

Title: Metric Gaussian Variational Inference

Abstract:

Efficiently approximating high dimensional probability distributions is the key for Bayesian methods in imaging. The number of parameters easily grows beyond the millions, a regime in which many traditional methods are infeasible. Metric Gaussian Variational Inference approximates the posterior distribution with a special Gaussian distribution. It uses the geometric properties of the posterior as an uncertainty estimate, which does not require an explicit representation of the covariance despite capturing correlations between all parameters in the high dimensional space. A standardized model formulation makes it applicable for a wide range of complex models. Second order optimization together with linear scaling of the method and the intrinsic parallel structure allows to perform fast inference in problems exceeding hundreds of millions of parameters. In this lecture I will go into the details on how this is possible.