Information Science and Technology Seminar Speaker Series

Dr. Alina Zare
University of Missouri

Multiple Instance Learning Approaches for Target Characterization

Wednesday, November 18, 2015

3:00 - 4:00 PM

TA-3, Bldg. 1690, Room 102 (CNLS Conference Room)

Abstract: Most supervised machine learning algorithms assume that each training data point is paired with an accurate training label (for classification) or value (for regression). However, obtaining accurate training label information is often time consuming, expensive, and/or infeasible for large data sets. Furthermore, human annotators may be inconsistent when labeling a data set, thus providing inherently imprecise label information. Given this, in many applications, one has access only to inaccurately labeled training data. For example, consider the case of single-pixel or sub-pixel target detection within remotely sensed imagery, often only GPS coordinates for targets of interest are available with an accuracy ranging across several pixels. Thus, the specific pixels that correspond to target is unknown (even with the GPS ground-truth information). Training an accurate classifier or learning a representative target signature from this sort of uncertain labeled training data is extremely difficult in practice. In this example, accurately labeled training is unavailable and an approach, such as Multiple Instance Learning (MIL) methods, that can learn from uncertain training labels is required. The challenge of needing to learn from weakly labeled data or uncertain training labels plagues many applications.

Biography: Alina Zare (PhD, University of Florida) teaches and conducts research in the area of pattern recognition and machine learning in the Electrical and Computer Engineering Department at the University of Missouri. Dr. Zare's research interests include hyperspectral image analysis, synthetic aperture sonar (SAS) analysis, LIDAR data analysis, wide band electromagnetic induction (WEMI) data analysis, landmine and explosive hazard detection, sparsity promotion, and machine learning. Her publications include "Endmember Variability in Hyperspectral Analysis" (2014 IEEE SPM), "Piece-wise Convex Multiple Model Endmember Detection and Spectral Unmixing" (2013 IEEE TGRS)," "Sampling Piece-wise Convex Endmember Detection" (2013 IEEE TGRS), "Directly Measuring Material Proportions using Hyperspectral Compressive Sensing" (2011 IEEE GRSL), "Hyperspectral Band Selection and Endmember Detection and Sparsity Promoting Priors" (2008, IEEE GRSL), and "Sparsity Promoting Iterated Constrained Endmembers" (2007, IEEE GRSL). Dr. Zare is a recipient of the prestigious National Science Foundation CAREER award for her research on "Supervised Learning with Incomplete and Uncertain Data."

For more information contact the technical host James Theiler, jtheiler@lanl.gov, 665-5682.

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