Abstract

Variational Bayes (VB) is set of techniques with growing popularity in statistical analysis and a field of active research. Its capacity to efficiently approximate complex distributions and intractable integrals made this group of algorithms extremely attractive in contemporary data analytics. On the other hand, the Generalized Linear Mixed Model (GLMM) is a class of models very useful in applied statistics. These models are widely implemented in various disciplines in the physical, biological and social sciences. It is designed to capture the correlations among observations in longitudinal studies by including the random effects. However, fitting GLMMs usually involves integrating over the random effects that are analytically intractable. Hence, we need to make use of approximation algorithms in such scenarios. Markov Chain Monte Carlo (MCMC) is typically the choice for approximating the posterior distribution in the Bayesian framework. But it could be very slow and inefficient for complicated models or large-scale datasets. As an alternative to MCMC, which aims to approximate the exact intractable posterior faithfully, we investigate the Variational approach that seeks a close mimic to the posterior with tractable form. Indeed, in this report, we compare and explore the traditional MCMC algorithm and Variational Bayes (VB) in fitting a GLMM.