Guillaume Goujard

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PhD candidate in optimization and control of distributed energy resources. Graduation date: December 2023.

INDUSTRY EXPERIENCE

Tesla August 2023 - Current

Software Engineer Palo Alto, CA

- Worked within Opticaster's team, focusing on building optimization algorithms to operate behind-the-meter batteries
- Comprehensively evaluated existing user load forecasting model over large scale of devices
- Research and develop an improved user load forecasting algorithm that outperforms the existing model

Heila Technologies May 2022 - May 2023

Algorithm Engineer Oakland, CA

- Developed a demand charge strategy increasing performance for C&I microgrids by 90%. Deployed to production
- Improved forecasting performance by developing a well-tuned low-variance Kalman Filter that outperformed the deep-learning solution on various accuracy measures
- Identified causality behind battery counter-performance by developing equivalent battery models that would ultimately improve SOC readings for the batteries in operation

PredictNow Apr. 2022

DataScience Consultant Toronto, Canada

- Improved speed of execution of a quantitative trading method from over 7 days to 15 minutes while refactoring code from 2500 to 1000 source code lines by developing a modular python package
- Trained a data-driven portfolio allocation method leading to a 3x increase in Sharpe Ratio (SP500, 2011-21)

nRaiden Apr. 2019 - Apr. 2020

Founder, Consultant Paris, France

- Forecasted French electricity prices by combining feature engineering and short-term Gray Box ML models (GAM)
- Developed strategies with daily Sharpe ratio of 0.9 in paper trading and an automatic bidder for the Intraday market
- Distributed the predictions with over 1,800 trading advice sent to a partner in March 2020 from a Linux virtual machine

Nano Energies Apr. 2018 - Jun. 2018

Data Scientist Prague, Czech Republic

- Deployed a new visualization tool on trading screens by reporting key trading indicators using Bokeh and kNNs
- Improved trading performances and beat analysts benchmarks by developing models to predict grid imbalance

RESEARCH EXPERIENCE

Energy Control and Application Lab (eCAL) Sept. 2020 - Current

Graduate Student Researcher with Dr. Scott J. Moura Berkeley, CA

- Developed a moving horizon estimation algorithm to recover hidden states over a Piecewise Affine dynamical system. Extension to Neural Net - MHE. Conference presentation.
- Applied Bayesian optimization to airborne wind energy that increased power output by 30% compared to a fixed wind turbine. Conference presentation
- Formulated a capacity expansion problem for transmission-scale battery packs taking its future impact on power-flows and price formation into consideration. Jupyter notebook available on GitHub; conference presentation

Lawrence Livermore National Laboratories May. 2021 - Aug. 2021
Summer Intern with Dr. Jean-Paul Watson Livermore, CA

- Developed a three-level optimization program for a Utility to select the hyper-parameters of decentralized pricing schemes to boost revenues and Electric Vehicle adoption

UC Davis Apr. 2019 Jul. 2019, May. 2020 Aug. 2020
Graduate Student Researcher with Dr. David L. Woodruff Davis, CA

- Created and distributed a wind-power simulation tool on GitHub under the supervision of Pr. David L. Woodruff. Journal publication
- Developed spatio-temporal scenarios using Gaussian Markov Random Field. Work in review
- Analyzed the improvement of power dispatch decisions based on a stochastic unit commitment under simulated scenarios

EDUCATION

University of California, Berkeley Sept. 2019 - exp. Dec 2023
Master of Science & PhD in Civil and Environmental Engineering (GPA: 3.8) Berkeley, CA

- **Coursework**: Optimization, Machine Learning, Power Systems, Nonlinear Systems, Stochastic Processes
- **Research**: PhD thesis on "Control under uncertainty of Energy Systems" with Professor Scott Moura.

Ecole Polytechnique Sept. 2016 - June 2020
Bachelor of Science and Master of Science in Applied Mathematics (GPA: 3.73) Palaiseau, FR

- **Coursework**: Control, PDE, Economics, Machine Learning, Operations Research

SELECTED PUBLICATIONS

[1] **Guillaume Goujard**, Chitra Dangwal, Preet Gill, Dylan Kato, Scott J. Moura, "Modeling and State Estimation for Lithium Sulfur Batteries as a Piecewise Affine System"
Submitted to Conference on Decision and Control 2023

[2] **Guillaume Goujard**, Patrick Keyantuo, Mathilde Badoual, Scott J. Moura, "Exploration vs. Exploitation in Airborne Wind Energy Systems via Information-Directed Sampling Control"
American Control Conference 2022

[3] **Guillaume Goujard**, Mathilde D. Badoual, Kieran A. Janin, Salomé Schwarz, Scott J. Moura, "Optimal Siting, Sizing and Bid Scheduling of a Price-Maker Battery on a Nodal Wholesale Market"
Accepted & Presented at the American Control Conference 2021

[4] **Guillaume Goujard**, Jean-Paul Watson, David L. Woodruff, "Mape Maker: A Scenario Creator."
Energy Systems

SKILLS

Languages : French (Native), English (Fluent)
Coding : Python (fluent; Sklearn, pytorch, Cvxpy, pyomo), LaTeX
Teaching : Teaching Assistant for E7-"Intro to Computer Programming for Scientists and Engineers" at UC Berkeley
Volunteering : Running for a Better Oakland, Social chair of IEEE Power System and Energy chapter at UC Berkeley
Citizenships : France, Canada

HOBBIES AND INTERESTS

Multicultural experiences : Canada 1996 to 2003, France 2003 to 2019, USA 2019 to now
Sports : Basketball team at Polytechnique, Running (2x marathon finisher), Backpacking