Capstone Project

Machine Learning Engineer

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Domain Background

We love dogs. Right ? Yes, most people love dogs. So sometimes we go to the park or travel somewhere we mostly meet dogs. When we go trekking dogs usually follow us :) isn't it. Sometimes we like a dog so much and a thought comes into our mind that is let's have a dog. And we don't know it's breed and this dog will be compatible with our atmosphere where we lived so we are tackling this problem by creating a classifier that will tell us the dog's breed using a dog's image and it will help us the dog's owners as well who are unsure about there dog's breed. We are going to use a Convolutional neural network (CNN) to deal with this problem as we all know CNNs are a better choice then Fully connected Neural networks for image classification.

Problem Statement

We are going to use an image as an input and based on an algo we design will give us an estimate of the dog's breed if the image is of a dog or if the image is of a human we will tell the most similar dog's breed for that human.

So in this project we will know

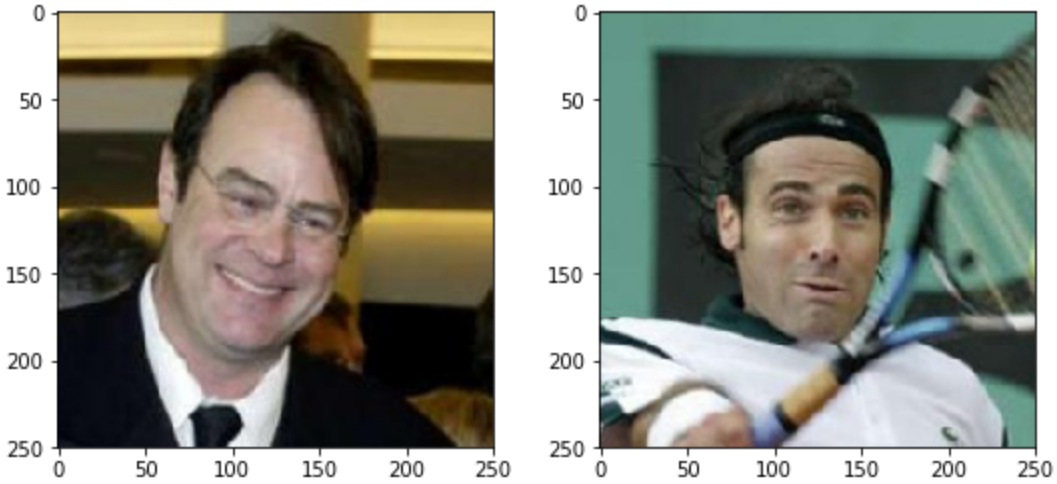
1. if an image is of a human or dog or none.
2. If dog then it's breed
3. If human then most similar dogs breed
4. Our algorithm should be at least 60% efficient

Datasets and Inputs

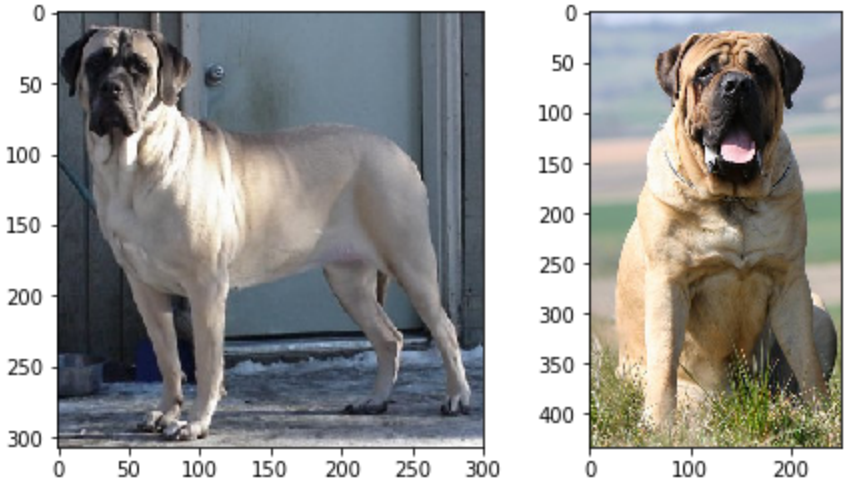
We are using image datasets provided by udacity

Dog Dataset Url : https://s3-us-west-1.amazonaws.com/udacity-aind/dog-project/dogImages.zip (8351 images)
Human Dataset Url : https://s3-us-west-1.amazonaws.com/udacity-aind/dog-project/lfw.zip (13233 images)

Human Image Example



Dog Image Example



Solution Statement

CNN model which will estimate dog's breed if there is a dog in the picture.
We may use transfer learning for better results as there are pre existing models on large datasets like imagenet and we finetune that model to get the desired result of our problem.
VGG-16 model, along with weights that have been trained on ImageNet, a very large, very popular dataset used for image classification and other vision tasks.
ImageNet contains over 10 million URLs, each linking to an image containing an object from one of 1000 categories.

Benchmark Model

I am going to use VGG-16 as a benchmark model. It's available in pytorch. I will modify the last Fully connected layer and freese all the convolution layer weights.

Evaluation Metrics

I am going to use accuracy as the evaluation matrix.

Project Design

As we are using a predefined project here in the course I am going to follow the same.

- Step 0: Import Datasets
- Step 1: Detect Humans
- Step 2: Detect Dogs
- Step 3: Create a CNN to Classify Dog Breeds (from Scratch)
- Step 4: Create a CNN to Classify Dog Breeds (using Transfer Learning)
- Step 5: Write your Algorithm

- Step 6: Test Your Algorithm