Capstone proposal

Dog Breed Classifier Using CNN

1 Domain Background

This model is used to identify the breed of a dog by just by giving an image to the user as an input and the model will classify by extracting the features of the of the dog then detecting the breed of the dog .If the model is supplied with a human image we it has to identity the resembling dog breed .

This model will be so useful for dog owners as it will prevent them from getting scammed and it will also save them lots of time and money for identifying the breed of their dog.

2 Problem Statement

Building a pipeline to process real world ,user supplied images that can be used in an application .The model build has to perform two tasks

- **Human face detection :If the model is given a human image it has to identity the resembling dog breed**
- **Dog detection: When the model is given an image of a dog it has to detect it's breed**

3 Datasets and Inputs

The dataset is provided by Udacity and it contains images of dogs and humans

- **The dog images datasets:(8151 image)of dogs with different sizes and backgrounds which are divided into training ,testing and validation.**

Training (6,680)image ,Testing (836)image and validation (835)image. The data is also divided to directories with 133 folder each .The number of images of each breed varies widely which makes the data unbalanced.

- **The humans images datasets:((13233) images of humans all with same size of 250x250 but the pictures are taken of different humans and different angles which also makes the data unbalanced**

4 Solution Statement

The solution is using OpenCv library for detecting humans in the images and using Neural networks for building a CNN model with multiple layers for the dog breed detection then implementing an algorithm that will combine both detectors

5 Benchmark Model

I have taken the VGG-16 model as a benchmark model which is Very Deep convolutional Networks for large Image Recognition". The model achieves 92.7% top-5 test accuracy in ImageNet, which is a dataset of over 14 million images belonging to 1000 classes.

The model created from must have an accuracy of 60% or more

6 Evaluation Metrics

I am going to take in consideration the accuracy as an Evaluation Metrics and as the Benchmark Model specifies the accuracy and I will also add the f1 score to the evaluation as the data is unbalanced.

7 Project design

1. **Import the necessary datasets and libraries and preprocess the data and train and test and validate the dataset**
2. **Human detection by implementing the algorithms that will be able to detect the features in human as OpenCV and integrated HaarCascad**

3. **Dog detection using VGG16 model**
4. **Create a CNN model to classify dog breed from scratch and implement and algorithm that combines the dog and human detectors as when given a dog image the output will be the dog's breed and when given a human the model will return the resembled dog breed and when given non the model will return an error**

References:

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https://neurohive.io/en/popular-networks/vgg16/