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Dog App

Domain Background

Image recognition has been around since the 1960's aiming to mimic human vision for the computer to tell object in the image. And only recently, with pre-trained CNNs and ImageNet, reaches a breakthrough in performing this task to the public. The pre-trained models help users to learn or used existing frameworks without spending time building the model from scratch, and use could also use as a benchmark and foundation to the developing model. ImageNet has helped provided tagged images as a source of data to develop and design a more sophisticated computer vision algorithm.

Problem Statement

The purpose of this project is to create the backend of a web application to classify between human and dog breeds and suggest the dog's breed or human resembled dog breed.

Datasets and Input

The input of this project is images provided by Udacity stored in <https://s3-us-west-1.amazonaws.com/udacity-ai-nd/dog-project/dogImages.zip> and <https://s3-us-west-1.amazonaws.com/udacity-ai-nd/dog-project/lfw.zip>. The *dogImages* folder contains 8,251 images with a dog's breed embedded in the path of the picture. And *lfw* contains 13,233 human face images.

Solutions

The ideal solution is to develop a CNN that will correctly classify all the dog's breed. But might use existing pre-trained CNNs instead because image training could be very computation expensive.

The first step is to classify humans and dogs using the best-trained model. Then, from the result, suggest a dog's breed that the human look like and predict the dog's race if it is a dog.

Benchmark Model

1. A CNN model from scratch to classify dog breeds with at least 10% accuracy.
2. A transfer learning CNN to classify dog breeds with at least 60% accuracy.

Evaluation Metrics

- Accuracy for binomial classification of humans and dogs.
- Log Loss is used for dog breed classification, considering there are 133 classes and takes into account the uncertainty of the prediction based on it varies from the actual label.

Project Design

1. Select a pre-trained model that detects humans most actually.
2. Select a pre-trained model that detects dogs most actually.
3. Select a model, from scratch or pre-trained, that most predict the dog breed.
4. Write an algorithm that identifies humans or dogs with output a dog's breed for an actual dog or human resembling dog breed. If either, output None.