MICHIGAN STATE UNIVERSITY
Department of Statistics and Probability

COLLOQUIUM

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On Theory for BART

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10:20 AM - 11:10 AM
Refreshments 10:00 AM
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Abstract

Ensemble learning is a statistical paradigm built on the premise that many weak learners can perform exceptionally well when deployed collectively. The BART method of Chipman et al. (2010) is a prominent example of Bayesian ensemble learning, where each learner is a tree. Due to its impressive performance, BART has received a lot of attention from practitioners. Despite its wide popularity, however, theoretical studies of BART have begun emerging only very recently. Laying the foundations for the theoretical analysis of Bayesian forests, Rockova and van der Pas (2017) showed optimal posterior concentration under conditionally uniform tree priors. These priors deviate from the actual priors implemented in BART. Here, we study the exact BART prior and propose a simple modification so that it also enjoys optimality properties. To this end, we dive into branching process theory. We obtain tail bounds for the distribution of total progeny under heterogeneous Galton-Watson (GW) processes exploiting their connection to random walks. We conclude with a result stating the optimal rate of posterior convergence for BART.

(joint with Enakshi Saha)

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