

Statistical Toolbox for Analysing Citizen Science Data

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Teaching material

- All Lectures and R-Scripts for the coding sessions are deposited under https://lionel68.github.io/cs_toolbox/

Software

- R, RStudio
- R-Packages: tidyverse, lme4, DHARMa, boot, rjags, jagsUI, unmarked, INLA, inlabru, rstudioapi
- INLA, JAGS

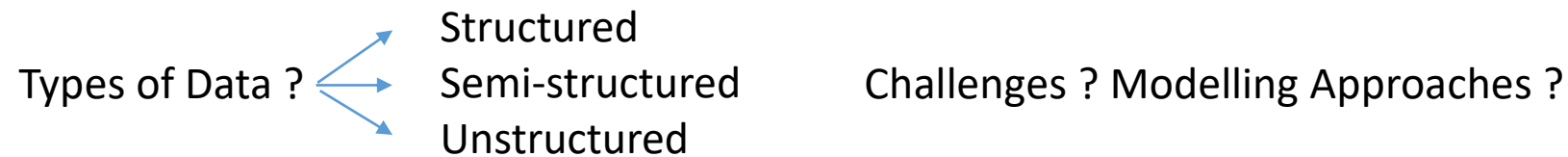
Questions/Comments to lectures

- Please do not post upcoming questions during the lectures and coding sessions to the Zoom chat, but use instead SLACK (see the link on github!), channel „questions-lectures”



09:30 – 09:45 Lecture: Welcome, Organisation of the workshop

09:45 – 10:15 Lecture: Introduction into the large diversity of citizen science data



10:15 – 10:45 Coding: fitting a (simple) trend model (time and space) to structured data

11:00 – 11:30 Lecture: introduction to occupancy models

(often) Semi-structured data
,Coupled' models, including estimation of detectability  Ecological process
Observation/Sampling process

Varying sampling effort, Variation among people in how they collect data, Timing, ...

'Simple' occupancy models (= one species, 'static' / 'single-season')

11:30 – 12:00 Coding: fitting (simple) occupancy models using R (unmarked) and JAGS

12:00 – 13:00 Lunch break

13:00 – 13:15 Exchange time

13:15 – 13:45 Lecture: more advanced occupancy models (multi species, dynamic occupancy models)

Single species → Multi species

Static (single season) → Dynamic (multi season)

13:45 – 14:15 Coding: fitting more advanced occupancy models using JAGS

Assumptions occupancy models: No residual spatial autocorrelation, i.e. possible spatial variation is captured by covariates, independence of detection and occupancy

14:15 – 14:45 Lecture: introduction into spatial models (INLA and inlabru)

When are spatial models needed?

Often unstructured data, e.g. presence-only data, sampling may be biased towards
high quality habitats, roads, larger cities,

Point pattern analysis, fitting point pattern models in INLA and inlabru

14:45 – 15:15 Coding: fitting spatial models (inlabru)



15:15 – 15:45 Lecture: Integrated modelling approaches (combined what we learn earlier)

15:45 – 16:15 Coding: fitting integrated models

16:15 – End Open discussion, Stats troubleshooting, data health checks

Questions ???