Evidence for finite and infinite mixture inference

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Résumé

Estimating the model evidence - or marginal likelihood of the data - is a notoriously difficult task for finite and infinite mixture models and we reexamine here different Monte Carlo techniques advocated in the recent and not so recent literature, as well as possibly novel approaches based on Geyer (1994) reverse logistic regression technique, Chib (1995) algorithm, and Sequential Monte Carlo (SMC). Applications are numerous. In particular, testing for the number of components in a finite mixture model or against the fit of a finite mixture model for a given dataset has long been and still is an issue of much interest, albeit yet missing a fully satisfactory resolution. Using a Bayes factor to find the right number of components K in a finite mixture model is known to provide a consistent procedure. We furthermore establish the consistence of the Bayes factor when comparing a parametric family of finite mixtures against the nonparametric 'strongly identifiable' Dirichlet Process Mixture (DPM) model. Joint work with Adrien Hairault (CEREMADE, Paris Dauphine, PSL) and Judith Rousseau (Dept of Statistics, Oxford)

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