統計科學研究所
INSTITUTE OF STATISTICAL SCIENCE

統計所學術演講　中研院統計所

學　術　演　講

講　題：A hierarchical expected improvement method for Bayesian optimization

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時　間：2024年2月2日(星期五)，10:30-12:00

地　點：統計所B1演講廳

Abstract

The Expected Improvement (EI) method is a widely-used Bayesian optimization method, which makes use of a fitted Gaussian process model for efficient black-box optimization. However, one key drawback of EI is that it is overly greedy in exploiting the fitted Gaussian process model, which results in suboptimal solutions. We propose a new hierarchical EI (HEI) framework, which makes use of a hierarchical Gaussian process model. HEI preserves a closed-form acquisition function, and corrects the over-greediness of EI by encouraging exploration. Under certain prior specifications, we prove the global convergence of HEI over a broad function space, and derive global convergence rates under smoothness assumptions on the objective function. We then introduce hyperparameter estimation methods which allow HEI to mimic a fully Bayesian procedure while avoiding expensive Markov-chain Monte Carlo sampling. Numerical experiments and a toy semiconductor optimization application show the improvement of HEI over existing black-box optimization methods.

(Authors: Zhehui Chen, Simon Mak, and C. F. Jeff Wu; to appear in JASA T&M)

※ 茶　會：10：10開始　　※ 英文演講，實體與線上視訊同步進行。