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MASTER'S THESIS PRESENTATION

Online Statistical Inference for the Stochastic Gradient Descent — From Bootstrap to Covariance Estimation

WHEN
May 2, 2022
11:00 AM

WHERE
Zoom Meeting
For ZOOM presentations, details will be provided in an email announcement for this seminar.

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In many applications involving a large dataset or online learning, stochastic gradient descent (SGD) is widely used for parameter estimation. While the algorithm is popular for computation and memory efficiency, statistical inference remains much unexplored. The traditional plug-in method is not applicable when there is no explicit formula for the Hessian of loss function. In this paper, an online bootstrap procedure is discussed, which, upon the arrival of each observation, updates the SGD estimate and many randomly perturbed SGD estimates. Theoretical properties are established for a general class models that includes generalized linear models and robust regression as special cases. The finite-sample performance and numerical utility is evaluated by simulation studies and real data applications. However, this bootstrap approach turns out to be less efficient than a more recent work on estimating the covariance matrix directly.

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