Machine Learning Engineer Nanodegree

Capstone Proposal

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Proposal

For the capstopne project for the Udacity Machine Learning Nanodegree, I have selected the classification of dog images using Convolutional Neural Networks (CNN).

Domain Background

Image classification is a common Machine Learning task, for this project we will be using different ML techniques and will compare the results obtained from them.

We wil use different techniques to build an image classifier that will determine if an image a dog, and if possible the breed of the dog.

Problem Statement

The purpose of this project is to evaluate different machine learning techniques, and compare and constrating. In order to do this I will use pre trained models, create a cnn from scratch and finally apply transfer learning techniques.

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Datasets and Inputs

The data set provided contains a training dataset that includes 8,351 dog images. The dog images includes multiple images of dogs each folder corresponding to a different dog breed

Solution Statement

In this project, I will use use different techniques to solve the problem. I will create a CNN from scratch and train it with the Dog dataset, finally I wil use transfer learning to train a model from scratch

Benchmark Model

I will use the VGG-16 model as my benchmark model, the model is capable of identifying 118 dog breeds.

Evaluation Metrics

This is a simple classification problem, we can use classification metrics such as Accuracy, Recall and F1 score along with confusion matrix to visualize the results.

Project Design

In order to accomplish the goals outlined for this project we will build a data pipeline that can perform the pre processing required for the images. Such has image resizing, converting all images to gray scale. Also we will need to create function that will output the evaluation metrics for all the models used so that the results of the different models can be compared. I will need to determine if GPU is required for the project or if CPU is enough to perform the required training, if a GPU is required I will use AWS Sagemaker notebook instance to perform the training on Amazon.