Intelligent Systems Project

Deep Learning Image Classification using PyTorch

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1. Overview

PyTorch is an open source machine learning library based on the Torch library, used for applications such as computer vision and natural language processing. It is primarily developed by Facebook's AI Research lab (FAIR). It is free and open-source software released under the Modified BSD license. Although the Python interface is more polished and the primary focus of development, PyTorch also has a C++ interface.

A number of pieces of Deep Learning software are built on top of PyTorch, including Uber's Pyro, HuggingFace's Transformers, and Catalyst.

PyTorch provides two high-level features:

- Tensor computing (like NumPy) with strong acceleration via graphics processing units (GPU)
- Deep neural networks built on a tape-based autodiff system

Deep learning (also known as deep structured learning or differential programming) is part of a broader family of machine learning methods based on artificial neural networks with representation learning. Learning can be supervised, semi-supervised or unsupervised.

This project is going to be a Python-developed Desktop Application that uses Image Classification and Deep Learning to assign the type of flower found in a picture. The picture can be loaded by the user and the application will simply provide the answer with the type of flower found.

2. Main functionalities

The main functionalities of the application will be:

- The user being able to choose a picture
- Load the picture in the application
- Get the type of flower as a result from the application

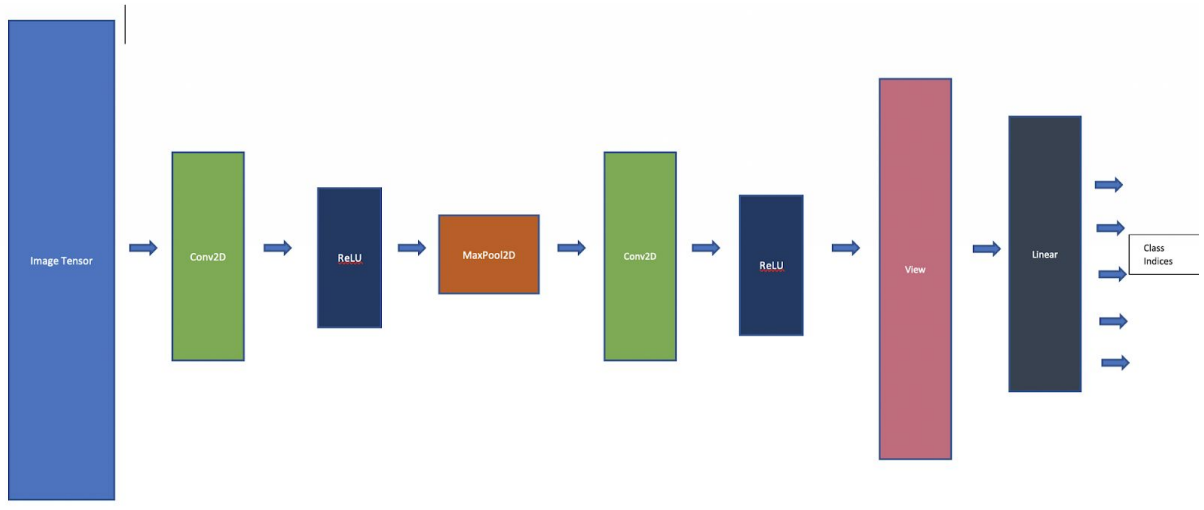
3. Detailed description of one algorithm

The flower classification will be based on a deep learning neural network pipeline and will be discussed in more depth after we can see some results. :)

4. Examples: existing & your own

An example of a similar project:
https://towardsdatascience.com/flower-classification-with-convolutional-neural-networks-b97130329e5f
However, this implementation is using the fastai Library. The fastai library simplifies training fast and accurate neural nets using modern best practices. We are not sure if we will be using this library yet.

General CNN Structure:



5. Proposed problem: general specification, source of data, related work

The dataset is acquired from www.kaggle.com and is a dataset used for flower recognition. It contains 4242 images of flowers.

The data collection is based on the data flickr, google images and yandex images.

The pictures are divided into five classes: chamomile, tulip, rose, sunflower, dandelion.

For each class there are about 800 photos. Photos are not high resolution, about 320x240 pixels. Photos are not reduced to a single size, they have different proportions!