Machine Learning Engineer Nanodegree

Capstone Proposal

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Proposal

Domain Background

The Dog breed classifier is a notable issue in ML. The issue is to distinguish a variety of dog if hound picture is given as information, whenever provided a picture of a human, we need to distinguish the looking like dog variety. The thought is to manufacture a pipeline that can process true client provided pictures and recognize a gauge of the dog's breed. This is a multi-class grouping issue where we can utilize managed AI to take care of this issue. Subsequent to finishing this model, I am arranging to fabricate a web application where client can enter a picture and acquire forecast from this model. This task offers me a chance to fabricate and send ML models, so I have picked this as my capstone venture.

Problem Statement

The thought is that we snap a photo with a telephone and the application mentions to us what dog breed is on the image. Furthermore, we need that application to instruct us to what dog variety a human is most carbon copy. We need to have a response to a couple of inquiries here. The fundamental inquiry is What dog breed is on the image? The subsequent inquiry is: How might you look on the off chance that you were a dog? To address these two inquiries we initially need to respond to the inquiry: Is on the image human or a dog?

This is a regulated learning issue and in light of the fact that we have our dog pictures isolated into breed classes we will utilize arrangement prescient displaying all the more unequivocally multi-class prescient model.

Dataset and Inputs

To take care of our concern our info information must be pictures since we need to client takes a picture of a dog (or human) with his telephone, sent it to our server and we would return what dog variety is in all likelihood in an image (or to which dog variety is human most resemble).

All information for this task is given by Udacity. We have pictures of dogs and pictures of people. All dog pictures are arranged in train(6,680 Images), test(836 Images) and valid(835 Images) catalog, and all the pictures in these registries are arranged in breed indexes. We have 133 envelopes (hound breeds) in each train, test and substantial catalog. Human pictures are arranged by name of every human. We have 13,234 Files (Images), 5,749 Folders(Humans). Our information isn't adjusted on the grounds that we have one picture of certain individuals and a few for other people. The equivalent is for hound pictures. (the thing that matters is from 1 to 9 pictures as a rule).dog pictures have diverse picture sizes, various foundations, a few mutts are in full

sizes and some simply ahead. Lightning isn't the equivalent. That is quite in light of the fact that we don't have the foggiest idea how clients' pictures will be, and we need that our model deals with various kinds of pictures. Human pictures are the entirety of a similar size 250×250. Pictures are with various foundations, light, from various edges, in some cases with barely any countenances on the picture. Here are a couple of tests of our dog and human pictures:

We can see from the model over that a few pictures have more than one human or a dog on a similar picture. Possibly it would be a smart thought to expel those pictures. I will test this to see the outcomes.

Solution Statement

We will utilize Convolutional Neural Networks (CNN) to make a model. CNN is a piece of profound neural systems and is incredible for investigating pictures. Hopefully we will blend CNN with XGBoost to locate the most ideal model yet that thought needs more research since I don't have the foggiest idea whether

this is doable. To discover if the image is human or not we will utilize the OpenCV model. Furthermore, to discover if the dog is on an image we will utilize a pre-prepared VGG16 model. We will make our CNN model utilizing move learning since we need much less pictures along these lines we despite everything can get extraordinary outcomes.

Benchmark Model

For our benchmark model, we will utilize the Convolutional Neural Networks (CNN) model made without any preparation with an exactness of over 10%. This ought to be sufficient to affirm that our model is working since irregular supposition would be 1 out of 133 varieties which are under 1% on the off chance that we don't consider lopsided information for our dog pictures.

Evaluation Metrics

The difficult we attempt to take care of is an arrangement issue. Since our information is an uneven, basic precision score isn't generally excellent here. On Kaggle they use multi-class log measurements to assess models. I will likewise utilize this measurement so I can contrast it with results on Kaggle. I will likewise utilize F1 score testing since it considers accuracy and review and it is simpler for me to get results.

We calculate F1 with formula:

F1 = 2 * (precision * recall) / (precision + recall)

Project Design

In the wake of getting a dataset that is given by Udacity second thing we need to do is to distinguish people on pictures.

We will utilize the OpenCV model to get faces from the picture and that will let us know is on the picture human or not. To do this we will execute Haar include based course classifiers. We can discovered increasingly about this here: Object Detection utilizing Haar highlight based course classifiers. Our work process on identifying faces:

- introduce pre-prepared face finder
- load picture
- convert picture to grayscale
- discover faces in the picture
- return valid if the quantity of appearances is more than 0 else return bogus

At that point we identify hounds on pictures. We will utilize the pre-prepared model VGG16 for this.

- first, we characterize our VGG16 model
- we will utilize GPU for better execution
- load and pre-process the picture
- send a picture to the VGG16 model
- model return file from 0 to 999 (hound classes are from 151 to 268)
- return valid if the list is >=158 and <=268 else return bogus

Our information is as of now separated into preparing, approval and test segments so we would now be able to utilize our train information to make a benchmark model utilizing Convolutional Neural Networks. In the wake of making a model we will test it with test information. At the point when we get precision over 10% we will continue on building another model utilizing move learning. With move learning, we can construct our model with less information to give us a superior outcome. We will utilize indistinguishable preparing information from previously. We will at that point test our model with a similar test information as in the past yet realize we anticipate that our exactness should be over 60%. At that point we can attempt to explore different avenues regarding distinctive model parameters to show signs of improvement results. We will utilize f1 score and log to assess our models.