING

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EDUCATION

Brown University (Enrolled, pursuing a CS degree) *September 2020 - Present*

Commonwealth School (GPA 4.98/5.00) *September 2016 - May 2020*

- **Programming Coursework**: Algorithms & Data Structures, Computer Architecture, OS, Machine Learning
- **Math Coursework**: Linear Algebra, Mathematical Logic, Multivariable Calculus, Theoretical Calculus

ACHIEVEMENTS

Papers: **A. Ding**, Q. Chen, Y. Cao and B. Liu, "Retinopathy of Prematurity Stage Diagnosis Using Object Segmentation and Convolutional Neural Networks," *2020 International Joint Conference on Neural Networks (IJCNN)*, in press

Technical Reports: "An Evaluation of UPC++ by Porting Shared-Memory Parallel Graph Algorithms"

Awards: National Merit Finalist, Presidential Scholar Semi-Finalist (pending Finalist decision)

Others: CS Club Founder, Math Team Co-Captain, NEC Symphony Orchestra (Cello), Fencing Varsity Sabre Captain

WORK EXPERIENCE

Machine Learning Researcher, University of Massachusetts Lowell *June 2019 - Present*

Researcher under the mentorship of Dr. Benyuan Liu

- Implemented an energy-efficient neural network using quantized MobileNet to recognize types of vegetables on Android devices
- Developed a novel neural network pipeline that combines object segmentation and image classification to automate the diagnosis of Retinopathy of Prematurity, achieving 13% accuracy increase compared to previous architectures
- First-authored paper and accepted by IJCNN 2020 for publication (see **Achievements**)
- Utilized Python, Kotlin, OpenCV, Machine Learning, NumPy, Tensorflow, Jupyter Notebook, and LaTeX

CS Researcher, Massachusetts Institute of Technology *January 2019 - January 2020*

MIT PRIMES (highly selective year-long research program)

- Investigated the scalability and robustness of UPC++, a distributed programming C++ library, by implementing a suite of parallel graph algorithms and benchmarking its performance on the NERSC supercomputer
- Compared UPC++'s performance with OpenMP on an AWS machine
- Authored technical report and presented on Fall PRIMES Conference 2019 (see **Achievements**)
- Utilized C++, Python, Parallel Algorithms, High Performance Computing, OpenMP, and LaTeX

Research Assistant, Massachusetts Institute of Technology *September 2017 - April 2018*

Intern for Dr. Tobias Gerstenberg

- Created a web-based interface (with a physics engine) to simulate causality experiments using Box2D.js
- Incorporated a SQL backend to store experiment results
- Utilized JavaScript, HTML/CSS, and MySQL

PROJECTS

Personal Website: *https://alexander-ding.github.io* (for additional information and projects)

Neural Net Flowchart (*https://alexander-ding.github.io/nn-flowchart*)

- Created a website to rapidly experiment, evaluate, and save neural network architectures using an intuitive GUI
- Designed an easy drag-and-drop interface using React.js
- Implemented a RESTful backend server to allow persistent model storage and link sharing
- Utilized: Python, Flask, Heroku, PostgresSQL, React.js, Tensorflow.js, HTML/CSS, Docker, GIT

YeetBot (*https://top.gg/bot/563019457367375882*)

- Built a Discord Bot (in >100 servers) using dlib that allows users to meme-ify images by overlaying identified faces with custom masks
- Incorporated OpenCV to support easy mask editing, as well as persistent user settings using a cloud-hosted server
- Utilized: Python, dlib, Machine Learning, OpenCV, Heroku, Docker, GIT

Python Like You Mean It (Chinese version) (*https://cn.pythonlikeyoumeanit.com*)

- Created a Chinese version of PythonLikeYouMeanIt, a free online resource for learning the basics of Python and NumPy
- Hosted the translation online to be accessible to the Chinese programming community, in collaboration with original author
- Utilized: NumPy, Markdown, Sphinx, GIT

Quote of the Week (*https://qotw.net*)

- Utilized Google Firebase to implement an online site for high school's Quote of the Week
- Utilized: Firebase, Bootstrap, React.js, Redux, GIT

SKILLS

Software: (*proficient*): Python, C++, Unix, GIT, SQL, LaTeX, Markdown, JavaScript (*familiar*): C, Go, React.js, HTML/CSS, Docker
Library: TensorFlow, NumPy, Flask, OpenMP, UPC++, Sphinx, Firebase