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: 3.8/4.0
- Relevant coursework: Information Theory (Graduate Level), Decision Making in Stochastic Systems (Graduate Level), Numerical Computing, Feedback Control Systems, Digital Signal Processing, Signals and Systems

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