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Capturing Correlated Clusters Using Mixtures of Latent Class Models

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Latent class models rely on the conditional independence assumption, i.e., it is assumed that the categorical variables are independent given the cluster memberships. Within the Bayesian framework, we propose a suitable specification of priors for the latent class model to identify the clusters in multivariate categorical data where the independence assumption is not fulfilled. Each cluster distribution is approximated by a latent class model, leading overall to a mixture of latent class models. The Bayesian approach allows to identify the clusters and fit their cluster distributions using a one-step procedure. We provide suitable estimation and inference methods for the mixture of latent class models and illustrate the performance of this approach on artificial and real data.

Keywords: Bayesian inference, model-based clustering, prior on the number of components, telescoping sampler.

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Primary author(s) :   MALSINER-WALLI, Gertraud (Vienna University of Economics and Business); GRUEN, Bettina (Vienna University of Economics and Business); FRUEHWIRTH-SCHNATTER, Sylvia (Vienna University of Economics and Business)

Presenter(s) :   MALSINER-WALLI, Gertraud (Vienna University of Economics and Business)

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