

COLLOQUIUM

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Hellinger Distance and Bayesian Non-Parametrics Hierarchical Models for Robust and Efficient Bayesian Inference

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A405 Wells Hall

10:20 a.m. - 11:10 a.m.

Refreshments: 10:00 a.m.

Abstract

We introduce a hierarchical framework to incorporate Hellinger distance methods into Bayesian analysis. We propose a model in which a Bayesian non-parametric prior is modified by the Hellinger distance between each non-parametric density and a proposed parametric family. The parameters in this family can then be estimated as hyperparameters in the model. In frequentist estimation, minimizing the Hellinger distance between a kernel density estimate and a parametric family has been shown to produce estimators that are both robust to outliers and statistically efficient when the parametric model is correct. We demonstrate that the same results are applicable when a non-parametric Bayes density estimate replaces the kernel density. We then demonstrate that robustness and efficiency also hold for the proposed hierarchical model. Our finite-sample behavior of the resulting estimates is investigated by simulation and on real world data.

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