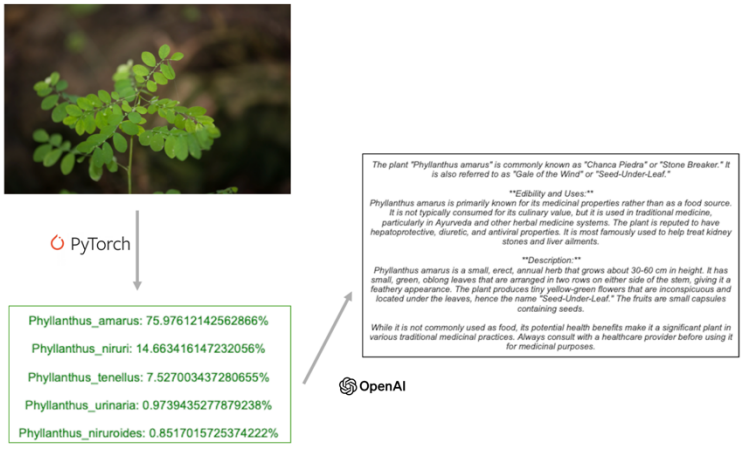
Fine-Tune a Torchvision Model for Plant Classification

DS 4002 CS3 | 4/21/2025 | William Giles



You have just joined a team tasked with quickly providing information on the edibility of wild plants to soldiers that are stationed in the jungle. The soldiers lack other food sources and the ability to search information on plants, other than the ability to send photos of plants to you. Your task is to improve a machine learning system that classifies plants and determines whether they are safe to eat.

There 380,000+ known species of plants, many with similar appearances [1]. Misidentification can lead to dire consequences, especially in unfamiliar regions for these soldiers. The current methods of testing for edibility are slow and risky; the Universal Edibility Test can take over 24 hours to evaluate a single part of a plant [1]. This project aims to make that process faster and more accessible through computer vision and AI.

Your role is to review the models developed by a previous team and attempt to improve their performance. You will see the performance metrics of a range of different Torchvision models; however, these models were developed years ago, and the team believes that the use of more modern architectures and model fine tuning can drastically improve the system's performance.

Your job is to select a Torchvision model architecture, fine-tune it on the Pl@ntNet-300K dataset, and evaluate its performance on plant classification. If your model performs well, it will be integrated it into the pipeline, which exposes an API endpoint to predict plant species from an image and queries OpenAI to assess edibility. You will add to the codebase to achieve this new functionality and submit a reflection, describing why your model is better or worse than others.

To get started, head to the GitHub Repo.

[1] Gina Wagner, "Can I Eat That? Answer the Question With the Universal Edibility Test," Backpacker, Nov. 30, 2021. https://www.backpacker.com/skills/universal-edibility-test/ [Accessed Apr. 3, 2025]