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Project Name

The Effects of Dune Plants on Caretta Caretta Nest Success

Overview

This project focuses on how dune plant roots affect the nest success of loggerhead turtles (Caretta caretta). Since these turtles lay eggs near dunes, roots can harm the eggs by breaking them. We aim to analyze and optimize the impact of dune plants on hatching success.

Background

Loggerhead turtles (Caretta Caretta), which are endangered, often lay their eggs near dunes where plant roots can harm the eggs and lower hatching success. Knowing which plants help or hurt is important for increasing hatching rates and helping conservation efforts. Understanding how different plants affect the nests is crucial for planning effective conservation methods.

Key Objectives

a. **Research Questions**

- Which dune plants improve loggerhead turtle nest success?
- Which plants reduce nest success?

b. **Key Steps**

- Data collection and preprocessing
- Analyze data to find plant impacts
- Build models to predict nest success
- Validate and improve model accuracy
- Report findings and recommendations

Methods and Workflow

a. **Datasets**

This data set was collected by excavating loggerhead sea turtle nests and identifying surrounding plants in 2022 on Casey Key, Sarasota County, Florida

b. Cleaning/Preprocessing

- Identifying missing values and deciding on appropriate methods for imputation or exclusion.
- Ensuring all variables, such as vegetation types and hatching success rates, are on a comparable scale.
- Normalizing and standardizing data to ensure comparability across different measurement scales, which is especially important for variables like plant types and nest success rates.

c. Modelling

We'll develop our models by first checking out the data closely through Exploratory Data Analysis (EDA). We'll use histograms and scatter plots to understand any patterns or connections. Then, we'll build different models, like logistic regression, decision trees, and random forests, to predict nest success. These models will consider things like the presence of vegetation and root impact. We'll test how well they work using cross-validation and metrics such as accuracy, precision, recall, and F1-score to find the best one for predicting nest success accurately.

d. Deliverables