Flowers Recognition

Rémi Ang
Udacity.com - Machine Learning Engineering Nano Degree

May 18, 2018

1 Definition

1.1 Project Overview

Object recognition is a major discipline in the field of computer vision. The applications are numerous and varied as self-driving vehicles environment detection, skin cancer screening or reality augmented tourism.

This project focus on the automatic recognition of flower species from pictures with potential applications such as:

- population tracking and preservation (imagine drones taking a census of flowers in your neighborhood)
- crop and food supply management
- toxicity detection
- Education (i.e. smartphone app for hitch-hiker and nature lovers)

Figure 1: it's a Daisy!

1.2 Problem Statement

Is it possible to accurately identify the variety of a flower from a picture ?

The today state of the art solution to tackle pictures classification problems is the creation and training of a deep Convolution Neural Network (CNN). The training has to be performed on a dataset of flower pictures classified by species.

1.3 Dataset

The dataset used in this project is the "Flowers Recognition Dataset" of Kaggle.com given by Alexander Mamaev.

The zip archive is 230MB and contains about 4300 flower images (.jpg) classified in 5 classes: Daisy, Dandelion, Rose, Sunflower and Tulip.

Figure 2: samples of "Flowers Recognition" dataset

The pictures appear to have been automatically scraped from the online picture portals Klickr, Google Images and Yandex Images.

The pictures represents single or multiple flowers under various angles, zoom, brightness conditions, life cycle stages. However, a significant number of pictures contains other subjects (persons, insects, other flowers, vase) or seem to be missclassified. Such pictures can potentially negatively impact the training of the CNN. A more detailed approach of the selection of suitable samples is described in chapter 3.1: Data Preprocessing

1.4 metrics

The evaluate our classification model is based on the *Accuracy ACC* and the *Classification Cross-Entropy* $H(y, \hat{y})$ metrics defined as follows:

$$ACC = \frac{number\ of\ correct\ predictions}{total\ number\ of\ prediction} \cdot 100$$

$$H(y, \hat{y}) = -\sum_{k=1} y_i log(\hat{y}_i)$$