Difference-of-Convex optimization for variational kl-corrected inference in dirichlet process mixtures

Variational methods for approximate inference in Bayesian models optimise a lower bound on the marginal likelihood, but the optimization problem often suffers from being nonconvex and high-dimensional. This can be alleviated by working in a collapsed domain where a part of the parameter space is marginalized. We consider the KL-corrected collapsed variational bound and apply it to Dirichlet process mixture models, allowing us to reduce the optimization space considerably. We find that the variational bound exhibits consistent and exploitable structure, allowing the application of difference-of-convex optimization algorithms. We show how this yields an interpretable fixed-point update algorithm in the collapsed setting for the Dirichlet process mixture model. We connect this update formula to classical coordinate ascent updates, illustrating that the proposed improvement surprisingly reduces to the traditional scheme.
Schmidt, Mikkel Nørgaard (Intern)

**Financing sources**
- Source: Internal funding (public)
- Name of research programme: Institut stipendie (DTU)
- Project: PhD