



Workshop 2017
September 19-20, 2017, Amsterdam

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Title: « Concentration of tempered posteriors and of their variational approximations »

Abstract:

While Bayesian methods are extremely popular in statistics and machine learning, their application to massive datasets is often challenging, when possible at all. Indeed, the classical MCMC algorithms are prohibitively slow when both the model dimension and the sample size are large. Variational Bayesian methods aim at approximating the posterior by a distribution in a tractable family. Thus, MCMC are replaced by an optimization algorithm which is orders of magnitude faster. VB methods have been applied in such computationally demanding applications as including collaborative filtering, image and video processing, NLP and text processing...

However, despite very nice results in practice, the theoretical properties of these approximations are usually not known. In this paper, we propose a general approach to prove the concentration of variational approximations of fractional posteriors. We apply our theory to two examples: matrix completion, and Gaussian VB.