



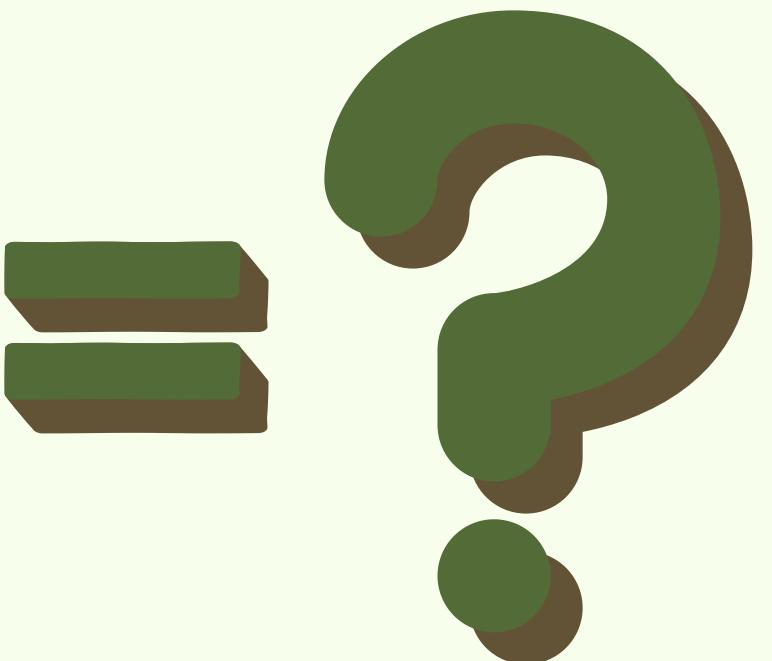
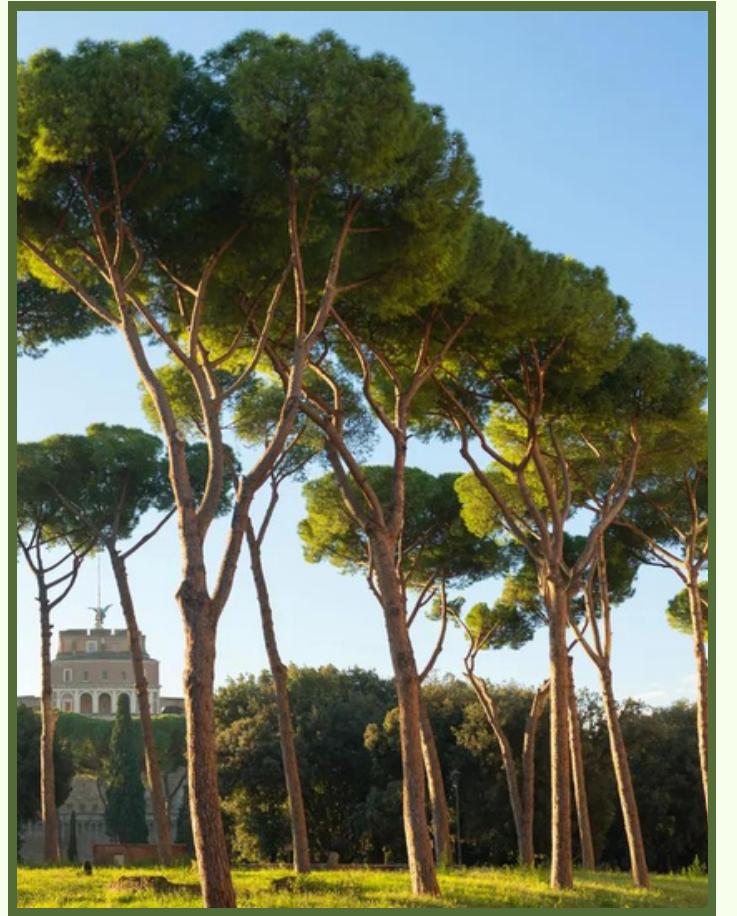
TREE ID APP

FOR

TREES IN PORTUGAL



by Veronika Stengel



TREE ID APP

THE IDEA
FORESTS IN PORTUGAL

TRAINING THE MODEL
TUNING THE MODEL
ADDED FEATURES

Trees in Portugal - Identified From an Image

Please upload your photograph of a tree:

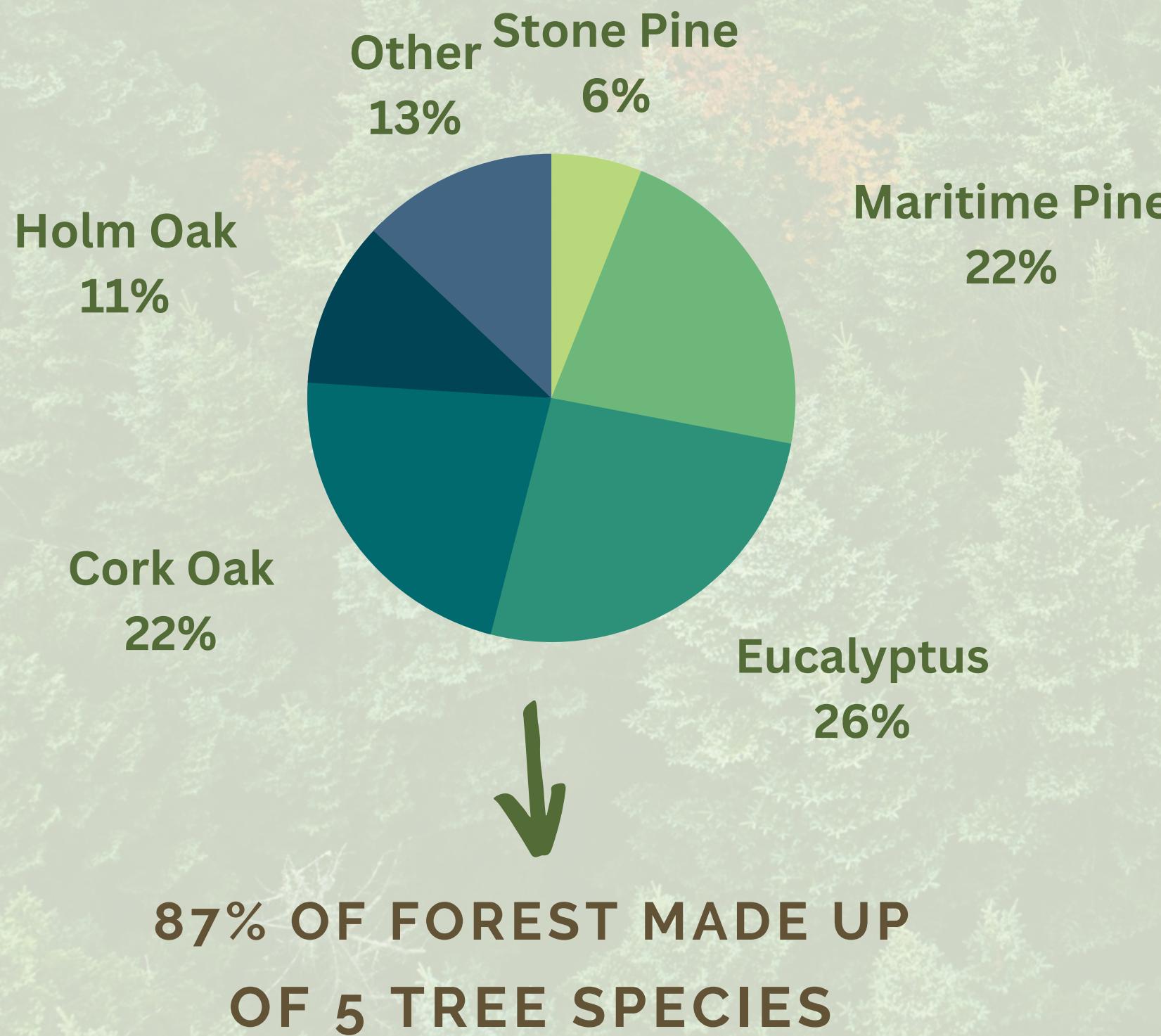
[Browse to Upload File](#)

No file selected.

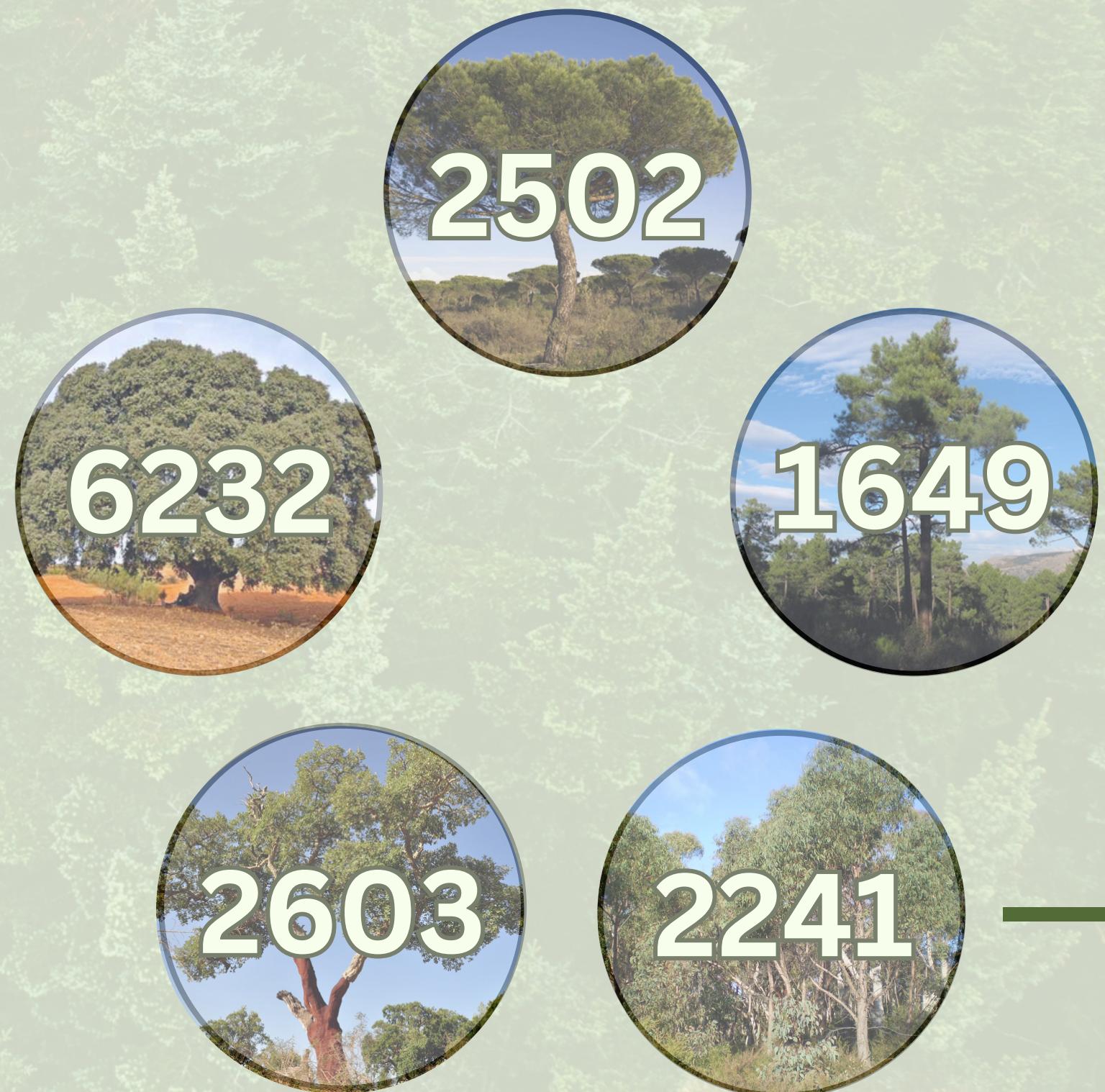
[Identify it!](#)

LIVE DEMO
FUTURE STEPS

FOREST SPECIES DIVERSITY IN PORTUGAL

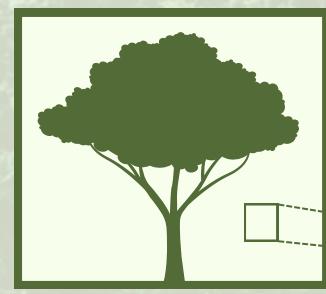


TRAINING DATA FOR TREE IDENTIFICATION

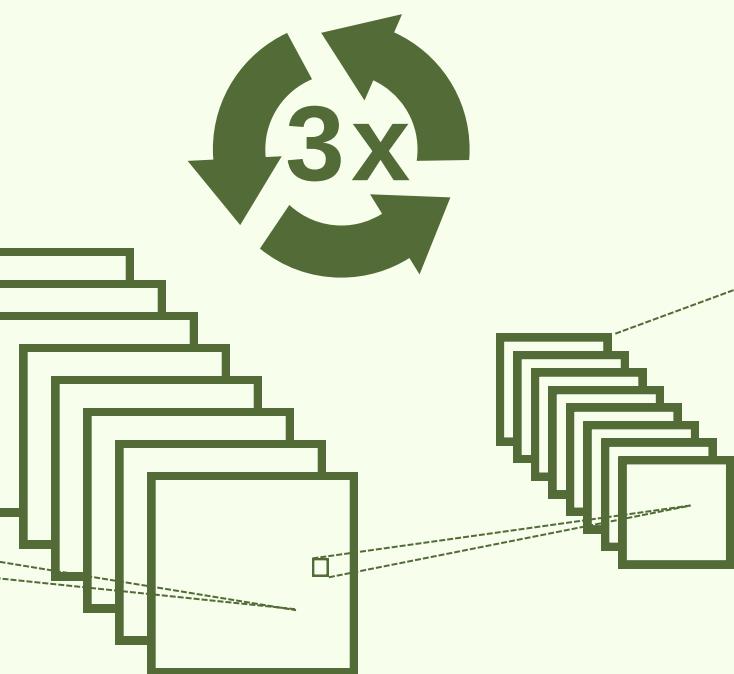


TREE IDENTIFICATION BY DEEP LEARNING

TECHNOLOGY
Convolutional Neural Network,
using Keras (TensorFlow)

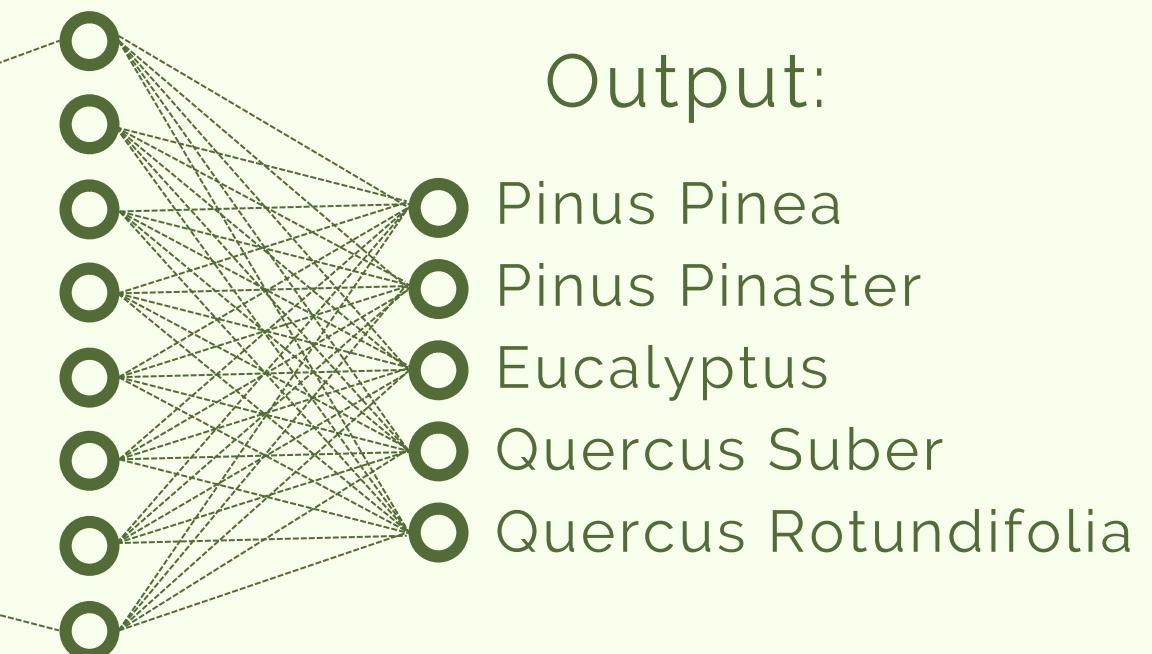


150x150 px



Convolution & Pooling
Activation Function: ReLU

FEATURE EXTRACTION



Flatten & Dense Layer (ReLU)
Activation Function: Softmax

CLASSIFICATION

TUNING THE MODEL



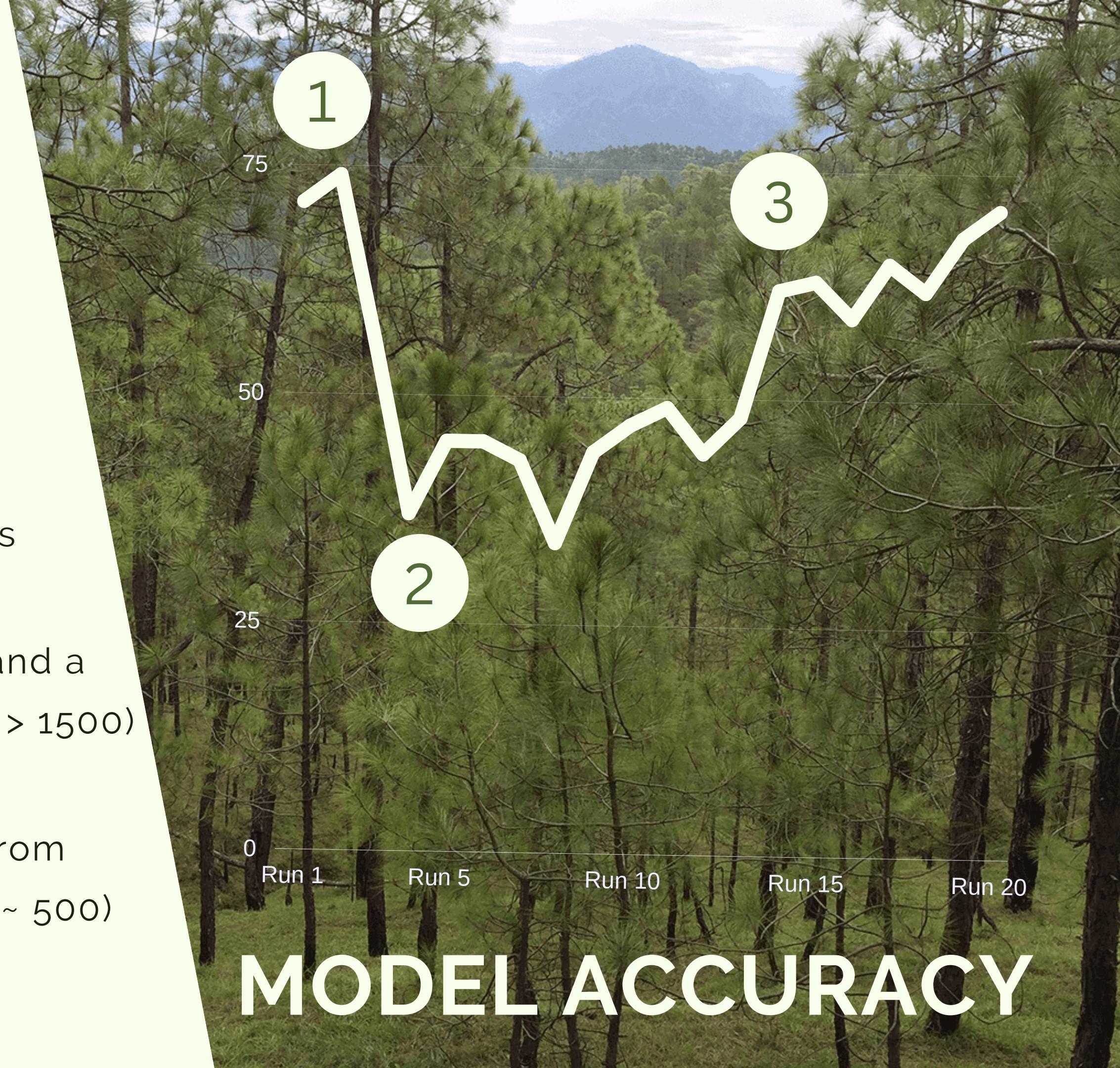
Started tests with about 100 images for 3 tree species

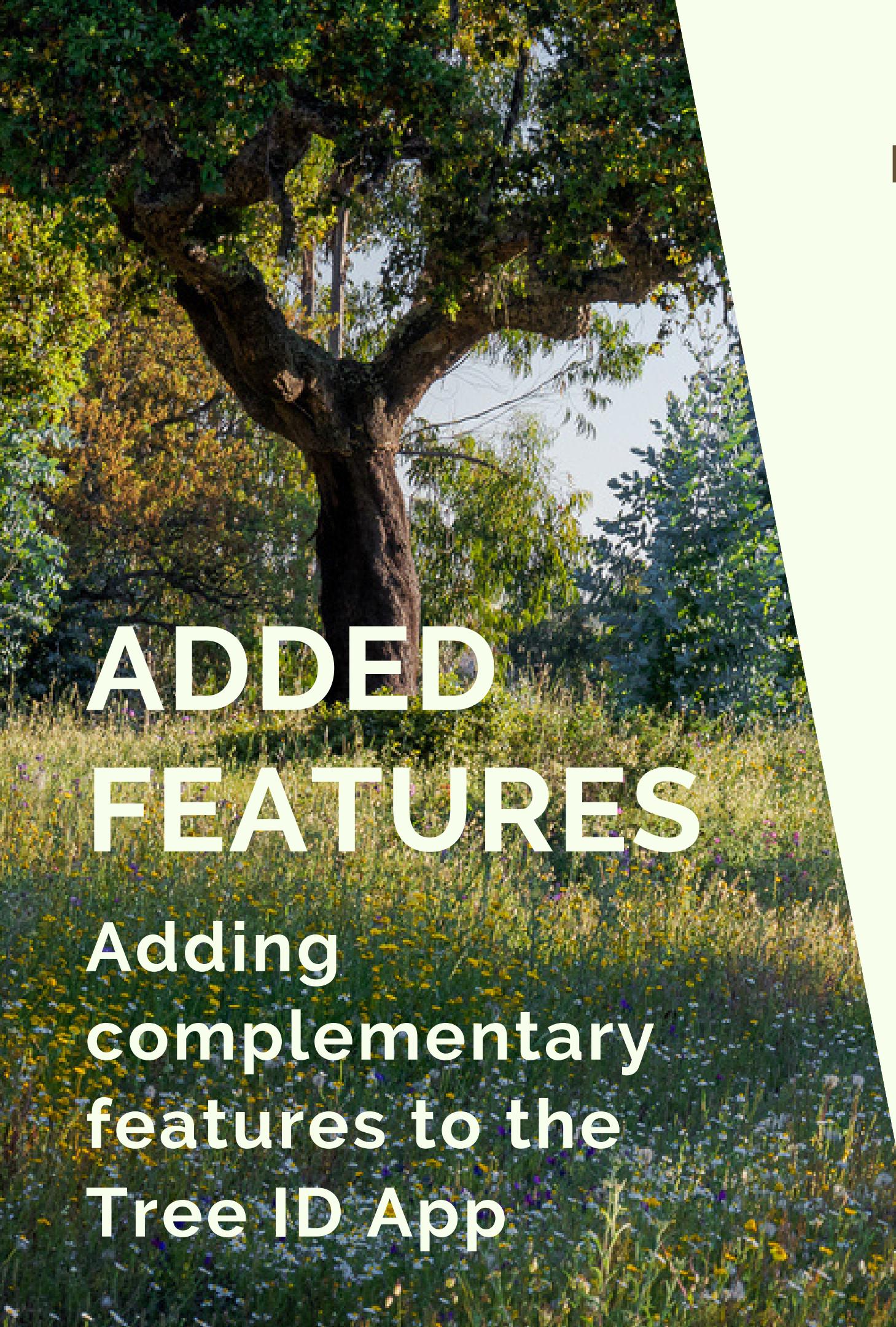


Added 2 more tree species and a lot of images (every species > 1500)



Using only curated images from webscraping (every species ~ 500)





ADDED FEATURES

Adding complementary features to the Tree ID App

BACKGROUND INFORMATION

- Example Image of identified species
- Small text about distribution of this species

MAP OF OCCURRENCES WORLDWIDE

- Data source is an API -> up to date information
- API provides an image of aggregated occurrence counts

MAP OF THESE TREE SPECIES IN LISBON

- Datasource: Webscraped Data from CM Lisboa
- Locations of trees with identified species
- Quite some Data Cleaning & Wrangling necessary



DEMO TIME

[Click here](#) to try out the Tree ID app!

TREE ID APP - PRODUCT PROTOTYPE

Trees in Portugal - Identified From an Image

Please upload your photograph of a tree:

Browse to Upload File No file selected.

Identify it!

Your uploaded image:



Predicted tree species:
Maritime Pine

Probability of prediction: 47 %

With second highest probability (24 %): Holm Oak

With third highest probability (21 %): Cork Oak

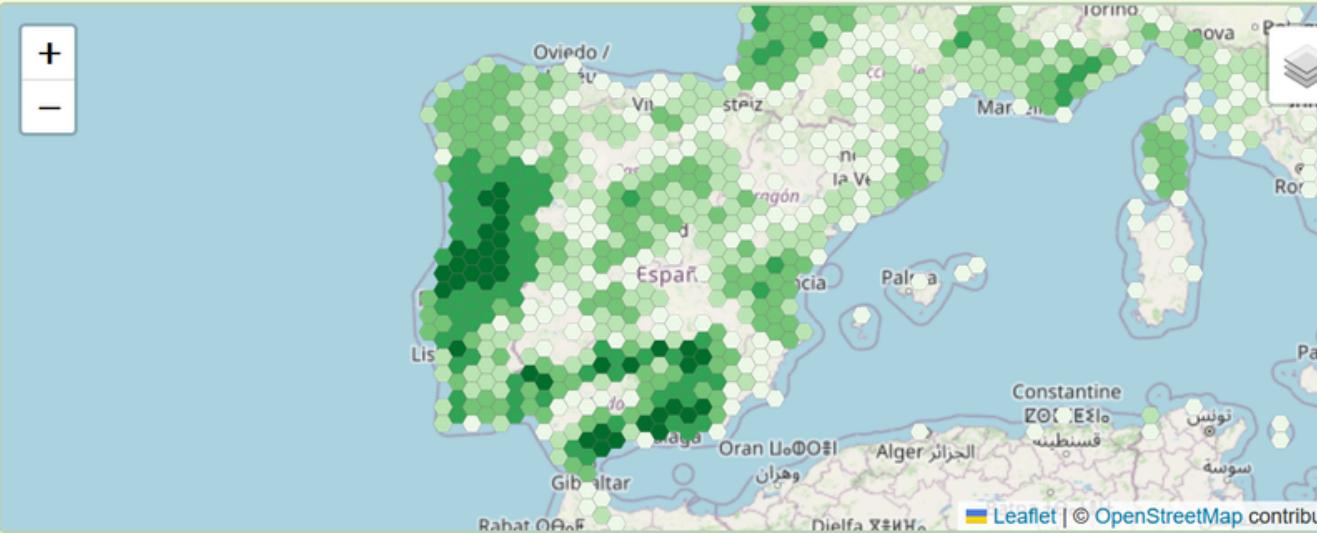
Pinheiro Bravo - Maritime Pine



Pinheiro Bravo - Maritime Pine

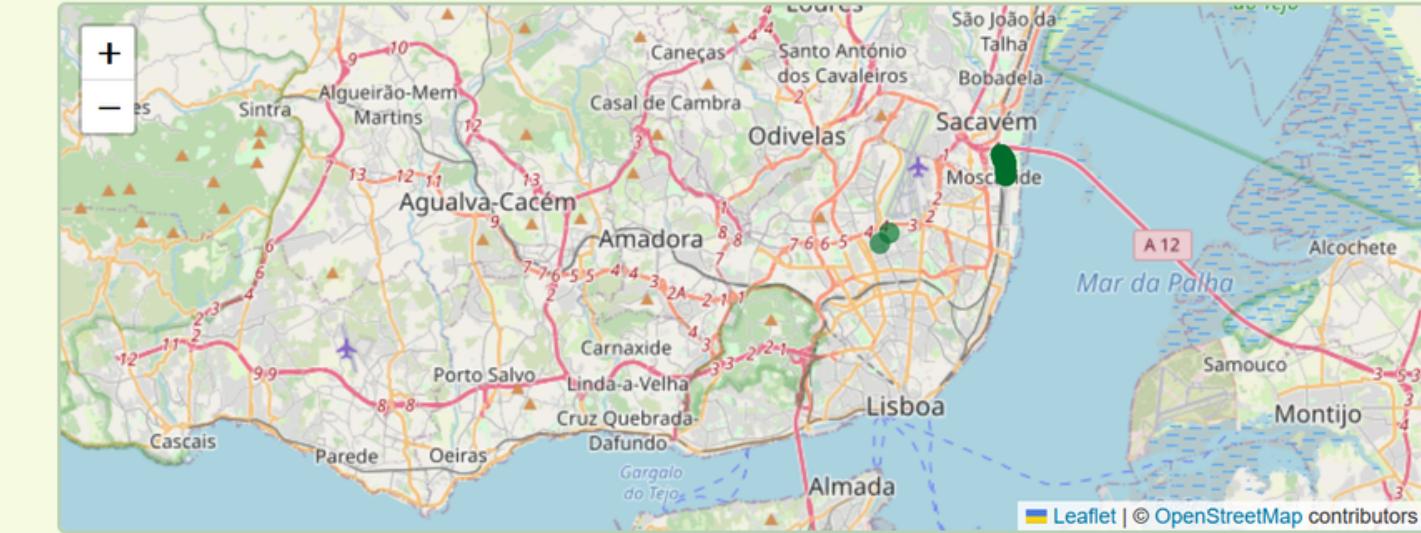
This is one of the 3 main species of trees in Mainland Portugal. It covers 22% of the forest area (713 mil ha). However, it is also the species with the biggest decline in area, loosing 265 mil hectares between 1995 and 2015.

Mapped Occurrences of different Species - Worldwide



Map Data layer: © GBIF.org (Global Biodiversity Information Facility) Leaflet | © OpenStreetMap contributors

This is where you can find Maritime Pine in Lisbon



Map Data layer: © Câmara Municipal de Lisboa Leaflet | © OpenStreetMap contributors

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FUTURE IMPROVEMENTS

MORE IMAGES

Improve the analysis by increased base data



MORE SPECIES

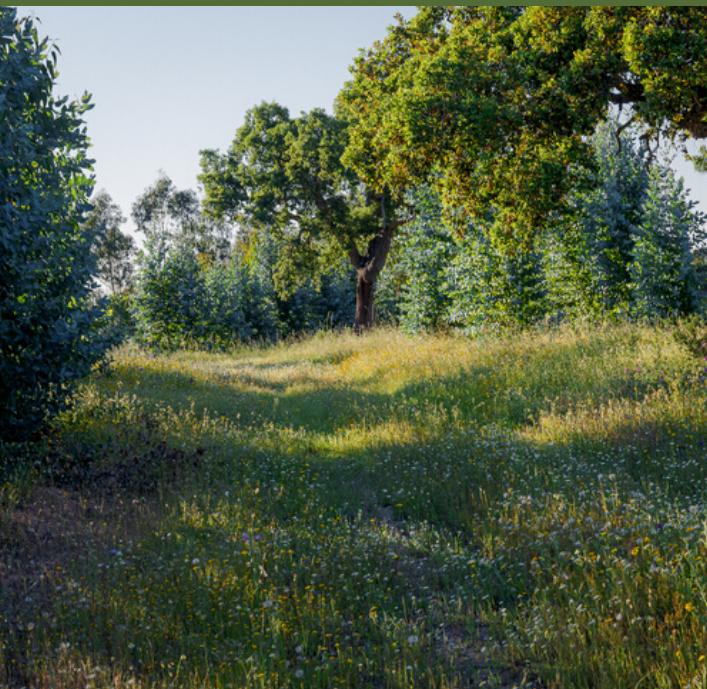
Include more tree species prevalent in Portugal



INCLUDE CLOSEUPS

Include images showing leaf details, bark details, fruits, flowers





THANK YOU

Any Questions?