UNIVERSITY OF CALIFORNIA MERCED | SCHOOL OF ENGINEERING

Electrical Engineering and Computer Science Seminar

Distributed Optimization and Learning for Intelligent Interdependent Networks

Dr. M. Hadi Amini

Friday, March 13, 2020
12:00 pm in COB 114

Faculty Host: Prof. Shijia Pan

Abstract

There is a transition from centralized decision-making paradigms towards distributed algorithms. Motivated by the large-scale optimization and learning problems in the smart city infrastructures that require comprehensive models and efficient computational methods, this talk will focus on two major paradigm changes in computational and application layers. The first part of this talk focuses on advances in smart power grids and electrified transportation networks, as well as coupling elements that affect the operation of both networks. I will broadly explain our novel framework for optimal operation of the interdependent power system and electrified transportation network. This holistic framework takes into account layered networks and the asynchronous information exchange to improve the operation of each layer considering the exogenous inputs from other networks. Currently, there is a need for control centers to solve large-scale optimization problems. This increases the computational complexity and requires extensive information sharing. The second part of this talk is devoted to distributed/decentralized optimization and learning methods in the context of interdependent networks. I will explain and demonstrate how the proposed distributed/decentralized algorithms achieve three major goals: 1) reducing the computational complexity of the large-scale optimization problems, 2) preserving the information privacy of entities over the network, and 3) enabling scalability and plug-and-play capability. The key advantage of the proposed methods is to eliminate the control centers and distribute computing among agents, i.e., in our proposed solutions, each agent/node will only exchange local information with a limited number of agents.

For additional information contact Prof. Carreira-Perpiñán mcarreira-perpinan@ucmerced.edu

soegrads@ucmerced.edu

M. Hadi Amini, School of Computing and Information Sciences, FIU

Biography

M. Hadi Amini is an Assistant Professor at the School of Computing and Information Sciences at Florida International University. He is the director of Sustainability, Optimization, and Learning for InterDependent networks laboratory (www.solidlab.network). He received his Ph.D. in Electrical and Computer Engineering from Carnegie Mellon University in 2019, where he received his M.Sc. degree in 2015. He also holds a doctoral degree in Computer Science and Technology. Prior to that, he received M.Sc. degree from Tarbiat Modares University in 2013, and the B.Sc. degree from Sharif University of Technology in 2011. His research interests include distributed optimization and learning algorithms, distributed computing and intelligence, sensor networks, interdependent networks, and cyber-physical-social resilience. Application domains include smart cities, energy systems, transportation electrification, and healthcare.

Hadi is a life member of IEEE-Eta Kappa Nu (IEEE-HKN), the honor society of IEEE. He served as as technical program committee of several IEEE and ACM conferences; and as the lead editor for a book series on ''Sustainable Interdependent Networks'' since 2017. He has published more than 80 refereed journal and conference papers, and book chapters. He edited/authored six books. He is the recipient of the best paper award from "2019 IEEE Conference on Computational Science & Computational Intelligence", best reviewer award from four IEEE Transactions, the best journal paper award in "Journal of Modern Power Systems and Clean Energy", and the dean's honorary award from the President of Sharif University of Technology. (Homepage: www.hadiamini.com)