Machine Learning Engineer Nanodegree

Capstone Proposal

Anup Kolte
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Proposal for Capstone Project

Dog Breed Classification

Domain Background

In Dog Breed Classification, we see the dataset contains pictures of mutts and people to which we need to

group hounds dependent on their varieties. At that point why Humans? the pictures of the people are utilized to perceive what classification of dog breeds will they be ordered (for the sake of entertainment reason) Also, when watched, we sort such attempts to the field of Computer Vision and Machine Learning, to which there are different works carried on in the above undertaking.

As of late in 2019, Punyanuch Borwarnginn et al proposed the work on hound breed classifcation utilizing the various ways to deal with order them dependent on their varieties to handle populace control, infection breakout, immunization control and legitimate ownnership. He and his collaborators utilized 1. Histogram Oriented Gradient and 2. Convolutional Neural Network utilizing Transfer Learning for the characterization reason. On making a near report, they found that the Neural Nets had a superior exhibition contrasted with the HOG descriptor.

(### Breakthrough Conventional Based Approach for Dog Breed Classification Using CNN with Transfer Learning)

Investigating the work conveyed above, we perceive how the dog breed classifcation can be utilized for deciding different data. This can be additionally extended to decide data on the 1. Kinds of Dog Breeds ideally picked by people 2. Segment Needs for the Dogs 3. Conduct examination of Dogs at various segment areas, and so forth.

Problem Statement

Here the objective is to make a Dog Breed Classifier and construct an application for the equivalent. The undertakings included are:

1. Download and Process the Images of the Dogs and Humans 2. Identify the Dogs and Humans utilizing the PreTrained models, for example, Haarcascade and VGG-16 3. Assemble and train a classifier to calssify hound breeds without any preparation 4. Likewise, train the model utilizing move learning with an effieciency to be utilized for application as well. 5. Utilizing the App, anticipate the type of the dog and furthermore the classification of dog breed the human looks like to.

It is application which can be very convenient to perceive the types of obscure mutts for the client and furthermore have a great time by making a similarity of a dog to the given human pictures.

Datasets and Inputs

Here, in the Dog Breed Classification, the dataset contains the pictures of Dogs and Humans. There are an aggregate of 133 varieties, 8351 pictures for hounds and 13233 pictures for people. Utilizing these pictures as information, it must be handled by our necessities and a model must be intended to prepare our machine.

The contribution to the neural net is either a picture of a dog or human to which we anticipate the yield as the type of the dog (for hound input) or tyoe if hound the human looks like to (for a human picture input).

Solution Statement

The client end application will be structured which will be valuable to recognize the dog breeds. To handle this, we need tp train our model to identiy the dog dependent on the specific highlights. The convolutional neural system can be utilized to prepare the model and dependent on the assessment and execution of the model, an application will be worked for the client experience.

Benchmark Model

We can benchmark all phases of our venture work process independently as given beneath:-

- VGG16 model utilized in move learning for hound discovery ought to anticipate hound in pictures with high accuracy. This guarantees our dog locator is all around prepared.

- The custom CNN must have some precision to get an instinct of whether the model is working, if working it must have the option to yield just one dog variety among 133 complete dog breeds. This will guarantee that our custom model is woking and can be prepared on full dataset. At last it ought to have the option to foresee with high Precison and high Recall after all phases of our work process are working.

- Another creiteria would resemble having our OpenCV's Haar falls classifier to work with high exactness.

✓ The benchmark for the model can be referenced to the Kaggle leaderboard for hound breed recognizable proof rivalry. The objective for this model is to arrive at a multiclass misfortune score under 0.01, which is in the best 100 of the opposition. The other benchmark will be **80%** expectation precision.

✓ The CNN model made without any preparation must have precision of at any rate 10%. This can affirm that the model is working in light of the fact that an arbitrary supposition will give a right answer about 1 of every multiple times, which relates to a precision of under 1%.

✓ The CNN model made utilizing move learning must have exactness of 60% or more.

Evaluation Metrics

The assessment measurements that can be utilized to assess the presentation of the AI model are:

Precision: The proportion of right forecasts to the complete size of the information (for example (TP+TN)/Data Size)

Disarray grid:

Review: The proportion of genuine positives to the genuine positive and bogus negative (for example TP/(TP+FN))

Exactness: The proportion of genuine positives to the genuine positive and bogus positive (for example TP/(TP+FP))

For this multi class arrangement, Multi class log misfortune will be utilized to assess the model. As a result of the unevenness in the dataset, exactness is a not a decent pointer here to gauge the presentation. Log misfortune assesses vulnerability of expectation dependent on the amount it shifts from genuine mark and this will help in assessing the model.

Project Design

The accompanying task can be planned by the underneath work process.

1. Data stacking and investigation

2. Data enlargement and handling

3. Detect the Dog and Humans utilizing the given locator calculations

4. Build a CNN preparing model without any preparation utilizing Deep Learning structure - Pytorch

5. Build a preparation model utilizing the Transfer Learning

Task would be isolated in the accompanying advances:

- Import fundamental python bundles and libraries required for different assignments. Import and preprocess the information and split it into train, approval and test sets.

- Detect human faces utilizing OpenCV's Haar course classifiers.

- Detect hounds utilizing pretrained VGG16 model.

- Create a custom CNN to characterize hound breeds.

- Algorithms to join Dog indicator and human identifier :

o If hound is identified, return hound breed expectation
o If human is distinguished, return taking after dog variety forecast.
o If nor is identified, return Error as yield.