STAT 280B-01: Seminars in Statistics on Oct-28th, 2019 (Monday 4pm in Engineering 2, Room 192)

Speaker: Matthias Poloczek, Uber AI Labs

Title: Scalable Bayesian optimization for high dimensional expensive functions

Abstract: Bayesian optimization has recently emerged as a powerful method for the sample-efficient optimization of expensive black-box functions. These functions do not have a closed-form and are evaluated for example by running a complex simulation, a lab experiment, or solving a PDE. Use cases arise in machine learning, e.g., when optimizing a reinforcement learning policy; examples in engineering include the design of aerodynamic structures or searching for better materials. However, the application of Bayesian optimization to high-dimensional problems remains challenging, and on difficult problems, Bayesian optimization is often not competitive with other paradigms. In the first part of the talk I will give a self-contained introduction to Bayesian optimization. Then I will present novel algorithms that overcome the previous limitations of Bayesian optimization and set a new state-of-the-art performance for high-dimensional problems. Based on joint work with Alexander Munteanu and Amin Nayebi presented at ICML 2019 and on joint work with David Eriksson, Michael Pearce, Jake Gardner, Ryan Turner that will appear in the Proc. of NeurIPS 2019.

Short Bio: Matthias leads the Bayesian optimization team at Uber AI. His research interests lie at the intersection of machine learning and optimization. Recently, he has focused on enabling Bayesian optimization for "exotic" black-box problems that arise in aerospace engineering and materials science. Matthias received his PhD in CS from Goethe University in Frankfurt in 2013 and then worked as a postdoc at Cornell with David Williamson and Peter Frazier from 2014 until 2017. He was an Assistant Professor in the Department of Systems and Industrial Engineering at the University of Arizona from 2017 until 2019.

Affiliation: Uber AI

Email: poloczek@uber.com