Edward Arthur **Quarm Jnr.**

Machine Learning · Optimization · Deep Learning

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Summary

Hi, I'm passionate about helping computers think independently. I'm a computational data scientist with 5 years of experience in developing algorithms to automate processes using techniques from machine learning, deep learning and control systems. I bring extensive skills in stochastic optimization, mixed-integer programming, linear and non-linear programming and robust optimization schemes. In my spare time I enjoy taking pictures!

Work Experience

Pacific Northwest National Laboratory

Washington, USA

Analytics Intern — *June 2021 - September 2021*

- Implemented stochastic optimization algorithm for multi-scenario Hurricane contingency analysis on Peurto Rico 1,200-bus Mesh Network.
- Formulated optimization problem with the objective to minimize generator operation cost and minimize network losses subject to operation and network constraints.
- Validated simulation results (power and voltage set-points) in PSS/E and PowerWorld power systems modeling tools.

The University of Texas at Arlington

Texas, USA

Research Assistant — *Jan. 2017 - June 2021*

- Modeled power system optimization problem of minimizing operation cost subject to technological constraints while considering uncertainty in problem formulation in MATLAB CVX framework.
- Reformulated the Mixed-Integer Program (MIP) by applying convex relaxations which make formulations scalable and tractable to be solved by MOSEK interior point solver.

Enstoa Inc.

Dallas, Texas

Machine / Deep Learning Intern — *June 2019 - Aug. 2019*

- Contributed to developing robust constraints for an MIP algorithm to optimize project scheduling for clients in the construction industry while maximizing profits
- Implemented python code to train image detection convoluted neural network (CNN) to identify objects such as walls, windows, rooms etc. in 2D floor plans.

Institute of Automatic Control, RWTH Aachen

Aachen, GERMANY

Research Intern — *Jan. 2016 - July 2016*

- Modeled state-space model of a 4 MW wind turbine drive-train and test bench in MATLAB
- Applied optimization algorithms to develop an H-infinity controller to emulate eigen frequencies of the mechatronic system in MATLAB robust optimization toolbox
- Successfully tested the working H-infinity controller in Hardware-in-the-Loop (HIL) dSPACE setup

Education

The University of Texas at Arlington

Texas, USA

Ph.D Electrical Engineering — *May 2017 - Dec. 2021 (Expected)*

Research Focus: Massively Scalable Computational Methods for Power System Scheduling in Electricity Markets
Advisor: Dr. Ramtin Madani

Université Grenoble Alpes

Grenoble, FRANCE

Msc. Systems Control and Information Technology — *Sept. 2015 - Nov. 2016*

Thesis Topic: Robust Multivariable Control of a Hardware-In-the-Loop (HIL) simulation for a 4 MW system test bench for wind turbines
Advisor: Dr. Uwe Jassmann

Kwame Nkrumah University of Sci. & Tech. (KNUST)

Kumasi, GHANA

Bsc. Electrical & Electronic Engineering — *Sept. 2009 - July 2013*

Thesis Topic: Electrical Impact Analysis of Grid-Connected Solar PV Systems on Distribution Grids - A Penetration level Study
Advisor: Dr. Emmanuel K. Anto

Publications

- **E. Quarm Jnr** and R. Madani, **"Microgrid Scheduling under Transient Load Uncertainty via Cone Programming Relaxation"** - 2021 Submitted for publication in IEEE Transactions on Power Systems
- **E. Quarm Jnr** and R. Madani, **"Scalable Security-Constrained Unit Commitment under Uncertainty via Cone Programming Relaxation"** - in IEEE Transactions on Power Systems, vol. 36, no. 5, pp. 4733-4744, Sept. 2021.
- **E. Quarm Jnr**, F. Zohrizadeh and R. Madani, **"A Scalable Computational Method for Security-constrained Unit Commitment with Energy Storage"** Abstract presented at INFORMS Annual Meeting, 2018
- F. Zohrizadeh, M. Kheirandishfard, **E. Quarm Jnr** and R. Madani, **"Penalized Parabolic Relaxation for Optimal Power Flow Problem"** 57th IEEE Conference on Decision and Control, 2018

Skills

Technical expertise

Python, PyTorch, Tensorflow,Keras, Scikit-learn, SQL,
PSS/E, PowerWorld, CPLEX, GUROBI, MOSEK, GAMS, CVX framework,
Mathlab & Simulink, C++, SAS, LaTeX

Natural Languages

English *(mother tongue)*, French *(full professional proficiency)* and German *(beginner)*

References

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PNNL

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