Project 4 Writeup

Instructions

- Provide an overview about how your project functions.
- Describe any interesting decisions you made to write your algorithm.
- Show and discuss the results of your algorithm.
- Feel free to include code snippets, images, and equations.
- List any extra credit implementation and result (optional).
- Use as many pages as you need, but err on the short side.
- **Please make this document anonymous.**

Project Overview

The goal of this project was to:

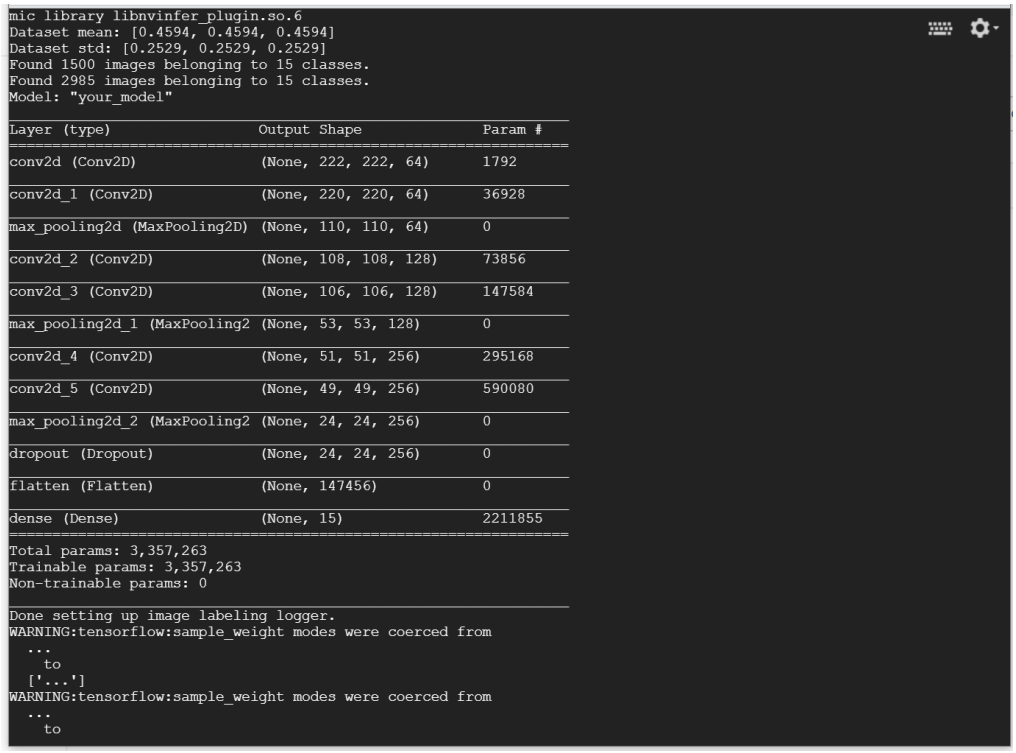
1) Design the architecture for a deep learning model for 15-scene recognition to achieve at least 65% accuracy with less than 15M parameters.
2) Fine tune the vgg model by writing a classification head with less than 15M trainable parameters to achieve at least 85% accuracy.

Results

Best classification performance:
Task 1: 66.97% accuracy (epoch 45)
Task 2: 88.51% accuracy (epoch 43)

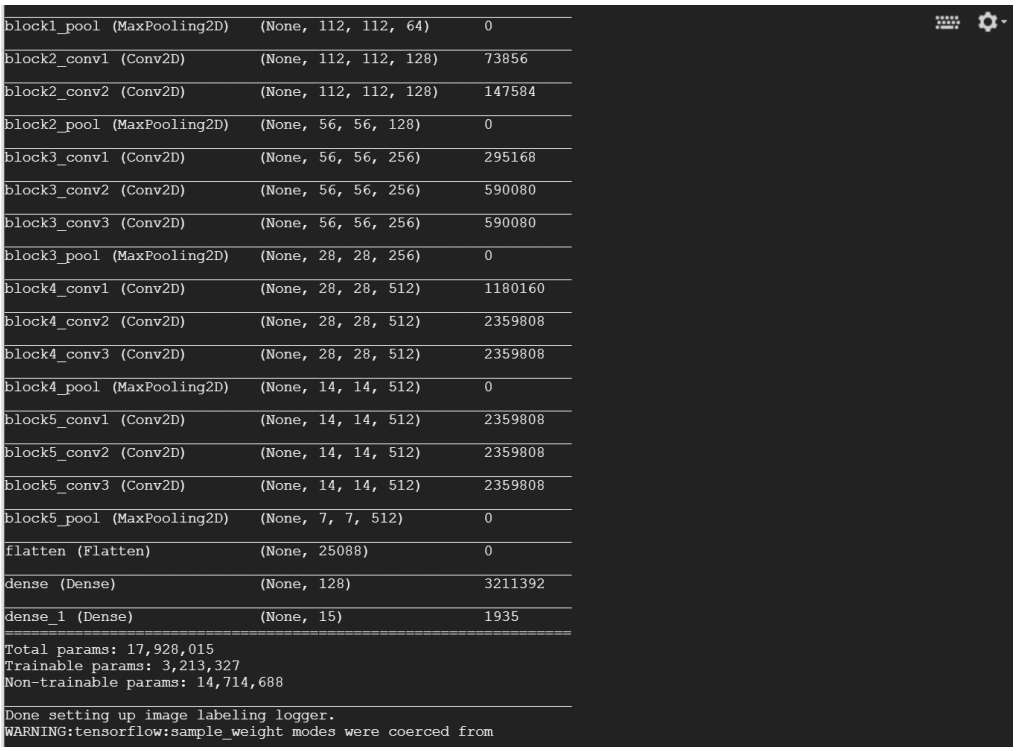
no extra credit

myModel model summary



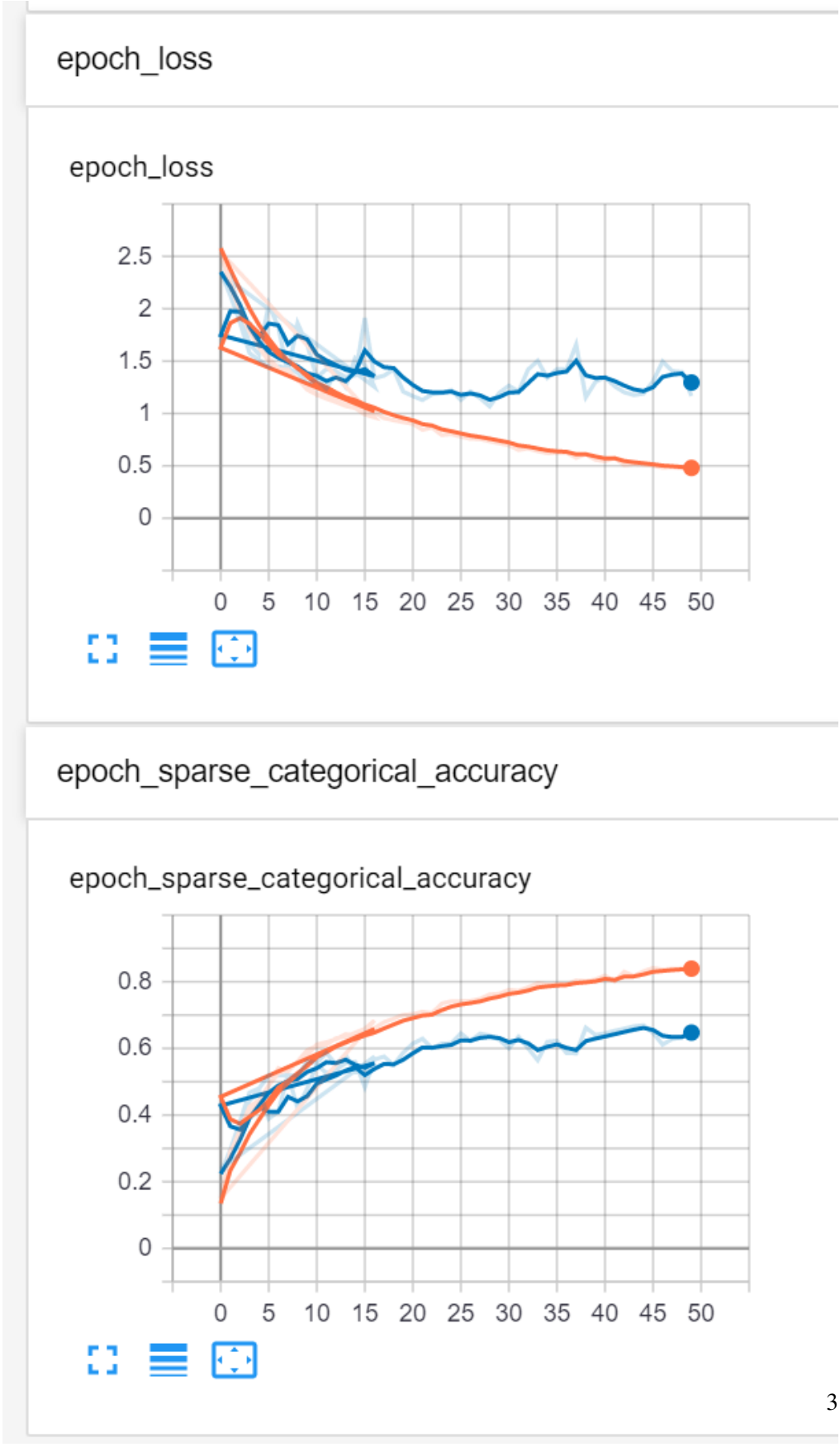
```
mic library libnvinfer_plugin.so.6
Dataset mean: [0.4594, 0.4594, 0.4594]
Dataset std: [0.2529, 0.2529, 0.2529]
Found 1500 images belonging to 15 classes.
Found 2985 images belonging to 15 classes.
Model: "your_model"
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
conv2d (Conv2D)              (None, 222, 222, 64)      1792
_________________________________________________________________
conv2d_1 (Conv2D)            (None, 220, 220, 64)      36928
_________________________________________________________________
max_pooling2d (MaxPooling2D) (None, 110, 110, 64)      0
_________________________________________________________________
conv2d_2 (Conv2D)            (None, 108, 108, 128)     73856
_________________________________________________________________
conv2d_3 (Conv2D)            (None, 106, 106, 128)     147584
_________________________________________________________________
max_pooling2d_1 (MaxPooling2 (None, 53, 53, 128)       0
_________________________________________________________________
conv2d_4 (Conv2D)            (None, 51, 51, 256)       295168
_________________________________________________________________
conv2d_5 (Conv2D)            (None, 49, 49, 256)       590080
_________________________________________________________________
max_pooling2d_2 (MaxPooling2 (None, 24, 24, 256)       0
_________________________________________________________________
dropout (Dropout)            (None, 24, 24, 256)       0
_________________________________________________________________
flatten (Flatten)            (None, 147456)            0
_________________________________________________________________
dense (Dense)                (None, 15)                2211855
=================================================================
Total params: 3,357,263
Trainable params: 3,357,263
Non-trainable params: 0
_________________________________________________________________
Done setting up image labeling logger.
WARNING:tensorflow:sample_weight modes were coerced from
  ...
    to
  ['...']
WARNING:tensorflow:sample_weight modes were coerced from
  ...
    to
```

VGG model summary



```
_________________________________________________________________
block1_pool (MaxPooling2D)   (None, 112, 112, 64)      0
_________________________________________________________________
block2_conv1 (Conv2D)        (None, 112, 112, 128)     73856
_________________________________________________________________
block2_conv2 (Conv2D)        (None, 112, 112, 128)     147584
_________________________________________________________________
block2_pool (MaxPooling2D)   (None, 56, 56, 128)       0
_________________________________________________________________
block3_conv1 (Conv2D)        (None, 56, 56, 256)       295168
_________________________________________________________________
block3_conv2 (Conv2D)        (None, 56, 56, 256)       590080
_________________________________________________________________
block3_conv3 (Conv2D)        (None, 56, 56, 256)       590080
_________________________________________________________________
block3_pool (MaxPooling2D)   (None, 28, 28, 256)       0
_________________________________________________________________
block4_conv1 (Conv2D)        (None, 28, 28, 512)       1180160
_________________________________________________________________
block4_conv2 (Conv2D)        (None, 28, 28, 512)       2359808
_________________________________________________________________
block4_conv3 (Conv2D)        (None, 28, 28, 512)       2359808
_________________________________________________________________
block4_pool (MaxPooling2D)   (None, 14, 14, 512)       0
_________________________________________________________________
block5_conv1 (Conv2D)        (None, 14, 14, 512)       2359808
_________________________________________________________________
block5_conv2 (Conv2D)        (None, 14, 14, 512)       2359808
_________________________________________________________________
block5_conv3 (Conv2D)        (None, 14, 14, 512)       2359808
_________________________________________________________________
block5_pool (MaxPooling2D)   (None, 7, 7, 512)         0
_________________________________________________________________
flatten (Flatten)            (None, 25088)             0
_________________________________________________________________
dense (Dense)                (None, 128)               3211392
_________________________________________________________________
dense_1 (Dense)              (None, 15)                1935
=================================================================
Total params: 17,928,015
Trainable params: 3,213,327
Non-trainable params: 14,714,688
_________________________________________________________________
Done setting up image labeling logger.
WARNING:tensorflow:sample_weight modes were coerced from
```

myModel loss (and accuracy) over time



VGG loss (and accuracy) over time