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Bayesian Modeling and MCMC Computation in Linear Logistic Regression for Presence-only Data

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Presence-only data are referred to situations in which, given a censoring mechanism, a binary response can be observed only with respect to on outcome, usually called \textit{presence}. In this work we present a Bayesian approach to the problem of presence-only data based on a two levels scheme. A probability law and a case-control design are combined to handle the double source of uncertainty: one due to the censoring and one due to the sampling. We propose a new formalization for the logistic model with presence-only data that allows further insight into inferential issues related to the model. We concentrate on the case of the linear logistic regression and, in order to make inference on the parameters of interest, we present a Markov Chain Monte Carlo algorithm with data augmentation that does not require the a priori knowledge of the population prevalence. A simulation study concerning 24,000 simulated datasets related to different scenarios is presented comparing our proposal to optimal benchmarks.

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