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THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY

Department of Mathematics

SEMINAR ON STATISTICS AND MACHINE LEARNING

ROOT-SGD: Sharp Nonasymptotics and Asymptotic Efficiency in a Single Algorithm

By

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Abstract

The theory and practice of stochastic optimization has focused on stochastic gradient descent (SGD) in recent years, retaining the basic first-order stochastic nature of SGD while aiming to improve it via mechanisms such as averaging, momentum, and variance reduction. Improvement can be measured along various dimensions, however, and it has proved difficult to achieve improvements both in terms of nonasymptotic measures of convergence rate and asymptotic measures of distributional tightness. In this work, we consider first-order stochastic optimization from a general statistical point of view, motivating a specific form of recursive averaging of past stochastic gradients. The resulting algorithm, which we refer to as Recursive One-Over-T SGD (ROOT-SGD), matches the state-of-the-art convergence rate among online variance-reduced stochastic approximation methods. Moreover, under slightly stronger distributional assumptions, the rescaled last-iterate of ROOT-SGD converges to a zero-mean Gaussian distribution that achieves near-optimal covariance. This is a joint work with Wenlong Mou, Martin Wainwright, and Michael Jordan.

Biography: *Dr. Junchi Li "Chris" is currently a research scientist at University of California, Berkeley. He obtained his B.S. from Peking University and his Ph.D. from Duke University, both in mathematics. He has since held several research positions, including the roles of visiting postdoctoral research associate in the Department of Operations Research and Financial Engineering, Princeton University and of visiting researcher in Tencent Technology. His research interests include statistical machine learning and optimization, scalable online algorithms for big data analytics, and stochastic dynamics on graphs and social networks. He has published original research articles in both top optimization journals and top machine learning conferences, including an oral presentation paper (1.23%) in NeurIPS 2017 and a spotlight presentation paper (4.08%) in NeurIPS 2018.*

Date : 28 August 2020 (Friday)
Time : 11:00am – 12:00noon
Zoom Meeting : https://hkust.zoom.us/j/5616960008

All are Welcome!