Spring 2014 Seminar Series
Presented by the CS Division

STRUCTURED SPARSE MODELS FOR OBJECT DETECTION AND CLASSIFICATION

WEDNESDAY APRIL 16, 2014

10:30 AM – HEC 101

In this presentation, different sparsity models for object detection and classification are discussed. The key innovative idea here is the use of different structured sparse constraints to simultaneously represent a multi-sensor (multi-measurement) test data by a linear combination of a few common training samples (basis) but weighted with a different set of coefficients for each measurement. Structured sparsity models (joint, Laplacian, group) automatically incorporate the inter-correlations (or dependencies) between multiple homogeneous (or heterogeneous) sensor data by assuming that the multi-measurement data represents the same physical event. The sparse representations of the measurements are obtained by simultaneously decomposing them over the given multi-modal dictionaries consisting of the training samples of all the classes and sensors. The recovered sparse coefficient vectors are then directly used for determining the label of the test measurements. Simulation results for several army applications show that the structured sparse-based classifier outperforms the classical SVM-based classification approach.

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Dr. Nasser M. Nasrabadi is a Senior Research Scientist (ST) with the US Army Research Laboratory (ARL). He received the B.Sc. (Eng.) and Ph.D. degrees in Electrical Engineering from Imperial College of Science and Technology (University of London), London, England, in 1980 and 1984, respectively.

During 1985 to 1986 he worked with Philips research laboratory in NY as a member of technical staff. From 1986 to 1991 he was an assistant professor in the Department of Electrical Engineering at Worcester Polytechnic Institute, Worcester, MA. From 1991 to 1996 he was an associate professor with the Department of Electrical and Computer Engineering at State University of New York at Buffalo, Buffalo, NY. Since September 1996 he has been a Senior Research Scientist at ARL working on image processing and machine learning. He has served as an associate editor for the IEEE Transactions on Image Processing, the IEEE Transactions on Circuits, Systems and Video Technology, and the IEEE Transactions on Neural Networks. He is a Fellow of ARL, SPIE and IEEE.