Vignesh (Viggy) Vanchinathan
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Objective: Machine learning engineer with a background in biomedical signal processing, deep learning, and human data modeling. Seeking opportunities to build and deploy intelligent systems to improve health.

EDUCATION

Johns Hopkins University, Baltimore, MD   *Aug 2021 – May 2025*
- *Program*: Bachelor of Science in Biomedical Engineering & Applied Mathematics and Statistics, Minor in CS
- *Awards*: Dean's List (4x), Bloomberg Distinguished Professors Summer Fellowship Awardee
- *Relevant coursework*: Machine Learning, Natural Language Processing, Linear Algebra, Probability, Mathematical Statistics, Computational Mathematics, Biomedical Data Science, Optimization, Monte Carlo Methods, DS/A

PROJECTS

Postprandial Glucose Spike Predictor *(Python, PyTorch, Deep Learning, Data Analytics)*   *Feb 2025 – May 2025*
- Scripted **pipeline** to extract and **predict post-meal glucose spikes** from continuous glucose monitor (CGM) data, extended for use as a teaching resource in 601.464 Artificial Intelligence Hopkins course
- Engineered **hybrid LSTM-MLP** model to use **time-series CGM data** and subject biomarkers to estimate spikes with MAE **<29 mg/dL,** comparable to standard CGM margins

Parkinetics *(Python, CLI, Machine Learning, Signal Processing)*   *Sept 2024 – Present*
- Designed comprehensive **CLI tool** to automatically **process 100s of raw IMU** files, accelerating the team's analysis multifold and providing insight into disease progression of study participants with Parkinson's
- Extracted **statistical, temporal, and spectral** features from IMU data and used to train an **XGBoost gradient-boosted tree ensemble**, achieving **~86% accuracy** in classifying study participants into healthy controls, mild, and moderate severity PD classes.
- Applied **continuous wavelet transforms** to IMU data as input features for a **CNN** under evaluation

F1 Race Simulation Automation *(Bash, Python, VMs, Multiagent Deep Reinforcement Learning)*   *Oct 2024 – Present*
- Deployed **bash script** to automate differential training of **reinforcement learning agents** and simulation of F1 race environments, saving team hours/run
- Leveraged containerized **cloud infrastructure** (Docker/Jupyter) to run large-scale data analysis jobs
- Built **interactive visualization** to demonstrate effect of objective functions on agent policy and race placements
- Presented at SIAM 2025 and MATRX 2025 (**Best Talk in Track, Runner-Up**) conferences

WORK EXPERIENCE

Research Intern, *Forschungszentrum Jülich,* Düsseldorf, Germany   *Jun 2024 – Present*
- Developed Python script using NumPy, Pandas, and Matplotlib to **extract over 25 clinically-relevant features** from time-series accelerometry data, **doubling** the scope of existing work
- Wrote R script to perform statistical analysis on extracted features such as speed, cadence, and stride/swing time, evaluating **robustness across multimodal data collection**

Technical Lead & Product Manager, *Johns Hopkins Biomedical Engineering*, Baltimore, MD   *Jan 2023 – Present*
- Spearheaded team of 8 Biomedical Engineering students over two-year timeline to **develop novel, at-home, measurement system** for evaluating functional impairment in Parkinson's disease.
- Utilized digital signal processing, machine learning, and deep learning to analyze time-series movement data
- Collected movement data from **30+ Parkinson's patients and healthy controls** in study approved by Johns Hopkins School of Medicine Institutional Review Board
- Articulated extensive literature search, competitive market analysis, solution conceptualization, and de-risking procedures in **Design History File documentation**
- Presented project basis and published abstract at **international conference** on movement disorders

Summer Intern, *Broad Institute of MIT and Harvard*, Cambridge, MA   *Jun 2021 – Aug 2021*
- Ported comprehensive R library for **transcriptomics analysis** ("Immune Response Enrichment Analysis", IREA) into **Python package**, expanding use for lab researchers
- Processed large **scRNA-sequencing** datasets in both R (Seurat) and Python (Pandas, Matplotlib, PyPI)

SKILLS

Programming Languages: Python, MATLAB, R (ggplot, tidyverse), Java, C/C++, LaTeX
Analysis Packages: Pytorch, NumPy, Pandas, Matplotlib, Scikit-Learn, Scanpy, tidyverse, ggplot