Unsupervised Ensemble Learning, making good decisions when knowing (almost) nothing
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In various applications, one is given the advice or predictions of several experts of unknown reliability, over multiple questions or queries. This scenario is different from standard supervised learning where classifier accuracy can be assessed from available labeled training or validation data, and raises several questions: given only the predictions of several classifiers of unknown accuracies, over a large set of unlabeled test data, is it possible to
a) reliably rank them, and
b) construct a meta-classifier more accurate than any individual classifier in the ensemble?
In this talk we'll show that under various independence assumptions between classifier errors, this high dimensional data hides simple low dimensional structures.
Exploiting these, we will present simple spectral methods to address the above questions, and derive new unsupervised spectral meta-learners.
We'll prove these methods are asymptotically consistent when the model assumptions hold, and present their empirical success on a variety of unsupervised learning problems.