

UDACITY MACHINE LEARNING ENGINEER NANODEGREE

A Capstone Proposal on
the Dog Breed Classifier Project.

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Domain Background

Generally, the dog is one of the most varied species of animals on the planet. Therefore, having a dog breed properly classified would help many to determine what exactly that type of dog it is with its own unique characteristics.

Problem Statement

The problem statement is based on how to identify a particular breed of a dog successfully, and how was this achieved?

There were the steps that had to be put into consideration.

1. It must recognise an image to ensure whether it is a human or a dog in it.
2. A successful classification of the dog breeds with an algorithm accuracy of nothing less than 60% is desired.

Dataset and Inputs

The datasets used were provided on the Udacity Machine Learning Nanodegree platform and they are:

1. The dog dataset (comprises of 8,351 dog images): <https://s3-us-west-1.amazonaws.com/udacity-aind/dog-project/dogImages.zip>
2. The human dataset (comprises of 13,233 dog images): <https://s3-us-west-1.amazonaws.com/udacity-aind/dog-project/lfw.zip>

Solution Statement

The solution is to design a Convolutional Neural Network (CNN) that is able to estimate the breed of a dog in any of the images appropriately.

Some of the steps taken were:

1. The needed datasets are obtained and downloaded first.
2. Under the parts of data preprocessing - Proper identification of the human images, which made use of Open Cv's implementation of Haar feature-based cascade classifiers to detect human faces in images and return a resembling dog breed.
3. Proper identification of the dog images, which made use of ImageNet because it has a huge database and large number of labelled dog images.
4. Lastly, on making accurate predictions by training a model and also an algorithm that determines whether an image contains a human, dog, or neither.

Benchmark Model

Using transfer learning to create a CNN that can identify dog breed from images that must attain at least 60% accuracy.

Evaluation Metrics

The accuracy percentage of 60% is sufficient to judge how well the model is performing.

Project Design

This represents the workflow of the completed project:

1. Getting the datasets: The human and dog datasets was obtained and downloaded to be used for this project.

2. Detecting humans: Once the data had been gotten successfully, human faces are detected by using the Open Cv's mode of implementation, and the pre-trained face detector extracts the number of faces that is found.
3. Detecting dog: The pre-trained models from ImageNet, the Resnet-50 are made use of.
4. Classification of the dog breed: Built a classifier using CNN to classify the dogs whilst using Pytorch and Transfer Learning models.
5. Writing an algorithm for output: In order to determine and test which of the images contain a human so as return the resembling dog breed, a dog breed, or an error that indicates neither.