

Sepideh Pourazarm

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Profile

PhD candidate in Systems Engineering at Boston University. Expertise in optimization, Machine Learning, big data analysis and modeling and control of network systems. Research focus on developing innovative solutions towards building a “smart city.” Motivated individual and systematic thinker.

Technical Background

- Optimization Theory
- Statistical Pattern Recognition
- Machine Learning
- Data Analysis
- Optimal Control
- Advanced Stochastic Modelling
- Dynamic Programming
- Probability and Statistical Methods
- Queueing Systems
- Discrete Event and Hybrid Systems

Skills

- Programming Languages: Python, JAVA, C++, R
- Typesetting/Modeling Software: MATLAB; CPLEX; Opt. Solvers: Gurobi, Opti, GPOPS-II; Octave, LATEX

Experience

Boston University, Control of Discrete Event Systems Laboratory, Boston, MA May 2013-Present

Graduate Research Assistant

Research project in collaboration with City of Boston.

Investigated performance of traffic network in Eastern Massachusetts.

- Analyzed traffic data to convert spatial average speed to average flow on each road.
- Estimated origin-destination flow demand for highway interstate sub-network.
- Estimated data-driven congestion functions for different scenarios by inverse optimization techniques.
- Quantified price of anarchy for highway interstate sub-network.

Research assistant on NSF grant project:

Developed algorithm to maximize lifetime of wireless sensor networks

- Incorporated non-ideal battery dynamic of nodes into the optimal control problem (OCP.)
- Reduced the computational complexity of the OCP by doing Hamiltonian Analysis.
- Investigated the network performance under sinkhole security attacks.
- Redefined the lifetime for networks with mobile source nodes.

Developed algorithm to determine optimal routing for Electric vehicles

- Formulated optimization problems for user-centric vs. system-centric scenarios.
- Reduced the computational complexity of the problems by problem decomposition.
- Quantified price of anarchy using real traffic data.

Graduate Teaching Assistant, Engineering Computation Course, Introduction to Programming Sept. 2012-May 2013

Nargan Engineering and Constructors, Tehran, Iran

2008-2011

Instrumentation and Control Engineer, Oil and Gas Industry

- Prepared data sheets and technical bid evaluation for field instruments.
- Prepared control and instrument technical room layouts, cable layout and grounding drawings.

Fazar Tajhiz, Supplier of measuring and monitoring instruments, Tehran, Iran
• Instrumentation Engineer, Oil and Gas Industry

Jun. 2007-Jun 2008

Education

Boston University, College of Engineering, Boston, MA

expected Fall 2016

PhD Candidate, Systems Engineering

Thesis: "Control and Optimization Approaches for Energy-limited Systems"

K.N.Toosi University of Technology, Tehran, Iran

• Master of Science in Electrical Engineering, Major in Control System

June 2007

• Bachelor of Science in Electrical Engineering, Major in Electronics

Sept. 2004

Professional activities and services

Peer Reviewing

Journals: Automatica, Control Engineering Practice, IEEE Trans. on Control of Network Systems, Journal of Network and Computer Applications, IEEE Trans. on Information Theory, International Journal of Robust and Nonlinear Control.

Organizational Activities

• Center for Information and Systems Engineering (CISE) Seminars, Student Host

2013 - 2016

• CISE, Graduate Student Workshop, Organizer and Student Chair, Boston University

Jan. 2016

Awards

- BU Graduate Research Symposium, Awarded CISE honorable mention, March 2015
- Best Student Paper Finalist Award, IEEE Int. Conf. on Networking, Sensing and Control, IEEE ICNSC 2014
- Systems Engineering PhD Student Travel Award, Oct. 2014 (GHC 2014), and Oct. 2015 (ADHS 2015);
- NSF Travel Award, NSF Data Science Workshop, Aug 2015

Selected Publications

- J. Zhang, **S. Pourazarm**, I. Paschalidis, C.G. Cassandras, The Price of Anarchy in Transportation Networks by Estimating User Cost Functions from Actual Traffic Data, 55th IEEE Conf. on Decision and Control, (Accepted)
- **S. Pourazarm**, C.G. Cassandras, Energy-Based Lifetime Maximization and Security of Wireless Sensor Networks with General Non-ideal Battery Models, IEEE Trans. on Control of Network Systems, 2016
- **S. Pourazarm**, C.G. Cassandras, Lifetime Maximization of Wireless Sensor Networks with a Mobile Source Node, in the Proc. of 54th IEEE Conference on Decision and Control (CDC2015), Dec. 2015
- **S. Pourazarm**, C.G. Cassandras, System-Centric Minimum-Time Paths for Battery-Powered Vehicles in Networks with Charging Nodes, IFAC Conf. on Analysis and Design of Hybrid Systems, 2015
- **S. Pourazarm**, C.G. Cassandras, T. Wang, Optimal Routing and Charging of Energy-limited Vehicles in Traffic Networks, International Journal of Robust and Nonlinear Control, Aug. 2015
- T. Wang, C.G. Cassandras, **S. Pourazarm**, Optimal Motion Control for Energy-aware Electric Vehicles, Control Engineering Practice Journal, Feb. 2015
- **S. Pourazarm**, C.G. Cassandras, A. Malikopoulos, Optimal Routing of Electric Vehicles in Networks with Charging Nodes: A Dynamic Programming Approach, in Proc. of IEEE International Electric Vehicle Conf., 2014
- **S. Pourazarm**, C.G. Cassandras, Optimal Routing of Energy-aware Vehicles in Networks with In-homogeneous Charging Nodes, in Proc. of 22nd IEEE MED Conference on Control and Automation, Jun. 2014