

SEMINAR NOTICE

Preston M. Green Department of Electrical and Systems Engineering

OFF-GRID COMPRESSED SENSING FOR SUPER RESOLUTION DIRECTION-OF-ARRIVAL ESTIMATION

Ph.D. Preliminary Research Examination

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Abstract: In traditional compressed sensing theory, the dictionary matrix is given a priori, whereas in real applications this matrix suffers from random noise and fluctuations. In this research we consider a signal model where each column in the dictionary matrix is affected by a structured noise. This formulation is common in direction-of-arrival (DOA) estimation of off-grid targets, encountered in both radar systems and array processing. We propose to use joint sparse signal recovery to solve the compressed sensing problem with column-wise mismatches and also give an analytical performance bound on this joint sparse recovery. We show that, under mild conditions, the reconstruction error of the original sparse signal is bounded by both the sparsity and the noise level in the measurement model. Moreover, we implement fast first-order algorithms to speed up the computing process. Numerical examples demonstrate the good performance of the proposed algorithm, and also show that the joint-sparse recovery method yields a better reconstruction result than existing methods. By implementing the joint sparse recovery method, the accuracy and efficiency of DOA estimation are improved in both passive and active sensing cases.

DATE: Wednesday, March 19, 2014

TIME: 10:10 a.m.

PLACE: Green Hall, Room 0120

Dissertation advisor:
Dr. Arye Nehorai

This seminar is in partial fulfillment
of the Doctor of Philosophy degree