Baldwin Cortes, Ph.D.

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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 extensive experience in large language models (LLMs) and image processing. Proficient in utilizing Pandas for data manipulation and analysis. Developed cutting-edge techniques for optimizing photovoltaic systems using deep reinforcement learning. Adept at leveraging cloud computing platforms such as Microsoft Azure and Huawei Cloud. Recently awarded an AI certification from Huawei and selected for an advanced hands-on AI training program in China. Committed to driving innovative and sustainable solutions through advanced data science and machine learning methodologies.

Experience

Research Scientist 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 Oct 2015 - Aug 2019

Lectured, facilitated class discussions, and organized various teaching activities for 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)

Languages

Spanish (Native), English (C1).

Certifications

Microsoft Certified: Azure Data Scientist Associate	(2024)
DeepLearning AI Deep Learning Specialization	(2024)
Huawei Certified ICT Associate-AI	(2024)
Stanford University & DeepLearning AI Machine Learning Specialization	(2023)
Google Advanced Data Analytics	(2023)

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
Version Control	Git, GitHub, GitLab

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.