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Mean-field approximations for high-dimensional Bayesian regression and their applications

Thursday, May 2nd, 2024

11:50 AM

96 Frelinghuysen Road, CoRE Building, Room 431

Zoom Meeting: Meeting ID: 969 0606 4706

Password: 745339

<https://rutgers.zoom.us/j/96906064706?pwd=ZklvbExpRVBjQ3c5dUhhYTFuR2ZrZz09>

Light refreshments will be served in Hill 452, 11:15am

Abstract: Variational approximations provide an attractive computational strategy to approximate high-dimensional probability distributions, and are routinely employed in Bayesian inference. The Naive Mean-Field (NMF) approximation is the simplest version of this strategy—this approach approximates a high-dimensional probability distribution in KL divergence by a mixture of product distributions. The accuracy of NMF has been recently established under structural constraints such as sparsity, but is not understood in general. This talk will be in two parts: first, we will investigate the accuracy of the NMF approximation for high-dimensional Bayesian regression. Then, we will develop novel Empirical Bayes methodology for the linear model by leveraging the NMF approximation.

This is based on joint works with Jiaze Qiu (Harvard), Sumit Mukherjee and Bodhisattva Sen (Columbia).

Bio: Subhabrata Sen is an Assistant Professor of Statistics at Harvard University. Prior to Harvard, he was a Schramm postdoctoral fellow at Microsoft Research New England and MIT. He obtained his PhD from Stanford Statistics in 2017. His research lies at the intersection of applied probability, statistics and machine learning. His research interests include high-dimensional and non-parametric statistics, random graphs and inference on networks.

Subhabrata has received the NSF CAREER Award (2022), the Probability Dissertation Award from Stanford Statistics for his thesis, an AMS Simons Travel grant, and an honorable mention at the Bernoulli Society New Researcher Award (2018). He has been a long term visitor at the Simons Institute for the Theory of Computing in Fall 2021 and Fall 2022, and has been an invited tutorial lecturer for the Georgia Tech AI institute for advances in Optimization.

