

# Analysis of LeafSnap Dataset

## Introduction

The LeafSnap dataset was developed by researchers from the University of Washington, Columbia University, the University of Maryland, and the Smithsonian Institution, funded by the National Science Foundation and Google. The purpose was to create an “Electronic Field Guide” for identifying tree species with just a picture of its leaves. This came in the form of an iPhone app that was released in May 2011. Later, A paper on the subject was published in Computer Vision - ECCV 2012. The paper talks about how the researchers used a nearest neighbors classification for determining which leaf is in the picture. I suspect that with a more complex algorithm, such as neural networks, I could replicate and possibly improve the app's results. Using the LeafSnap dataset, I trained various types of neural networks, like convolutional neural networks, MobileNetV2, and ResNet50. For faster algorithm runtime, I also chose species with the most pictures of them. After various attempts at making neural networks and waiting hours for them to train, I concluded that a simpler model, such as the one used in the paper, is better for the task. Not to say that a neural network cannot solve this problem with higher efficiency, I just do not have the computational power and expertise in fine-tuning necessary for doing so. I did, however, attempt to apply my own KNN to this problem and had more success.

## Methods

The primary dataset that I used for the project was the official LeafSnap dataset. I approached this problem multiple ways through segmentation and breaking the image down to various sizes for better model digestion. The goal was for the model to accurately predict which species of tree a given leaf was from.