Model-Based Optimization and Algorithm Configuration

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Model-Based optimization, especially in its combination of Gaussian processes coupled with the expected improvement criterion (EGO algorithm) has arguably become one of the most important techniques for dealing with expensive black-box optimization problems, i.e., where single objective function evaluations are already extremely time-consuming. A closely related - but more challenging - problem is algorithm configuration. Here, we are given a set of so-called problem instances and need to identify the optimal settings of a computational approach that "solves" them. Prominent examples are solvers for discrete optimization, but the model selection problem in machine learning / data mining can also be cast into this framework.
In my talk I will introduce model-based optimization and explain how its techniques can be transferred to algorithm configuration. I will highlight current work in this area and discuss open challenges that remain.