Human vs Animal classification

This project uses convolutional neural network to train an image classifier that is able to identify Animal and Human images with 98% testing accuracy. This image classifier can be used to identify Animal and Human images from new images.

1. Problem to solve

Build a model to tell the type of image (Animal or Human) from an image.

2. Available data

-Created a new data set 7800 for training and 1480 for testing

-For Animal data I use available dataset stl10 and 10-monkey-species.

-For Human data I use google images and refined it.

3. What I did

Main Code(classifier.py)

1. Data loading and data preprocessing
    - Load image data
    - Training set: apply transformations such as rotation, scaling, and horizontal flipping (model generalizes / performs better)
    - All datasets: Resize and crop to the appropriate image size (required by pre-trained model)
    - All datasets: Normalize image colors (RGB) using mean and standard deviation of pre-trained model
    - Training set: data shuffled at each epoch
2. Build and train the model
    - Load a pre-trained network `inceptionv3(trained on ImageNet)` and freeze parameters
    - Define a new, untrained neural network as a classifier. The classifier has a hidden layer (ReLU activation) and an output layer (LogSoftmax activation).
    - Train the classifier layers using forward and backpropagation on GPU
    - Track the loss and accuracy on the validation set to determine the best hyperparameters
3. Use the trained classifier to predict image content
    - Test trained model on testing set (98% accuracy)
    - And save best validation accuracy model as checkpoint
    - Model is saved as **classifier_model.h5**

4. Prediction on Images

1. **Single Input Prediction** (single_predict.py)
    - Provide the relative location of file to be predicted with extension.
    - Predict the image

2. **Batch Input Prediction** (batch_prediction.py)
    - Provide the relative location of folder of Images to be predicted.
    - Predict the image