

Climate change and our threatened species



Oriental Lesser Chevrotain
a.k.a. The Lesser Mousedeer (*Tragulus kanchil*)



- 01 Background and Problem Statement
- 02 Data cleaning and Visualization
- 03 Modelling and Evaluation
- 04 Conclusions and Future Considerations



The lesser mousedeer

- Found in dense forested areas
- Frugivores
- Currently sightings restricted to the Central Nature Reserves



Why focus on the lesser mousedeer?

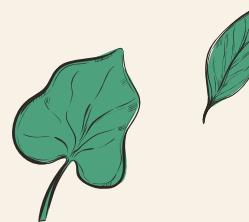


01

Current distribution



Both happen to be mangrove specialists



02

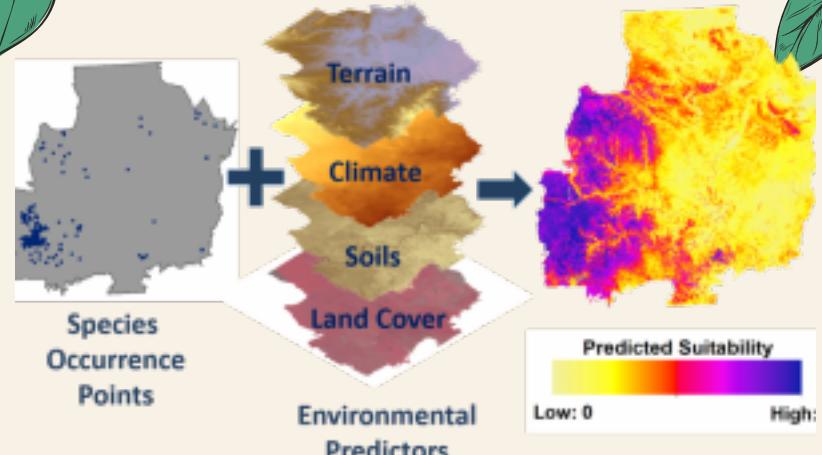
Availability of data

iNaturalist





What is Species Distribution Modelling?



Species distribution modelling uses computer algorithms to predict the distribution of a species across geographic space and time using environmental data

Data sourcing and cleaning

01

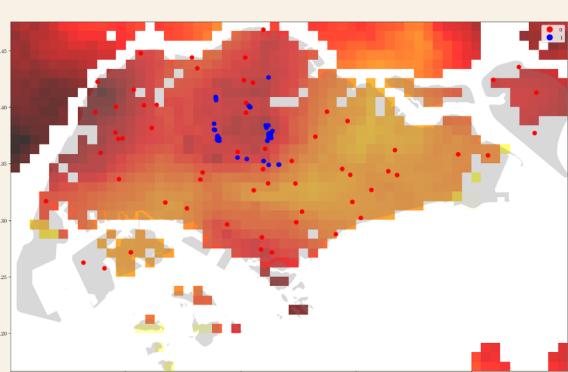
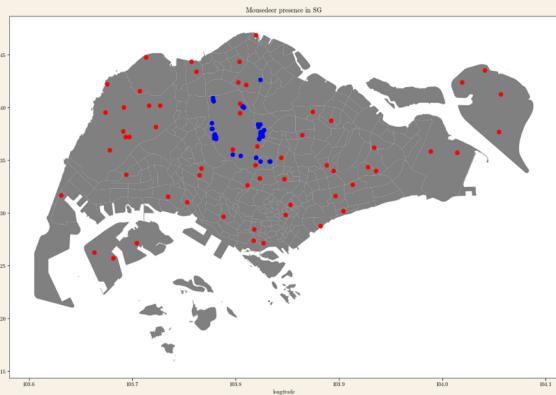
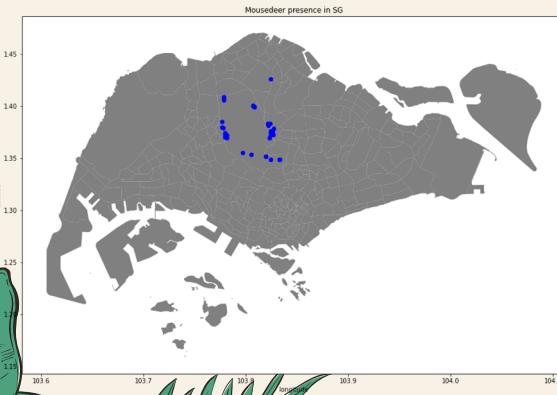
iNaturalist
presence data

02

Pseudo-absence
point generation

03

Clip and Transform
Bioclimatic Variables



List of 19 Bioclimatic Variables

Bioclimatic variables
BIO1 Annual Mean Temperature
BIO2 Mean Diurnal Range (Mean of monthly (max temp-min temp))
BIO3 Isothermality (BIO2/BIO7) (x100)
BIO4 Temperature Seasonality (standard deviation x100)
BIO5 Max Temperature of Warmest Month
BIO6 Min Temperature of Coldest Month
BIO7 Temperature Annual Range (BIO5–BIO6)
BIO8 Mean Temperature of Wettest Quarter
BIO9 Mean Temperature of Driest Quarter
BIO10 Mean Temperature of Warmest Quarter
BIO11 Meant Temperature of Coldest Quarter
BIO12 Annual Precipitation
BIO13 Precipitation of Wettest Month
BIO14 Precipitation of Driest Month
BIO15 Precipitation Seasonality (Coefficient of Variation)
BIO16 Precipitation of Wettest Quarter
BIO17 Precipitation of Driest Quarter
BIO18 Precipitation of Warmest Quarter
BIO19 Precipitation of Coldest Quarter

Current

Type: Continuous

Resolution: 1km

Year: 1970-2000

Future 1 and Future 2

Type: Continuous

Resolution: 4.5km

Year: 2021-2040

Note:

Future 1 = 4.5 degree warming

Future 2 = 3 degree warming

What is raster data



1kmx1km

Raster data is any pixelated (or gridded) data where each pixel is associated with a specific geographical location



Let's predict some
suitable habitats for
these cuties!

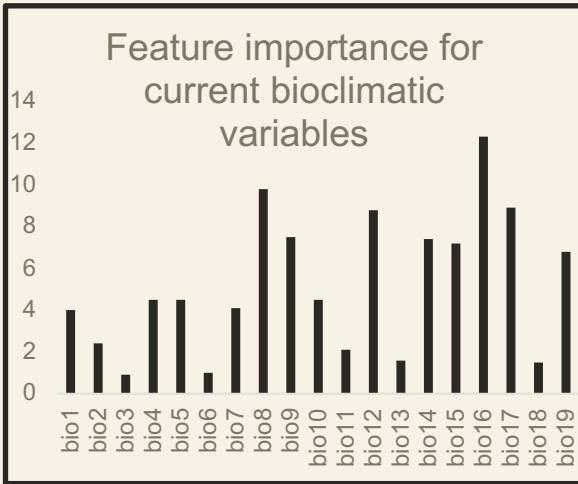
Modelling and Evaluation

Current		
Model	Accuracy	F1 Score
RF	0.92	0.93
KNN	0.83	0.85
SVM	0.58	0.71
LogR	0.52	0

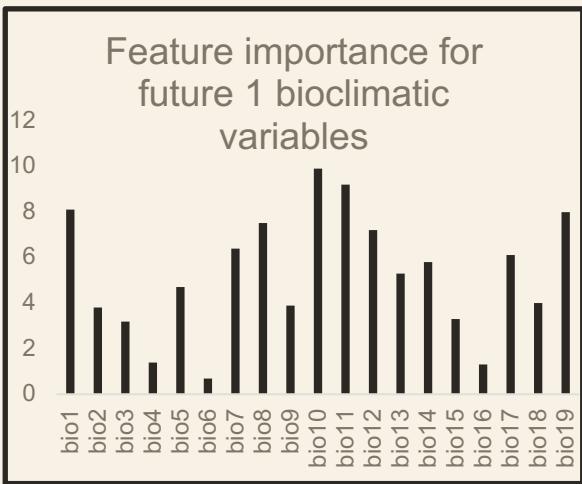
Future 1		
Model	Accuracy	F1 Score
RF	0.85	0.87
KNN	0.88	0.9
SVM	0.42	0.59
LogR	0.85	0.87

Future 2		
Model	Accuracy	F1 Score
RF	0.93	0.94
KNN	0.9	0.92
SVM	0.65	0.74
LogR	0.81	0.83

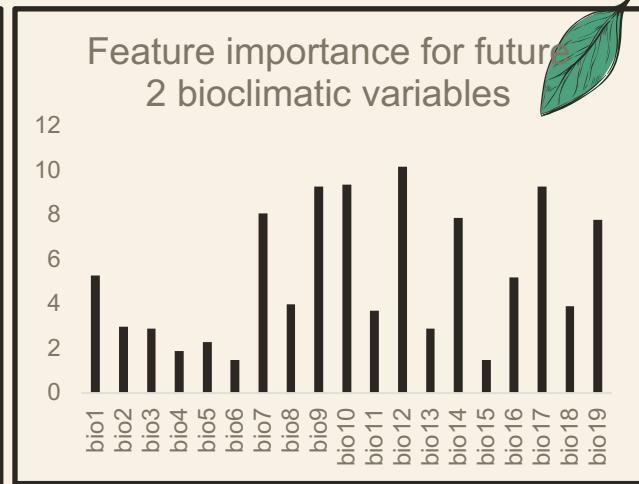
Feature Importance



BIO16 Precipitation
of Wettest Quarter



BIO10 Mean
Temperature of
Warmest Quarter



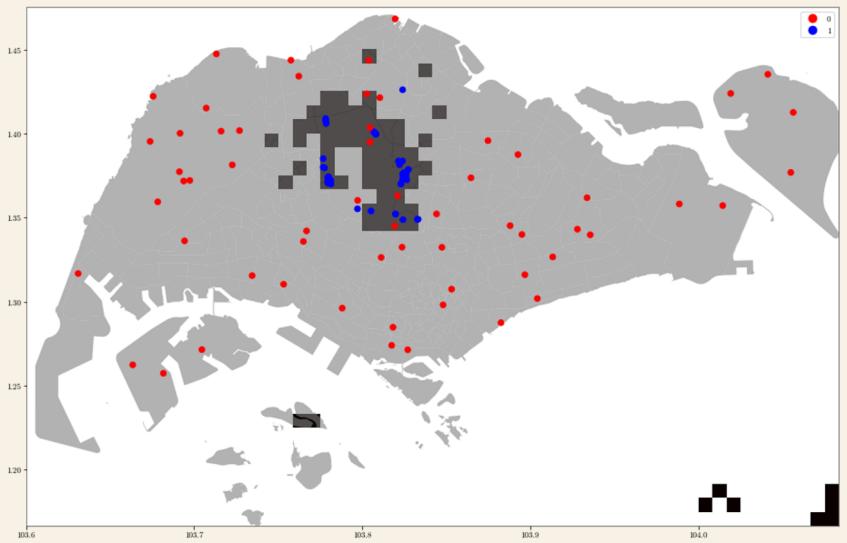
BIO12 Annual
Precipitation



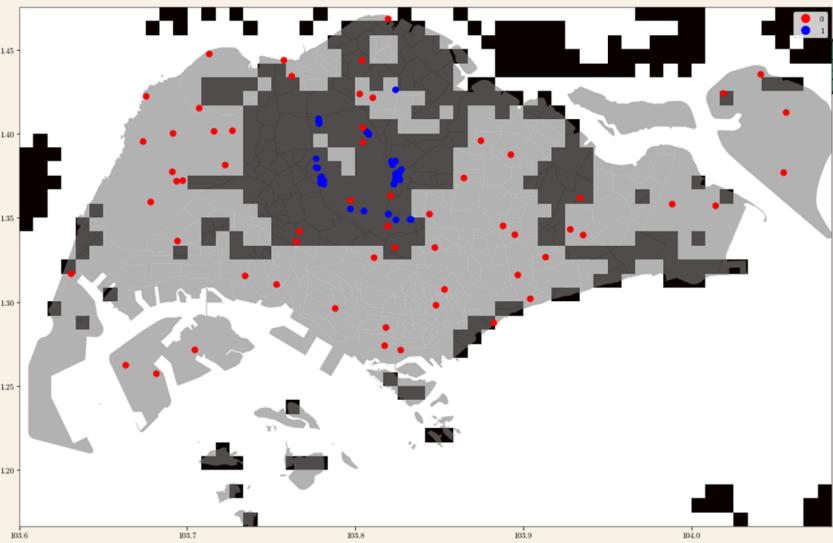


Let's look at
some maps

Current bioclimatic variable predictions

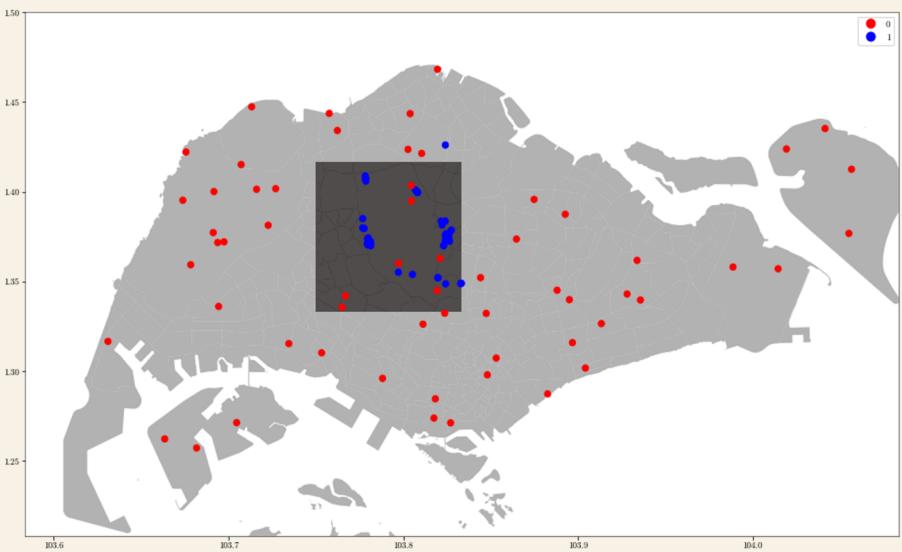


RandomForestClassifier

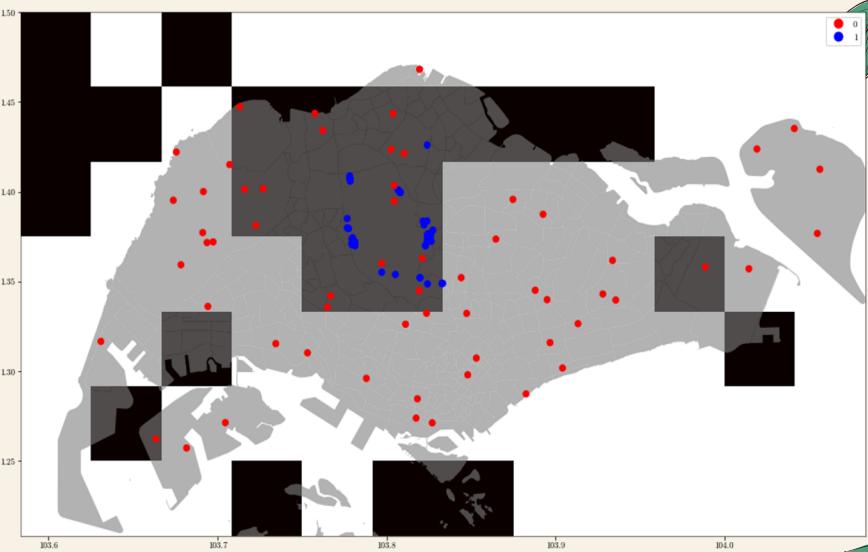


KNeighborsClassifier

Future 1 bioclimatic variable predictions

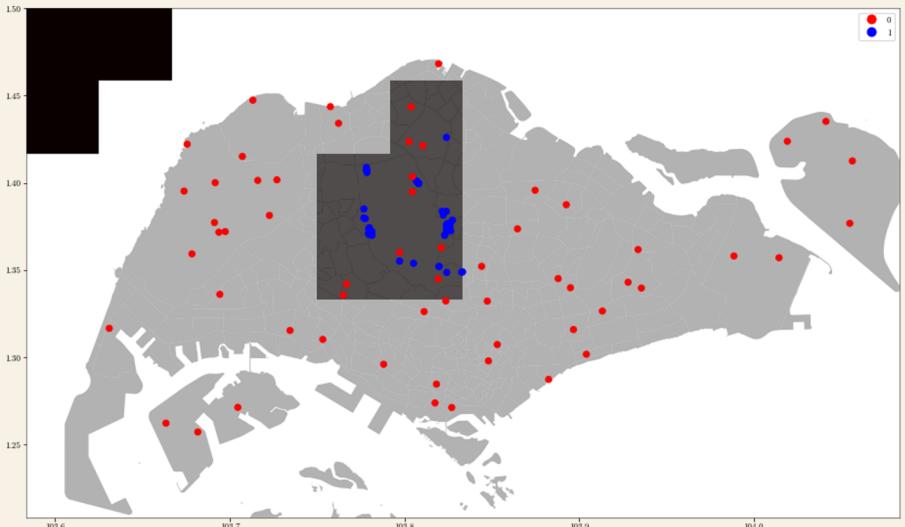


RandomForestClassifier

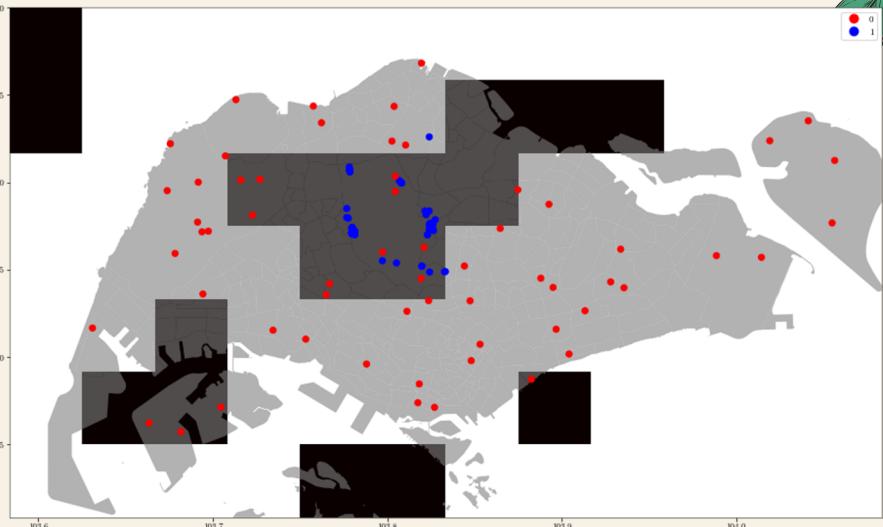


KNeighborsClassifier

Future 2 bioclimatic variable predictions



RandomForestClassifier



KNeighborsClassifier

Conclusions and Future Considerations



Modelling

- RandomForest fares better than the conventional MaxEnt Model (LogReg)
- Explore the use of neural networks in future iterations
- Using SMOTE to oversample presence data for rare species

Data

- Species selection
- Land cover variables i.e. land-use-land-cover, NDVI, elevation





Do you have any
questions?

CREDITS: This presentation template was created by **Slidesgo**, including icons by **Flaticon**, and infographics & images by **Freepik**

Please keep this slide for attribution.