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SenSIP Seminar Series

The Glass and its Knockoffs are Half Full: The Power of Optimism in Multi-Fidelity Optimization

Presenter: Gautam Dasarathy
Assistant Professor in ECEE
April 12th, 2019, 3:00 PM / Room: GWC 487

Abstract

 Abstract: In many scientific and engineering applications, we are tasked with the optimization of a black-box function that is often expensive even to evaluate. However, in many cases, cheap approximations to this function may be obtainable. For example, the real world behavior of an autonomous vehicle can be (possibly poorly) approximated by a significantly cheaper computer simulation. The cross-validation behavior of a neural network maybe approximated by small representative samples of the training set. One might hope that these approximations can be used to efficiently eliminate vast regions of the optimization space, and adaptively hone the search onto a small, promising region. In this talk, I will show how one can formalize this task as a multi-fidelity bandit problem where the target function and its approximations are sampled from a Gaussian process. I will introduce a new meta-algorithm based on the principle of optimism in the face of uncertainty that (a) comes with theoretical guarantees which reveal the above intuitive behavior, and (b) empirically vastly outperforms other known methods on several synthetic and real experiments.

Bio: Gautam Dasarathy is an Assistant Professor in the School of ECEE at ASU. He received his M.S. and Ph.D. degrees in Electrical and Computer Engineering from the University of Wisconsin - Madison in 2010 and 2014 respectively. He was then a postdoctoral researcher in the Machine Learning department at Carnegie Mellon University and at the Electrical and Computer Engineering department at Rice University. His research interests lie in the areas of machine learning, signal processing, high-dimensional statistics, and networked systems.

Refreshments will be served

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