Please join the Biometric Colloquium

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ON THE IMPROVEMENT OF PREDICTIVE MODELING USING POSTERIOR PREDICTIVE CHECKING AND BAYESIAN STACKING - AN EXAMPLE OF MODELING GENDER INEQUALITY IN READING USING PISA 2018

October 4th, 2023 at 9:00 am

Seminarraum, Center for Medical Data Science (previously CeMSIIS),
Spitalgasse 23, Room 88.03.513
Medical University of Vienna, 1090 Wien

HOST: Georg Heinze

ABSTRACT

Inferential statistics provide well-established methods to account for uncertainty that can be attributed to sample size or the distribution of the residual term of a statistical model. However, model uncertainty is an often-neglected issue which leads to overconfident analysis interpretations and mis-calibrated predictions. Practitioners have used various ad hoc solutions to select a final model from a set of alternative models.

Model uncertainty is pervasive in real world analysis situations. Bayesian inference theory has long provided approaches that make it possible to address model uncertainty in a sophisticated way, here we focus on Bayesian stacking and posterior predictive checking. Based on these methods we put systematic effort into dealing with model uncertainty in Bayesian predictive modelling. We work out a real-world application that incorporate these approaches: We apply these tools for model uncertainty in combination with predictive modelling to the PISA 2018 data to investigate potential inequality for reading competency with respect to gender and socio-economic background. The approach combines information from many complex models leading to more conservative posterior inference and accounts for different sources of uncertainty in a natural and coherent way. The empirical example serves as rough guideline for practitioners who want to implement the concepts of predictive modelling and model uncertainty in their work to similar research questions.

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