Machine Learning Nanodegree Capstone Proposal

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Project Background

The project is “Write an Algorithm for a Dog Identification App” which involves the field of computer vision. Image classification algorithms can take the form of CNNs (convolution neural networks) and they will be used in this project.

Starter code is provided in the form of a Jupyter notebook which goes through a step-by-step process for developing the algorithm.

This project is chosen because it builds on a similar project from the AI Programming with Python Nanodegree.

Problem Statement

Develop an algorithm that can estimate the breed of a dog from a user supplied image. If the image is of a human, the algorithm will provide an estimate of the dog breed that is most resembling.

The algorithm should be able to correctly identify the breed in at least 60% of images where a single dog and no human is present.

Datasets and Inputs

There are three sets of images:

- Dog dataset
- Human dataset
- User supplied dataset

The dog and human datasets will be provided by Udacity. They will be split into train, validation, and test datasets.

User supplied datasets are used as a final check.

Solution Statement

The solution is to follow a project pipeline supplied by Udacity in the form of a Jupyter notebook.

The notebook will work through various stages of development including

- loading and processing of images
- creating training, validation, and test sets
- developing from scratch and transfer learning CNN models
- training and testing the models
- analyzing the performance of image detection algorithms
- integrating various models together to satisfy the problem statement

Benchmark Model

The benchmark model is the VGG16 model from the AI Programming with Python Nanodegree. This model was used in that Nanodegree program to determine if an image was of a dog or cat.

In this project, VGG16 will be used both an unmodified and a modified form.

Evaluation Metrics

The primary metric will be accuracy, but other metrics such as precision, recall, sensitivity, and specificity, and F1 score will be calculated.

Project Design

The project will be completed exclusively in a Jupyter notebook provided by Udacity. This note may be modified during project execution.