Special Issue

Bayesian Machine Learning

Message from the Guest Editors

Since the dawn of machine learning, Bayesian theory has played an important role because it enables practical learning from small amounts of data, the quantification of uncertainty in outcomes, and the introduction of a robust ensemble of models. Therefore, it is natural that approaches to issues with deep learning have followed the connection between Bayesian theory and deep learning, called Bayesian deep learning. It is also known that various techniques supporting deep learning, such as stochastic gradient methods, dropout, batch normalization, parameter regularization, and noise injection, are related to Bayesian theory. Bayesian optimization, which enables the optimization of black-box functions using the nature of uncertainty quantification in nonparametric Bayesian theory, is being used in real-world applications such as hyperparameter tuning, materials development, and human interaction.

This Special Issue focuses on research at the intersection of Bayesian theory and machine learning. Specifically, Bayesian theory related to machine learning, Bayesian latent variable models, Bayesian deep neural networks, Bayesian optimization, and various applications are welcome.

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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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