Mirudhula Mukundan

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Education

Carnegie Mellon University, *School of Computer Science* — ***Pittsburgh, USA***
Master of Science in Computational Biology, GPA: 3.80/4.00 — (2021 - 2023)
Relevant Courses: Machine Learning, Intermediate Deep Learning, Optimization, Bioinformatics

PES University — ***Bangalore, India***
Bachelor of Technology in Biotechnology, GPA: 9.27/10 — (2016 - 2020)
Bachelor of Technology, Minor in Computer Science, GPA: 9.35/10 — (2016 - 2020)
Achievements: CNR and MRD Scholarship from 2017-2019

Experience

Research Assistant
Lee Lab, Carnegie Mellon University, Pittsburgh, USA — *Jan 2022 - Present*
- Analyzing macaque EEG time-series data to evaluate evolution of neural firing rates.
- Utilizing predictive coding to model spatiotemporal patterns in the brain.

Project Assistant
Cognition Lab, Indian Institute of Science (IISc), Bangalore, India — *Dec 2019 - July 2021*
- Designed and developed behavior tasks for investigating the effect of cognitive load on attention.
- Worked with multiple PhD students to conduct experimental tasks and decode EEG signal data.
- Pioneered the use of web-based experiments to remotely conduct experiments during COVID-19.

Software Developer, Intern
CGI, Bangalore, India — *June 2018 - Aug 2018*
- Developed a spelling corrector for a ChatBot platform using LSTM recurrent neural networks.
- Employed sequence-to-sequence and character-based encoder-decoder model.

Projects

Deep Learning Pipeline for Accurate TSS Prediction in CAGE Data — *Mar 2023 - April 2023*
- Developed an end-to-end pipeline with pre-trained DeepTSS and DNABERT for prediction of TSS.
- Evaluated performance by intersecting results with RefTSS and EPDnew predictions of TSS.

A Single Cell RNA-seq Based Aging Clock for Human Neurons — *Sept 2022 - Nov 2022*
- Developed Poisson Variational Autoencoder for efficient age prediction.
- Improved model performance by 36% from Multilayer Perceptron model and Standard VAE.

Common Signatures between Severe Asthma and Lung Cancer — *Oct 2022 - Nov 2022*
- Implemented Gene Set Enrichment Analysis on data from GEO, to identify common signatures.
- Validated results by classifying a separate lung cancer-asthma dataset using Decision Trees.

Classification of Glioma — *Feb 2022 - Mar 2022*
- Employed Gaussian Naive Bayes and Support Vector Machine to classify TCGA glioma subtypes.
- Validated the results with a 5-fold cross-validation and achieved over 85% accuracy.

Skills

Programming Languages: C, Python, Java, Go, R, MATLAB, HTML, Javascript, SQL, Bash
Frameworks & Tools: Pytorch, Tensorflow, Keras, Scikit-learn, Bioconductor, AWS, HPC, Docker
Bioinformatics: BLAST, Bedtools, Samtools, IGV, MEME Suite, BWA