Title:
Statistical Model-based Optimization

Speaker:
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Abstract:
The literature concerned with the development of optimization techniques is both large and diverse. Optimization algorithms that construct some kind of statistical model and use this model to influence the search process can be found in areas such as Evolutionary Computation, Machine Learning and Engineering Design, as well as in the fields of stochastic and global optimization. The algorithms considered in this talk are based on a model of the density of "promising" points from a sample or population evaluated at a given iteration of the algorithm.

The Cross-entropy method uses a probability density function to generate a sample of candidate solutions at each iteration of the algorithm. This sample is evaluated with respect to the objective function of the problem. A proportion of the best points in the sample are then used to modify the search distribution so as to decrease the cross-entropy (or Kullback-Liebler) distance between the search distribution and a degenerate distribution over the (estimated) optimal solution.

An alternative approach that is prevalent in statistics and machine learning is to use Bayesian inference. Based on this framework, a simple continuous Bayesian Estimation of Distribution Algorithm is described.