Mario Garingo

Curriculum Vitae

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Current Employment

2018 – Current **OCAD University PHASE Lab**, Graduate Research Assistant
Develop algorithms to perform automatic and semi-automatic segmentation from various medical imaging technologies, using marching cube, histogram manipulation, seed based approaches, morphological filters and U-Net deep learning architecture. Develop and implement a pipeline to generate image ready frame stacks for medical holography from segmented MRI data of rat, monkey, and human brain. As well as worked with UHN to develop segementation of OCT vascular data for 3D medical holographic visualization.

2016 – Current **Headache Sciences Inc.**, Chief Technology Officer
Develop the patent pending main algorithm of the company, to detect predisposition of migraine using machine learning and advanced signal processing techniques. Develop technical drawings and memos to communicate algorithm to a wide variety of academic and non-academic audience. Perform clinical data acquisition of patients for various pilot studies. Manage a team to identify medical regulation requirments, market research and venues of commercialization of the product. Create proposals for various grants and ethic boards which were successfully accepted.

2012 – Current **Cerebral Diagnostics Canada Inc.**, Lead Developer and Biomedical Research Engineer
Develop various novel analytical tools to characterize and classify a variety of neurological processes. Created novel K-complex, alpha and delta analysis for sleep medicine using EEG source localization. Lead a group of mathematicians at the Fields Institute to develop a novel brain synchonization technique to identify brain region connectivity. Established a new protocol for VEP and LEP analysis for pain using EEG and source localization. Enhancing proficiency and performance of existing proprietary programs by optimizing code and merging programs. Programing proprietary robotic arm to test and measure thresholds of pain as it relates to diabetic neuropathy and carpal tunnel syndrome. Developing a new cap system for easy recording of EEG signals. Developed brain sonification techniques. Develop pipeline, analysis and program to transform existing brain imaging techniques into holographic print ready images.

Previous Employment

2015 – 2019 **Dementia Health**, Data Scientist
Develop analytical tools to identify abnormalities in the EEG of Alzheimerś subjects to autonomously differenitate them from a normative group. Develop novel signal processing techniques to perform feature analysis, reduction and fusion. Modify and identify approriate existing machine learning techniques to perform pattern classifcation. Perform clinical data acquisition of patients for various pilot studies. Create proposals for various grants and ethic boards which were successfully accepted.

2015 – 2016 **University Health Network**, Programmer
Developed mobile apps for android and OS, as well as various web applications. These included creating a medical adherance app in which patient adherenace were tracked and automatic reports were sent to doctors.

2011 – 2012 **Real Programing 4 Kids**, Instructor

Taught children ages 7-15 about the fundamentals and good programming practices of computer programming using C++, C#, Java and Visual Basics. Helped them develop computer games based on the knowledge gained in the course. Communicated effectively by using simple and clear terminology to explain complex terms.

2011 – 2012 **Colours Without Borders**, Research Assistant

Used C to acquire data from a device called the i1 pro to obtain colour information of a given colour bar. Analyzed raw spectrum of colour bar and successfully classified individual colours within a colour bar. Used C++ to create a graphical user interface(GUI) for pressman operators to maintain standard consistent colours within a printing job based on expected colour bar information and acquired colour bar information. The GUI communicated to a local and web server via SQL lite, to monitor the progression of a printing job.

2010 – 2012 **Ryerson Signal Analysis Research Groups**, Research Assistant

Used MATLAB to analyze spectrum and power densities of various EEG signals. Researched and developed algorithms to efficiently perform analysis. Used intelligent system classification techniques to group similar EEG signals. Developed a GUI in C# and MATLAB to perform different algorithms on EEG signals. Presented work and findings in weekly conference meetings.

Education

2013–2015 **Masters of Science in Electrical and Computer Engineering**, *Ryerson University, Toronto, Ontario*

2007–2011 **Bachelor in Electrical and Computer Engineering**, *Ryerson University, Toronto, Ontario*

Masters Thesis

Title *Audio display and environmental sound analysis of diagnostic and therapeutic respiratory sounds.*

Supervisors Dr.Sridhar Krishnan

Description The objective of this work is to provide a framework to aid physicians in identifying early respiratory ailments as well as provide a means of monitoring medication compliancy for both the patient and physicians. To aid physicians identify abnormal sounds during auscultations such as crackle, this work proposes a multimedia approach in the form of audio display (AD) to enhance crackle sounds produced in respiration. This work utilize a two step AD approach in which the crackle sound is first separated from the rest of the vesicular sound and then either sonified or audified. To aid in monitoring use of medication this work proposes an environmental sound analysis (ESA) framework to autonomously quantify adherence to medication. This work employed traditional audio features to extract meaningful discriminatory information to identify the inhaler sounds from the environment with the aid of maximum relevance and minimum redundancy algorithm and the hidden markov model.

Certifications

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

Awards

2016 **Won Stages 1,2 and 3 of the Norman Esch Award**

2015 **Awarded 1 of 5 Ontario Brain Insitite Interns in the Province**

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

Technical and Personal Skills

Programming Languages	C, C++,C#, VBA, Python, Matlab, Arduino, TeX, Java Script, Java, HTML, SQL, and CSS. Also basic ability with: Assembly and VHDL.
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.
Others	Can write well organized and structured reports and memos.

Publications

Conference

Discriminative Analysis of Migraine with Aura using Non-Linear Support Vector Classification, Congress of the International Headache Society2017

A Non-Linear Support Vector Machine Approach to Testing for Migraine With Aura Using Electroencephalography, International Conference on Computational Science and Computational Intelligence 2017

Patent

Diagnosis of Migraine Via Expert System, US20180242919A1

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

Interests and Extra-Curricular Activities

I frequently participate in machine learning algorithm competitions in oder 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 also an avid runner, competing in various road and trail races in Toronto.

Languages

English	**Fluent**
Tagalog	**Native Speaker**
Ilocano	**Native Speaker**

References

References available on request