Confidence in nonparametric Bayesian credible sets?

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School of Physical and Mathematical Sciences

Nonparametric inference has the purpose of not making restrictive a-priori assumptions. Nonparametric Bayesian inference starts with a prior on a function space, which should not restrict the shape of the unknown function too much. We illustrate this with the example of Gaussian process priors. The usual Bayesian machine produces a posterior distribution, also on the function space, which one would like to use both for estimating the unknown function and for quantifying the remaining uncertainty of the inference. We study the success of these procedures from a frequentist perspective. For the second this involves the frequentist coverage of a posterior credible set, a central set of prescribed posterior probability. We show that there is a danger of prior oversmoothing, and we ask some questions about preventing this by a hierarchical or empirical Bayes method.

Speaker Biography
Professor van der Vaart studied mathematics, philosophy and psychology at the University of Leiden, and received a PhD in mathematics from this university in 1987. He held positions in College Station, Texas and Paris (not in Texas), and was visiting professor in Berkeley, Harvard and Seattle. He is currently Professor of Stochastics at the Vrije Universiteit Amsterdam, and member of the Royal Netherlands Academy of Arts and Sciences.

Host: Assistant Professor Lian Heng, Division of Mathematical Sciences, School of Physical and Mathematical Sciences