Baldwin Cortes, Ph.D.

🌐 Website | ⬡ GitHub | in LinkedIn | ✉ balcortex@hotmail.com | 📱 (+52) 443.429.9695

SUMMARY

Seasoned machine learning engineer and data scientist with a Ph.D. in Electrical Engineering, specializing in data analytics, SQL, and Python. Expertise in machine learning for regression, classification, and forecasting, along with experience in large language models and image processing. Developed groundbreaking techniques for optimizing photovoltaic systems' performance using deep reinforcement learning, including novel maximum power point tracking methods. Recently earned an AI certification from Huawei and was selected for a fully-funded training program in Hangzhou, China, focusing on cutting-edge AI algorithms. Currently serving as an Associate in Energy Insights at Sproule, where I develop advanced energy models and provide strategic insights for the energy transition.

EXPERIENCE

Associate, Energy Insights - Sproule, Mexico   Aug 2024 - Present

– Developed advanced energy models using machine learning algorithms to capture key variables and transition pathways, contributing to data-driven insights for energy transition strategies.
– Created data transformation pipelines to clean and transform data for modeling and analysis.
– Created visualizations to assess model performance, highlight feature importance, and improve interpretability.
– Communicated results and insights through concise updates and detailed documentation for the team.
– Participated in the hiring process for new members within the team.

Machine Learning Engineer - G2i Inc., USA (In partnership with Scale AI)   Jun 2024 - Aug 2024

– Evaluated the quality of AI-generated code, providing human-readable summaries of rationale.
– Assisted in training LLMs by evaluating responses and providing recommendations on understanding assignments.

Research Scientist (Ph.D. graduate) - UMSNH, Mexico   Mar 2018 - Feb 2022

– Managed data acquisition and cleaning for a weather station, processing over four million measurements across four years.
– Conducted time series forecasting experiments using deep learning algorithms for local irradiance, surpassing state-of-the-art models by improving prediction accuracy by over 0.8%.
– Developed a novel method using deep learning to characterize photovoltaic panels, reducing the parameter error estimation by 50% compared to the most widely used method.
– Innovated multiple maximum power point tracking techniques for photovoltaic systems utilizing deep reinforcement learning, surpassing the performance of state-of-the-art algorithms by increasing power generation by over 2%.

Adjunt Professor - UMSNH, Mexico   Oct 2015 - Aug 2019

Lectured several courses including Digital Electronics, Digital Control, Microcontrollers, and Instrumentation.

EDUCATION

2018 - 2022	Ph.D. in Electrical Engineering at **Universidad Michoacana (UMNSH)**	(GPA: 4.0/4.0)
2015 - 2017	M.Sc. in Electrical Engineering at **Universidad Michoacana (UMNSH)**	(GPA: 4.0/4.0)
2009 - 2014	B.Sc. (*Hons*) in Electronics Engineering at **Universidad Michoacana (UMNSH)**	(GPA: 3.7/4.0)

Ph.D. Thesis	Deep Reinforcement Learning and Demonstrations Applied to Global MPPT in Photovoltaic Systems
M.Sc. Thesis	Design of a Takagi-Sugeno Fuzzy Observer for an 11-Tray Batch Binary Distillation Column
B.Sc. Thesis	Portable Digital Oscilloscope with Bluetooth Communication, Based on Signal Processor and Android Device

LANGUAGES

Spanish (Native), English (C1), Portuguese (A1)

SKILLS

Time Series	Analysis, Modelling, Forecasting
Programming Languages	Python, MATLAB, C, JavaScript, VHDL

Machine Learning Frameworks	PyTorch, TensorFlow, Keras, Scikit-Learn, LightGBM, XGBoost
Deep Learning	NLP, Image Processing, Deep Reinforcement Learning
Big Data Tools	Apache Spark, Databricks
Cloud Platforms	Microsoft Azure, Huawei Cloud
Web Development	HTML5, JavaScript, CSS3
Database Management	SQL, MongoDB
Workflow Management	Apache Airflow, Kedro
Project Management	Agile, Scrum, Kanban, Attlasian Jira

CERTIFICATIONS

Agile with Atlassian Jira	(2024)
University of Michigan: Digital Twins	(2024)
Microsoft Certified: Azure Data Scientist Associate	(2024)
Databricks Lakehouse Fundamentals	(2024)
Huawei Advanced Training on Artificial Intelligence	(2024)
DeepLearning AI Deep Learning Specialization	(2024)
Huawei Certified ICT Associate-AI	(2024)
Stanford University & DeepLearning AI Machine Learning Specialization	(2023)
Microsoft Certified: Azure AI Fundamentals	(2023)
Google Advanced Data Analytics	(2023)
Google Data Analytics Certificate	(2023)

HONORS & AWARDS

Highest GPA of the 3rd Semester of the Doctoral Program in Electrical Engineering	(2019)
CENEVAL Award for Excellence in EGEL Performance	(2015)
First Place in the 2014 Technological Development Prototype Contest	(2014)
First Place of the Class in the Electronic Engineering Degree Program	(2014)

WORKSHOPS & SEMINARS

Efficient Computing in Python	(2019)
4th Workshop on Monitoring, Diagnostics, and Fault-Tolerant Control	(2016)
Sliding Mode for Engineering Application	(2015)

PUBLICATIONS

Cortés, Baldwin, Roberto Tapia, and Juan J. Flores (2021a). "A Behavioral Cloning based MPPT for Photovoltaic Systems: Learning Through P&O Demonstrations". In: *2021 IEEE International Autumn Meeting on Power, Electronics and Computing (ROPEC)*. Vol. 5, pp. 1–6. DOI: 10.1109/ROPEC53248.2021.9668084.

Cortés, Baldwin, Roberto Tapia, and Juan J. Flores (2021b). "System-Independent Irradiance Sensorless ANN-Based MPPT for Photovoltaic Systems in Electric Vehicles". In: *Energies* 14.16. ISSN: 1996-1073. DOI: 10.3390/en14164820. URL: https://www.mdpi.com/1996-1073/14/16/4820.

Cortés, Baldwin, Roberto Tapia, and Juan J. Flores (2020). "Characterization of a polycrystalline photovoltaic cell using artificial neural networks". In: *Solar Energy* 196, pp. 157–167. ISSN: 0038-092X. DOI: https://doi.org/10.1016/j.solener.2019.12.012. URL: https://www.sciencedirect.com/science/article/pii/S0038092X19312265.

Flores, Juan J., Baldwin Cortés, José R. Cedeño González, et al. (2020). "Prediction of the Solar Resource through Differences". In: *2020 IEEE International Autumn Meeting on Power, Electronics and Computing (ROPEC)*. Vol. 4, pp. 1–6. DOI: 10.1109/ROPEC50909.2020.9258682.

Flores, Juan J., Josué D. González, Baldwin Cortés, et al. (2019). "Evolving SARIMA Models Using cGA for Time Series Forecasting". In: *2019 IEEE International Autumn Meeting on Power, Electronics and Computing (ROPEC)*, pp. 1–6. DOI: 10.1109/ROPEC48299.2019.9057132.

Orozco, Gilberto, Baldwin Cortés, Mario Heras, et al. (2016). "Analysis and comparison of distillation column models considering constant and variable relative volatility". In: *2016 IEEE International Autumn Meeting on Power, Electronics and Computing (ROPEC)*, pp. 1–6. DOI: 10.1109/ROPEC.2016.7830590.