BBRecapture for capture-recapture data modelling with behavioural effects

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This **BBRecapture** package has been built up to help researchers to fit some relevant classes of capture-recapture models within the framework of Bayesian inference. Special emphasis is given on recently developed tools to take into account flexible behavioral response to capture. The main function developed in the package relies on the generalized linear model framework in the spirit of Huggins [6] and Alho [1] for regressing the capture occurrence on previous partial capture histories although shortcuts have been embedded to reduce computational complexity whenever possible. There are also some functions which fit the same class of models maximizing the unconditional likelihood as opposed to the most frequently used approach based on the conditional likelihood [5]. There are theoretical arguments related to the so-called *likelihood failure* [3, 4] which support the use of a Bayesian approach for the estimation of the unknown population size in the presence of behavioral response to capture. Some simulation studies have been also carried out in [2] to highlight the occurrence of the likelihood failure pathology and the loss of inferential performance of the conditional likelihood approach even in the absence of failure. In the same circumstances the unconditional likelihood approach should be preferred to the conditional likelihood but it is in any case outperformed by the Bayesian approach. Functions in the package are designed to allow minimal efforts by the researcher although optional arguments often allow for a more customized and refined model building.

References

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