

Fast approximate inference for multivariate longitudinal data

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Abstract:

Collecting information on multiple longitudinal outcomes is increasingly common in many clinical settings. In many cases it is desirable to model these outcomes jointly. However, in large datasets, with many outcomes, computational burden often prevents the simultaneous modelling of multiple outcomes within a single model.

We develop a mean field variational Bayes algorithm, to jointly model multiple Gaussian, Poisson or binary longitudinal markers within a multivariate generalised linear mixed model.

Through simulation studies and clinical applications (in the fields of sight threatening diabetic retinopathy and primary biliary cirrhosis) we demonstrate substantial computational savings of our approximate approach when compared to a standard Markov Chain Monte Carlo, while maintaining good levels of accuracy of model parameters.

This talk will give a brief overview of variational Bayes approaches and discuss some of the algebraic tools needed to streamline model estimation. We will also detail some of the factors that can affect performance of variational Bayes approximations.

Key words: Variational Bayes; Longitudinal Data; mixed models; Bayesian modelling (Please limit yourself to 5 key words)