Carlos Simon Amador Izaguirre
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Experience

Harvard Medical School / Boston Children's Hospital — **Boston, United States**
Research Assistant — **July 2023 – January 2024**

- Processed around 3 MRI images/week at the Fetal Neonatal Neuroimaging and Developmental Science Center (FNNDSC), aiding in the processing of new datasets for the study of brain development and neural fetal conditions.
- Researched innovative unsupervised learning (VAEs) algorithm for anomaly detection of fetal MRIs, conducting a literature review, modeling, training, and evaluation for 5 months resulting in 2 functional models:
    - Programmed in Python employing over 5 libraries (Pytorch, Nibabel, NumPy, Pandas, and Matplotlib).
    - Generated metrics (MAE, MSE, Anom) significantly different ($p<0.05$) between anomaly and typical development.
- Evaluated and improved the current pipeline for MRI analysis using deep learning architectures, including the evaluation of U-Net models.

Advanced Ciberphysical Systems Laboratory — **Guadalajara, Mexico**
Research Assistant — **August 2022 – June 2023**

- Assisted in a doctoral dissertation on deep learning for motor imagery classifiers during 1 semester:
    - Facilitated the development of innovative neural network architectures for processing EEG data by evaluating 2 databases encompassing 1526 individual registers over 4 months, designing a pipeline for said project.
    - Programmed around 3 processing scripts in both MATLAB and Python.
- Evaluated 2 channel selection methods, processing 1526 EEG registers over 4 months for different DL classifiers (MLP, CNN), as well as traditional machine learning algorithms (decision trees, linear discriminant analysis).
    - Use of the TensorFlow, MNE, Numpy, Pandas, and Matplotlib libraries in Python.
    - Findings from this study will soon be published, aiding preprocessing for neural network applications in motor imagery.

Bio mechatronics Laboratory — **Guadalajara, Mexico**
Research Assistant — **August 2022 – December 2022**

- Contributed to a gait analysis study, collaborating with MIT and Tecnológico de Monterrey. Recorded precise gait data for over 10 subjects using motion capture technology (Vicon Nexus).
- Automated the processing of gait data using Python code, streamlining analysis procedures, and reducing data processing time by 50% compared to manual methods. Enabled efficient extraction and organization of key metrics for further analysis.
- Delivered comprehensive data analysis reports to MIT researchers in 2 months, including statistical analysis and over 4 visualizations. Assisted in interpreting and evaluating prosthesis socket designs.

Education

Tecnológico de Monterrey Campus Guadalajara — **Guadalajara, Mexico**
Bachelor of Science (B.S.), Biomedical Engineering — **August 2020 – June 2024**

- GPA: 92.38 / 100

Skills

Relevant Coursework: Signal Analysis, Modeling & Control, Bioinstrumentation, Medical Image Processing, Neuroengineering. Attendant at Revolutionary Ventures (MIT), AI in Medicine (Harvard Medical School), Biomedical Engineering Seminar Series (MIT HST)

Relevant Certifications: Introduction to Structured Query Language (SQL) (Coursera), Applied Machine Learning in Python (Coursera), Deep Learning with PyTorch (Coursera), Applied Plotting, Charting & Data Representation in Python (Coursera), Introduction to Data Science in Python (Coursera)

Soft Skills: Leadership, intercultural communication, collaboration, analytical thinking, emotional intelligence.

Technical Skills: Python/Pytorch, R, MySQL, MATLAB/Simulink, Linux/Bash, Git, Minitab, Data Science, Statistics, Machine Learning, Deep Learning, Image Processing, Research Skills, Computer Science, Relational Databases, Neuroscience.

Languages: Spanish (Native), English (IELTS 8), German (A2).