M.Sc., Erick Axel Martinez Ríos.
Ph.D. Candidate | Data Scientist | Signal Processing & Machine Learning Researcher

erick.martinezr95@gmail.com
LinkedIn +52 5562233973 GitHub Public Repository
YouTube Project Portfolio ORCID
ResearchGate Google Scholar Profile

Professional Overview

Ph.D. candidate in Engineering Sciences with a focus on signal processing, machine learning, and data-driven modeling. Experienced in developing classification and forecasting models for water leakage detection, road surface analysis, and physiological signal monitoring. Skilled in Python, MATLAB, Simulink, and system identification techniques. Passionate about applied research.

Employment History

Aug 2020 – Present

Research Assistant, Tecnológico de Monterrey, Mexico City.

- Responsible for training and validating machine learning models for classification tasks such as road surface anomaly detection, water leak detection, and hypertension prediction. Techniques used include support vector machines, decision trees, linear discriminant analysis, convolutional neural networks, nearest neighbor methods, early and late fusion, multimodal classification, and transfer learning. Project code is available on GitHub, video presentations are in the YouTube project portfolio, and related scientific reports are listed in my Google Scholar profile.
- In charge of modeling the temperature dynamics of permanent magnet synchronous motors using data-driven system identification (e.g., artificial neural networks) and implementing them via Processor-in-the-Loop hardware. Collaboration with Politecnico Di Torino and Elaphe Propulsion Systems.
- Analysis of data by hypothesis testing and feature selection using ANOVA, t-tests, and multiple comparison methods.
- Worked with time-series and image data for pattern recognition; applied advanced feature extraction and selection techniques.
- Manage doctoral students in scientific writing, resulting in four co-authored journal publications on the topics of robotics, education, and anomaly detection.
- Published eight first-author articles in artificial intelligence, signal processing, and engineering education.
- Reviewer of more than 46 scientific manuscripts for journals including *Expert Systems with Applications*, *Computers in Biology and Medicine*, and *IEEE Access*.

Aug 2023 – Aug 2025

Part-Time Professor, Tecnológico de Monterrey, Mexico City.

- Taught elective courses in mechatronics and mechanical engineering at PrepaTec (high school level), including an introduction to automotive engineering covering combustion engines, electric vehicles, and autonomous driving systems. Received an overall teaching evaluation of 9.76/10. Instructed undergraduate courses in electrical engineering, automation, and control systems. Earned a teaching evaluation average of 9.46/10.

Nov 2018 – Jul 2020

Project Specialist, Tecnológico de Monterrey, Mexico City. Prototyping Engineer for Artificial Intelligence (Deep Learning) based products. Technological Transfer Experience. Patent Applications.

Employment History (continued)

June 2018 – November 2018

Hardware in the Loop Engineer, P3-Group Contractor of Ford Motor Company, State of Mexico.

- Analyzed product requirements and technical specifications for automotive embedded systems.
- Designed and documented high-level test cases for Instrument Panel Cluster (IPC) validation.
- Maintained and updated IPC software across multiple vehicle platforms.
- Reported and tracked software issues with external suppliers to ensure timely resolution.

Education

2022 – 2026

Ph.D. Doctorate in Engineering Sciences, Instituto Tecnológico y de Estudios Superiores de Monterrey.

- Average: 100/100
- Focused thesis work on applying the wavelet transform for signal classification, tackling datasets and problems such as water leakage detection and road surface anomaly detection using vibration data and machine learning techniques.
- Produced four journal articles and four conference papers based on the thesis research.
- Developed a thermal model for a permanent magnet synchronous motor using nonlinear system identification methods, resulting in a conference publication.
- Implemented the developed thermal model on a 32-bit microcontroller via a model-based approach.
- Awarded a full academic scholarship throughout the program.

2020 – 2022

M.Sc. Master in Engineering Sciences, Instituto Tecnológico y de Estudios Superiores de Monterrey.

- Final Average: 99.69/100. Summa Cum Laude.
- My thesis project focused on using machine learning and signal processing techniques to detect high blood pressure based on clinical and physiological data.
- Thesis work led to two journal articles and one conference article.
- Specialization in Machine Learning and Signal Processing.
- Full Academic Scholarship

2013 – 2017

B.Sc. Mechatronics Engineer, Instituto Tecnológico y de Estudios Superiores de Monterrey.
Cum Laude Degree.
Final Average: 94/100

Skills

Languages — Strong reading, writing, and speaking competencies in English. TOEFL ITP: 590.

Coding — Arduino, MATLAB (Advanced), Python (Intermediate), R (Intermediate), Scikit-learn, Keras, TensorFlow 2, Simulink, Simulink Coder, Processor in the Loop, LaTeX, LabVIEW.

Misc. — Academic research, project management, teamwork, critical analysis, problem-solving, self-learning, leadership and mentoring, teaching, training, consultation, work under pressure, LaTeX typesetting, and publishing.

Miscellaneous Experience

Awards and Achievements

2022 **Academic Publication in Academic Journals and Conferences**, Author of 16 scientific publications in the areas of artificial intelligence, machine learning, signal processing, control, electrical engineering, and education. See the list of publications: Click Here To see the full list of publications .

Summa Cum Laude Recognition from the master's degree studies, Recognition for outstanding performance while studying for the Master's Degree in Engineering Sciences at Instituto Tecnológico y de Estudios Superiores de Monterrey.

2017 **Cum Laude Recognition from undergraduate studies**, Recognition for outstanding performance while studying Mechatronics Engineering at Instituto Tecnológico y de Estudios Superiores de Monterrey.

Certificates

Machine Learning and Deep Learning

2021 **Introduction to Machine Learning**. Duke University. https://www.coursera.org//verify/Y54HU3ZFAYA7.

Getting started with TensorFlow 2. Imperial College London. https://www.coursera.org//verify/ZS6NA45BVX44.

Deep Learning. DeepLearning.AI. https://coursera.org/verify/specialization/A5SA963R2BGS.

Applied Machine Learning in Python. University of Michigan. https://www.coursera.org//verify/VKTLCFN7EVCH.

Programming and Data Handling

2021 **Programming for Everybody (Getting Started with Python)**. University of Michigan. https://www.coursera.org//verify/FZB3PC5A4BF4.

Python Data Structures. University of Michigan. https://www.coursera.org//verify/CA63RN679XQS.

Understanding and Visualizing Data with Python. University of Michigan. https://www.coursera.org//verify/PU98QCQZ33ZH.

Statistics and Data Analysis

2024 **Inferential Statistics**. Duke University. https://www.coursera.org//verify/LEJUG8YIJ2ZZ.

2021 **Inferential Statistics**. University of Amsterdam. https://www.coursera.org//verify/L5WZB3D5T6SN.

Basic Statistics. University of Amsterdam. https://www.coursera.org//verify/YDJZLGVHVMDB.

Predictive Modeling, Model Fitting, and Regression Analysis. University of California, Irvine. https://www.coursera.org//verify/ZXXLL93G7PPQ.

Intro to Analytic Thinking, Data Science, and Data Mining. University of California, Irvine. https://www.coursera.org//verify/46WZQJDKK8PX.

Signal Processing and Time Series

2021 **Practical Time Series Analysis**. The State University of New York. https://www.coursera.org//verify/D76WA4D7VSU9.

Digital Signal Processing 1: Basic Concepts and Algorithms. École Polytechnique Fédérale de Lausanne. https://www.coursera.org//verify/CYAAK4EKG6XA.