

Dog Breed Image Classification via Convolutional Neural Networks

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Overview

- Barking Data Inc. would like to develop a dog classification model in order to develop and later sell various applications to pet product companies, veterinary offices, animal rescues and other companies who may benefit from these tools.
- Potential applications:
 - 53% of Americans households include a dog, creating a huge market and need for canine care products. This model could be used to generate more custom/personalized product recommendations to pet parents as well as drive more personalized marketing.
 - Help identify lost dogs and help reunite them with their owners through facial recognition.

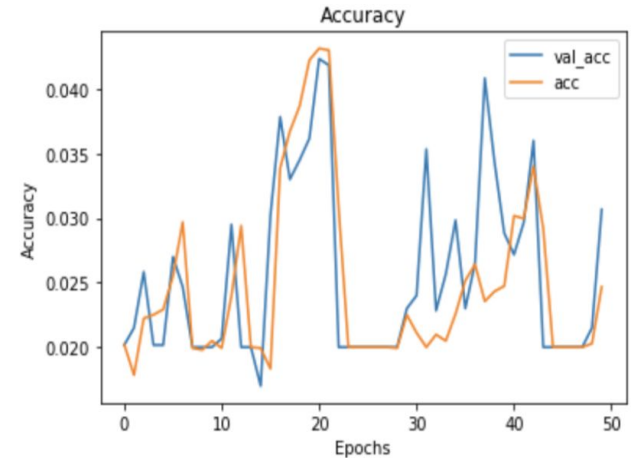
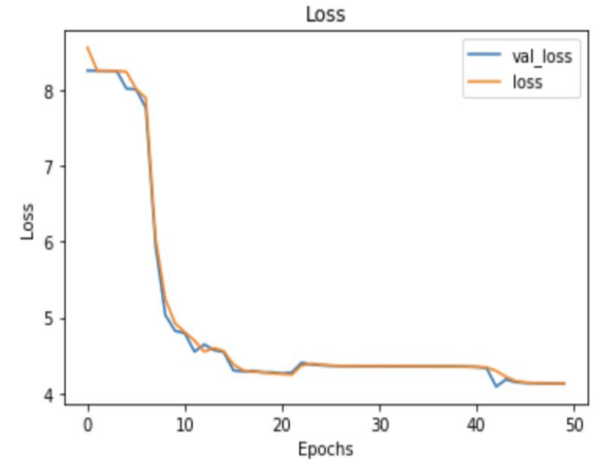
Approach



- Generate our own data set by scraping Google Images for photos of the top 50 most popular breeds (according to AKC).
- Attempt multiple model approaches
 - Densely connected network
 - Convolutional Neural Network
 - Transfer Learning (VGG19 and Inceptionv3)
- The Stanford Dog dataset is added to our existing images in order to increase our sample size for better model performance.
- Evaluation: Accuracy score & accuracy/loss curves (overfitting)

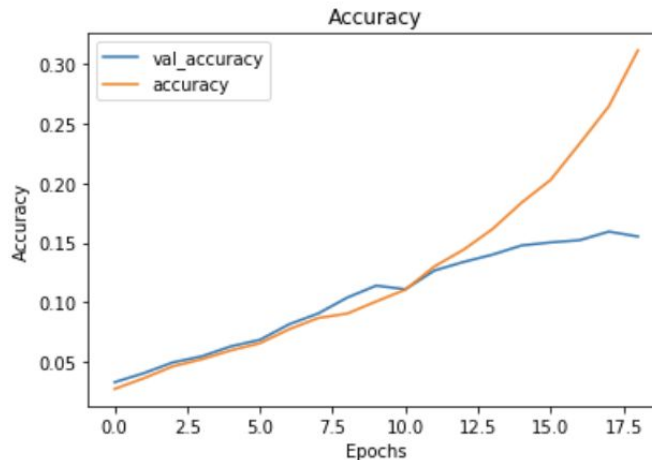
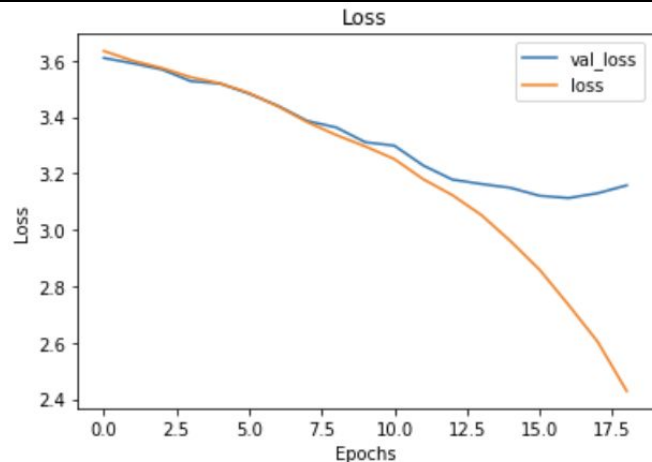
Baseline Model

- Densely Connected Network
 - Four layers
- Accuracy between 2% and 3%
- Signs of overfitting and instability



Final Model

- Larger sample size - combined with Stanford Dog Dataset
- Leverage dropout regularization to prevent overfitting
- Accuracy:
 - Training data: 55%
 - Test data: 53%



Next Steps

- Increase the size of our dataset. We saw strong improvements after combining our data with the Stanford Dog dataset.
- Test leveraging K-fold cross validation to improve our model. This may help prevent some of the overfitting we're seeing.
- Once we have an improved model, we should try to expand our model to provide predictions for mixed-breed dogs.

Thank You!

Sources

- Selenium Package (<https://selenium-python.readthedocs.io/>)
- Stanford Dogs Dataset
(<https://render.githubusercontent.com/http://vision.stanford.edu/aditya86/ImageNetDogs/>)
- Model Approach Reference
(<https://machinelearningmastery.com/how-to-develop-a-cnn-from-scratch-for-cifar-10-photo-classification/>)