Darin Tsui

(909) 306-4398 | darint@gatech.edu | darintsui.github.io | darintsui | darintsui

Experience

Graduate Research Assistant *Atlanta, GA*

AI ML and Information Research (AMIR) Group *Jun. 2023 - Present*

- Improved supervised and generative model performance on biological datasets by 60% through L1 regularization.
- Applied Walsh-Hadamard transforms on variational autoencoders to extract explainable features.

Medical Imaging Data Engineering Intern *San Diego, CA*

Surgalign *Jan. 2023 - Aug. 2023*

- Designed an internal MRI image processing application using Python that reduced preprocessing time per sample.
- Assisted in developing ground truth dataset of imaging data to assess the effectiveness of deep learning models.
- Validated deep learning models against surgeon-generated data using Sørensen–Dice coefficient statistical testing.

Development Engineer *La Jolla, CA*

Integrated Systems Neuroengineering Laboratory *Jun. 2022 - Jul. 2023*

- Developed feature extraction and machine learning pipeline for bioelectronic COVID-19 detection using scikit-learn.
- Achieved accuracies of 98.5% when detecting COVID-19 proteins, improving classification by 30.1%.
- Published first-author 4-page paper to the Conference of the IEEE Engineering in Medicine and Biology Society (EMBC).

Research Lead *La Jolla, CA*

Talke Biomedical Device Laboratory *Dec. 2021 - Aug. 2023*

- Designed low-cost vision system for minimally invasive surgery using OpenCV with fiducial markers.
- Implemented Kalman filtering to achieve sub-millimeter error in design-validation testing.
- Published first-author papers to IEEE and the ASME Annual Conference on Information Storage and Processing Systems.

Projects

Brain-Computer Interface (BCI) Signal Classification *Jan. 2023 - Apr. 2023*

- Designed a novel feature extraction algorithm for electroencephalogram (EEG) data by ensembling time-based data.
- Improved state-of-the-art accuracy from 61.04% to 63.16% using PyTorch neural network architecture.

Convolutional Neural Networks (CNN) for Plankton Classification *Jan. 2023 - Apr. 2023*

- Implemented AlexNet for plankton image classification using PyTorch.
- Increased model robustness by synthetically manipulating imaging data, improving the classification accuracy by 27%.

Tumor Imaging Classification *Sept. 2022 - Dec. 2022*

- Implemented convolutional neural networks (CNN) with TensorFlow implementation on brain MRI images, achieving 78.43% accuracy after 10 epochs.
- Compared CNN implementation with K-Nearest Neighbors using scikit-learn, achieving 77.49% accuracy.

Leadership

President *San Diego, CA*

IEEE at UC San Diego *May 2022 - May 2023*

- Managed operations for UC San Diego's 350+ student body by communicating with and delegating tasks to officers.
- Co-founded IEEE's Supercomputing Team with the San Diego Supercomputing Center (SDSC), increasing membership count by 10%.
- Hosted technical workshops on deep learning and classical machine learning by explaining mathematical concepts with relatable examples.

Education

Georgia Institute of Technology *Aug. 2023 - Present*

Ph.D. in Electrical and Computer Engineering

University of California San Diego *Sept. 2019 - Jun. 2023*

Bachelor of Science in Bioengineering, GPA 3.939

Skills

Programming Python, MATLAB, Bash (Linux Shell Scripting)

Libraries PyTorch, TensorFlow, Scikit-learn, OpenCV, Scipy, Matplotlib, Numpy, Pandas

Relevant Coursework Statistical Learning, Neural Networks and Deep Learning, Bioinformatics Statistical Analysis