Assessing the Reliability of Citizen Science Data for Avian Species Identification

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Aims

- Citizen science is increasingly popular; this includes the identification app iNaturalist.

- Observations are classified as "Casual", "Needs ID", or "Research" quality.

- Many studies use observations from citizen science platforms, assuming their reliability.

- Few studies have analysed the entire database, instead focusing on specific species and trends (Mesaglio & Callaghan, 2021).

- I tested whether their accuracy should be assumed and how these platforms could be further improved.

Methods

- Censused all iNaturalist avian observations between January 2000 and December 2019.

- Approximated the accuracy of the three quality grades.

- Used a Linear Mixed Model to determine which factors had the greatest impact on observation accuracy.

- Compared the species richness of iNaturalist to an official dataset to validate its utility in measuring ecological trends.

Observation Accuracy

- Randomly sampled 40 observations from each quality grade.

- I manually identified all observations, commenting on what makes them good (or bad).

- Compared my IDs to those on the platform to calculate the percentage observation success (i.e. accuracy):

Quality Grade	Percentage Accuracy
Casual	10%
Needs ID	22.5%
Research	97.5%
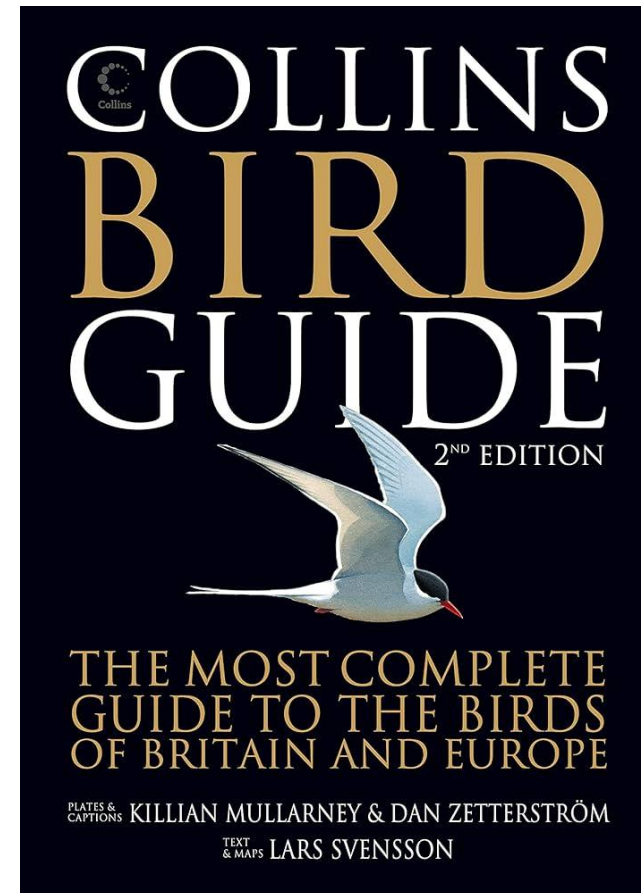
Bad Observations

The hardest to identify had either:

- No pictures

Note: All of the upcoming identifications are taken from iNaturalist.

Barn Swallow
(*Hirundo rustica*)

No Photo

Bad Observations

The hardest to identify had either:

- No pictures

- Low-resolution or dark pictures

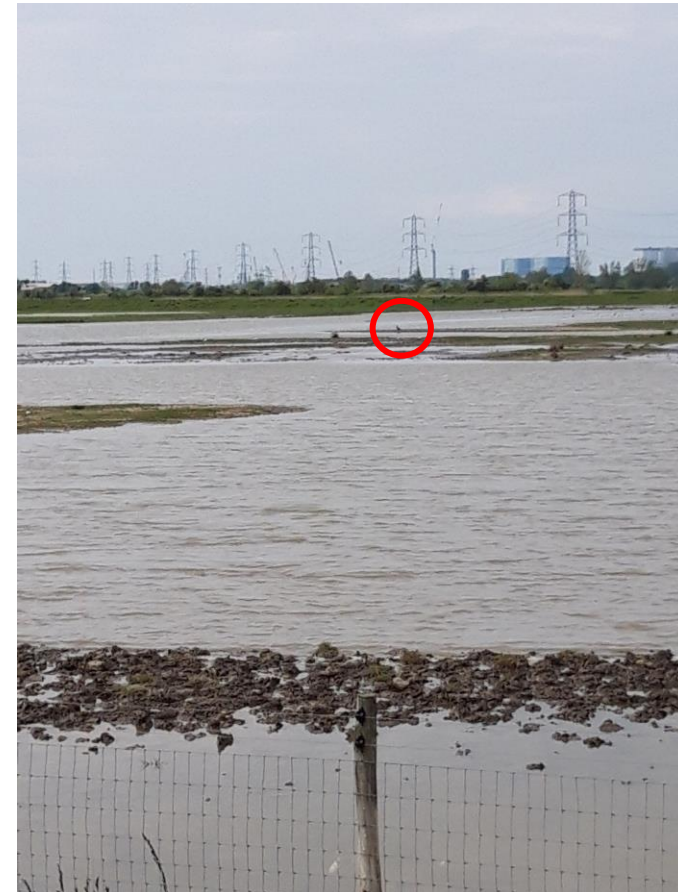European Robin
(*Erithacus rubecula*)

Bad Observations

The hardest to identify had either:

- No pictures

- Low-resolution or dark pictures

- Small picture

Little Egret
(*Egretta garzetta*)

Bad Observations

The hardest to identify had either:

- No pictures

- Low-resolution or dark pictures

- Small picture

- (Part of a) dead bird

No ID

Bad Observations

The hardest to identify had either:

- No pictures

- Low-resolution or dark pictures

- Small picture

- (Part of a) dead bird

- No birds in the picture

Common Whitethroat
(*Curruca communis*)

Bad Observations
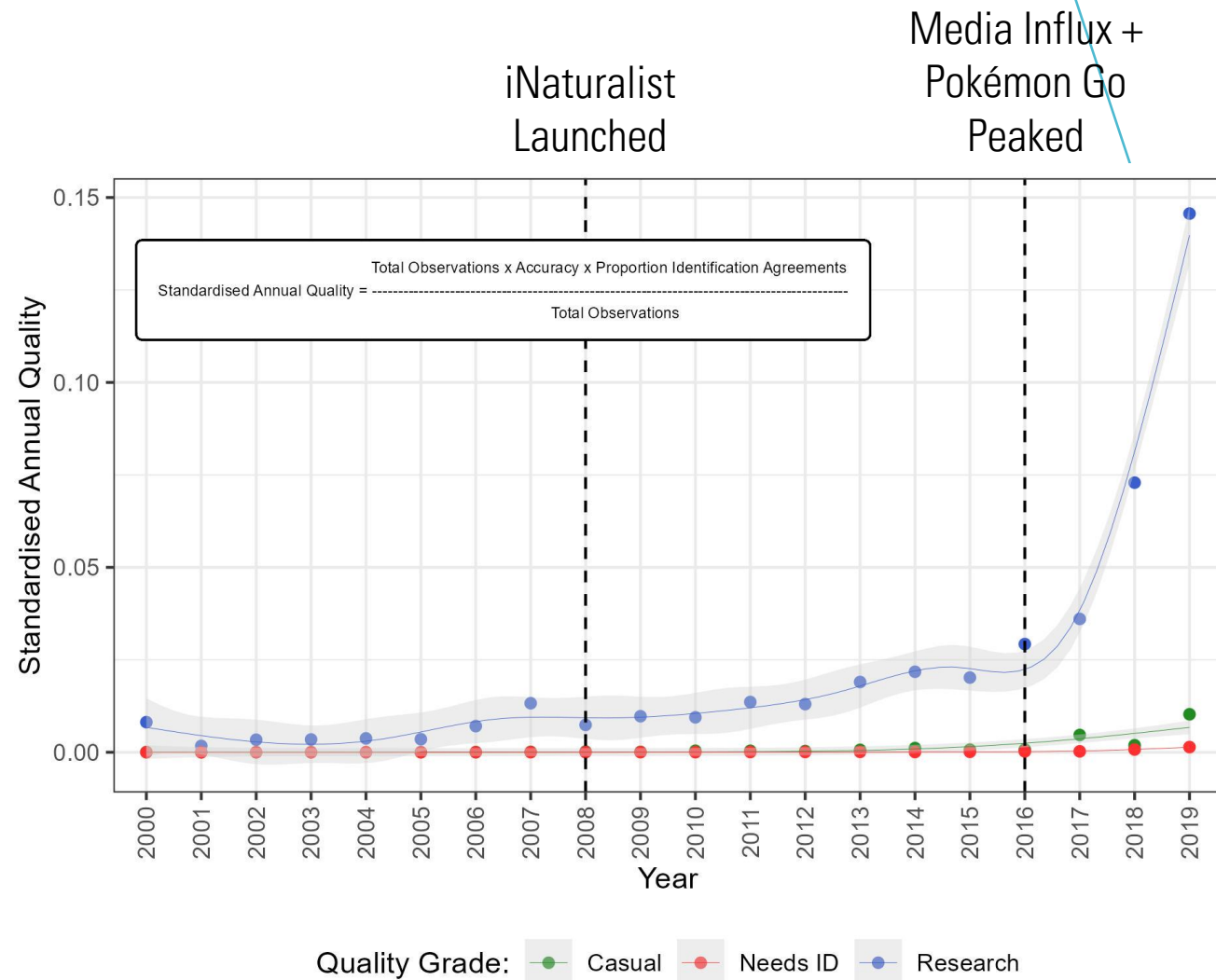
The hardest to identify had:

- No pictures

- Low-resolution or dark pictures

- Small picture

- (Part of a) dead bird

- No birds in the picture

- Too many birds in the picture

Mallard Duck
(*Anas platyrhynchos*)

Annual Change in Quality

- There was an exponential increase in annual observation quality for each of the three grades.

- Unclear whether this trend applied to Needs ID.

- In 2016, iNaturalist was heavily advertised in the media.

- Suggested that the rise was also influenced by exploration apps (e.g. Pokémon Go), with users switching to iNaturalist for a more realistic experience (Iwane, 2016).


Standardised Annual Quality = (Total Observations x Accuracy x Proportion Identification Agreements) / (Total Observations)

Quality Grade: ● Casual ● Needs ID ● Research

Linear Mixed Model

- Response Variable:
  - Percentage accuracy of the quality grade
- Random Variables:
  - Year
  - Location (UK Counties)
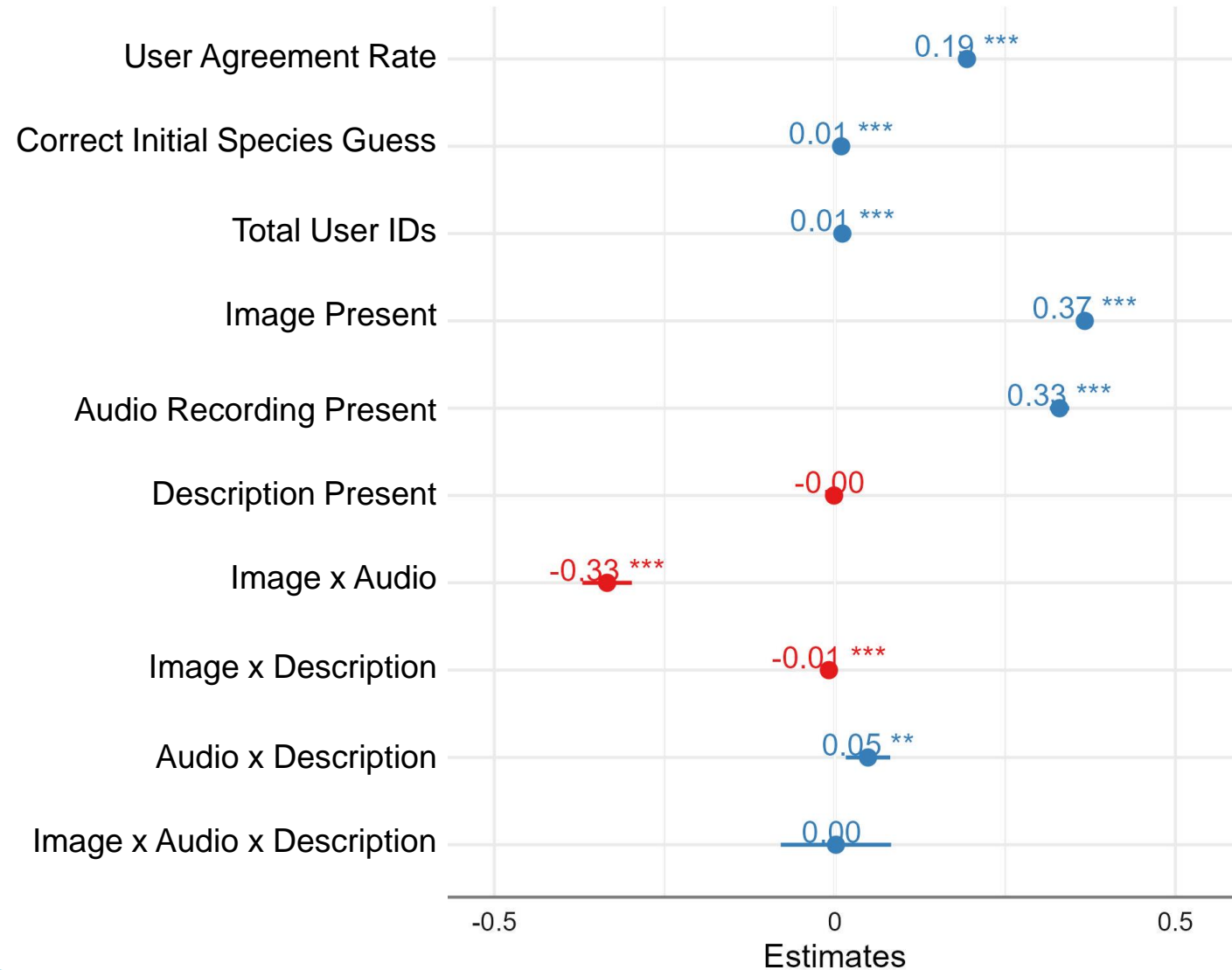
Species Richness

- To test whether iNaturalist's data is reliable in ecological calculations.

- Calculated species richness of iNaturalist per UK county (using government regional areas database).

- Compared to an official UK species richness study (Dyer and Oliver, 2016) by using chi-squared.

- (Chi-Squared = 2926, d.f. = 2916, p = 0.44)

- Therefore no statistical difference, but boxplot suggests iNaturalist is not 100% similar.
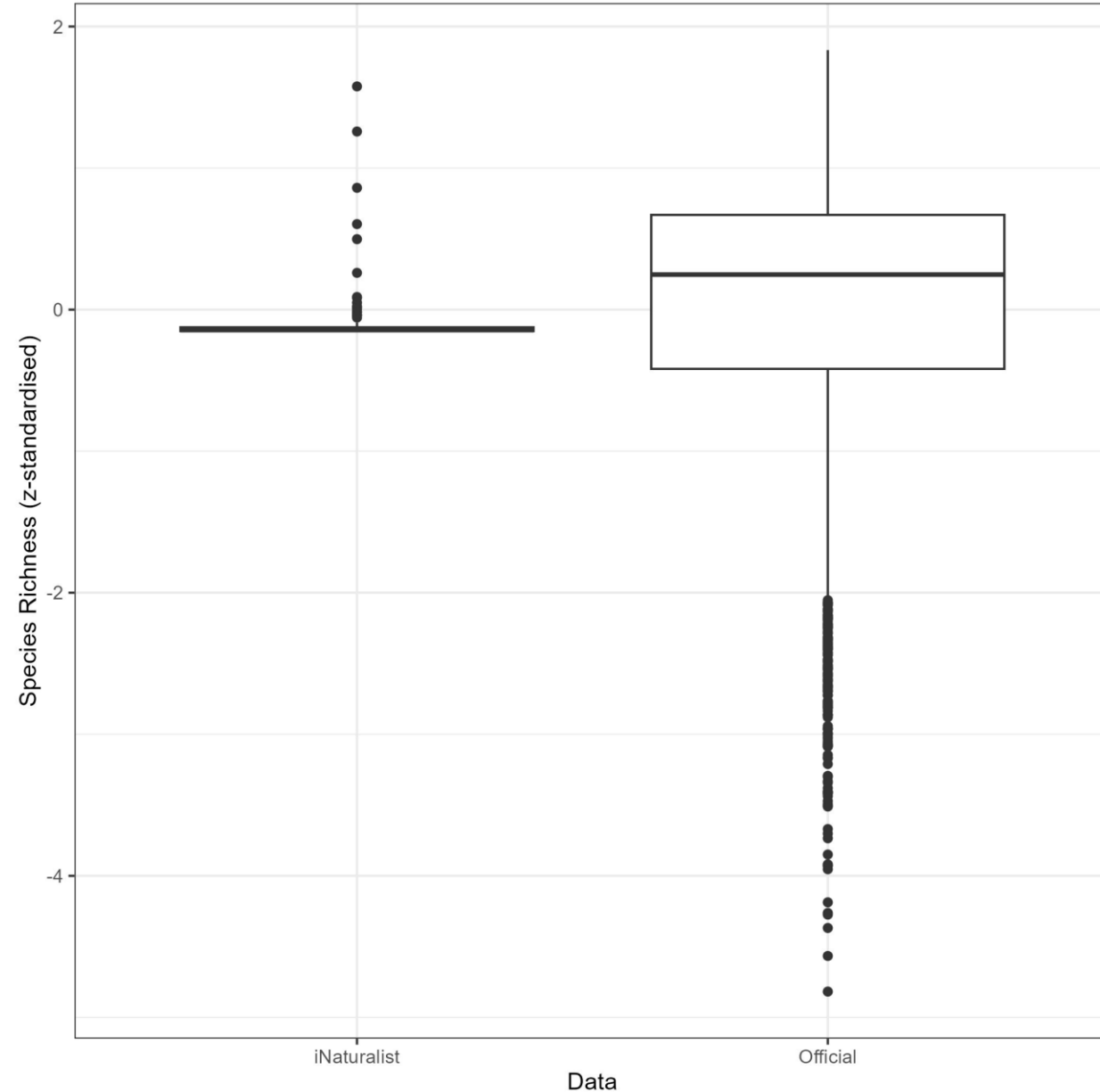
Conclusions

- Citizen science identification platforms (e.g. iNaturalist) are somewhat reliable for use in ecological analysis.

- The platforms become more popular and reliable alongside increased advertising and engagement.

- Some flaws with how users record observations.

- The platform requires better guidelines and/or a brief training demo to ensure user consistency.

*Thank You,
Any Questions?*