Dog Breed Classifier

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Introduction

Every day more and more people get familiar with the power of image classification and subsequent alterations, whether they are aware of it or not. Using snapchat and/or instagram A.R. filters require complex underlying neural networks built upon training on millions, and in somes cases **billions**, of images. Humans have integrated these tools to achieve things such as dog filters, recognition of faces in photo galleries.

This project aims to delve into the world of image classification, by selecting a goal that is neither too difficult or too simple. Image dog breed classification.

Project Outline (Goal)

The goal of the project will be to build an image classification model, in which images of dogs are classified based on their breeds. If the image of a human is provided instead, it will approximate the dog breed that looks the most similar. It will be using CNNs (Convolutional Neural Networks) to achieve this purpose.

Fig. 1. Dog breed classification example.

Datasets and Inputs

The base human and dog datasets are also provided in the project's repository, consisting of **13233 samples** of image data for the human dataset and **8351 samples** for the dog dataset. Each image consists of one or more of the species it is supposed to portray. For example, an image may contain more than one human face for the human dataset.

Implementation

This project will be built by following the steps provided in [this github repository](#). The final goal will be to have a working prediction model that can accurately classify dog breeds from different images of dogs, as well as approximate dog breeds to human faces.

Given an image, the model will first verify if the image is either a dog or a human. It will try to detect a human face with the OpenCV pre-trained face detector. The algorithm will operate under the following rules:

- If a dog is detected in the image, it will return the predicted breed.
- If a human is detected in the image, it will return the resembling dog breed.
- If neither is detected in the image, it will provide output that indicates an error.

The project notebook will contain a model built from scratch using PyTorch convolutional neural networks, and a transfer learning model, using the pre-built CNN VGG-16 for image recognition.
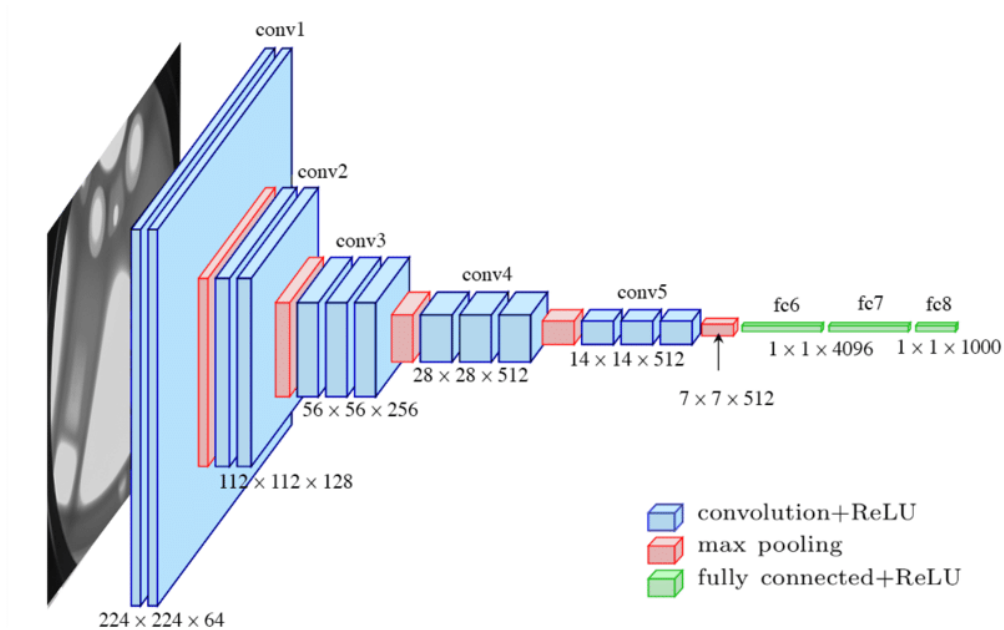

Fig. 2. The standard VGG-16 network architecture

Evaluation

The project will be tested by selecting images randomly and testing the model on them. The project notebook will contain these tests, along with their expected outcomes.