

Analysis of Presence-only data via Exact Bayes: the bayesPO package in R

Presence-only data appears from opportunistic sampling of species. Its sighting locations are often recorded from citizen science programs or herbaria and do not follow a systematic or randomized design. If this sampling bias is not taken into account, occurrence estimation might be wrongfully skewed towards locations that are easily accessible to people.

Although there are some available software tools aimed at presence-only data, it used to be hard to perform Bayesian analysis of such data. bayesPO is an R package and is available in CRAN. It implements the methodology from the recently accepted paper in the Annals of Applied Statistics to perform Bayesian analysis without the need for model approximation.

Bayesian analysis implies full evaluation of the estimation uncertainty which can be summarized in credible intervals. Additionally, expert knowledge can be included in the model in the form of prior information. Popular forms of regularization and model selection will be available by the presentation date. The implemented methodology can provide parameter and model identification, even when a covariate is used to explain both intensity and observability.

The talk will showcase the packages functionalities, potential and output. In particular, the basics of model estimation will be shown. Features analogous to the popular MaxEnt software will be presented, such as covariates importance and impact curves. The talk will close with a discussion on desired features.