Abstract:

In this study, we consider analysis of continuous repeated measurement outcome that are collected through time, called longitudinal data, within the framework of linear mixed-effects models with non-Gaussian distributions.
The framework assumes that the longitudinal outcome can be decomposed into fixed-effects, time-invariant and time-varying random-effects, where the latter specified by a stochastic process, and measurement noise.
In each of the component we allow for usage of normal-variance mixture distribution, like Generalised Laplace, normal inverse Gaussian or t-distribution. We apply the model on a dataset of measurement of
eGFR (estimated Gromerular Filtration Rate) for approximately 16000 patient. The eGRF is a proxy measurement for patients renal function, and is used to predict the risk of acute kidney failure.
We show that an increasing use of more complex model gives a gradual increase of predictive performance. Finally we show how to (computationally) efficiently estimate the parameters of the model
using stochastic gradient method with subsampling.