Cespedes Tenorio **MAURICIO**

Electrical Engineer | Signal Processing & Machine Learning

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Master of Engineering Science candidate at Western University, holding a BEng in electrical engineering. Pursuing my graduate degree in biomedical engineering, with a special focus on machine learning and signal processing. Also enrolled in a machine learning specialization as part of the master's program. Actively engaged in diverse machine learning projects during the master's program, emphasizing image processing, LLMs, and signal processing, alongside software development initiatives. With 1.5 years of industry experience in software testing and development gained at Boston Scientific.

Education

Current – Sept 2022 | London, ON, Canada

Master of Engineering Science in Biomedical Engineering

The University of Western Ontario

- **Anticipated graduation :** Sept 2024.
- **Specialization :** Machine Learning.
- **Master's Thesis :** An open pipeline for the analysis of recordings from intracranial electroencephalography.

March 2017 – July 2021 | San Jose, Costa Rica

Bachelor of Engineering in Electrical Engineering

University of Costa Rica

- **Grade Average :** 9.63
- **Graduation project :** Control algorithm for imaging-guided photothermal therapy : mathematical modeling, design and simulation.

Relevant Research Experience

Current – Aug 2022 | London, ON, Canada

Graduate MESc Student

Khan Computational Imaging Lab, The University of Western Ontario

- Developing tools for preprocessing of intracranial electroencephalography recordings using signal processing techniques.
- Developing an automatic classifier for intracranial EEG signals using deep learning (CNNs and RNNs) and traditional machine learning techniques (XGBoosting and Random Forests).
- Collaborating in projects related to medical image processing using machine learning, including the automatic segmentation of intracranial EEG electrodes.
- Involved with SW development projects in Python, such as Ciftipy and SlicerNeuro.

Python | Signal Processing | Machine Learning | Linux | Pytorch | Keras | sklearn

July 2020 – Aug 2021 | San Jose, Costa Rica

Research Assistant

Biomedical Engineering Research Lab, UCR

- Simulated systems involving photoacustic imaging and ablation systems for cancer treatment.
- Developed simulated control systems for the optimization of ablation cancer therapies along with photoacustic imaging.

MATLAB | Python | Mathematical Simulations

Work Experience

Current – Sept 2022 | London, ON, Canada

Software/Hardware Technician

Robarts Research Institute

Relevant responsibilities :

- Preparing scenes in 3D Slicer for their use in Virtual Reality.
- Setting up and troubleshooting of VR equipment and SlicerVR.

Python | 3D Slicer | 3D Slicer Development

Aug 2022
Sept 2021

R&D Software Test Engineer I

Heredia, Costa Rica

Boston Scientific

Relevant responsibilities :

- Worked with a cardiac electrophysiology mapping system called Rhythmia Mapping System.
- Executed and developed manual and automated tests for software systems and tools.
- Worked closely to the Concepts team, responsible for the development of the signal processing algorithms for the Rhythmia Mapping System, to create manual and automated tests that covered relevant clinical cases.
- Developed a side project for the neuromodulation R&D team at Boston Scientific for the automatic testing of neuromodulation signals using Python and signal processing.

Python | Cardiac Electrophysiology | Linux | Bash

Sept 2021
March 2021

R&D Software Test Engineer Intern

Heredia, Costa Rica

Boston Scientific

Relevant responsibilities :

- Received training related to cardiac electrophysiology, cardiac mapping and software tools like Squish, Bitbucket and Jira.
- Executed manual, automated and sanity testing for several software tools.

SW Testing | Cardiac Electrophysiology | Python

Publications and Conferences

Journal Articles

Tissue damage-tracking control system for image-guided photothermal therapy of cancer
Mauricio Céspedes Tenorio, Carlos A. Wattson Sánchez, Diego S. Dumani
Frontiers in Thermal Engineering 2 (2022). 2022

Conference Proceedings

Modeling thermometry image perturbations during photoacoustic imaging-guided photothermal therapy
Mauricio Céspedes Tenorio, Diego S. Dumani
2021 IEEE UFFC Latin America Ultrasonics Symposium (LAUS), 2021

Multivariable Fuzzy Logic Controlled Photothermal Therapy
Mauricio Céspedes Tenorio, Diego S. Dumani
IFAC-PapersOnLine 54.15 (2021) p. 400-405. 2021

Multivariable fuzzy logic controlled photothermal therapy
Mauricio Céspedes Tenorio, Diego Dumani Jarquín
Ingeniería 31 (déc. 2020) p. 35+. 2020

Languages

English	Professional proficiency.
Spanish	Native proficiency.

Technical Skills

Programming	Python (Pandas, Scipy, Scikit-learn, PyTorch, etc.), C/C++, MATLAB.
Signal Processing	Spectral analysis, digital filters, time frequency analysis, etc.
Machine Learning	Basic ML algorithms and deep learning solutions.
Miscellaneous	Linux, Bash, Markdown, Git/Github, Docker, Singularity, Poetry.

References

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