International Workshop For Nonparametric Bayesians

2018년 6월 15일 (금)

서울대학교 25동 210호

09:00 – 09:50		Registration
09:50 – 10:00		Opening address
10:00 – 10:40	Lancelot James (Professor, Hong Kong University of Science and Technology)	Gibbs partitions, Mittag Leffler functions and waiting time models
10:40 – 11:20	Bas Kleijn (Assistant professor, University of Van Amsterdam)	The frequentist validity of Bayesian limits
11:20 – 12:00	Minwoo Chae (Assistant professor, Case Western Reserve university)	On Bayesian Consistency
12:00 – 14:00		Lunch
14:00 – 14:40	Botond Szabó (Assistant professor, Leiden university)	On distributed Bayesian computation
14:40 – 15:20	Yongdai Kim (Professor, Seoul National University)	Bayesian analysis of sparse factor models: Computation and Asymptotics
15:20 – 16:00	Juho Lee (Postdoctoal research assistant, University of Oxford)	Bayesian models for random simple graphs with power-law degree distributions
16:00 –		Closing

주최 : 서울대학교 통계학과

문의 : 김용대 교수 (서울대학교 통계학과, ydkim0903@gmail.com)

Gibbs partitions, Mittag Leffler functions and waiting time models

Lancelot James

(Professor, Business Statistics, Hong Kong University of Science and Technology)

Abstract - We examine Gibbs partitions from different perspective and describe classes of random partitions that can be expressed in terms of waiting time distributions

The frequentist validity of Bayesian limits

Bas Kleijn

(Assistant professor, the Korteweg-de Vries Institute for Mathematics, University of van Amsterdam)

Abstract - To the frequentist who computes posteriors, not all priors are useful asymptotically: in this talk Schwartz's 1965 Kullback-Leibler condition is generalised to enable frequentist interpretation of convergence of posterior distributions with the complex models and often dependent datasets in present-day statistical applications. We prove four simple and fully general frequentist theorems, for posterior consistency; for posterior rates of convergence; for consistency of the Bayes factor in hypothesis testing or model selection; and a theorem to obtain confidence sets from credible sets. The latter has a significant methodological consequence in frequentist uncertainty quantification: use of a suitable prior allows one to convert credible sets of a calculated, simulated or approximated posterior into asymptotically consistent confidence sets, in full generality. This extends the main inferential implication of the Bernstein-von Mises theorem to non-parametric models without smoothness conditions. Proofs require the existence of a Bayesian type of test sequence and priors giving rise to local prior predictive distributions that satisfy a weakened form of Le Cam's contiguity with respect to the data distribution. Results are applied in a wide range of examples and counter examples.

On Bayesian Consistency

Minwoo Chae

(Assistant professor, Department of Mathematics, Applied Mathematics and Statistics, Case Western Reserve University)

Abstract - It is well-known that the Kullback-Leibler (KL) positivity condition implies the posterior consistency in the weak topology, but not sufficient for consistency in total variation. Barron et al. [Ann. Statist. (1999)] provided a counterexample showing that the KL positivity is insufficient for the strong consistency. A lot of sufficient conditions for the strong consistency have been investigated in literature. In this talk, we consider a new sufficient condition which involves the convergence rate in L´evy-Prokhorov metric. Based on this result, we prove the posterior consistency with novel classes of priors devised for heavy-tail distributions: a Dirichlet process mixture of normal distributions with Cauchy as the mean parameter of Dirichlet process, and a Dirichlet process mixture of Student-t distributions.

Ondistributed Bayesian computation

Botond Szabó

(Assistant professor, Department of Statistics, Leiden University)

Abstract - First, the theoretical properties of various Bayesian distributed methods are investigated on the benchmark nonparametrc signal-in-Gaussian-white- noise model. Then we consider the limitations and guarantees of distributed methods in general under communication constraints on the same benchmark nonparametric model

Bayesian analysis of sparse factor models: Computation and Asymptotics

Yongdai Kim

(Professor, Department of statistics, Seoul National University)

Abstract - Factor models aim to describe dependence stucture among multivariate data in terms of a small number of latent variables called factors. A practical issue of applying factor models is that the number of factors (K) and a level of sparsity of a loading matrix are unknown. Some Bayesian approaches have been proposed to model the uncertainty in K and sparsity. Two popular strategies are (1) to put a prior on K and sparsity priors on the vectorized loading matrix conditional on K and (2) to put sparsity priors on infinite dimensional loading matrices. The first one is appealing dut to its theoretical soundness while the second enjoys the relatively simple and generic computation algorithm. In this talk, we introduce a prior bridging these two strategies. The proposed prior has an efficient Gibbs sampling algorithm with appeling theoretical properties. We provide frequentist properties of our Bayesian approach including posterior contraction in covariance matrix and posterior consistency for K.

Bayesian models for random simple graphs with power-law degree distributions

Juho Lee

(Postdoctoral research assistant, Department of statistics, University of Oxford)

Abstract - Many real-world graphs are known to be scale-free, which means that the distributions of degrees in graphs follow power-law. Several models have been proposed to model those scale-free graphs, but the index of graphs generated by those models are restricted to be in (1, 2), while the index of real-world scale-free graphs are reported to be in (2, 3). In this work, we propose two novel Bayesian model for simple graphs. The first model, which is based on inverse gamma prior on vertex weights, can generate random graphs whose asymptotic degree distributions follow power-law with arbitrary index greater than 2. The second model, based on generalized inverse Gaussian prior, generates random graphs whose asymptotic degree distributions follow power-law with exponential cutoff, and the index would be an arbitrary number greater than 1. We also propose extensions of these models that incorporates latent overlapping community structures in graphs. For the posterior inference, we propose efficient MCMC algorithm based on Hamiltonian Monte-Carlo.