

EE Department Seminars

(Acceptable as EE 579 and SCO 579 seminars)

January 8, 2009, Friday, 3 p.m.
Yorgo I Stefanopulos Meeting Lounge (KB 217)

Convex Relaxations for Robust Identification of Hybrid Models

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In order to extract useful information from a data set, it is necessary to understand the underlying model. This talk will address two of the main challenges in identification of such models. First, the data is often generated by multiple, unknown number of sources; that is, the underlying model is usually a mixture model or hybrid model. This requires solving the identification and data association problems simultaneously. Second, the data is usually corrupted by noise necessitating robust identification schemes. Motivated by these challenges we consider the problem of robust identification of hybrid models that could interpolate the data within a given noise bound. In particular, for static data we try to fit affine subspace arrangements to the data; and for dynamic data we try to infer the underlying switched affine dynamical system. We define suitable a priori model sets and objective functions that seek "simple" models which can capture the information sparsely encoded in the data set. Although this leads to generically NP-Hard problems, we develop computationally efficient algorithms based on convex relaxations. The effectiveness of the proposed methods will be illustrated using both simulations and several non-trivial problems arising in computer vision applications such as image/video segmentation and human activity analysis.

Necmiye ÖZAY received the B.S. degree in Electrical and Electronics Engineering from Bogazici University, Istanbul in 2004 and the M.S. degree in Electrical Engineering from the Pennsylvania State University, University Park, PA in 2006. Currently she is a Ph.D. candidate at Electrical and Computer Engineering Department at Northeastern University, Boston, MA. In summer 2008, she was a research intern at GE Global Research, Niskayuna, NY. She has also held short term visiting positions at Sabanci University, Istanbul in 2005 and Polytechnic University of Catalunya, Barcelona in 2008. Her research interests lie at the broad interface of system identification, convex optimization, control theory, and computer vision. She received the IEEE Control Systems Society Conference on Decision and Control Best Student Paper Award in 2008 and the IEEE Computer Society Biometrics Workshop Best Paper Honorable Mention Award in 2009. She is a student member of the IEEE and SIAM.