Migrating distance sampling projects from Distance for Windows to the Distance R package

Eric Rexstad, David L. Miller, Laura Marshall and Len Thomas

Centre for Research into Ecological and Environmental Modelling University of St Andrews

Introduction

The Distance software (Thomas et al., 2010) has been downloaded >40,000 times in its 20-year history. Much of the underlying machinery is written in R. For some users, there may be benefits to performing the analysis with the underlying R code, rather than working with the graphical user interface (GUI).

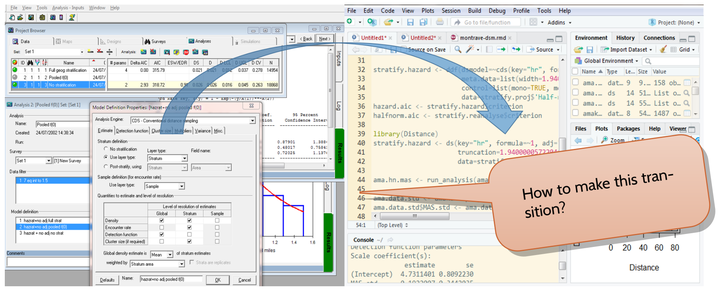

Fig. 1: Traditional Distance for Windows interface (left) and distance sampling analysis in R (right).

Challenges hindering the transition between analysis with the GUI and analyses in R are two-fold:

- Legacy data reside in Distance (GUI) projects, unavailable for importing into R, and
- Analyses that are easily described using the GUI may be difficult to specify, particularly if analyst is not proficient in R.

How to bridge between the two?

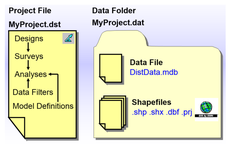

Fig. 2: Database structure of a Distance project.

Distance project (`.dst`) file contains:

1. Data
2. model definitions
3. analysis results

within an Access database.

- Trick is to extract contents of (2) and translate into R code
- Target the results of previous step to contents of (1) the data
- Perhaps contrast results of R analysis with results stored in the Access database

Applications–Legacy projects

- We try to do this. what?
- we try to do that.

Learning structure of R interface

CREEM

Centre for Research into Ecological and Environmental Modelling

Fig. 3: The organisation for which we work

Comparative analysis of difficult data

- We try to do this. what?
- we try to do that.

Caveats

`readdst` is not able to translate all GUI analyses into R code. Current limitations are inability to translate

- analyses using the `dsm`, `mads` and `Dssim` engines,
- analyses using post-stratification and
- bootstraps for variance estimation.

Request for additional datasets

- We try to do this. what?
- we try to do that.
- We try to do this. what?
- we try to do that.
- We try to do this. what?
- we try to do that.

Additional information

Literature

References

Miller, D. L.. 2017. *Package readdst*.

Miller, D. L., E. Rexstad, L. Thomas, L. Marshall, and J. Laake. 2016. Distance Sampling in R. *bioRxiv*.

Thomas, L., S. T. Buckland, E. A. Rexstad, J. L. Laake, S. Strindberg, S. L. Hedley, J. R. Bishop, T. A. Marques, and K. P. Burnham. 2010. Distance software: design and analysis of distance sampling surveys for estimating population size. *Journal of Applied Ecology*, 47(1):5–14.

QR codes to package/website/bioRxiv