Special Issue

Approximate Bayesian Inference

Message from the Guest Editor

Extremely popular for statistical inference, Bayesian methods are also becoming popular in machine learning and AI: it is important for any device not only to predict well, but also to provide a quantification of the uncertainty of the prediction. Traditionally, Bayesian estimators were implemented by Monte-Carlo methods. These algorithms target exactly the posterior distribution. However, in machine learning, the volume of the data used in practice makes Monte Carlo methods too slow to be useful. Motivated by these applications, recently, many faster algorithms were proposed that target an approximation of the posterior. 1) Some methods still use Monte Carlo simulations, but target an approximation of the posterior: approximate Metropolis-Hastings based on subsampling, Langevin Monte Carlo, or ABC. 2) Approximations methods based on optimization, like variational approximations, Laplace approximations or EP. The objective of this special issue is to provide the latest advances in approximate Monte Carlo methods and in approximations of the posterior: design of efficient algorithms, study of the statistical properties of these algorithms, and challenging applications.

Guest Editor

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The concept of entropy is traditionally a quantity in physics that has to do with temperature. However, it is now clear that entropy is deeply related to information theory and the process of inference. As such, entropic techniques have found broad application in the sciences.

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Editor-in-Chief

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