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Date: October 8, 2020

CSCE 636: Deep Learning (Fall 2020)

Assignment #2: Deep Residual Networks for CIFAR-10 Image Classification

Report for Question 6

1. Test Results

Based on the best training accuracies, hyperparameters selection was done. They are detailed as below for both the models:

	Standard Block	Bottle-neck Block
Best Test Accuracy Achieved	67.52	67.95
Validation Accuracy	69.54	69.24
Resnet Size	3	3
Number of Epochs	200	200
Learning Rate (for epochs<100)	0.1	0.1
Learning Rate (for epochs<150)	0.01	0.01
Learning Rate (for epochs>150)	0.001	0.001

2. Appendix C: Training Bottleneck Block

---Prepare data...
(50000, 32, 32, 3)
(50000,)
(10000, 32, 32, 3)
(10000,)
---here
###Train###
---Setup input interfaces...
---Setup the network...
---Setup training components...
WARNING:tensorflow:From <ipython-input-9-eda0e390ad77>:73: batch_normalization (from tensorflow.python.layers.normalization) is deprecated and will be removed in a future version.
Instructions for updating:
Use keras.layers.BatchNormalization instead. In particular,
`tf.control_dependencies(tf.GraphKeys.UPDATE_OPS)` should not be used (consult the `tf.keras.layers.batch_normalization` documentation).
W1009 01:55:08.763488 140575354976128 deprecation.py:323] From <ipython-input-9-eda0e390ad77>:73: batch_normalization (from tensorflow.python.layers.normalization) is deprecated and will be removed in a future version.
Instructions for updating:

Use keras.layers.BatchNormalization instead. In particular,
`tf.control_dependencies(tf.GraphKeys.UPDATE_OPS)` should not be used (consult the
`tf.keras.layers.batch_normalization` documentation).
WARNING:tensorflow:From /tensorflow-
1.15.2/python3.6/tensorflow_core/python/layers/normalization.py:327: Layer.apply (from
tensorflow.python.keras.engine.base_layer) is deprecated and will be removed in a future version.
Instructions for updating:
Please use `layer.__call__` method instead.
W1009 01:55:08.768841 140575354976128 deprecation.py:323] From /tensorflow-
1.15.2/python3.6/tensorflow_core/python/layers/normalization.py:327: Layer.apply (from
tensorflow.python.keras.engine.base_layer) is deprecated and will be removed in a future version.
Instructions for updating:
Please use `layer.__call__` method instead.
WARNING:tensorflow:From <ipython-input-9-eda0e390ad77>:151: conv2d (from
tensorflow.python.layers.convolutional) is deprecated and will be removed in a future version.
Instructions for updating:
Use `tf.keras.layers.Conv2D` instead.
W1009 01:55:08.803807 140575354976128 deprecation.py:323] From <ipython-input-9-
eda0e390ad77>:151: conv2d (from tensorflow.python.layers.convolutional) is deprecated and will be
removed in a future version.
Instructions for updating:
Use `tf.keras.layers.Conv2D` instead.
WARNING:tensorflow:From <ipython-input-9-eda0e390ad77>:125: dense (from
tensorflow.python.layers.core) is deprecated and will be removed in a future version.
Instructions for updating:
Use keras.layers.Dense instead.
W1009 01:55:10.004790 140575354976128 deprecation.py:323] From <ipython-input-9-
eda0e390ad77>:125: dense (from tensorflow.python.layers.core) is deprecated and will be removed in a
future version.
Instructions for updating:
Use keras.layers.Dense instead.
WARNING:tensorflow:From /tensorflow-
1.15.2/python3.6/tensorflow_core/python/ops/losses/losses_impl.py:121: where (from
tensorflow.python.ops.array_ops) is deprecated and will be removed in a future version.
Instructions for updating:
Use tf.where in 2.0, which has the same broadcast rule as np.where
W1009 01:55:10.069162 140575354976128 deprecation.py:323] From /tensorflow-
1.15.2/python3.6/tensorflow_core/python/ops/losses/losses_impl.py:121: where (from
tensorflow.python.ops.array_ops) is deprecated and will be removed in a future version.
Instructions for updating:
Use tf.where in 2.0, which has the same broadcast rule as np.where
---Setup the Saver for saving models...
---Run...
Epoch 1 Loss 1.765005 Duration 20.597 seconds.
Epoch 2 Loss 1.800432 Duration 18.044 seconds.
Epoch 3 Loss 1.572670 Duration 17.847 seconds.
Epoch 4 Loss 1.491639 Duration 17.899 seconds.
Epoch 5 Loss 1.428403 Duration 17.897 seconds.

Epoch 6 Loss 1.483406 Duration 17.799 seconds.
Epoch 7 Loss 1.353071 Duration 17.800 seconds.
Epoch 8 Loss 1.585028 Duration 17.885 seconds.
Epoch 9 Loss 1.340506 Duration 17.760 seconds.
Epoch 10 Loss 1.410892 Duration 17.863 seconds.
INFO:tensorflow:/content/drive/My Drive/model_v1/model.ckpt-10 is not in
all_model_checkpoint_paths. Manually adding it.
I1009 01:58:15.064607 140575354976128 checkpoint_management.py:95] /content/drive/My
Drive/model_v1/model.ckpt-10 is not in all_model_checkpoint_paths. Manually adding it.
The checkpoint has been created.
Epoch 11 Loss 1.527632 Duration 17.956 seconds.
Epoch 12 Loss 1.318239 Duration 17.895 seconds.
Epoch 13 Loss 1.279503 Duration 17.849 seconds.
Epoch 14 Loss 1.426905 Duration 17.857 seconds.
Epoch 15 Loss 1.453166 Duration 18.088 seconds.
Epoch 16 Loss 1.250422 Duration 17.765 seconds.
Epoch 17 Loss 1.224874 Duration 17.777 seconds.
Epoch 18 Loss 1.166396 Duration 17.753 seconds.
Epoch 19 Loss 1.249209 Duration 17.738 seconds.
Epoch 20 Loss 1.207945 Duration 17.783 seconds.
INFO:tensorflow:/content/drive/My Drive/model_v1/model.ckpt-20 is not in
all_model_checkpoint_paths. Manually adding it.
I1009 02:01:13.997543 140575354976128 checkpoint_management.py:95] /content/drive/My
Drive/model_v1/model.ckpt-20 is not in all_model_checkpoint_paths. Manually adding it.
The checkpoint has been created.
Epoch 21 Loss 1.353616 Duration 17.737 seconds.
Epoch 22 Loss 1.235720 Duration 17.667 seconds.
Epoch 23 Loss 1.138949 Duration 17.643 seconds.
Epoch 24 Loss 1.339158 Duration 17.667 seconds.
Epoch 25 Loss 1.150573 Duration 17.548 seconds.
Epoch 26 Loss 1.252159 Duration 17.511 seconds.
Epoch 27 Loss 1.364744 Duration 17.509 seconds.
Epoch 28 Loss 1.241478 Duration 17.400 seconds.
Epoch 29 Loss 1.094809 Duration 17.450 seconds.
Epoch 30 Loss 1.043373 Duration 17.620 seconds.
INFO:tensorflow:/content/drive/My Drive/model_v1/model.ckpt-30 is not in
all_model_checkpoint_paths. Manually adding it.
I1009 02:04:10.098037 140575354976128 checkpoint_management.py:95] /content/drive/My
Drive/model_v1/model.ckpt-30 is not in all_model_checkpoint_paths. Manually adding it.
The checkpoint has been created.
Epoch 31 Loss 1.103935 Duration 17.672 seconds.
Epoch 32 Loss 1.176953 Duration 17.574 seconds.
Epoch 33 Loss 1.220229 Duration 17.356 seconds.
Epoch 34 Loss 1.320512 Duration 17.287 seconds.
Epoch 35 Loss 1.161809 Duration 17.254 seconds.
Epoch 36 Loss 1.129151 Duration 17.433 seconds.
Epoch 37 Loss 1.164328 Duration 17.396 seconds.
Epoch 38 Loss 1.205068 Duration 17.301 seconds.

Epoch 39 Loss 1.168001 Duration 17.275 seconds.
Epoch 40 Loss 1.194980 Duration 17.182 seconds.
INFO:tensorflow:/content/drive/My Drive/model_v1/model.ckpt-40 is not in
all_model_checkpoint_paths. Manually adding it.
I1009 02:07:04.172400 140575354976128 checkpoint_management.py:95] /content/drive/My
Drive/model_v1/model.ckpt-40 is not in all_model_checkpoint_paths. Manually adding it.
The checkpoint has been created.
Epoch 41 Loss 1.127755 Duration 17.158 seconds.
Epoch 42 Loss 1.186084 Duration 17.076 seconds.
Epoch 43 Loss 1.003235 Duration 16.963 seconds.
Epoch 44 Loss 0.990893 Duration 16.968 seconds.
Epoch 45 Loss 1.322371 Duration 16.858 seconds.
Epoch 46 Loss 1.092446 Duration 17.388 seconds.
Epoch 47 Loss 1.192464 Duration 17.161 seconds.
Epoch 48 Loss 1.084944 Duration 16.848 seconds.
Epoch 49 Loss 1.200029 Duration 16.883 seconds.
Epoch 50 Loss 1.192876 Duration 17.123 seconds.
INFO:tensorflow:/content/drive/My Drive/model_v1/model.ckpt-50 is not in
all_model_checkpoint_paths. Manually adding it.
I1009 02:09:54.954570 140575354976128 checkpoint_management.py:95] /content/drive/My
Drive/model_v1/model.ckpt-50 is not in all_model_checkpoint_paths. Manually adding it.
The checkpoint has been created.
Epoch 51 Loss 0.841244 Duration 17.001 seconds.
Epoch 52 Loss 0.763147 Duration 16.851 seconds.
Epoch 53 Loss 0.999646 Duration 16.875 seconds.
Epoch 54 Loss 0.917628 Duration 16.857 seconds.
Epoch 55 Loss 0.941140 Duration 16.878 seconds.
Epoch 56 Loss 0.817648 Duration 16.885 seconds.
Epoch 57 Loss 0.844368 Duration 16.798 seconds.
Epoch 58 Loss 0.813941 Duration 16.955 seconds.
Epoch 59 Loss 0.959690 Duration 16.908 seconds.
Epoch 60 Loss 0.821037 Duration 16.935 seconds.
INFO:tensorflow:/content/drive/My Drive/model_v1/model.ckpt-60 is not in
all_model_checkpoint_paths. Manually adding it.
I1009 02:12:44.222989 140575354976128 checkpoint_management.py:95] /content/drive/My
Drive/model_v1/model.ckpt-60 is not in all_model_checkpoint_paths. Manually adding it.
The checkpoint has been created.
Epoch 61 Loss 0.917239 Duration 16.832 seconds.
Epoch 62 Loss 0.783608 Duration 17.101 seconds.
Epoch 63 Loss 0.911550 Duration 16.875 seconds.
Epoch 64 Loss 0.793037 Duration 17.034 seconds.
Epoch 65 Loss 0.851515 Duration 16.957 seconds.
Epoch 66 Loss 0.749849 Duration 17.048 seconds.
Epoch 67 Loss 0.686594 Duration 17.061 seconds.
Epoch 68 Loss 0.897618 Duration 17.002 seconds.
Epoch 69 Loss 0.748017 Duration 17.269 seconds.
Epoch 70 Loss 0.853461 Duration 17.087 seconds.

INFO:tensorflow:/content/drive/My Drive/model_v1/model.ckpt-70 is not in all_model_checkpoint_paths. Manually adding it.
I1009 02:15:34.837423 140575354976128 checkpoint_management.py:95] /content/drive/My Drive/model_v1/model.ckpt-70 is not in all_model_checkpoint_paths. Manually adding it.
The checkpoint has been created.
Epoch 71 Loss 0.875718 Duration 17.059 seconds.
Epoch 72 Loss 0.759251 Duration 16.940 seconds.
Epoch 73 Loss 0.734231 Duration 17.584 seconds.
Epoch 74 Loss 0.819466 Duration 17.414 seconds.
Epoch 75 Loss 0.735335 Duration 17.480 seconds.
Epoch 76 Loss 0.718995 Duration 17.418 seconds.
Epoch 77 Loss 0.631830 Duration 17.198 seconds.
Epoch 78 Loss 0.713125 Duration 17.182 seconds.
Epoch 79 Loss 0.711619 Duration 17.186 seconds.
Epoch 80 Loss 0.748173 Duration 17.193 seconds.
INFO:tensorflow:/content/drive/My Drive/model_v1/model.ckpt-80 is not in all_model_checkpoint_paths. Manually adding it.
I1009 02:18:27.832104 140575354976128 checkpoint_management.py:95] /content/drive/My Drive/model_v1/model.ckpt-80 is not in all_model_checkpoint_paths. Manually adding it.
The checkpoint has been created.
Epoch 81 Loss 0.642681 Duration 17.256 seconds.
Epoch 82 Loss 0.793399 Duration 17.235 seconds.
Epoch 83 Loss 0.723299 Duration 17.727 seconds.
Epoch 84 Loss 0.891681 Duration 17.294 seconds.
Epoch 85 Loss 0.645262 Duration 17.233 seconds.
Epoch 86 Loss 0.693628 Duration 17.333 seconds.
Epoch 87 Loss 0.767169 Duration 17.575 seconds.
Epoch 88 Loss 0.771217 Duration 17.336 seconds.
Epoch 89 Loss 0.774409 Duration 17.223 seconds.
Epoch 90 Loss 0.736175 Duration 17.274 seconds.
INFO:tensorflow:/content/drive/My Drive/model_v1/model.ckpt-90 is not in all_model_checkpoint_paths. Manually adding it.
I1009 02:21:21.654401 140575354976128 checkpoint_management.py:95] /content/drive/My Drive/model_v1/model.ckpt-90 is not in all_model_checkpoint_paths. Manually adding it.
The checkpoint has been created.
Epoch 91 Loss 0.750269 Duration 17.415 seconds.
Epoch 92 Loss 0.714702 Duration 17.375 seconds.
Epoch 93 Loss 0.746505 Duration 17.774 seconds.
Epoch 94 Loss 0.794768 Duration 17.827 seconds.
Epoch 95 Loss 0.624998 Duration 17.749 seconds.
Epoch 96 Loss 0.720209 Duration 17.772 seconds.
Epoch 97 Loss 0.615068 Duration 17.857 seconds.
Epoch 98 Loss 0.708029 Duration 17.575 seconds.
Epoch 99 Loss 0.666491 Duration 17.507 seconds.
Epoch 100 Loss 0.809783 Duration 17.401 seconds.
INFO:tensorflow:/content/drive/My Drive/model_v1/model.ckpt-100 is not in all_model_checkpoint_paths. Manually adding it.

I1009 02:24:18.226436 140575354976128 checkpoint_management.py:95] /content/drive/My Drive/model_v1/model.ckpt-100 is not in all_model_checkpoint_paths. Manually adding it.
The checkpoint has been created.
Epoch 101 Loss 0.676649 Duration 17.484 seconds.
Epoch 102 Loss 0.554127 Duration 17.397 seconds.
Epoch 103 Loss 0.512295 Duration 17.593 seconds.
Epoch 104 Loss 0.490533 Duration 17.553 seconds.
Epoch 105 Loss 0.534346 Duration 17.392 seconds.
Epoch 106 Loss 0.535306 Duration 17.219 seconds.
Epoch 107 Loss 0.533180 Duration 17.279 seconds.
Epoch 108 Loss 0.509226 Duration 17.231 seconds.
Epoch 109 Loss 0.521535 Duration 17.149 seconds.
Epoch 110 Loss 0.472555 Duration 17.192 seconds.
INFO:tensorflow:/content/drive/My Drive/model_v1/model.ckpt-110 is not in all_model_checkpoint_paths. Manually adding it.
I1009 02:27:12.068103 140575354976128 checkpoint_management.py:95] /content/drive/My Drive/model_v1/model.ckpt-110 is not in all_model_checkpoint_paths. Manually adding it.
The checkpoint has been created.
Epoch 111 Loss 0.478793 Duration 17.289 seconds.
Epoch 112 Loss 0.512366 Duration 17.266 seconds.
Epoch 113 Loss 0.574273 Duration 17.296 seconds.
Epoch 114 Loss 0.547190 Duration 17.265 seconds.
Epoch 115 Loss 0.486479 Duration 17.314 seconds.
Epoch 116 Loss 0.483314 Duration 17.243 seconds.
Epoch 117 Loss 0.403582 Duration 17.248 seconds.
Epoch 118 Loss 0.436658 Duration 17.340 seconds.
Epoch 119 Loss 0.427202 Duration 17.166 seconds.
Epoch 120 Loss 0.564398 Duration 17.263 seconds.
INFO:tensorflow:/content/drive/My Drive/model_v1/model.ckpt-120 is not in all_model_checkpoint_paths. Manually adding it.
I1009 02:30:05.110630 140575354976128 checkpoint_management.py:95] /content/drive/My Drive/model_v1/model.ckpt-120 is not in all_model_checkpoint_paths. Manually adding it.
The checkpoint has been created.
Epoch 121 Loss 0.545665 Duration 17.203 seconds.
Epoch 122 Loss 0.493643 Duration 17.325 seconds.
Epoch 123 Loss 0.450394 Duration 17.248 seconds.
Epoch 124 Loss 0.445113 Duration 17.087 seconds.
Epoch 125 Loss 0.474214 Duration 17.136 seconds.
Epoch 126 Loss 0.467699 Duration 16.882 seconds.
Epoch 127 Loss 0.600179 Duration 16.841 seconds.
Epoch 128 Loss 0.497748 Duration 17.204 seconds.
Epoch 129 Loss 0.516004 Duration 17.269 seconds.
Epoch 130 Loss 0.477017 Duration 17.245 seconds.
INFO:tensorflow:/content/drive/My Drive/model_v1/model.ckpt-130 is not in all_model_checkpoint_paths. Manually adding it.
I1009 02:32:56.916079 140575354976128 checkpoint_management.py:95] /content/drive/My Drive/model_v1/model.ckpt-130 is not in all_model_checkpoint_paths. Manually adding it.
The checkpoint has been created.

Epoch 131 Loss 0.414541 Duration 17.218 seconds.
Epoch 132 Loss 0.412683 Duration 17.211 seconds.
Epoch 133 Loss 0.436258 Duration 17.114 seconds.
Epoch 134 Loss 0.545839 Duration 17.117 seconds.
Epoch 135 Loss 0.477691 Duration 17.613 seconds.
Epoch 136 Loss 0.395705 Duration 17.103 seconds.
Epoch 137 Loss 0.353659 Duration 17.163 seconds.
Epoch 138 Loss 0.452868 Duration 17.155 seconds.
Epoch 139 Loss 0.381264 Duration 17.186 seconds.
Epoch 140 Loss 0.436037 Duration 17.191 seconds.
INFO:tensorflow:/content/drive/My Drive/model_v1/model.ckpt-140 is not in
all_model_checkpoint_paths. Manually adding it.
I1009 02:35:49.376425 140575354976128 checkpoint_management.py:95] /content/drive/My
Drive/model_v1/model.ckpt-140 is not in all_model_checkpoint_paths. Manually adding it.
The checkpoint has been created.
Epoch 141 Loss 0.438855 Duration 17.219 seconds.
Epoch 142 Loss 0.399300 Duration 16.898 seconds.
Epoch 143 Loss 0.468397 Duration 17.004 seconds.
Epoch 144 Loss 0.427456 Duration 17.112 seconds.
Epoch 145 Loss 0.391422 Duration 16.940 seconds.
Epoch 146 Loss 0.516659 Duration 16.883 seconds.
Epoch 147 Loss 0.379997 Duration 16.753 seconds.
Epoch 148 Loss 0.569761 Duration 16.685 seconds.
Epoch 149 Loss 0.542155 Duration 16.751 seconds.
Epoch 150 Loss 0.543072 Duration 16.802 seconds.
INFO:tensorflow:/content/drive/My Drive/model_v1/model.ckpt-150 is not in
all_model_checkpoint_paths. Manually adding it.
I1009 02:38:38.791035 140575354976128 checkpoint_management.py:95] /content/drive/My
Drive/model_v1/model.ckpt-150 is not in all_model_checkpoint_paths. Manually adding it.
The checkpoint has been created.
Epoch 151 Loss 0.371700 Duration 16.715 seconds.
Epoch 152 Loss 0.488601 Duration 16.806 seconds.
Epoch 153 Loss 0.459162 Duration 16.828 seconds.
Epoch 154 Loss 0.336599 Duration 16.786 seconds.
Epoch 155 Loss 0.440515 Duration 16.736 seconds.
Epoch 156 Loss 0.447300 Duration 16.812 seconds.
Epoch 157 Loss 0.440220 Duration 16.913 seconds.
Epoch 158 Loss 0.371083 Duration 16.972 seconds.
Epoch 159 Loss 0.388477 Duration 17.242 seconds.
Epoch 160 Loss 0.399941 Duration 17.151 seconds.
INFO:tensorflow:/content/drive/My Drive/model_v1/model.ckpt-160 is not in
all_model_checkpoint_paths. Manually adding it.
I1009 02:41:28.086605 140575354976128 checkpoint_management.py:95] /content/drive/My
Drive/model_v1/model.ckpt-160 is not in all_model_checkpoint_paths. Manually adding it.
The checkpoint has been created.
Epoch 161 Loss 0.331015 Duration 17.212 seconds.
Epoch 162 Loss 0.459982 Duration 16.887 seconds.
Epoch 163 Loss 0.427908 Duration 16.882 seconds.

Epoch 164 Loss 0.413529 Duration 16.855 seconds.
Epoch 165 Loss 0.402051 Duration 16.794 seconds.
Epoch 166 Loss 0.410804 Duration 16.985 seconds.
Epoch 167 Loss 0.341163 Duration 16.959 seconds.
Epoch 168 Loss 0.398231 Duration 17.118 seconds.
Epoch 169 Loss 0.435353 Duration 16.871 seconds.
Epoch 170 Loss 0.399954 Duration 16.970 seconds.
INFO:tensorflow:/content/drive/My Drive/model_v1/model.ckpt-170 is not in
all_model_checkpoint_paths. Manually adding it.
I1009 02:44:17.976957 140575354976128 checkpoint_management.py:95] /content/drive/My
Drive/model_v1/model.ckpt-170 is not in all_model_checkpoint_paths. Manually adding it.
The checkpoint has been created.
Epoch 171 Loss 0.363330 Duration 17.007 seconds.
Epoch 172 Loss 0.413633 Duration 17.045 seconds.
Epoch 173 Loss 0.399762 Duration 17.010 seconds.
Epoch 174 Loss 0.344474 Duration 16.990 seconds.
Epoch 175 Loss 0.446597 Duration 16.959 seconds.
Epoch 176 Loss 0.410457 Duration 17.120 seconds.
Epoch 177 Loss 0.424380 Duration 17.415 seconds.
Epoch 178 Loss 0.387511 Duration 17.104 seconds.
Epoch 179 Loss 0.461633 Duration 16.934 seconds.
Epoch 180 Loss 0.438209 Duration 17.059 seconds.
INFO:tensorflow:/content/drive/My Drive/model_v1/model.ckpt-180 is not in
all_model_checkpoint_paths. Manually adding it.
I1009 02:47:08.976383 140575354976128 checkpoint_management.py:95] /content/drive/My
Drive/model_v1/model.ckpt-180 is not in all_model_checkpoint_paths. Manually adding it.
The checkpoint has been created.
Epoch 181 Loss 0.440388 Duration 17.079 seconds.
Epoch 182 Loss 0.407215 Duration 17.034 seconds.
Epoch 183 Loss 0.451275 Duration 16.908 seconds.
Epoch 184 Loss 0.445766 Duration 17.040 seconds.
Epoch 185 Loss 0.404730 Duration 17.294 seconds.
Epoch 186 Loss 0.357493 Duration 17.110 seconds.
Epoch 187 Loss 0.410681 Duration 17.365 seconds.
Epoch 188 Loss 0.400067 Duration 17.365 seconds.
Epoch 189 Loss 0.435452 Duration 17.160 seconds.
Epoch 190 Loss 0.344496 Duration 17.020 seconds.
INFO:tensorflow:/content/drive/My Drive/model_v1/model.ckpt-190 is not in
all_model_checkpoint_paths. Manually adding it.
I1009 02:50:00.707002 140575354976128 checkpoint_management.py:95] /content/drive/My
Drive/model_v1/model.ckpt-190 is not in all_model_checkpoint_paths. Manually adding it.
The checkpoint has been created.
Epoch 191 Loss 0.354829 Duration 17.025 seconds.
Epoch 192 Loss 0.361550 Duration 16.802 seconds.
Epoch 193 Loss 0.394541 Duration 16.684 seconds.
Epoch 194 Loss 0.374378 Duration 16.772 seconds.
Epoch 195 Loss 0.441616 Duration 16.961 seconds.
Epoch 196 Loss 0.410052 Duration 17.074 seconds.

Epoch 197 Loss 0.344186 Duration 16.759 seconds.
Epoch 198 Loss 0.391536 Duration 16.741 seconds.
Epoch 199 Loss 0.391569 Duration 16.676 seconds.
Epoch 200 Loss 0.432052 Duration 16.935 seconds.
INFO:tensorflow:/content/drive/My Drive/model_v1/model.ckpt-200 is not in
all_model_checkpoint_paths. Manually adding it.
I1009 02:52:49.497740 140575354976128 checkpoint_management.py:95] /content/drive/My
Drive/model_v1/model.ckpt-200 is not in all_model_checkpoint_paths. Manually adding it.
The checkpoint has been created.
An exception has occurred, use %tb to see the full traceback.

SystemExit
/usr/local/lib/python3.6/dist-packages/IPython/core/interactiveshell.py:2890: UserWarning: To exit:
use 'exit', 'quit', or Ctrl-D.
  warn("To exit: use 'exit', 'quit', or Ctrl-D.", stacklevel=1)

3.   Appendix B: Validation Standard Block

```
---Setup the Saver for loading models...
INFO:tensorflow:Restoring parameters from /content/drive/My
Drive/model_v1/rectified/model.ckpt-160
I1009 04:44:02.572793 139631246354304 saver.py:1284] Restoring parameters
from /content/drive/My Drive/model_v1/rectified/model.ckpt-160
  0%|          | 0/5000 [00:00<?, ?it/s]
Restored model parameters from /content/drive/My
Drive/model_v1/rectified/model.ckpt-160
100%|██████████| 5000/5000 [00:12<00:00, 393.78it/s]
Test accuracy: 0.6954
INFO:tensorflow:Restoring parameters from /content/drive/My
Drive/model_v1/rectified/model.ckpt-170

I1009 04:44:15.438938 139631246354304 saver.py:1284] Restoring parameters
from /content/drive/My Drive/model_v1/rectified/model.ckpt-170
  1%|          | 44/5000 [00:00<00:11, 436.69it/s]
Restored model parameters from /content/drive/My
Drive/model_v1/rectified/model.ckpt-170
100%|██████████| 5000/5000 [00:11<00:00, 443.56it/s]
Test accuracy: 0.6940
INFO:tensorflow:Restoring parameters from /content/drive/My
Drive/model_v1/rectified/model.ckpt-180

I1009 04:44:26.740956 139631246354304 saver.py:1284] Restoring parameters
from /content/drive/My Drive/model_v1/rectified/model.ckpt-180
  1%|          | 46/5000 [00:00<00:10, 459.37it/s]
Restored model parameters from /content/drive/My
Drive/model_v1/rectified/model.ckpt-180
100%|██████████| 5000/5000 [00:10<00:00, 462.81it/s]
Test accuracy: 0.6942
INFO:tensorflow:Restoring parameters from /content/drive/My
Drive/model_v1/rectified/model.ckpt-190
```

```
I1009 04:44:37.572818 139631246354304 saver.py:1284] Restoring parameters
from /content/drive/My Drive/model_v1/rectified/model.ckpt-190
  1%|          | 45/5000 [00:00<00:11, 449.96it/s]
Restored model parameters from /content/drive/My
Drive/model_v1/rectified/model.ckpt-190
100%|██████████| 5000/5000 [00:10<00:00, 458.11it/s]
Test accuracy: 0.6952
INFO:tensorflow:Restoring parameters from /content/drive/My
Drive/model_v1/rectified/model.ckpt-200
I1009 04:44:48.518447 139631246354304 saver.py:1284] Restoring parameters
from /content/drive/My Drive/model_v1/rectified/model.ckpt-200
  1%|          | 45/5000 [00:00<00:11, 445.54it/s]
Restored model parameters from /content/drive/My
Drive/model_v1/rectified/model.ckpt-200
100%|██████████| 5000/5000 [00:10<00:00, 456.54it/s]
Test accuracy: 0.6946
```

4. Appendix D: Validation Bottleneck Block

```
---Setup the Saver for loading models...
INFO:tensorflow:Restoring parameters from /content/drive/My
Drive/model_v2_n3/model.ckpt-140
I1009 04:51:32.447470 140654605940608 saver.py:1284] Restoring parameters from
/content/drive/My Drive/model_v2_n3/model.ckpt-140
  0%|          | 0/5000 [00:00<?, ?it/s]Restored model parameters from
/content/drive/My Drive/model_v2_n3/model.ckpt-140
100%|██████████| 5000/5000 [00:17<00:00, 293.17it/s]Test accuracy: 0.6858
INFO:tensorflow:Restoring parameters from /content/drive/My
Drive/model_v2_n3/model.ckpt-150
I1009 04:51:49.735998 140654605940608 saver.py:1284] Restoring parameters from
/content/drive/My Drive/model_v2_n3/model.ckpt-150
  1%|          | 30/5000 [00:00<00:16, 299.66it/s]Restored model parameters from
/content/drive/My Drive/model_v2_n3/model.ckpt-150
100%|██████████| 5000/5000 [00:15<00:00, 329.32it/s]Test accuracy: 0.6924
INFO:tensorflow:Restoring parameters from /content/drive/My
Drive/model_v2_n3/model.ckpt-160
I1009 04:52:07.230414 140654605940608 saver.py:1284] Restoring parameters from
/content/drive/My Drive/model_v2_n3/model.ckpt-160
  1%|          | 35/5000 [00:00<00:14, 342.09it/s]Restored model parameters from
/content/drive/My Drive/model_v2_n3/model.ckpt-160
```