



Data Science in Nature



What insights we can gain from eBird
and iNaturalist data



How I Got Into DS

- I wanted to be able to gain more insights from the data I was creating
- The tools available without coding weren't very good
- I was fascinated by recent advancements in AI/ML

What is Data Science and Machine Learning?

Data Science:

- Taking data (usually very large datasets) and deriving insights from said data

ML/AI:

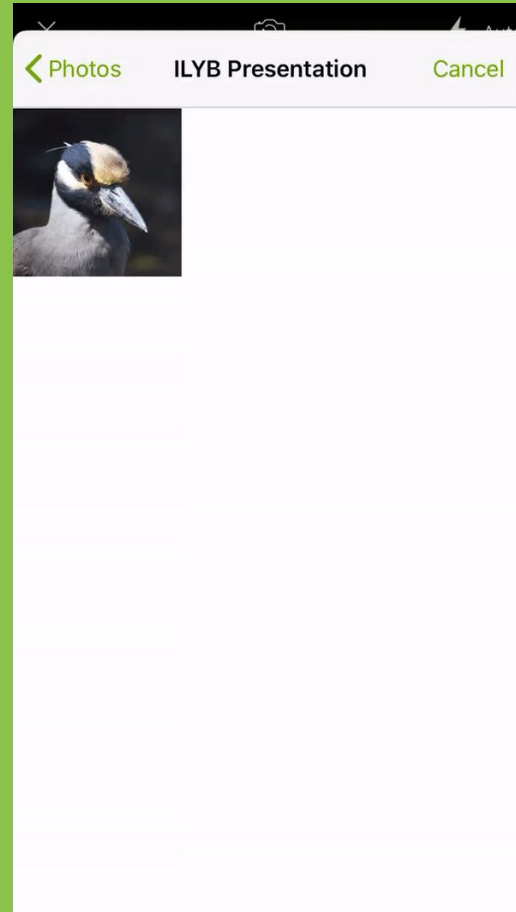
- Sort of like trying to mimic a human brain, but inside a computer!

Machine Learning

Computer Vision

How iNaturalist uses Computer Vision

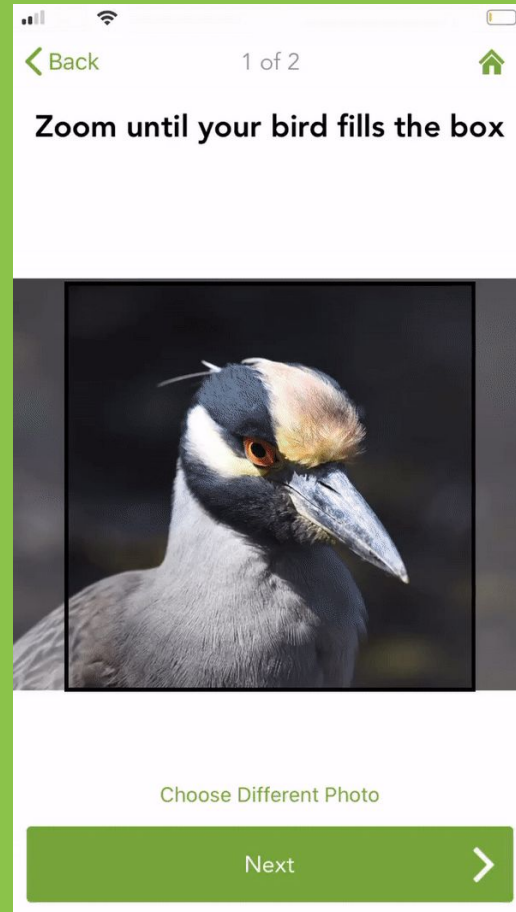
- Very high accuracy
- Most observations on iNat use the CV results
- Does not use location to filter results
- Can identify more than 20000 species



Computer Vision

How Merlin uses Computer Vision

- High accuracy
- Fast results
- Uses location to filter results
- Powered by photos on Macaulay Library many of which are submitted from eBird
- Only does birds



Other ML/AI algorithms and applications

- Linear & Logistic Regression
- Random Forest
- Decision Trees
- ANN's
- CNN's
- RNN's

So How is Data Science Done?

What are some of the languages used?



How about some of the programs for DS?



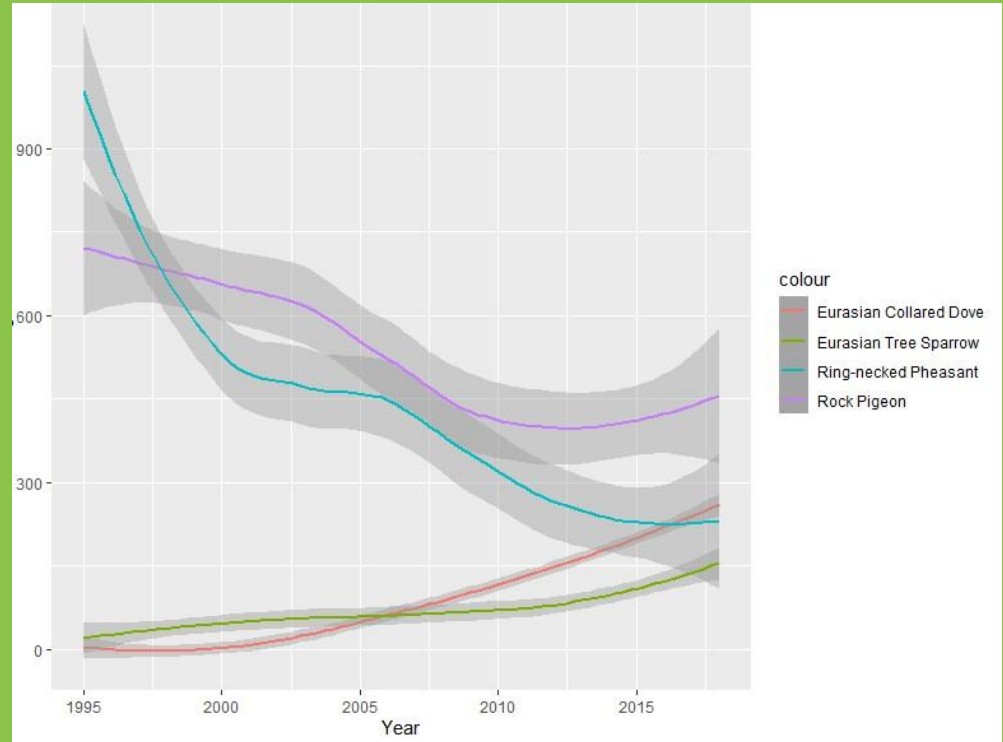
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Visualization

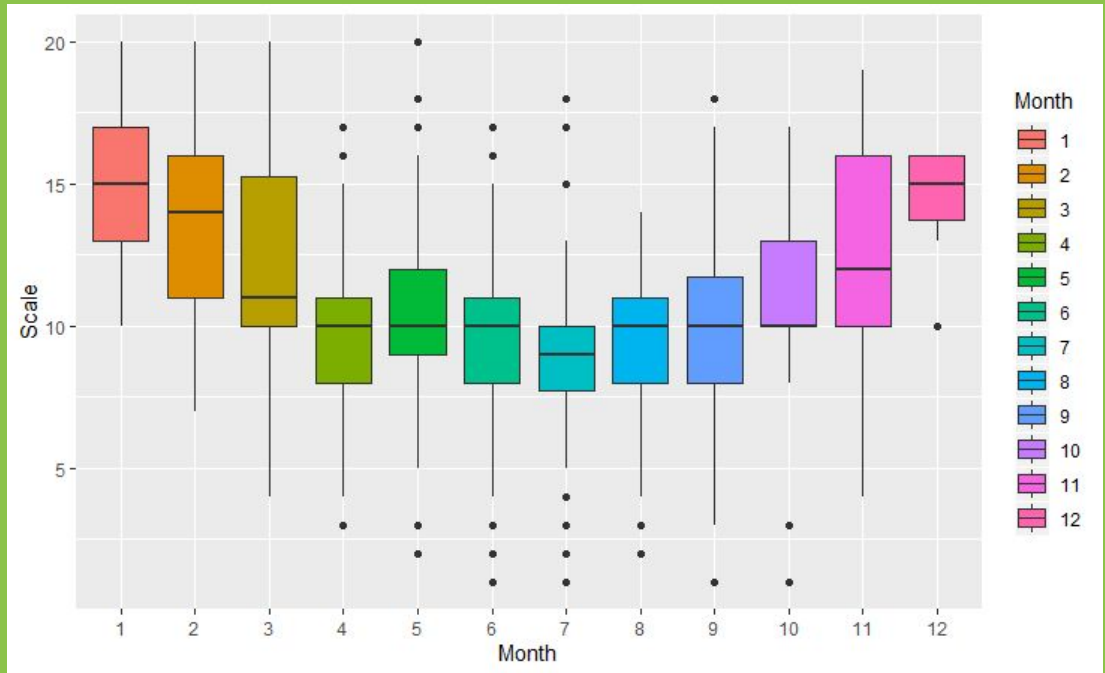
Some of the visualizations you can produce

Number of BBS observations in a given year



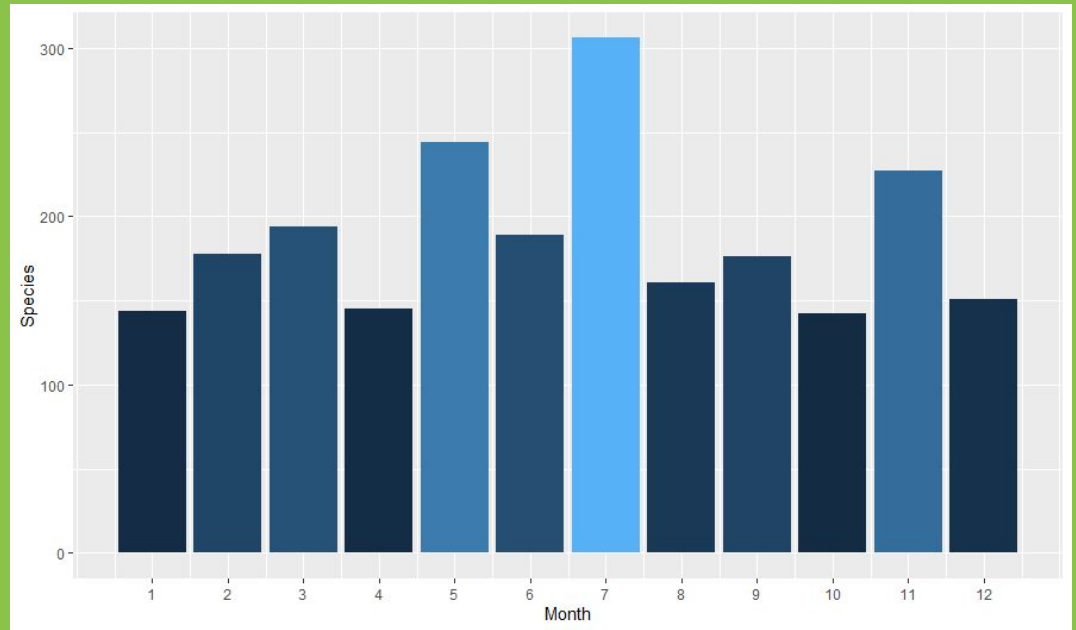
Some of the visualizations you can produce

Abdominal darkness of
Toxomerus marginatus flies
by month observed



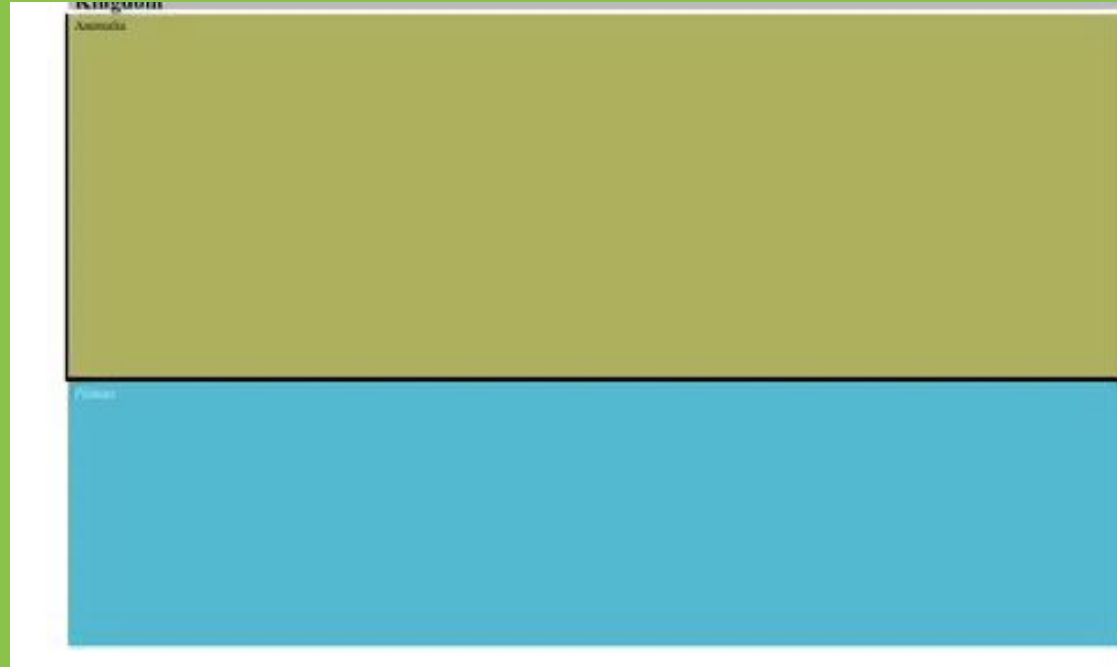
Some of the visualizations you can produce

My eBird species by month



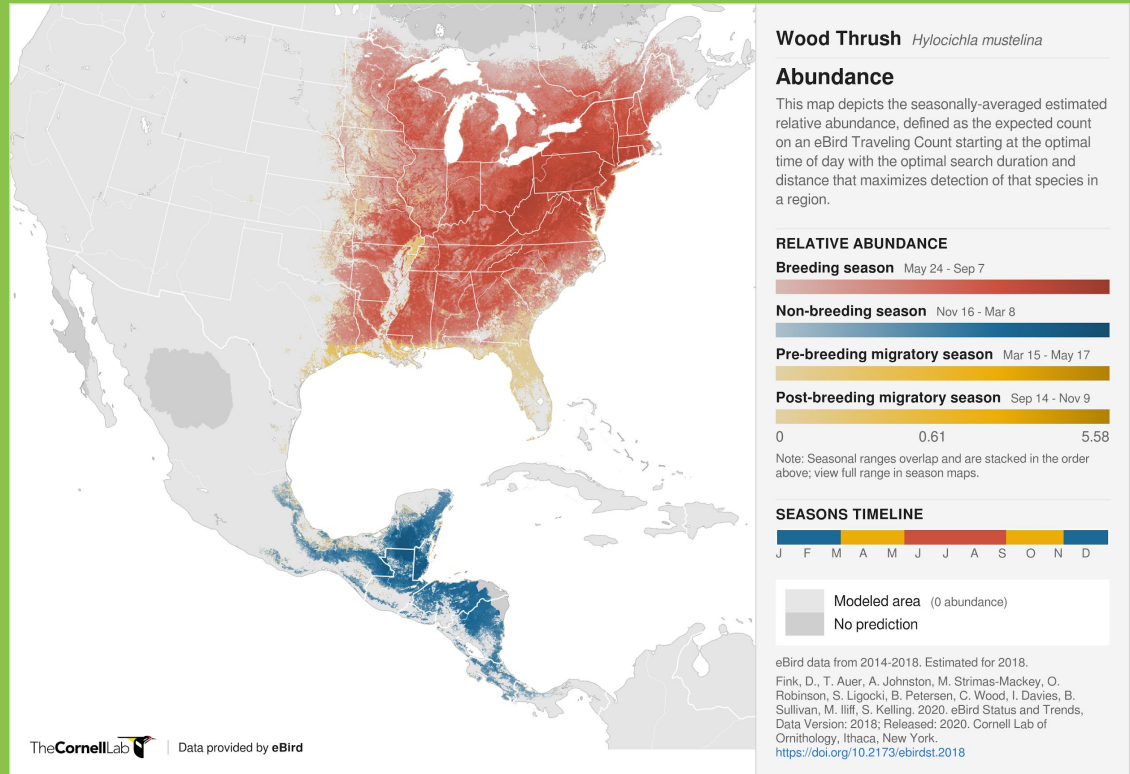
Some of the visualizations you can produce

Tree map of my iNat Obs
(Sorry for the poor quality GIF)



eBird Status and Trends

- Created using R
- One of the most detailed range maps for bird species anywhere
- Uses eBird observations



How do you get data?

- For your personal eBird/iNat data
 - Download your eBird data in My eBird
 - Under the explore tab in iNat
 - Using the iNat api
- For projects including data from others
 - eBird API
 - “rebird” and “ebirdapi” packages
 - iNat API
 - Download iNat data using the Download page
 - GBIF

Thank you!

Most of the code for the visualizations and ML/AI scripts can be found at
https://github.com/oliverburrus/iNat_Visualizations

If you would like to know more, feel free to shoot me an email at
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