Survey Existing Research

Step 6 of the MLE bootcamp is to survey existing research and reproduce available solutions. This will give us some idea of what the state of the art approaches are, how well they work, and also something to measure our own end solution against.

Project statement

To recap, we are building an image classifier for pictures of flowers. Our dataset has 300 classes of flowers, which makes training a model pretty hard.

Existing Research

I found a website that benchmarks different image classifier models on different datasets. It includes links to the underlying research and instructions on how to reproduce it. I looked through this site and selected a few interesting articles. More on them in the sections below. Source: https://paperswithcode.com/task/image-classification

Escaping the Big Data Paradigm with Compact Transformers

In this article they discuss using Compact Transformers (CCTs), which can achieve similar results as CNNs but require fewer parameters to train.

- Link: https://paperswithcode.com/paper/escaping-the-big-data-paradigm-with-compact
- Date: 2022-06-06

Big Transfer (BiT): General Visual Representation Learning

This article discusses how to generalize transfer learning. They increase the scale of the pre-training and use a simple heuristic to easily adapt a model to a new task.

- Link: https://paperswithcode.com/paper/large-scale-learning-of-general-visual
- Date: 2020-05-05

Reproducing Results

I tested both approaches in this notebook.

Summary

I found that both approaches are viable, however the transfer approach (BiT) outperformed the CCT approach in a number of ways:
- BiT had better accuracy.
- BiT epochs took less time to run
- BiT was simpler to implement since it used more standard tensorflow libraries.

My conclusion here is that transfer learning is the way to go with this project. CCT is an interesting approach, but does not seem to be as good.