KARTIK S. PRADEEPAN

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EDUCATION

Ph.D. Computational Neuroscience, Western University | GPA: 4.0/4.0 — Expected 01/2024

- Thesis title: *Investigating neuronal network development using multielectrode arrays*
- Recipient of the Natural Sciences and Engineering Research Council Postgraduate Scholarship

BSc. (Honours) Genetics & Physiology, Western University | GPA: 3.7/4.0 — 2013-2018

SUMMARY

Computational neuroscientist transitioning into a *full stack* data scientist. 5+ years of experience in designing experiments, handling complex datasets, developing analysis pipelines, and implementing statistical/machine learning models. My experience in leading cross-functional collaborations and communicating technical findings equips me to work seamlessly in interdisciplinary teams. My background in management consulting for NPOs demonstrates my capacity to apply data-driven solutions to business challenges.

TECHNICAL SKILLS

Languages:	Python, MATLAB, SQL, Bash, Git, R (via JASP)
Techniques:	Pandas, Scipy, NumPy, Scikit-Learn, PyTorch, TensorFlow, Keras, Statsmodels, nevergrad, NLP (SpaCy, NLTK, LLMs via OpenAI API and Hugging Face), Beautiful Soup, Selenium
Visualization:	Matplotlib, Seaborn, NetworkX, MNE, Tableau, Illustrator/Affinity Designer

RELEVANT AWARDS

Thales Student Innovation Case Competition - 1st place out of 52 groups from Canadian Universities [press release]

- Problem: Design an AI capable of automatically finding opinion clusters and analyzing pieces of evidence
- Solution: "Opinion Galaxies: A ML Network Approach to Big Data in Medical Research."
- Successful because we: 1) Identified a niche to scope the original problem statement. 2) Designed and iterated prototype in under 4 weeks. 3) Communicated appropriate breadth and depth to Thales engineers, designers, and executives. 4) Recognized limitations and proposed alternatives.

PROJECTS

Detection of Reverberating Super Bursts in Neuronal Multielectrode Data [project link; submitted to Cell Press Neuron]

- Designed a novel algorithm to detect (AUC: 0.82) and classify characteristics in time-series data that are not reported by off-the-shelf analysis software.
- Created a data modelling pipeline that applies unsupervised learning and regression techniques, and feature generators resulting in a runtime 90% faster than proprietary analysis software.
- Implemented the pipeline into a desktop app using Tkinter for non-coding research scientists to use – currently used by 4 labs.
- Techniques applied: K-means clustering, Gaussian Mixed Models, Linear Regression, RANSAC regression, curve fitting, Principal Component Analysis

Spiking Neural Network Modeling of Rett Syndrome Networks [published in Nature Translational Psychiatry]

- Reduced MSE by 57% by performing model fitting using Bayesian inferencing (SBI) and gradient-free optimization (nevergrad) in Python to generate experimentally representative single neuron models compared to random search optimization.
- Simulated 10 spiking network models based on experimentally relevant parameters to make predictions about disease states and provide mechanistic insight, which eliminated the need for 60% of the wet lab experiments.

Deep Learning for the Diagnosis and Classification of Rett Syndrome [project link]

- Classified electrophysiological time series features of stem cell-derived neurons to predict disease and control groups (F1: 93%), as well as developmental stage (F1: 86%) using a deep neural network (technical details in project link).

WORK EXPERIENCE

University Consulting Group – *Management Consultant & Team Lead* — 09/2022 – 04/2023

- Led teams of 5+ consultants across pro-bono engagements with major NA non-profit organizations including Athletes for Hope (to expand into Canada) and London Community Foundation (to improve recruitment, retention, and engagement strategy).
- Conducted extensive market research, competitor analysis, and regulatory assessment to identify key opportunities and challenges for a market entry strategy tailored to the Canadian non-profit landscape.
- Identified pain points of internal processes by conducting internal interviews, and collaborating with HR and senior leadership.
- Designed a recruitment dashboard to visualize hiring issues and identify high ROI processes which was predicted to improve recruiting efforts by 3-fold.
- Delivered a detailed implementation plan, outlining a 12-month roadmap of milestones, KPIs, and resources required, to key stakeholders including the VP and Executive Administrator – predicted to decrease attrition by 50%.

NON-TECHNICAL SKILLS

Communication: Seasoned communicator with a track record of presenting at 15+ conferences, publishing scientific writing, hosting podcasts, teaching 1000+ students in multiple formats, and organizing workshops to train graduate students in scientific communication.
Collaboration/Teamwork: Led collaborations with 8 researchers across 5 institutions to combine individual expertise to tackle complex problems relating to neurodegenerative and neurodevelopmental disorders.