Hafez Bazrafshan

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Experience

Senior Computational Software Engineer, Enverus 2025–present
Data Scientist, Habitat Energy 2024–2025

- Designed virtual trading algorithms to help DA traders
- Contributed to the bidding platform used by DA asset managers

Senior Electricity Market Optimization Engineer, EnergyVault 2023–2024

- Contributed to the VaultBidder^{TM} product
- Designed and managed databases for power market data

Principal Data Scientist, Enverus 2021–2023

I helped build and launch the electricity price forecast products. My responsibilities include the following:

- Build ML models that predict electricity market participants' behavior
- Implement and validate mathematical formulations that simulate the electricity market
- Research on how public data can be leveraged to improve forecast performance
- Build pipelines for automating forecasts based on most recent available data
- Conduct client meetings and incorporate feedback into our models

Energy Optimization Developer, Ascend Analytics 2019-2021

I supported the optimization modeling team. My tasks included the following:

- Developed and analyzed validity of large-scale decision-making models under uncertainty
- Derived detailed generator and energy asset optimization models for customers
- Benchmarked and pinpointed efficient implementation of legacy optimization routines

Post-PhD Research 2018-2019

I held several short-term research positions: (1) PostDoc at CU Boulder with Prof. K. Baker where I helped win Challenge 1 of the Grid Optimization Competition (2) PostDoc at University of Denver with Prof. A. Khodaei where I helped with research in optimization for energy systems and mentored undergraduate students with their projects (3) PostDoc at CU Boulder with Prof. E. Dall'Anese where I conducted theoretical research on power flow methods in distribution networks (4) Research Engineer at UT Austin with Prof. H. Zhu where I conducted research on convex relaxation for optimization problems in power system

Education

Ph.D. Electrical Engineering, The University of Texas at San Antonio 2018

Dissertation: Modeling and Optimization of Electrical Power Networks

M.S. Electrical Engineering, The University of Texas at San Antonio 2014

Thesis: Stochastic Optimization for Power Management in Radial Distribution Networks

B.S. Electrical Engineering Iran University of Science and Technology 2012
Concentration and research: Communications, Breast cancer detection, and biolectromagnetics

Stack

Python, Scikit-Learn, TensorFlow, Julia, MySQL, PostgresQL, Docker, Kubernetes, CVX, MOSEK, GAMS, AMPL, CPLEX, YALMIP, Pyomo, Xpress, IPOPT, OpenDSS, Matpower, PowerWorld, Rust

Sample publications

For more, please take a look at my website

(j2) **M. Bazrafshan** and N. Gatsis, "Comprehensive Modeling of Three-Phase Distribution Systems via the Bus Admittance Matrix," *IEEE Trans. Power Syst.*, vol. 33, no. 2, pp. 2015–2029, Mar. 2018.

(j1) **M. Bazrafshan** and N. Gatsis, "Convergence of the Z-Bus Method for Three-Phase Distribution Load-Flow with ZIP Loads," *IEEE Trans. Power Syst.*, vol. 33, no. 1, pp. 153–165, Jan. 2018.

Services

Reviewer for IEEE Transactions on Power Systems, Smart Grid **Best reviewer award 2018**, Sustainable Energy, Applied Energy, and several conferences such as SmartGridComm, GlobalSIP, CDC, ACC, and ECC

Awards and Honors

- Ranked 3rd and 5th (resp. in division 1 and 2) of the ARPA-E Grid Optimization Competition
- UTSA development award and IEEE student housing support (2014, 2015, 2016, 2018)
- UTSA best master's thesis 2014, Graduate Fellowship for Pursuing PhD 2014
- Valero research scholarships and travel grants 2012–2016
- Member of Etta Kappa Nu Honors Society

PhD Software

- **MultiphaseVRs**: Tap optimization for step-voltage regulators (SVRs) within an optimal power flow (OPF) problem: `http:github.com/hafezbazrafshan/MultiphaseVRs`
- **Three-phase distribution modeling** Constructs Y-BUS for the multi-phase 37-bus, 123-bus, 900-bus, and the 8500-node distribution networks and computes the load-flow via Z-BUS: `https://github.com/hafezbazrafshan/three-phase-modeling`
- **Contraction mapping** Numerically verifies that Z-Bus method is a contraction mapping on IEEE distribution test networks, implements forward-backward sweep load-flow: `https://github.com/hafezbazrafshan/contractionmapping`
- **LQR-OPF**:Performs load-following control on power networks via either linear-quadratic regulator (LQR) or automatic generation control (AGC): `https://github.com/hafezbazrafshan/LQR-OPF`.

Student employment

Graduate Research Assistant, UTSA 2014-2018
Teaching Assistant, UTSA (Engineering Analysis, Electromagnetics, Intro to EE) 2013-2015
Lab Assistant, UTSA, (Machine Learning Algorithms for Indoor Position Systems) 2013
Grader, UTSA 2013-2014
Teaching Assistant, IUST, (Communication Systems) Tehran, Iran 2011