Animal Migration Pattern Analyses

Group 5 – Members

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Motivation and Objective

Migration Pattern can often tell us about the reasons why animals migrate such as :

- Food Acquisition
- Reproductive needs
- Climate Adaptation
- Loss of Habitat etc.

It can also help us to analyse any other reasons which might lead to migration such as

- Symbiotic relationship
- Rarity of species etc.

We used the Movebank.org studies to extract and read the animal migration patterns. It provides a comprehensive list of studies of animal tracking with the animal location , time and relative distance (MoveBank Website).

Datasets

- Jaguar Dataset
  - Study Summary: “Individual jaguars were monitored in five different range countries representing a large portion of the species’ distribution…”
- Fox Dataset
  - Study Summary: “Low home-range overlap between neighbors suggested territoriality and substantial exploitation competition for space..”

Analysis Overview

- We meticulously analyzed the migration data of Red and Arctic Foxes within a specific geographical area during the same time period.

- This examination revealed nuanced patterns of interaction and movement dynamics between the two species.

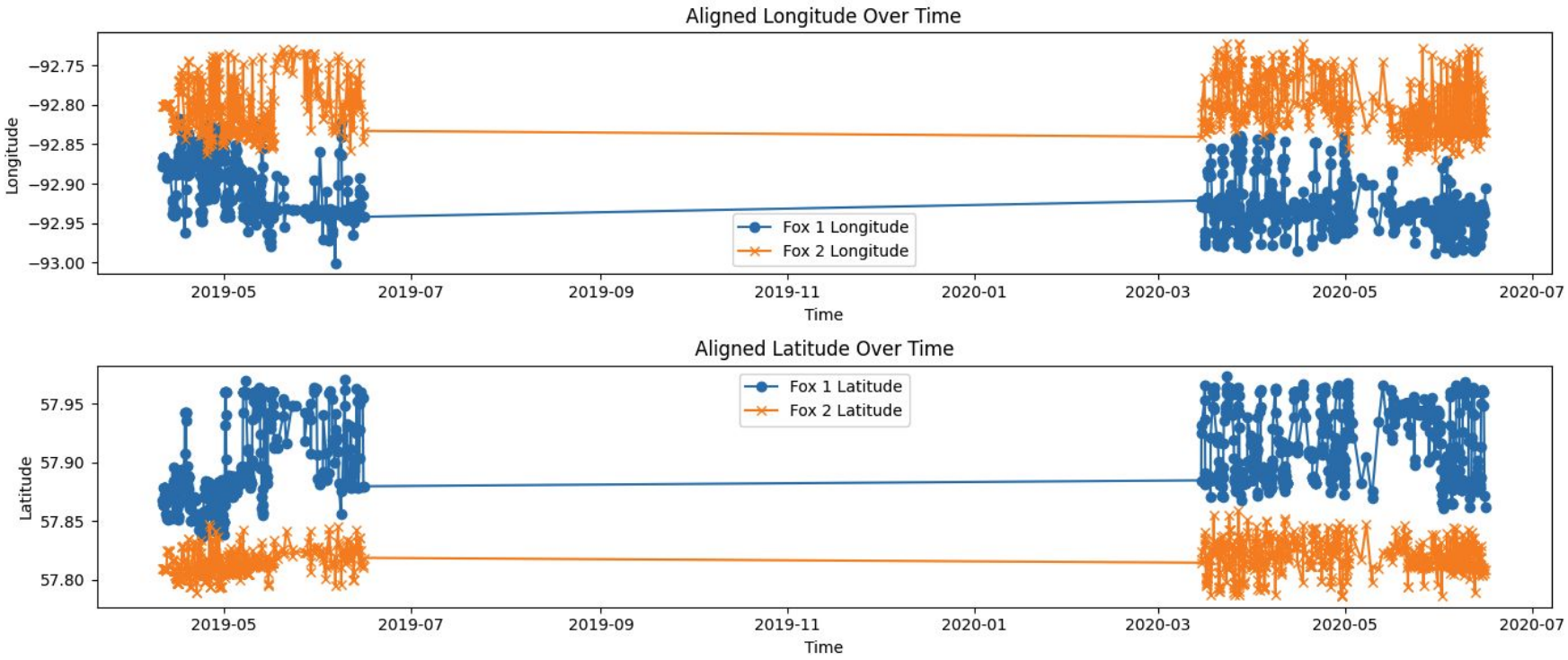
- From our observations, we extracted profound insights into their behavioral correlations, enhancing our ecological understanding.

- Recognizing the broader applicability of our methodology, we generalized our computational framework.

- The resulting flexible code can now predict correlations across diverse datasets, extending beyond our initial focus on foxes.

- To illustrate this versatility, we provided a representative example dataset.

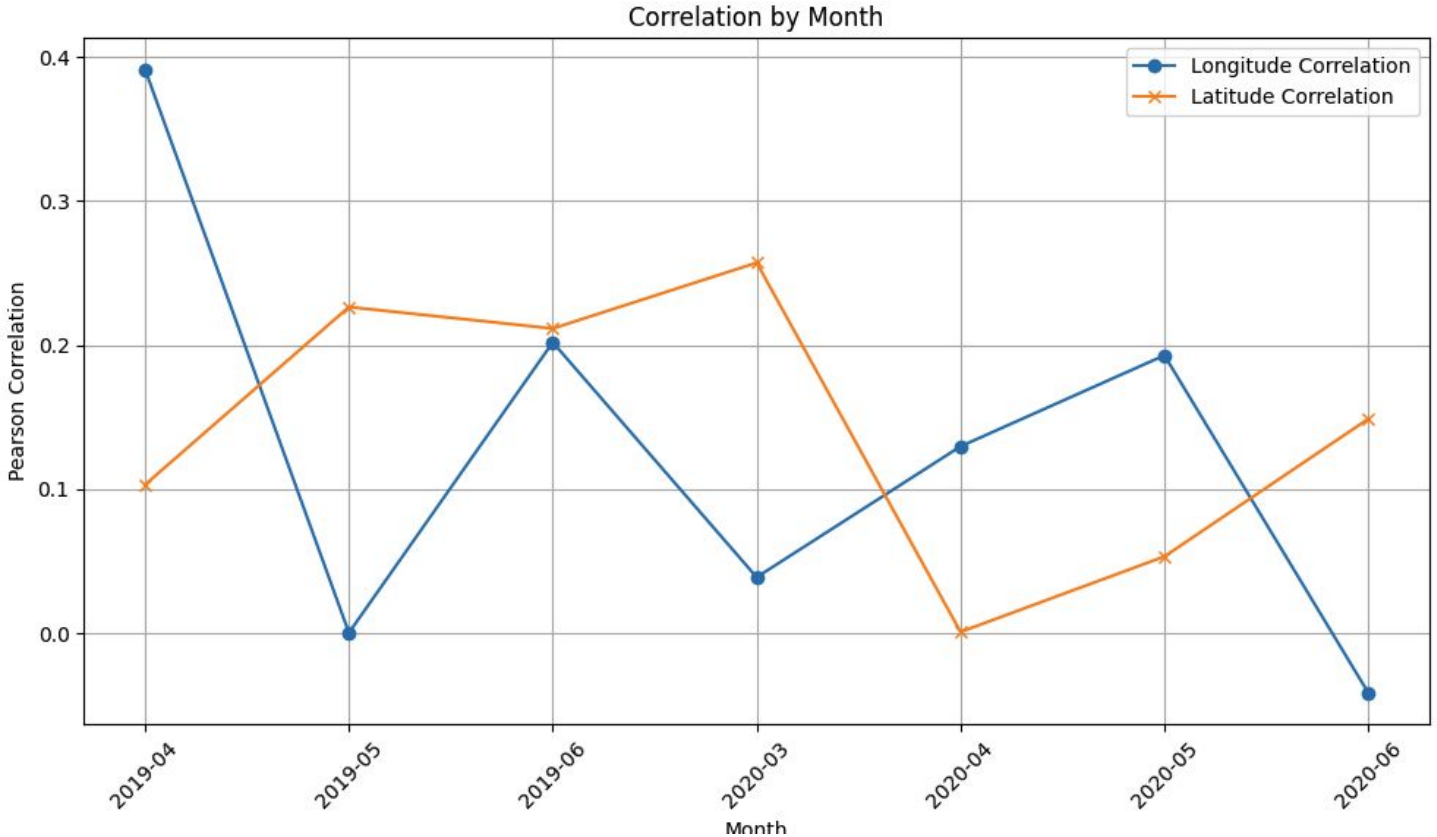
Correlation between two different Red Foxes



- Pearson_corr_long: 0.122
- Pearson_corr_lat: 0.230

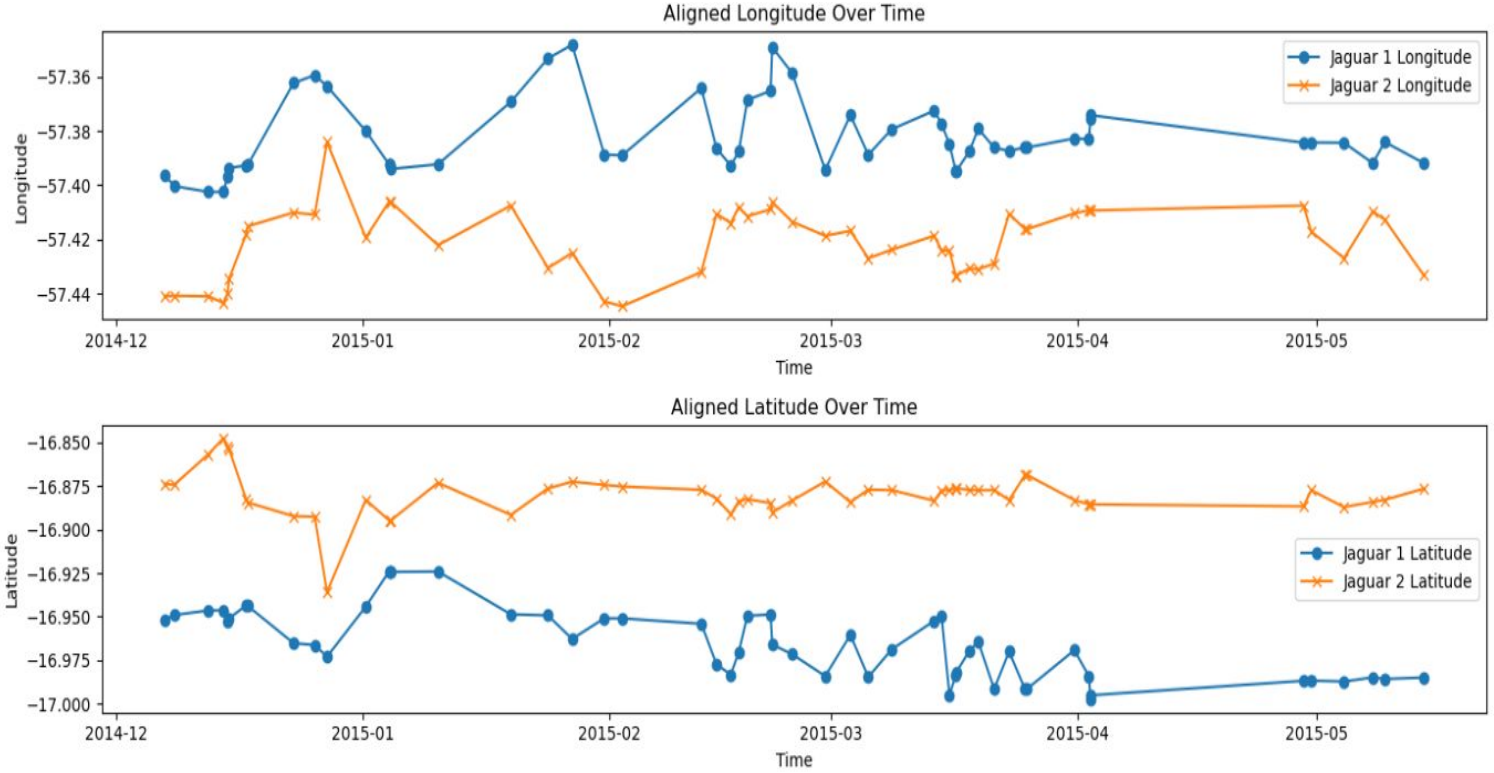
- The vicinity in the longitude and latitude depicts their co – existing behavior.
- The fact that there is not much overlap between them indicates they used the habitat differentially

Correlation between two different Red Foxes by month



- Heterogeneous landscapes may relax interspecific competition between expanding and native species, allowing exclusive use of some resources.

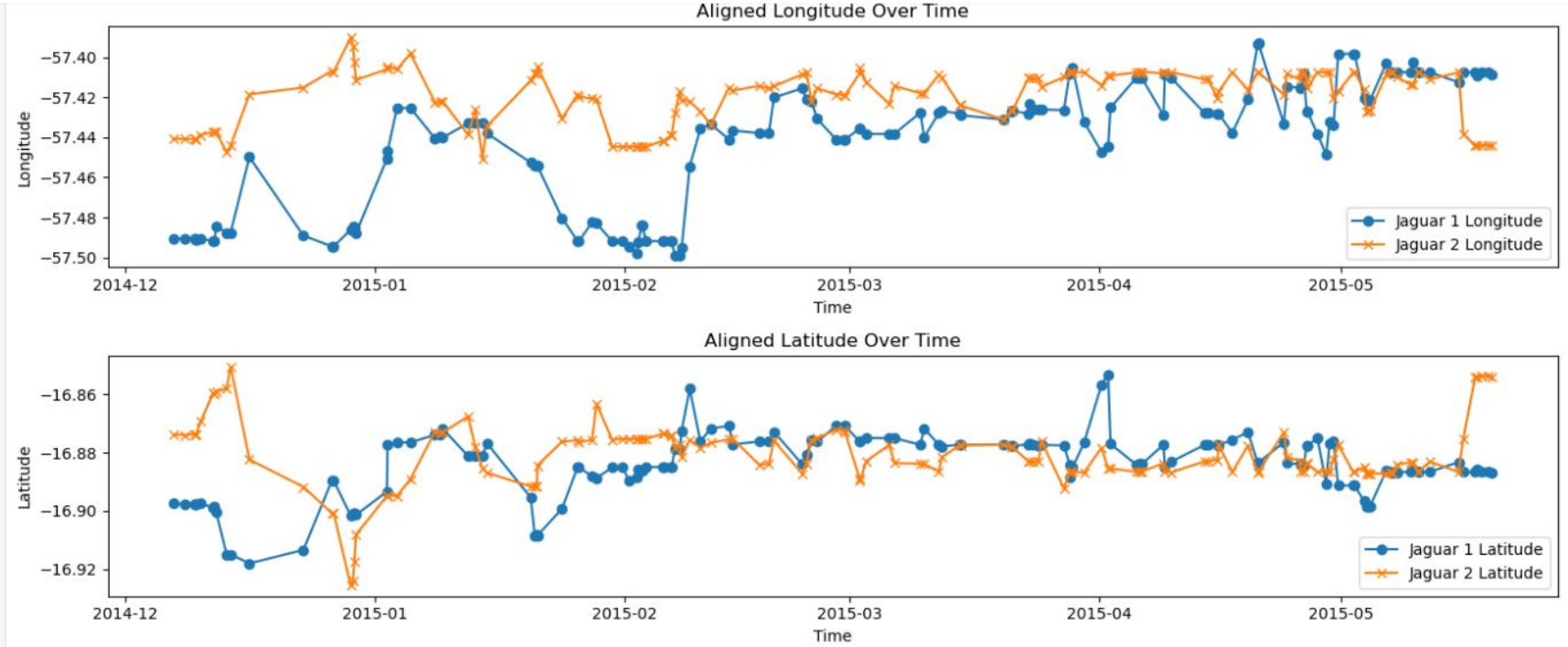
Correlation between two different Jaguars



- Pearson_corr_long: 0.398
- Pearson_corr_lat: 0.0396

- They share overlapping habitats or movement corridors along the east-west (longitude) axis, likely due to shared environmental features like rivers or prey. The lack of latitude correlation suggests they might use different resources or avoid each other along the north-south axis, indicating less spatial overlap. These patterns could reflect resource partitioning or territorial behavior

Correlation between another pair of Jaguars

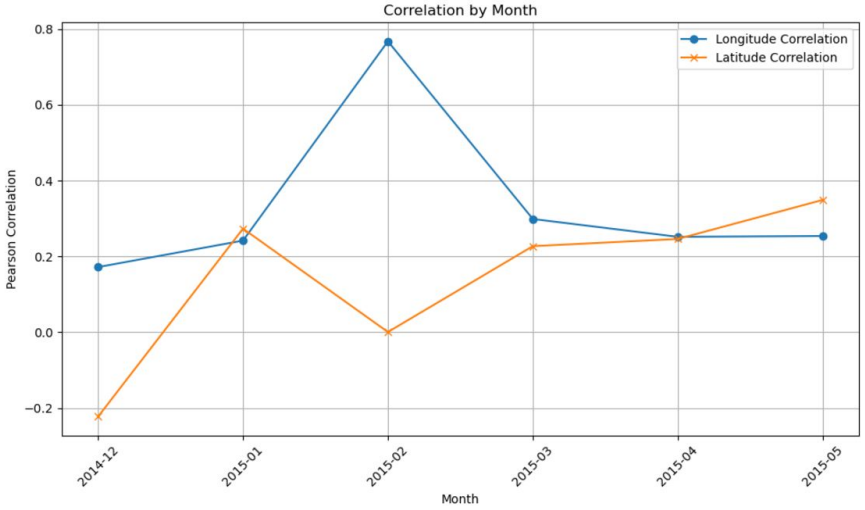


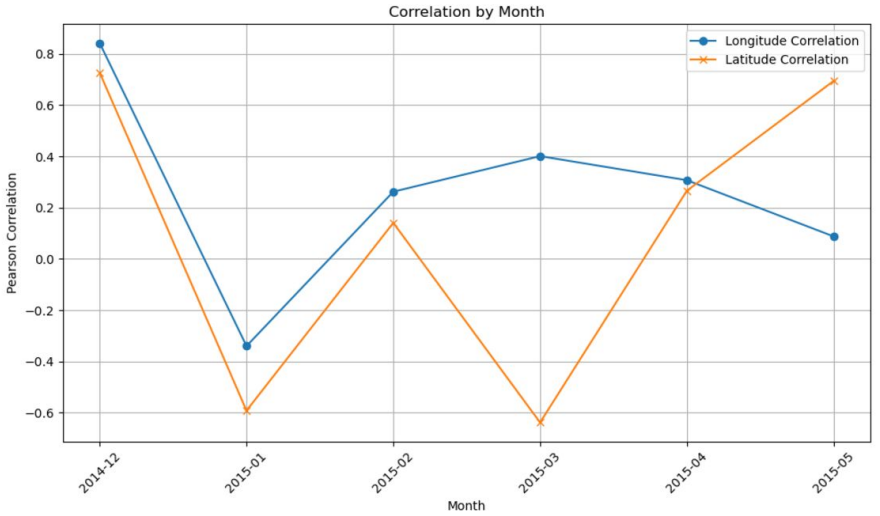

```
{'pearson_corr_long': 0.44521313588832123, 'pearson_corr_lat': 0.05344297215576589}
```

- Pearson_corr_long: 0.445
- Pearson_corr_lat: 0.053

- Correlation between another pair of Jaguars show the similar correlation result as the previous pair

Correlation between two different Jaguars by month





- The divergence in correlation patterns (high in longitude but low in latitude) might reflect distinct ecological behaviors, such as one jaguar ranging more extensively north-south while the other maintains consistent east-west movement.
- The gradual increase in latitude correlation towards May 2015 could indicate converging activity or shared areas of interest during that period, possibly driven by environmental factors like prey availability or mating season.

Website Demo

Link: https://trhussain-ece143-gang-beasts.streamlit.app/

THANK YOU