Title

brms.mmrm: an R package for Bayesian MMRMs

Abstract

The mixed model for repeated measures (MMRM) is a popular, versatile type of model for continuous longitudinal clinical trial data. Early phase studies, particularly in neurology and pulmonology, are increasingly adopting Bayesian MMRMs for primary analyses and decisions. The {brms} R package, which runs Bayesian regression models using Stan, supports longitudinal generalized linear models. However, statisticians have historically lacked a standard implementation specific to Bayesian MMRMs. Most Bayesian MMRM analyses still work through difficult modeling and implementation decisions from scratch.

{brms.mmrm} is a new R package which leverages {brms} to run Bayesian MMRMs for clinical analysis. The package has a simple tailor-made interface, statistical guardrails, and convenient routines for post-processing and visualization. Using specialized archetypes for routine modeling scenarios, the package helps safely and transparently set informative priors, facilitating the use of expert elicitation and historical borrowing. This talk demonstrates the functionality of {brms.mmrm} on a realistic simulated dataset, covering data preparation, model specification, post-processing, visualization, and informative prior specification through specialized archetypes.

The {brms.mmrm} package is an industry-wide collaboration within Openstatsware, an American Statistical Association working group dedicated to developing and improving statistical software for biopharmaceutical research.

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Presenter bio

Will Landau earned his PhD from Iowa State University in 2016, where his dissertation research applied Bayesian methods, hierarchical models, and GPU computing to the analysis of RNA-seq data. He works at Eli Lilly and Company, where he develops Bayesian methods and software for clinical statisticians.