

Signal Processing Seminar

Title: Distortion-Rate Functions and Greedy Reconstruction Algorithms for Quantized Compressive Sensing

Speaker: Professor Olgica Milenkovic
ECE - UIUC

Date: Wednesday, February 4, 2009

Time: 4:00 - 5:00 pm

Where: 4269 Beckman Institute

Abstract: Compressive sensing (CS) is a linear sampling method which converts unknown input signals, embedded in a high dimensional space, into signals that lie in a space of significantly smaller dimension. CS schemes have received significant attention due to their wide applications in medical imaging, biosensing, spectrum monitoring and other areas of signal processing.

For most practical applications, it is reasonable to assume that the measurements are quantized and that therefore one does not have infinite precision observations. In this talk, we characterize the average reconstruction distortion introduced by quantizing compressive sensing measurements. Both uniform and non-uniform, scalar and vector quantization schemes are considered. We derive analytical expressions for the corresponding asymptotic distortion-rate functions, provided that the measurement matrices belong to a predefined random matrix ensemble.

Furthermore, we propose new modifications of LP and greedy reconstruction algorithms that accommodate quantization errors, and evaluate their performance through extensive computer simulations.

This is joint work with Wei Dai and Vin Pham Hoa, UIUC.