

A vibrant forest scene with sunlight filtering through the trees and several birds in flight.

Bird Species Observation Analysis

This project analyzes bird species distribution and diversity within forest and grassland ecosystems. Understanding the factors that influence bird populations is crucial for effective biodiversity conservation and ecological planning. This presentation highlights the methods, findings, and insights gained from analyzing comprehensive bird observation data. Our analysis provides a foundation for informed decision-making in wildlife conservation and sustainable land management.



by **Gnanasekar S**

Project Overview

This project aims to analyze bird species distribution and diversity in contrasting forest and grassland ecosystems. We seek to understand how environmental factors influence bird populations and their behavior. By identifying key patterns, we aim to support biodiversity conservation efforts and contribute to effective ecological planning.



Species Distribution

Analyze bird species distribution across different ecosystems.



Environmental Influence

Understand how environmental factors impact bird populations.



Conservation Support

Support biodiversity conservation and ecological planning.

Skills & Tools Used

The project leveraged a range of skills and tools to effectively analyze and visualize bird observation data. These included proficiency in Python for data manipulation, Pandas for data structuring, SQL for database management, Streamlit for creating interactive dashboards, and Plotly for generating insightful visualizations.

Data Analysis

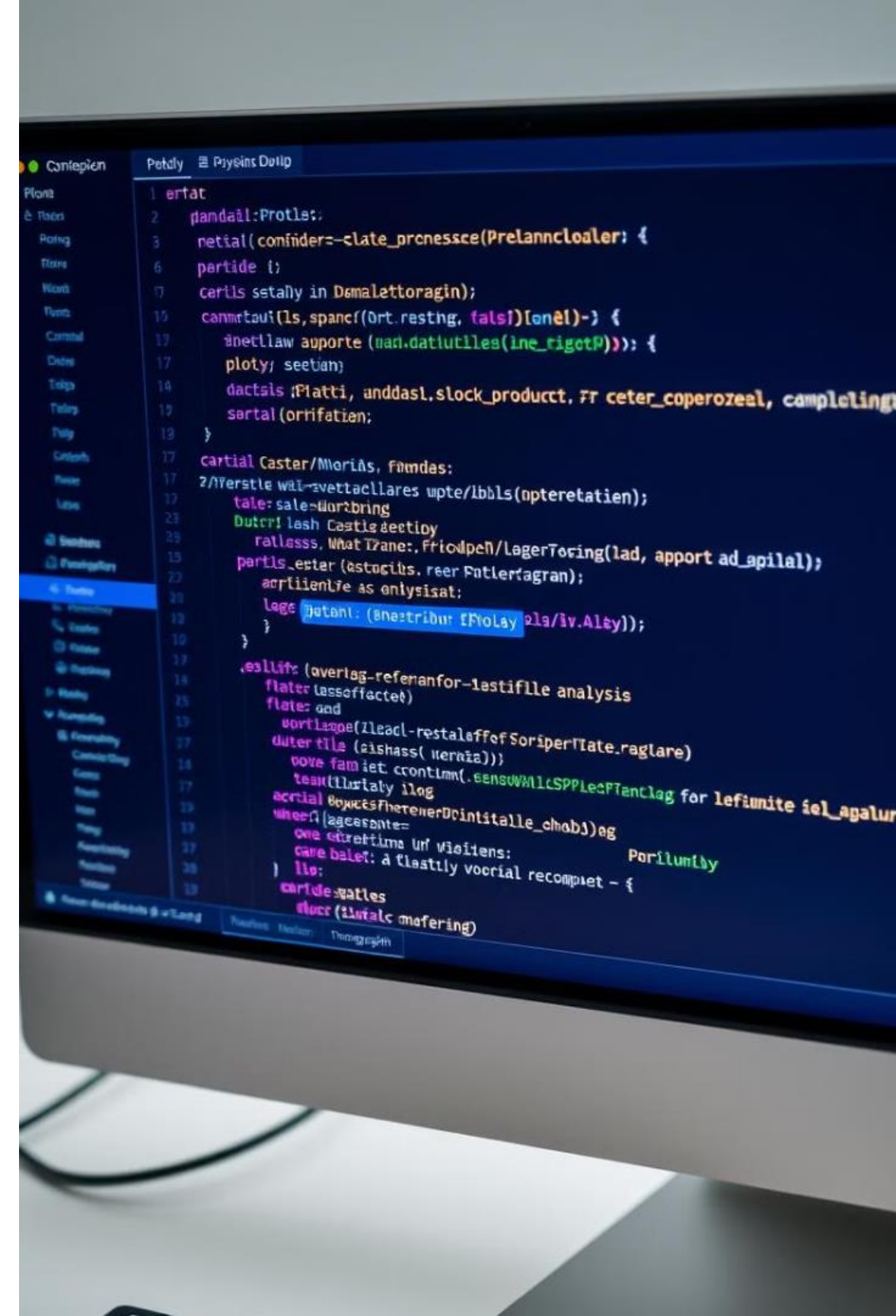
Python, Pandas

Database

SQL

Visualization

Streamlit, Plotly



Problem Statement

The project addresses the need to understand bird behavior across two distinct ecosystems: forest and grassland. By studying patterns of habitat preference and the impact of diversity, we aim to provide insights for conservation and sustainable land use. This study focuses on addressing fundamental questions about bird ecology in these areas.

1

Ecosystem Study

Understand bird behavior across ecosystems.



Habitat Preference

Study patterns of habitat preference.



Sustainable Land Use

Provide insights for conservation and sustainable land use.



Business Use Cases

The insights from this project have several practical applications. They can inform wildlife conservation efforts, guide eco-tourism planning, promote sustainable agriculture practices, and support policy-making for environmental agencies. The analysis helps bridge the gap between ecological research and real-world decision-making.

Wildlife Conservation

Monitoring biodiversity and informing conservation strategies.

Eco-tourism Planning

Designing sustainable tourism experiences based on bird diversity.

Sustainable Agriculture

Promoting farming practices that support bird habitats.

Policy Making

Informing environmental policies with data-driven insights.

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Dataset Description

The analysis utilizes two primary datasets, each representing data from forest and grassland ecosystems. These datasets include multiple Excel sheets for different administrative units. Key features include species identification, location details, observer information, timestamps, and environmental factors recorded during observations.

- 1

Ecosystem Data

Two datasets from Forest and Grassland ecosystems.
- 2

Multiple Units

Multiple Excel sheets per dataset for different administrative units.
- 3

Key Features

Species, location, observer, time, environmental factors.

Data Cleaning & Preprocessing

Effective data cleaning and preprocessing were crucial for ensuring data quality. This involved merging data from multiple sheets, standardizing column names and formats, handling missing values appropriately, and removing irrelevant columns. The result was a unified and prepared dataset ready for exploratory data analysis and visualization.

1

Data Merging

Combined data from multiple sources.

2

Standardization

Unified column names and formats.

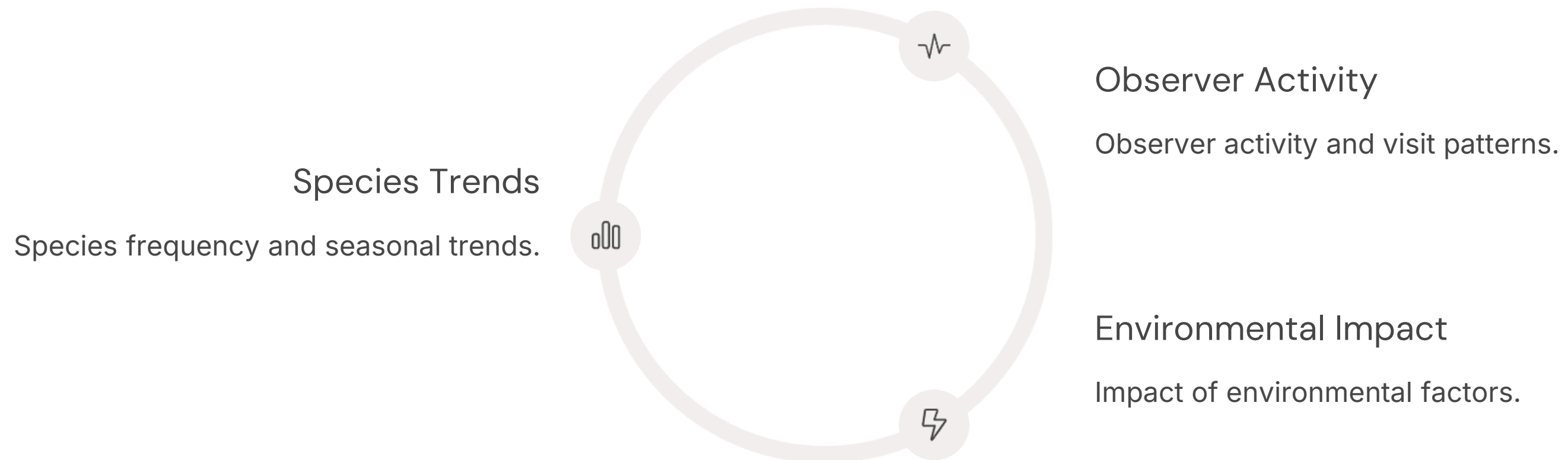
3

Missing Values

Addressed incomplete data entries.

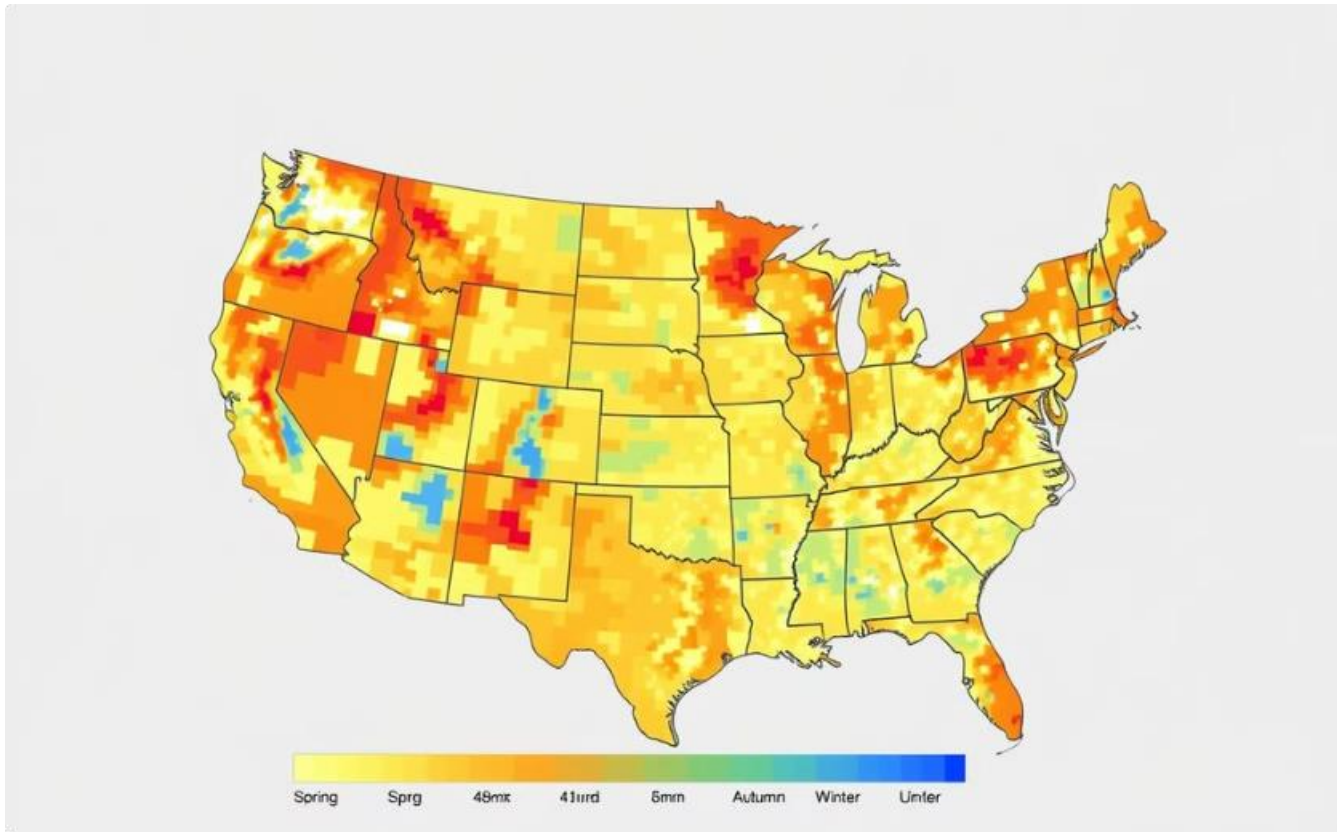
Exploratory Data Analysis

Exploratory Data Analysis (EDA) revealed key insights into bird observation patterns. Analysis included species frequency and seasonal trends, observer activity and visit patterns, flyover behavior, and the impact of environmental factors like temperature, humidity, wind, and disturbances. These insights informed subsequent analyses and visualizations.



Interactive Dashboard (Streamlit)

An interactive dashboard was developed using Streamlit to enable dynamic exploration of the data. Key features included a heatmap of the top 10 bird species observed by season, distribution of observer activity, seasonal observation counts, and filtering capabilities by observer and region. The dashboard facilitated deeper insights into bird observation patterns.



Heatmap by Season



Observer Distribution



Bird Conservation Study Findings

Key Findings & Insights

The analysis revealed several key findings, including high species diversity in specific plots and times of year. Observer bias was noted in some units, and environmental factors such as temperature and sky conditions significantly affected sightings. Watchlist species were concentrated in particular regions, highlighting areas of conservation concern.

High

Species Diversity

High species diversity in certain plots.

Yes

Observer Bias

Observer bias observed in some units.

Yes

Env. Impact

Environmental factors affect sightings.

High

Species Watchlist

Watchlist species concentrated in regions.