Mario **GARINGO**

BEng. MASc.

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Employment History

2017-Present

Headache Sciences Inc., PART-TIME
Medical AI, Data Science & Clinical Research

- Developed the company's patented migraine detection algorithm using advanced machine learning and signal processing techniques.
- Spearheaded research and implementation of machine learning models for headache disorders, driving innovation in medical AI applications.
- Led a multidisciplinary team to execute product development strategies, ensuring alignment with the company's vision and delivering innovative solutions.
- Integrated AI, data science, and clinical research into the product roadmap, aligning technological advancements with strategic business objectives.
- Authored 5 grant proposals and secured ethical board approvals, ensuring compliance with regulatory standards and successfully obtaining 100K+ funding.
- Managed clinical data acquisition for 6 pilot studies evaluating AI-driven solutions for headache disorder management.
- Designed and implemented tools and metrics to monitor machine learning model performance and ensure data accuracy in clinical and operational settings.
- Presented research findings to stakeholders, partners, and investors through impactful data visualization and storytelling.

python MATLAB plotly SQL Latex JavaScript

2021-2024

Neureka, FULL-TIME
R&D – Full Stack Development & Healthcare Solutions Using AI

- Led a team of engineers and interns to develop advanced seizure detection models using actigraphy data, employing classical machine learning methods (SVM, decision trees, clustering) and modern neural network techniques (CNNs, RNNs, transformers).
- Developed and transitioned a sleep staging algorithm using actigraphy data for home-use devices into a production environment, later enhancing it with deep learning techniques to improve accuracy and efficiency.
- Created seizure and sleep scores by integrating metrics from actigraphy and sleep data, providing actionable insights for physicians to improve patient outcomes.
- Designed and implemented a predictive method for seizure detection using actigraphy data, contributing to early warning systems for epilepsy management.
- Developed heart rate variability (HRV) metrics for extraction from at-home wearable devices, enabling continuous health monitoring for patients.
- Implemented an automated reporting system for nocturnal seizures and sleep metrics, enabling physicians to adjust medication dosage and timing based on actionable data.
- Collaborated with physicians and customers to identify and deploy new features, including additional sleep metrics, trend analysis, and automated reporting capabilities.
- Rapidly developed MVPs and prototypes for potential collaborators, incorporating video surveillance, audio analysis, and Large Language Model (LLM) applications.

python MATLAB plotly PostgreSQL Latex JavaScript Dart DASH OracleCloud AmazonWebService(AWS) GoogleCloudPlatform(GCP)

2015-2022 **Cerebral Diagnostics Canada Inc., PART-TIME**
Biomedical Machine Learning and Data Science Specialist

- Developed the patent-pending main algorithm to detect predisposition to fibromyalgia using advanced machine learning and signal processing techniques.
- Researched, developed, and evaluated analytical tools for data mining, statistical analysis, and machine learning models for central sensitization disorders, driving innovation in diagnostic capabilities.
- Led clinical data acquisition efforts for studies involving patient data, ensuring compliance with research protocols and ethical standards.
- Authored successful grant proposals and ethics board approvals, securing funding and advancing clinical research initiatives.
- Established a protocol for evoked potentials analysis using EEG and source localization techniques, advancing research into pain perception and central sensitization.
- Developed a pipeline to transform brain imaging data into holographic, print-ready images, expanding the accessibility and utility of complex neural data.
- Created brain sonification techniques, enabling the transformation of neural signals into auditory representations for innovative data interpretation.
- Programmed proprietary robotic arms to test and measure pain thresholds in studies of diabetic neuropathy and carpal tunnel syndrome.
- Enhanced proprietary software performance by optimizing code and integrating programs, improving usability and efficiency.
- Developed data visualizations and performed data wrangling, presenting complex datasets in an accessible format for diverse audiences.
- Created technical drawings and memos to effectively communicate algorithm designs to both academic and non-academic audiences.
- Developed a new EEG cap system for simplified signal recording in clinical and research settings.

python | MATLAB | Java | VisualBasics | C++ | webGL | openGL | plotly | SQL | LATEX | JavaScript

2015-2019 **Dementia Health, PART-TIME**
Data Scientist

- Developed analytical tools to identify EEG abnormalities in Alzheimer's subjects, enabling autonomous differentiation from normative groups using advanced machine learning techniques.
- Designed and implemented novel signal processing techniques for feature analysis, reduction, and fusion, optimizing data inputs for pattern classification.
- Modified and adapted machine learning models to improve accuracy in EEG-based Alzheimer's diagnostics, ensuring robust pattern classification.
- Led clinical data acquisition efforts for pilot studies, ensuring high-quality patient data collection and adherence to research protocols.
- Authored successful grant proposals and ethics board applications, securing funding and approvals for innovative clinical research projects.

python | MATLAB | C++ | C | Latex | PostGRE

2015-2016 **University Health Network, PART-TIME**
Consultant Mobile Application Programmer

- Developed mobile applications for Android and iOS as well as various web applications, delivering user-friendly and efficient solutions.
- Created a medical adherence app to track patient compliance and automatically generate reports for physicians, enhancing healthcare communication and management.

HTML | CSS | PhoneGap | JavaScript

2011-2015 **Cerebral Diagnostics Canada Inc., PART-TIME**
Junior Biomedical Research Engineer and Programmer

- Led a team of mathematicians at the Fields Institute to develop a novel brain synchronization technique, enabling the identification of brain region connectivity and advancing neurological research.
- Developed innovative analytical tools to characterize and classify neurological processes, improving the understanding of brain activity patterns.
- Created novel K-complex, alpha, and delta analysis techniques for sleep medicine using EEG source localization, enhancing diagnostic and therapeutic applications.

MATLAB | Java | VisualBasics | C | C++

2011-2012 **Real Programming 4 Kids, FULL-TIME**
Instructor

- Taught children ages 7-15 fundamental programming concepts using C++, C#, Java, and Visual Basic, emphasizing good programming practices and logical problem-solving.
- Guided students in developing computer games, applying the knowledge gained throughout the course to build practical, creative projects.
- Communicated complex programming concepts in simple terms, ensuring students understood key concepts and could apply them effectively.

C++ C# Java VisualBasics

2011-2012 **Ryerson University, PART-TIME**
Research Assistant

- Developed a C++ graphical user interface (GUI) for pressman operators, enabling them to maintain consistent colors during printing jobs by comparing expected and acquired color bar information.
- Used C to acquire color data from the i1 Pro device, analyzing the spectrum of a color bar and successfully classifying individual colors.
- Implemented real-time communication between the GUI and local/web servers via SQLite, enabling seamless monitoring of printing job progress and ensuring operational efficiency.

C++ C Java MATLAB SQLite

2010-2012 **Ryerson Signal Analysis Research Group, FULL-TIME**
Research Assistant

- Developed algorithms to analyze EEG signals using MATLAB, focusing on spectrum and power densities for efficient data processing.
- Applied intelligent system classification techniques to group similar EEG signals, enhancing the accuracy of data interpretation.
- Created a C# and MATLAB-based GUI to execute various algorithms on EEG signals, improving user interaction and workflow.
- Presented research findings in weekly conference meetings, effectively communicating technical work to stakeholders.

MATLAB C++ C# Latex

Education

2013 - 2015 **Master of Applied Science in Electrical and Computer Engineering**, Toronto Metropolitan University (formerly known as Ryerson University), Ontario, Canada

2007 - 2011 **Bachelor in Electrical and Computer Engineering**, Toronto Metropolitan University (formerly known as Ryerson University), Ontario, Canada

Certification

2016 **Independent Ethics Committee - Responsible Conduct of Research**, Collaborative Institutional Training Initiative, University of Miami

Technical and Personal Skills

Programming Languages: C C++ C# VisualBasics Python MATLAB Arduino TeX JavaScript Java HTML SQL CSS DART

Frameworks and Libraries: Numpy SciPy Pandas Keras SKLearn TensorFlow PyTorch MXNet Matplotlib Seaborn Plotly Dash Bokeh ggplot Django Flask Jekyll BeautifulSoup Eli5 Angular React Node webGL openGL OpenCV

Cloud Services: Amazon Web Services (AWS) Google Cloud Platform (GCP) Oracle Cloud Infrastructure (OCI)

Management Tools and Practices: Git GitHub Microsoft Teams Microsoft 365 Slack Jira Agile Scrum Google Suite

General Business Skills:

- Excellent verbal and written skills
- Self-motivated and punctual.
- Good presentation skills.
- Works well in a team.
- Fast learner and quick problem solver with high attention to detail.
- Can write well organized and structured reports, memos, grant and ethic proposals, and patent and FDA submissions.

Languages and Interests

Fluent - Language: English

Native - Language: Tagalog, Illocano

Interests

- I frequently participate in machine learning algorithm competitions in order to reinforce my existing knowledge in the area of data analysis and pattern classification, while also learning new algorithms and ways to make them more efficient.
- I am an avid runner, competing in various road and trail races in Toronto.
- Volunteer as a Lead Steward for Toronto Nature Steward, I oversee a team of 15+ volunteers to remove invasive plants in a ravine, organizing tasks, planning events, and ensuring everything runs smoothly. I manage resources, make detailed notes, and guide the team to achieve our environmental goals safely and effectively.

Awards

2015 **Ontario Brain Institute Internship Recipient**

2013 **Awarded Best Project in the 2013 International Conference for Up-Coming Engineers**

Publication and Patents

Conferences & Journals

- **Four State Sleep Staging From a Multilayered Algorithm Using Electrocardiographic and Actigraphic Data**, Journal of Clinical Neurophysiology 2024
- **At-home Sleep Quality Measurements Correlate with Subsequent Seizures in Individuals with Epilepsy**, American Epilepsy Society 2022
- **At-home sleep quality measurements correlate with next-day seizure counts in individuals with Epilepsy**, Society for Neuroscience 2021
- **A Medical Visualization Framework and Pipeline for Holographic MRI**, The International Society for Optics and Photonics 2020
- **Advances in the Direction Towards an Objective EEG Test for Migraine : A Data Driven Approach for Subtyping Classification of Migraine**, CEPHALALGIA. Vol. 39., ENGLAND : SAGE PUBLICATIONS LTD, 2019
- **Discriminative Analysis of Migraine with Aura using Non-Linear Support Vector Classification**, CEPHALALGIA. Vol. 37., ENGLAND : SAGE PUBLICATIONS LTD, 2017
- **A Non-Linear Support Vector Machine Approach to Testing for Migraine With Aura Using Electroencephalography**, Computational Science and Computational Intelligence, 2017 International Conference on. IEEE, 2017
- **The Novel Application of eLORETA for analysis of Delta Sleep in Humans : Implications for Research**, 10th Annual Congress of The Society for Brain Mapping and Therapeutics 2012

Patents

- **Diagnosis of Migraine Via Expert System**, US20180242919A1
- **Diagnosis of Pain Via Expert System**, CDC-028592 US PRO

Thesis & Book

- **Audio Display And Environmental Sound Analysis Of Diagnostic And Therapeutic Respiratory Sounds**, Ryerson University
- **Atlas of the Electrical Generators of Sleep - Content Contributor**, Xlibris Corporation eBook

References

References will be provided upon request.