Lawrence Liu

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Education

University of California, Los Angeles (UCLA) Los Angeles, CA

Bachelor of Science in Electrical Engineering *June 2024 (Expected)*

- GPA: 3.754/4.0
- Relevant coursework: Circuits, Signals and Systems, Digital Signal Processing, Data Structures and Algorithms, Feedback Control Systems, Information Theory (Graduate Level), Decision Making in Stochastic Systems (Graduate Level)

Research Experience

Undergraduate Research Assistant February 2022 – Present

Complex Networks Group at UCLA, under supervision of Prof. Vwani Roychowdhury *Los Angeles, CA*

Unsupervised Seizure EEG Biomarker Discovery

- Worked with graduate students and proposed a novel unsupervised approach using a Variational Autoencoder (VAE)
- Designed and implemented a novel self-supervised learning (VAE) in Pytorch based on CNN to successfully distill a seizure-related biomarker (high-frequency oscillations) from brain EEG signal
- Developed data visualization modules to interpret the performance of the network using GMM, K-means, T-SNE, and PCA
- The biomarker was used to predict the seizure surgery outcome and outperforms expert Neurologists
- This project is in the procedure of paper submission

Open Source HFO Detector

- Created an open source package for automatic brain signal biomarker detection, in Python
- Optimize the pipeline so that it exceed the previous implementation by 10 times (1000%) though introducing multi-processing and vectorization
- Lead a group of team members and help them to debug and deploy the implementation
- In the procedure of publishing the completed modules to pip

Experience

Internal Vice President June 2022 – Present

Linux Users Group at UCLA

- Managed the Linux Users Group servers as a system administrator, including managing member websites and maintaining our general website
- Led installfests to help 20+ students install Linux on their computers
- Created a AI chatbot with Python and Hugging Face to interact with members on our Discord server through the Discord API
- In the process of installing Linux From Scratch on an old Mac with the aim of developing a Linux Distribution for the Linux Users Group at UCLA

Projects

Kaggle Competition: Tabular Playground Series - Dec 2021 Decembe 2021 - January 2022

- Competition consisting of 1188 teams attempting to create a model that predicts categorical target based on a tabular dataset
- Applied an ensemble of Tabnet, SVM, and Random Forest Classifiers
- Finished in the top 6% of the competition, position 66th out of 1188

Kaggle Competition: RSNA-MICCAI Brain Tumor Radiogenomic Classification July 2021 - October 2021

- A competition to classify Brain Tumor MRI Scans based on presence of MGMT promoter methylation.
- Used an EfficentNet Convolutional Neural Network (CNN) trained on slices from the MNI scan

Technical Skills

Languages: Python, C/C++, R, Matlab, Octave, Julia, Mathematica
Tools: Git, Bash Scripting, Pytorch, Sklearn, Tensorflow, Pandas, NumPy, Matplotlib, Simulink
Operating Systems: Windows, Mac OS, Linux (Arch Linux, Debian, Linux From Scratch)
Shop Skills: Soldering, PCB design, 3D printing
Other: Microsoft Office, PID Tuning