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Bayesian Structure Selection Approaches for Categorical Responses via Multi-task Learning

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Abstract

In this work, we concentrate on the Bayesian structure selection problems for the categorical response. We focus on solving the selection problem for single response and multiple categories. Based on multinomial probit model, we transform problem of that on single response with multiple categories into multiple responses by introducing certain latent variables. Here, we consider the group structure with sparsity property on the rows of coefficient matrix where each row corresponds to one variable. Then we identify the relevant variables for the responses and the selection problems can be treated as the multi-task learning problem. The effectiveness of our proposed method will be demonstrated through simulation studies. Finally, we will investigate structure selection problems using our proposed method and apply them to a medical dataset.

Keywords: Multi-task learning, component-wise algorithm, group structure, Markov chain Monte Carlo