

A Continuous Complexity Analysis of Support Vector Machines

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In this talk we will analyze support vector machine (SVM) learning algorithms from the standpoint of continuous complexity theory. Such a continuous algorithmic analysis is appropriate to study the complexity of SVM's, which are formulated in the language of continuous operations (function evaluation and the basic arithmetic operations). We will study information and algorithmic complexity separately, analyzing optimality properties. We will also analyze a scaling between the two. Such a scaled relationship is motivated by some currently studied paradigms in which increased information (e.g., examples) calls for increased algorithmic complexity (e.g., polynomial order of the approximating function). This scaling analysis will yield error bounds on our algorithms. We will apply the algorithms studied to a machine learning analysis bioinformatic data.