



Channing Network Science Seminar

May 25th (Friday), 2018, 11am @ 5th-floor conference room



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Distributionally Robust Learning and Applications to Predictive Health Analytics

Abstract: We present a distributionally robust optimization approach to learning predictive models, either in the context of classification or regression. Motivated by medical applications, we assume that training data are contaminated with (unknown) outliers, which have the effect of skewing the parameters of the model. Our robust learning approach is able to guard against such outliers and learn model parameters consistent with the non-outlying data. We establish rigorous out-of-sample guarantees on the performance of the method and develop extensions to nonlinear models, where different predictive models are used for different clusters of the data, or even individual data points. We will discuss several medical applications of our methods, including predicting hospitalizations for chronic disease patients, predicting and preventing re-admissions following general surgery, predicting hospital length-of-stay for surgical patients, and detecting CT scans with an abnormal radiation dosage delivered to the patient.

Bio: Yannis Paschalidis is a Professor of Electrical and Computer Engineering, Systems Engineering, and biomedical Engineering at Boston University. He is the Director of the Center for Information and Systems Engineering (CISE). He obtained a Diploma (1991) from the National Technical University of Athens, Greece, and an M.S. (1993) and a Ph.D. (1996) from the Massachusetts Institute of Technology (MIT), all in Electrical Engineering and Computer Science. He has been at Boston University since 1996. His current research interests lie in the fields of systems and control, networks, optimization, operations research, computational biology, and medical informatics.

Prof. Paschalidis' work has been recognized with a CAREER award (2000) from the National Science Foundation, the second prize in the 1997 George E. Nicholson paper competition by INFORMS, the best student paper award at the 9th Intl. Symposium of Modeling and Optimization in Mobile, Ad Hoc, and Wireless Networks (WiOpt 2011) won by one of his Ph.D. students for a joint paper, an IBM/IEEE Smarter Planet Challenge Award, and a finalist best paper award at the IEEE International Conference on Robotics and Automation (ICRA). His work on protein docking (with his collaborators) has been recognized for best performance in modeling selected protein-protein complexes against 64 other predictor groups (2009 Protein Interaction Evaluation Meeting). His recent work on health informatics won an IEEE Computer Society Crowd Sourcing Prize. He was an invited participant at the 2002 Frontiers of Engineering Symposium organized by the National Academy of Engineering, and at the 2014 National Academies Keck Futures Initiative (NAFKI) Conference. Prof. Paschalidis is a Fellow of the IEEE and the Editor-in-Chief of the IEEE Transactions on Control of Network Systems.

Hosted by Yang-Yu Liu