Bayesian machine learning

ECTS : 4

Volume horaire : 24

Description du contenu de l'enseignement :

Bayesian Nonparametrics:

- Introduction
- The Dirichlet Process
- Infinite Mixture models
- Posterior Sampling
- Models beyond the Dirichlet Process
- Gaussian Processes
- Selected applications

Bayesian Deep Learning

- Why do we want parameter uncertainty
- Priors for Bayesian neural networks
- Posterior inference
- Martingale Posteriors and generalised Bayesian Inference

Compétence à acquérir :

Essentials of Bayesian Nonparametrics, main concepts for Bayesian Deep Learning

Mode de contrôle des connaissances :

Final exam and homework

Bibliographie, lectures recommandées :

- Hjort NL, Holmes C, Müller P, Walker SG, editors. Bayesian nonparametrics. Cambridge University Press; 2010 Apr 12.
- Ghosal S, Van der Vaart AW. Fundamentals of nonparametric Bayesian inference. Cambridge University Press; 2017 Jun 26.
- Williams CK, Rasmussen CE. Gaussian processes for machine learning. Cambridge, MA: MIT press; 2006.
- Many references at https://www.gatsby.ucl.ac.uk/~porbanz/npb-tutorial.html
- Murphy KP. Probabilistic machine learning: Advanced topics. MIT press; 2023 Aug 15.
- Fong E, Holmes C, Walker SG. Martingale posterior distributions. Journal of the Royal Statistical Society Series B: Statistical Methodology. 2023 Nov;85(5):1357-91.

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