CALVIN A. PERUMALLA, PH.D.

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PROFESSIONAL SUMMARY

Signal processing and machine learning engineer with a PhD in Electrical Engineering and 7+ years building multimodal signal pipelines for biomedical and clinical applications. Deep expertise in FIR/IIR filtering, FFT/wavelets, feature extraction, and deep learning (PyTorch/TensorFlow) for video-based gesture/pose analysis. Proven collaborator across hardware/software teams, delivering validated algorithms in Python within fast-paced R&D environments.

SKILLS

- Signal processing (FIR, IIR, FFT, STFT, wavelets)
- Spectral and time–frequency analysis
- Feature extraction, denoising, filtering
- Python
- NumPy
- SciPy
- Pandas
- scikit-learn
- Matplotlib
- Jupyter Notebooks
- PyTorch
- TensorFlow
- Deep learning (CNN, LSTM, RNN)
- Human pose/gesture recognition from video
- Keypoint detection and tracking
- OpenCV
- Sensor fusion; multimodal data (video, EEG, force, ultrasound)
- SQL
- PySpark
- Databricks
- C++
- Git
- PCA, HDBSCAN, k-means
- Anomaly detection
- MMSE, OLS optimization
- Experiment design, validation, metrics

RELEVANT WORK EXPERIENCE

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

- Designed end-to-end Python pipelines for multimodal surgical data: video, EEG, force, and ultrasound.
- Built CNN+LSTM models for hand-gesture/pose recognition; state-of-the-art detection accuracy on simulated procedures.
- Defined sensor requirements, integrated DAQ hardware; validated algorithms with clinicians using rigorous protocols.
- Led datasets, annotation, and reproducible Jupyter workflows; code reviews, experiments, and metrics tracking.

Data Scientist, Vectra AI, San Jose, CA — Oct 2017–Mar 2020

- Engineered scalable PySpark/SQL pipelines over 1B+ rows; productionized anomaly detection models.
- Reduced analyst workload 80% via novel DNS exfiltration and DCE-RPC threat detectors.
- Implemented model evaluation, A/B tests, and monitoring; collaborated with platform teams for deployment.
- Wrote performant Python; optimized features, latency, and memory on HPC and Databricks.

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

- Developed ECG signal processing: FIR/IIR filtering, FFT/wavelets, and feature extraction for diagnosis and prediction.
- Achieved >99% PAF prediction, 98% condition classification using neural networks and SVMs.
- Built MMSE algorithms for iVCG; reduced 12-lead conversion error below 6%.

• Researched LSTM-based mobility prediction; 95% accuracy forecasting base-station handovers.

EDUCATION

• PhD, Electrical Engineering, University of South Florida, Tampa, FL — May 2017.
• MS, Electrical Engineering, University of South Florida, Tampa, FL — May 2014.
• B.Tech, Electronics and Communication, Malla Reddy Engineering College (JNTU), Hyderabad — May 2011.
• Dissertation: Machine learning and adaptive signal processing for electrocardiographic applications.

SELECTED ACHIEVEMENTS

• State-of-the-art surgical gesture recognition from video using CNN+LSTM.
• >99% PAF prediction from 24-hour ECG via novel feature engineering.
• 80% workload reduction for security analysts through anomaly detection pipelines.
• $350K seed funding secured as Co-PI for operating-room sensing system.