CS 5100 Spring '19 Project Proposal: Dog Breed Identification

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Title: Identification of Dog Breed from images using Machine Learning.

Problem Description:

The aim of this project it to create a model that identifies dogs in images and classifies them based on their breed.

Computer vision is an emerging trend in Artificial Intelligence and is being used in various domains. A lot of research is being done in teaching a machine to interpret images in the way a human sees it. This results in numerous models being created everyday which enables the computer to not just picture the objects but also to identify them.

I am aiming to implement a model which trains the computer to visualize dogs, in the way a human being does. Our plan is to implement a machine to identify dogs in images and to predict what breed the dog belongs to.

Datasets:

The dataset used for this project is the Stanford Dogs dataset. The Stanford Dogs dataset contains images of 120 breeds of dogs from around the world. This dataset has been built using images and annotation from ImageNet for the task of fine-grained image categorization. The dataset contains 20850 images of dogs in total. The problem is given as a competition in Kaggle and the required datasets are available in the website. There are 3 sets of data used.

Link: https://www.kaggle.com/orangutan/keras-vgg19-starter/data

- train.zip - the training set, you are provided the breed for these dogs (60% of total images)
- test.zip - the test set, you must predict the probability of each breed for each image
- labels.csv - the breeds for the images in the train set

Algorithms:

Following are the most commonly used algorithms for image recognition/classification:

1. Convolution Neural Network (CNN)
2. Support Vector Machine (SVM)
3. Naive Bayes classifier

I will be using Convolution Neural Network, the most popular deep learning technique. It is a class of deep artificial neural networks. CNNs are commonly used for solving problems related to Computer Vision. This project involves creating a own Convolutional Neural Network model to identify the breed of a dog from its image.

comparisons and analysis?

Expected Results:

Since the dataset involves 120 breeds of dogs (120 classes), I am aiming for a 30-50% of accuracy from the build CNN model, (i.e.,) the outcome of the build CNN model would predict any given image with the accuracy of 30-50%. This is however an anticipation and the accuracy may vary as I work along the dataset and fine tune the model. For comparison of results, pre-trained models can be used. The pre-trained models are available in the KERAS library. Pre-trained models are used to obtain the bottle-neck features and then a densely connected layer is added to classify the images from the higher dimensional feature vector obtained from the pre-trained models.

These pre-trained model results will be compared against the results of our own convolution neural network model built.

Note: The pre-trained models are high-level and have as many as 20 – 30 layers. They are also trained with millions of training samples before they are used in this project. Hence, the model using these pre-trained models will have very high accuracy when compared with our custom-made CNN model.

References:

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