CALVIN A. PERUMALLA, PH.D.

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PROFESSIONAL SUMMARY

Signal Processing Engineer (PhD, EE) with 8+ years building ML-driven pipelines for physiological sensing and video analytics. Expert in FIR/IIR filtering, FFT/wavelets, feature extraction, and deep learning (PyTorch/TensorFlow) for human pose/activity recognition. Proven collaborator delivering production-ready Python solutions and validated algorithms for clinical-grade applications.

SKILLS

- Programming Languages: Python, C++, SQL, MATLAB
- Frameworks & Libraries: PyTorch, TensorFlow, NumPy, SciPy, pandas, scikit-learn, Matplotlib, OpenCV
- Tools & Platforms: Jupyter, Git, AWS, Databricks, Spark, Docker, Linux
- Other Relevant Skills: FIR/IIR filtering, FFT/spectral analysis, wavelet analysis, feature extraction, human pose estimation, keypoint tracking, LSTM, validation/benchmarking

RELEVANT WORK EXPERIENCE

Postdoctoral Researcher, Stanford School of Medicine — Feb 2021–Present

- Analyzed multi-modal sensor data (video, pressure, EEG) to extract physiological signatures and performance metrics.
- Designed Python signal-processing pipelines: FIR/IIR filtering, FFT, wavelets, feature extraction; built CNN-LSTM models in PyTorch/TensorFlow.
- Implemented human pose estimation and keypoint tracking for surgical activity recognition; improved gesture detection accuracy to state-of-the-art.
- Partnered with hardware/software teams; defined requirements, integrated algorithms, and validated performance on clinical and simulated datasets.

Data Scientist, Vectra (Cybersecurity) — Oct 2017–Mar 2020

- Built high-performance SQL and PySpark data pipelines; curated >1B rows; engineered features for network behavior modeling.
- Developed and productionized anomaly detection models; reduced analyst workload by 80% through precision triage and automation.
- Wrote robust, testable Python; staged models on distributed systems; instrumented monitoring and validation dashboards.
- Collaborated cross-functionally, presenting results to engineering and product; drove iterations from research to deployment.

PhD Research Assistant, University of South Florida — Jan 2013–Aug 2017

- Researched ECG signal processing and machine learning; FIR/IIR design, spectral analysis, wavelets, and feature engineering.
- Predicted paroxysmal atrial fibrillation from 24-hour ECG; achieved >99% accuracy using novel temporal features.
- Converted wireless iVCG signals to 12-lead ECG via MMSE estimation; reduced reconstruction error to <6%.
- Built LSTM/SVM models for diagnostic classification; achieved 98% accuracy on long-term ECG datasets.

EDUCATION

- PhD, Electrical Engineering, University of South Florida, 2017 — Dissertation: Machine learning and adaptive signal processing for ECG.
- MS, Electrical Engineering, University of South Florida, 2014.
- B.Tech, Electronics and Communication, Malla Reddy Engineering College (JNTU), 2011.

SELECTED ACHIEVEMENTS

- Led video-based surgical activity recognition; delivered state-of-the-art hand-gesture detection with deep learning.
- Secured $350K Stanford Catalyst seed funding as co-PI for sensor-based performance assessment system.
- Published 14 peer-reviewed papers; awarded 2 U.S. patents in biomedical signal processing.
- Achieved >99% PAF prediction accuracy; reduced analyst workload 80% with production ML.