

Edward Quarm

Computational Data Scientist



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<https://edwardquarm.github.io/home/>

SUMMARY

I build solutions that help machines think independently. For 5+ years, I have developed algorithms to tackle challenging problems in operations research, machine learning and energy. Problems I love to solve are supervised and unsupervised learning, scheduling and portfolio optimization problems. I bring extensive skills in developing solutions in stochastic optimization, mixed-integer programming, linear and non-linear programming.

RELEVANT SKILLS

Gurobi & IBM ILOG CPLEX, Python, Numpy, Pandas, GAMS, PostgreSQL, MATLAB, GIT, Keras, Scikit-learn, TensorFlow, C++, SAS, CVXPY, MATLAB CVX, PYOMO.

PROFESSIONAL EXPERIENCE

PACIFIC NORTHWEST NATIONAL LABORATORY, Richland, WA

Analytics Intern, June 2021–September 2021

- Improved contingency preparedness for system operators by formulating and implementing stochastic optimization for multi-scenario contingency on grid network using grid dataset.
- Wrote clean and highly efficient code to minimize generator operations costs and network losses subject to system constraints in < 3months.
- Brought about the first implementation of stochastic multi-scenario optimization problem in the Energy group.

UT ARLINGTON, Arlington, TX

Research Assistant, June 2017–June 2021

- Published articles in IEEE journal on stochastic multi-scenario optimization problem able to tackle 12,000 binary variables and 2 million continuous variables in 35 minutes at 0.05% from global optimality.
- Wrote clean and highly efficient code to reformulate Mixed-Integer Program (MIP) to Semidefinite Program (SDP) which performed 10x faster than CPLEX and GUROBI solvers for large-scale problems.

ENSTOA INC., New York, NY

Machine Learning Intern, June 2019–August 2019

- Implemented python code to train image detection CNN to identify objects such as walls, windows, rooms etc. in thousands of 2D floor plans for clients in the construction industry using Pytorch and TensorFlow.
- Developed efficient python code for objective and constraints in a project scheduling optimization problem for clients in the construction industry to maximize profits. Code performed 5x times faster than previously developed.

EDUCATION

UT Arlington, Arlington, TX

Ph.D., Electrical Engineering, November 2021(Expected)

Research Focus: Massively Scalable Computational Methods for uncertainty scheduling in Electricity Markets (GPA: 3.79/4.0)

Universite Grenoble Alpes, Grenoble, FRANCE

MSc., Systems Control and Information Technology, November 2016

Research Focus: Robust Multivariable Control of a HIL simulation for a 4MW system test bench for wind turbines (Grade: Very Good)

KNUST, Kumasi, GHANA

BSc., Electrical & Electronics Engineering, July 2013

Honors: (GPA: 3.5/4.0)

RELEVANT PROJECTS

Anomaly detection using machine Learning (Repo: <https://tinyurl.com/anomalyML>)

- Developed machine learning algorithm to detect abnormalities in sensor data using statistical measures and sliding window.
- Tested the accuracy of statistical algorithm using confusion matrix.

Training a CNN using Keras on MNIST dataset (Repo: <https://tinyurl.com/CNNdigits>)

- Trained a large database of handwritten digits (MNIST dataset) using Tensorflow Keras.
- Code successfully identified handwritten digits at an accuracy of 98%.

Unit Commitment implementation using Gurobipy (Repo: <https://tinyurl.com/generatorscheduling>)

- Developed scheduling problem to schedule generators with objective of minimizing generation cost subject to system network constraints.

PUBLICATIONS

- **E.Quarm Jnr** and R. Madani, "Scheduling under transient uncertainty via cone programming relaxation" – 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"- 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. Kherandishfard, **E. Quarm Jnr** and R. Madani, "Penalized Parabolic Relaxation for Optimal Power Flow Problem" 57th IEEE Conference on Decision and Control, 2018

