A theoretical comparison of deep learning and Bayes with deep Gaussian process priors

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Abstract:
Deep neural networks have received a lot of attention recently and considerable progress has been made to build an underlying mathematical foundation. In a first part of the talk we summarise some statistical convergence results. Deep Gaussian process priors can be viewed as continuous analogues of Bayesian neural networks and this raises the question whether there is a closer link with deep learning. In the second part of the talk, we show that the posterior for a suitable deep Gaussian process prior can achieve fast posterior contraction rates and discuss the connection with deep learning.

Keywords:
Machine learning; deep neural networks; frequentist Bayes; deep Gaussian processes; posterior contraction