# Geometry-based Learning in High Dimensional Data

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Abstract:

High dimensional covariate information is taken as a detailed description of any individuals involved in a machine learning and classification problem. The inter-dependence patterns among these covariate vectors may be unknown to researchers. This fact is not well recognized in classic and modern machine learning literature. In this talk, I will implement an accommodating attitude to exploit potential inter-dependence patterns embedded within the high dimensionality throughout by first computing the similarity between data nodes and then discovering pattern information in the form of Ultrametric tree geometry among almost all the covariate dimensions involved. And I will make use of these patterns to build supervised and semi-supervised learning algorithms. My data-driven learning approaches begin with the binary-class setting, then go into the multiple-class setting. Finally, I will demonstrate the efficiencies of my learning algorithms with several datasets.