Number of Filters	128		128			512		512		4
Layer Type	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dropout (0.35)	Dense()	Dropout (0.35)	Dense()
Conv. Size	(6,6)	(6,6)	(6,6)	(6,6)						
Padding	valid		valid							
activation	relu		relu			relu		relu		softmax

```
Epoch 1/30
2017-11-25 22:29:11.195056: I tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:900] successful NUMA node read from SysFS had negative value (-1), but there must be at least one NUMA node, so returning NUMA node zero
2017-11-25 22:29:11.195673: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1064] Found device 0 with properties:
name: Tesla K80 major: 3 minor: 7 memoryClockRate(GHz): 0.8235
pciBusID: 0000:00:04.0 totalMemory: 11.17GiB freeMemory: 11.03GiB
2017-11-25 22:29:11.195697: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1154] Creating TensorFlow device (/device:GPU:0) -> (device: 0, name: Tesla K80, pci bus id: 0000:00:04.0, compute capability: 3.7)
250/250 [==============================] - 251s - loss: 1.3899 - acc: 0.2665 - val_loss: 1.3888 - val_acc: 0.2500
Epoch 2/30
250/250 [==============================] - 239s - loss: 1.1286 - acc: 0.4250 - val_loss: 0.7277 - val_acc: 0.6020
Epoch 3/30
250/250 [==============================] - 235s - loss: 0.7380 - acc: 0.6116 - val_loss: 0.6064 - val_acc: 0.6533
Epoch 4/30
250/250 [==============================] - 233s - loss: 0.6735 - acc: 0.6252 - val_loss: 0.5630 - val_acc: 0.6756
Epoch 5/30
250/250 [==============================] - 234s - loss: 0.6311 - acc: 0.6492 - val_loss: 0.5086 - val_acc: 0.6916
Epoch 6/30
250/250 [==============================] - 232s - loss: 0.5868 - acc: 0.6685 - val_loss: 0.5606 - val_acc: 0.6624
Epoch 7/30
250/250 [==============================] - 232s - loss: 0.5775 - acc: 0.6798 - val_loss: 0.4881 - val_acc: 0.6953
Epoch 8/30
250/250 [==============================] - 232s - loss: 0.5472 - acc: 0.6957 - val_loss: 0.4822 - val_acc: 0.7172
Epoch 9/30
250/250 [==============================] - 233s - loss: 0.5395 - acc: 0.7001 - val_loss: 0.4812 - val_acc: 0.7150
Epoch 10/30
250/250 [==============================] - 239s - loss: 0.5285 - acc: 0.6961 - val_loss: 0.4548 - val_acc: 0.7152
Epoch 11/30
250/250 [==============================] - 235s - loss: 0.5067 - acc: 0.7096 - val_loss: 0.4570 - val_acc: 0.7095
Epoch 12/30
250/250 [==============================] - 244s - loss: 0.5090 - acc: 0.7089 - val_loss: 0.4251 - val_acc: 0.7231
Epoch 13/30
250/250 [==============================] - 235s - loss: 0.4970 - acc: 0.7154 - val_loss: 0.4288 - val_acc: 0.7334
```

```
Epoch 14/30
250/250 [==============================] - 235s - loss: 0.5101 - acc: 0.7154 - val_loss: 0.4270 - val_acc: 0.7353
Epoch 15/30
250/250 [==============================] - 234s - loss: 0.4734 - acc: 0.7200 - val_loss: 0.4086 - val_acc: 0.7357
Epoch 16/30
250/250 [==============================] - 232s - loss: 0.4809 - acc: 0.7180 - val_loss: 0.4103 - val_acc: 0.7418
Epoch 17/30
250/250 [==============================] - 229s - loss: 0.4771 - acc: 0.7288 - val_loss: 0.4569 - val_acc: 0.7269
Epoch 18/30
250/250 [==============================] - 231s - loss: 0.4677 - acc: 0.7245 - val_loss: 0.4155 - val_acc: 0.7424
Epoch 19/30
250/250 [==============================] - 231s - loss: 0.4614 - acc: 0.7328 - val_loss: 0.4409 - val_acc: 0.7229
Epoch 20/30
250/250 [==============================] - 233s - loss: 0.4654 - acc: 0.7306 - val_loss: 0.4133 - val_acc: 0.7472
Epoch 21/30
250/250 [==============================] - 233s - loss: 0.4677 - acc: 0.7271 - val_loss: 0.4272 - val_acc: 0.7264
Test loss: 4.9933286047
Test accuracy 0.66375
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
conv2d_1 (Conv2D)            (None, 300, 300, 128)     13952
_________________________________________________________________
max_pooling2d_1 (MaxPooling2 (None, 50, 50, 128)       0
_________________________________________________________________
conv2d_2 (Conv2D)            (None, 50, 50, 128)       589952
_________________________________________________________________
max_pooling2d_2 (MaxPooling2 (None, 8, 8, 128)         0
_________________________________________________________________
flatten_1 (Flatten)          (None, 8192)              0
_________________________________________________________________
dense_1 (Dense)              (None, 512)               4194816
_________________________________________________________________
dropout_1 (Dropout)          (None, 512)               0
_________________________________________________________________
dense_2 (Dense)              (None, 512)               262656
_________________________________________________________________
dropout_2 (Dropout)          (None, 512)               0
_________________________________________________________________
dense_3 (Dense)              (None, 4)                 2052
```

==========

Total params: 5,063,428
Trainable params: 5,063,428
Non-trainable params: 0

Number of Filters	128		250			512		512		4
Layer Type	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dropout (0.35)	Dense()	Dropout (0.35)	Dense()
Conv. Size	(6,6)	(6,6)	(6,6)	(6,6)						
Padding	same		same							
activation	relu		relu			relu		relu		softmax

Epoch 1/30
2017-11-29 14:20:43.752113: I tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:900] successful NUMA node read from SysFS had negative value (-1), but there must be at least one NUMA node, so returning NUMA node zero
2017-11-29 14:20:43.752793: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1064] Found device 0 with properties:
name: Tesla K80 major: 3 minor: 7 memoryClockRate(GHz): 0.8235 pciBusID: 0000:00:04.0
totalMemory: 11.17GiB freeMemory: 11.03GiB 128, 250, 512, 512
2017-11-29 14:20:43.752822: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1154] Creating TensorFlow device (/device:GPU:0) -> (device: 0, name: Tesla K80, pci bus id: 0000:00:04.0, compute capability: 3.7)
250/250 [==============================] - 258s - loss: 1.3673 - acc: 0.3084 - val_loss: 1.2138 - val_acc: 0.4500
Epoch 2/30
250/250 [==============================] - 249s - loss: 0.9916 - acc: 0.5166 - val_loss: 0.6953 - val_acc: 0.6129
Epoch 3/30
250/250 [==============================] - 249s - loss: 0.7244 - acc: 0.6158 - val_loss: 0.5993 - val_acc: 0.6610
Epoch 4/30
250/250 [==============================] - 249s - loss: 0.6868 - acc: 0.6315 - val_loss: 0.5539 - val_acc: 0.6814
Epoch 5/30
250/250 [==============================] - 248s - loss: 0.6293 - acc: 0.6496 - val_loss: 0.5570 - val_acc: 0.6839
Epoch 6/30
250/250 [==============================] - 248s - loss: 0.6124 - acc: 0.6615 - val_loss: 0.5166 - val_acc: 0.7008
Epoch 7/30
250/250 [==============================] - 248s - loss: 0.5984 - acc: 0.6649 - val_loss: 0.5135 - val_acc: 0.7039
Epoch 8/30
250/250 [==============================] - 248s - loss: 0.5678 - acc: 0.6842 - val_loss: 0.4847 - val_acc: 0.7107
Epoch 9/30
250/250 [==============================] - 248s - loss: 0.5547 - acc: 0.6837 - val_loss: 0.4642 - val_acc: 0.7163
Epoch 10/30
250/250 [==============================] - 247s - loss: 0.5497 - acc: 0.6914 - val_loss: 0.4707 - val_acc: 0.7219
Epoch 11/30
250/250 [==============================] - 249s - loss: 0.5354 - acc: 0.6930 - val_loss: 0.4615 - val_acc: 0.7161

```
Epoch 12/30
250/250 [==============================] - 248s - loss: 0.5203 - acc: 0.6989 - val_loss: 0.4595 - val_acc: 0.7168
Epoch 13/30
250/250 [==============================] - 247s - loss: 0.5129 - acc: 0.7022 - val_loss: 0.4721 - val_acc: 0.7277
Epoch 14/30
250/250 [==============================] - 250s - loss: 0.5127 - acc: 0.7066 - val_loss: 0.4289 - val_acc: 0.7357
Epoch 15/30
250/250 [==============================] - 248s - loss: 0.4982 - acc: 0.7176 - val_loss: 0.4338 - val_acc: 0.7412
Epoch 16/30
250/250 [==============================] - 247s - loss: 0.4892 - acc: 0.7217 - val_loss: 0.4404 - val_acc: 0.7366
Epoch 17/30
250/250 [==============================] - 248s - loss: 0.4812 - acc: 0.7234 - val_loss: 0.4357 - val_acc: 0.7448
Epoch 18/30
250/250 [==============================] - 247s - loss: 0.4889 - acc: 0.7245 - val_loss: 0.4627 - val_acc: 0.7320
Epoch 19/30
250/250 [==============================] - 247s - loss: 0.4715 - acc: 0.7344 - val_loss: 0.4128 - val_acc: 0.7608
Epoch 20/30
250/250 [==============================] - 248s - loss: 0.4676 - acc: 0.7295 - val_loss: 0.4399 - val_acc: 0.7484
Epoch 21/30
250/250 [==============================] - 247s - loss: 0.4742 - acc: 0.7322 - val_loss: 0.5086 - val_acc: 0.7316
Epoch 22/30
250/250 [==============================] - 247s - loss: 0.4559 - acc: 0.7415 - val_loss: 0.4207 - val_acc: 0.7291
Epoch 23/30
250/250 [==============================] - 247s - loss: 0.4630 - acc: 0.7359 - val_loss: 0.4181 - val_acc: 0.7605
Epoch 24/30
250/250 [==============================] - 248s - loss: 0.4560 - acc: 0.7436 - val_loss: 0.4040 - val_acc: 0.7397
Epoch 25/30
250/250 [==============================] - 249s - loss: 0.4527 - acc: 0.7414 - val_loss: 0.4063 - val_acc: 0.7520
Epoch 26/30
61/250 [======>.....................] - ETA: 114s - loss: 0.4510 - acc: 0.744     67/250 [=======>.....................] - ETA: 112s - loss: 0.4507 - acc: 0.741
62/250 [======>.....................] - ETA: 114s - loss: 0.4510 - acc: 0.744     68/250 [=======>.....................] - ETA: 111s - loss: 0.4510 - acc: 0.740
63/250 [======>.....................] - ETA: 113s - loss: 0.4510 - acc: 0.744     69/250 [=======>.....................] - ETA: 111s - loss: 0.4511 - acc: 0.739
64/250 [======>.....................] - ETA: 113s - loss: 0.4514 - acc: 0.741     70/250 [=======>.....................] - ETA: 111s - loss: 0.4514 - acc: 0.738
65/250 [======>.....................] - ETA: 113s - loss: 0.4526 - acc: 0.739     71/250 [=======>.....................] - ETA: 110s - loss: 0.4542 - acc: 0.736
66/250 [======>.....................] - ETA: 112s - loss: 0.4524 - acc: 0.740
250/250 [==============================] - 249s - loss: 0.4526 - acc: 0.7418 - val_loss: 0.3967 - val_acc: 0.7418
Epoch 27/30
250/250 [==============================] - 248s - loss: 0.4521 - acc: 0.7460 - val_loss: 0.4216 - val_acc: 0.7593
Epoch 28/30
250/250 [==============================] - 248s - loss: 0.4551 - acc: 0.7425 - val_loss: 0.4052 - val_acc: 0.7486
```

```
Epoch 29/30
250/250 [==============================] - 248s - loss: 0.4412 - acc: 0.7514 - val_loss: 0.4146 - val_acc: 0.7625
Epoch 30/30
250/250 [==============================] - 248s - loss: 0.4430 - acc: 0.7479 - val_loss: 0.4323 - val_acc: 0.7445
Test loss: 4.93330636978
Test accuracy 0.659375
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
conv2d_1 (Conv2D)            (None, 300, 300, 128)     13952
_________________________________________________________________
max_pooling2d_1 (MaxPooling2 (None, 50, 50, 128)       0
_________________________________________________________________
conv2d_2 (Conv2D)            (None, 50, 50, 250)       1152250
_________________________________________________________________
max_pooling2d_2 (MaxPooling2 (None, 8, 8, 250)         0
_________________________________________________________________
flatten_1 (Flatten)          (None, 16000)             0
_________________________________________________________________
dense_1 (Dense)              (None, 512)               8192512
_________________________________________________________________
dropout_1 (Dropout)          (None, 512)               0
_________________________________________________________________
dense_2 (Dense)              (None, 512)               262656
_________________________________________________________________
dropout_2 (Dropout)          (None, 512)               0
_________________________________________________________________
dense_3 (Dense)              (None, 4)                 2052
=================================================================
Total params: 9,623,422
Trainable params: 9,623,422
Non-trainable params: 0
```

Number of Filters	128		256			512		512		4
Layer Type	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dropout (0.35)	Dense()	Dropout (0.35)	Dense()
Conv. Size	(6,6)	(6,6)	(6,6)	(6,6)						
Padding	valid		valid							
activation	relu		relu			relu		relu		softmax

```
Epoch 1/30
```

```
2017-11-30 00:42:50.282025: I tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:900] successful NUMA node read from SysFS had negative value (-1), but there must be at least one NUMA node, so returning NUMA node zero
2017-11-30 00:42:50.282631: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1064] Found device 0 with properties:
name: Tesla K80 major: 3 minor: 7 memoryClockRate(GHz): 0.8235
pciBusID: 0000:00:04.0
totalMemory: 11.17GiB freeMemory: 11.03GiB
2017-11-30 00:42:50.282656: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1154] Creating TensorFlow device (/device:GPU:0) -> (device: 0, name: Tesla K80, pci bus id: 0000:00:04.0, compute capability: 3.7)
250/250 [==============================] - 242s - loss: 1.3626 - acc: 0.2908 - val_loss: 1.2037 - val_acc: 0.4106
Epoch 2/30
250/250 [==============================] - 226s - loss: 0.9322 - acc: 0.5236 - val_loss: 0.8404 - val_acc: 0.5610
Epoch 3/30
250/250 [==============================] - 232s - loss: 0.7368 - acc: 0.6131 - val_loss: 0.7779 - val_acc: 0.5932
Epoch 4/30
250/250 [==============================] - 232s - loss: 0.6681 - acc: 0.6440 - val_loss: 0.5737 - val_acc: 0.6669
Epoch 5/30
250/250 [==============================] - 236s - loss: 0.6092 - acc: 0.6637 - val_loss: 0.5412 - val_acc: 0.6883
Epoch 6/30
250/250 [==============================] - 231s - loss: 0.6295 - acc: 0.6673 - val_loss: 0.5864 - val_acc: 0.6687
Epoch 7/30
250/250 [==============================] - 234s - loss: 0.5684 - acc: 0.6926 - val_loss: 0.5177 - val_acc: 0.6911
Epoch 8/30
250/250 [==============================] - 229s - loss: 0.5420 - acc: 0.6946 - val_loss: 0.5117 - val_acc: 0.6834
Epoch 9/30
250/250 [==============================] - 238s - loss: 0.5298 - acc: 0.7019 - val_loss: 0.5094 - val_acc: 0.7054
Epoch 10/30
250/250 [==============================] - 239s - loss: 0.5409 - acc: 0.6969 - val_loss: 0.4709 - val_acc: 0.7172
Epoch 11/30
250/250 [==============================] - 237s - loss: 0.5132 - acc: 0.7105 - val_loss: 0.4557 - val_acc: 0.7215
Epoch 12/30
250/250 [==============================] - 235s - loss: 0.4910 - acc: 0.7160 - val_loss: 0.4366 - val_acc: 0.7431
Epoch 13/30
250/250 [==============================] - 239s - loss: 0.4889 - acc: 0.7233 - val_loss: 0.4758 - val_acc: 0.7209
Epoch 14/30
250/250 [==============================] - 237s - loss: 0.4693 - acc: 0.7290 - val_loss: 0.4307 - val_acc: 0.7420
Epoch 15/30
250/250 [==============================] - 236s - loss: 0.4703 - acc: 0.7312 - val_loss: 0.5957 - val_acc: 0.7151
Epoch 16/30
250/250 [==============================] - 237s - loss: 0.4747 - acc: 0.7365 - val_loss: 0.4208 - val_acc: 0.7427
Epoch 17/30
```

```
250/250 [==============================] - 225s - loss: 0.4562 - acc: 0.7365 - val_loss: 0.4319 - val_acc: 0.7360
Epoch 18/30
250/250 [==============================] - 239s - loss: 0.4791 - acc: 0.7250 - val_loss: 0.4197 - val_acc: 0.7428
Epoch 19/30
250/250 [==============================] - 232s - loss: 0.4481 - acc: 0.7509 - val_loss: 0.4059 - val_acc: 0.7465
Epoch 20/30
250/250 [==============================] - 233s - loss: 0.4573 - acc: 0.7438 - val_loss: 0.4007 - val_acc: 0.7430
Epoch 21/30
250/250 [==============================] - 228s - loss: 0.4425 - acc: 0.7519 - val_loss: 0.4119 - val_acc: 0.7510
Epoch 22/30
250/250 [==============================] - 226s - loss: 0.4574 - acc: 0.7428 - val_loss: 0.4036 - val_acc: 0.7389
Epoch 23/30
250/250 [==============================] - 232s - loss: 0.4464 - acc: 0.7541 - val_loss: 0.4049 - val_acc: 0.7446
Epoch 24/30
250/250 [==============================] - 234s - loss: 0.4362 - acc: 0.7457 - val_loss: 0.4289 - val_acc: 0.7389
Epoch 25/30
250/250 [==============================] - 232s - loss: 0.4306 - acc: 0.7584 - val_loss: 0.4086 - val_acc: 0.7455
Epoch 26/30
250/250 [==============================] - 231s - loss: 0.4266 - acc: 0.7533 - val_loss: 0.4128 - val_acc: 0.7457
Test loss: 4.32757368922
Test accuracy 0.68
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
conv2d_1 (Conv2D)            (None, 295, 295, 128)     13952
_________________________________________________________________
max_pooling2d_1 (MaxPooling2 (None, 49, 49, 128)       0
_________________________________________________________________
conv2d_2 (Conv2D)            (None, 44, 44, 256)       1179904
_________________________________________________________________
max_pooling2d_2 (MaxPooling2 (None, 7, 7, 256)         0
_________________________________________________________________
flatten_1 (Flatten)          (None, 12544)             0
_________________________________________________________________
dense_1 (Dense)              (None, 512)               6423040
_________________________________________________________________
dropout_1 (Dropout)          (None, 512)               0
_________________________________________________________________
dense_2 (Dense)              (None, 512)               262656
_________________________________________________________________
```

dropout_2 (Dropout) (None, 512) 0

_____

dense_3 (Dense) (None, 4) 2052

==========

Total params: 7,881,604
Trainable params: 7,881,604
Non-trainable params: 0

Number of Filters	128		256			512		4
Layer Type	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dropout (0.35)	Dense()
Conv. Size	(6,6)	(6,6)	(6,6)	(6,6)				
Padding	valid		valid					
activation	relu		relu			relu		softmax

Epoch 1/30
2017-11-30 02:27:51.363572: I tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:900] successful NUMA node read from SysFS had negative value (-1), but there must be at least one NUMA node, so returning NUMA node zero
2017-11-30 02:27:51.364193: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1064] Found device 0 with properties:
name: Tesla K80 major: 3 minor: 7 memoryClockRate(GHz): 0.8235 pciBusID: 0000:00:04.0
totalMemory: 11.17GiB freeMemory: 11.03GiB
2017-11-30 02:27:51.364219: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1154] Creating TensorFlow device (/device:GPU:0) -> (device: 0, name: Tesla K80, pci bus id: 0000:00:04.0, compute capability: 3.7)
250/250 [==========] - 238s - loss: 1.3246 - acc: 0.3282 - val_loss: 1.0460 - val_acc: 0.4850
Epoch 2/30
250/250 [==========] - 235s - loss: 0.8516 - acc: 0.5650 - val_loss: 0.6637 - val_acc: 0.6277
Epoch 3/30
250/250 [==========] - 237s - loss: 0.6826 - acc: 0.6266 - val_loss: 0.5605 - val_acc: 0.6815
Epoch 4/30
250/250 [==========] - 236s - loss: 0.6195 - acc: 0.6569 - val_loss: 0.5359 - val_acc: 0.6952
Epoch 5/30
250/250 [==========] - 231s - loss: 0.5806 - acc: 0.6834 - val_loss: 0.5041 - val_acc: 0.7148
Epoch 6/30
250/250 [==========] - 233s - loss: 0.5506 - acc: 0.6941 - val_loss: 0.4966 - val_acc: 0.7168
Epoch 7/30
250/250 [==========] - 231s - loss: 0.5300 - acc: 0.7084 - val_loss: 0.4617 - val_acc: 0.7259
Epoch 8/30
250/250 [==========] - 224s - loss: 0.5059 - acc: 0.7200 - val_loss: 0.4597 - val_acc: 0.7190
Epoch 9/30
250/250 [==========] - 224s - loss: 0.5116 - acc: 0.7151 - val_loss: 0.4726 - val_acc: 0.7267
Epoch 10/30

```
250/250 [==============================] - 225s - loss: 0.4835 - acc: 0.7284 - val_loss: 0.4553 - val_acc: 0.7318
Epoch 11/30
250/250 [==============================] - 235s - loss: 0.4624 - acc: 0.7415 - val_loss: 0.4775 - val_acc: 0.7307
Epoch 12/30
250/250 [==============================] - 234s - loss: 0.4554 - acc: 0.7464 - val_loss: 0.4291 - val_acc: 0.7369
Epoch 13/30
250/250 [==============================] - 225s - loss: 0.4379 - acc: 0.7459 - val_loss: 0.4167 - val_acc: 0.7512
Epoch 14/30
250/250 [==============================] - 229s - loss: 0.4339 - acc: 0.7594 - val_loss: 0.3994 - val_acc: 0.7698
Epoch 15/30
250/250 [==============================] - 226s - loss: 0.4348 - acc: 0.7525 - val_loss: 0.4052 - val_acc: 0.7582
Epoch 16/30
250/250 [==============================] - 230s - loss: 0.4275 - acc: 0.7575 - val_loss: 0.4049 - val_acc: 0.7509
Epoch 17/30
250/250 [==============================] - 231s - loss: 0.4300 - acc: 0.7572 - val_loss: 0.4288 - val_acc: 0.7477
Epoch 18/30
250/250 [==============================] - 229s - loss: 0.4214 - acc: 0.7586 - val_loss: 0.4059 - val_acc: 0.7485
Test loss: 5.06435893536
Test accuracy 0.660625
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
conv2d_1 (Conv2D)            (None, 295, 295, 128)     13952
_________________________________________________________________
max_pooling2d_1 (MaxPooling2 (None, 49, 49, 128)       0
_________________________________________________________________
conv2d_2 (Conv2D)            (None, 44, 44, 256)       1179904
_________________________________________________________________
max_pooling2d_2 (MaxPooling2 (None, 7, 7, 256)         0
_________________________________________________________________
flatten_1 (Flatten)          (None, 12544)             0
_________________________________________________________________
dense_1 (Dense)              (None, 512)               6423040
_________________________________________________________________
dropout_1 (Dropout)          (None, 512)               0
_________________________________________________________________
dense_2 (Dense)              (None, 4)                 2052
=================================================================
Total params: 7,618,948
Trainable params: 7,618,948
```

Non-trainable params: 0
adamax = Adamax(lr=0.003, beta_1=0.9, beta_2=0.999, epsilon=1e-08, decay=0.0)

Number of Filters	128		256			512		4
Layer Type	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dropout (0.35)	Dense()
Conv. Size	(6,6)	(6,6)	(6,6)	(6,6)				
Padding	valid		valid					
activation	relu		relu			relu		softmax

Epoch 1/30
2017-12-01 23:26:50.672250: I tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:900] successful NUMA node read from SysFS had negative value (-1), but there must be at least one NUMA node, so returning NUMA node zero
2017-12-01 23:26:50.672978: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1064] Found device 0 with properties:
name: Tesla K80 major: 3 minor: 7 memoryClockRate(GHz): 0.8235 pciBusID: 0000:00:04.0
totalMemory: 11.17GiB freeMemory: 11.03GiB
2017-12-01 23:26:50.673009: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1154] Creating TensorFlow device (/device:GPU:0) -> (device: 0, name: Tesla K80, pci bus id: 0000:00:04.0, compute capability: 3.7)
250/250 [==============================] - 251s - loss: 1.3990 - acc: 0.2666 - val_loss: 1.3470 - val_acc: 0.3381
Epoch 2/30
250/250 [==============================] - 244s - loss: 1.2290 - acc: 0.4011 - val_loss: 0.9368 - val_acc: 0.5640
Epoch 3/30
250/250 [==============================] - 245s - loss: 0.8468 - acc: 0.5615 - val_loss: 0.6607 - val_acc: 0.6345
Epoch 4/30
250/250 [==============================] - 241s - loss: 0.6966 - acc: 0.6179 - val_loss: 0.6149 - val_acc: 0.6449
Epoch 5/30
250/250 [==============================] - 238s - loss: 0.6335 - acc: 0.6501 - val_loss: 0.5840 - val_acc: 0.6584
Epoch 6/30
250/250 [==============================] - 239s - loss: 0.5883 - acc: 0.6704 - val_loss: 0.5251 - val_acc: 0.6945
Epoch 7/30
250/250 [==============================] - 236s - loss: 0.5509 - acc: 0.6926 - val_loss: 0.5091 - val_acc: 0.7066
Epoch 8/30
250/250 [==============================] - 233s - loss: 0.5241 - acc: 0.7050 - val_loss: 0.4651 - val_acc: 0.7243
Epoch 9/30
250/250 [==============================] - 237s - loss: 0.4917 - acc: 0.7246 - val_loss: 0.4591 - val_acc: 0.7286
Epoch 10/30
250/250 [==============================] - 242s - loss: 0.4842 - acc: 0.7221 - val_loss: 0.4667 - val_acc: 0.7154
Epoch 11/30
250/250 [==============================] - 233s - loss: 0.4655 - acc: 0.7308 - val_loss: 0.4525 - val_acc: 0.7339
Epoch 12/30
250/250 [==============================] - 233s - loss: 0.4590 - acc: 0.7397 - val_loss: 0.4183 - val_acc: 0.7440

```
Epoch 13/30
250/250 [==============================] - 232s - loss: 0.4391 - acc: 0.7501 - val_loss: 0.4074 - val_acc: 0.7495
Epoch 14/30
250/250 [==============================] - 235s - loss: 0.4364 - acc: 0.7508 - val_loss: 0.4289 - val_acc: 0.7356
Epoch 15/30
250/250 [==============================] - 235s - loss: 0.4342 - acc: 0.7550 - val_loss: 0.4189 - val_acc: 0.7529
Epoch 16/30
250/250 [==============================] - 236s - loss: 0.4241 - acc: 0.7603 - val_loss: 0.3860 - val_acc: 0.7662
Epoch 17/30
250/250 [==============================] - 236s - loss: 0.4129 - acc: 0.7675 - val_loss: 0.3934 - val_acc: 0.7665
Epoch 18/30
250/250 [==============================] - 233s - loss: 0.3979 - acc: 0.7789 - val_loss: 0.4239 - val_acc: 0.7489
Epoch 19/30
250/250 [==============================] - 237s - loss: 0.3980 - acc: 0.7699 - val_loss: 0.3643 - val_acc: 0.7658
Epoch 20/30
250/250 [==============================] - 239s - loss: 0.3929 - acc: 0.7754 - val_loss: 0.3818 - val_acc: 0.7674
Epoch 21/30
250/250 [==============================] - 243s - loss: 0.3905 - acc: 0.7776 - val_loss: 0.3783 - val_acc: 0.7702
Epoch 22/30
250/250 [==============================] - 237s - loss: 0.3861 - acc: 0.7792 - val_loss: 0.3686 - val_acc: 0.7694
Epoch 23/30
250/250 [==============================] - 241s - loss: 0.3806 - acc: 0.7873 - val_loss: 0.3871 - val_acc: 0.7597
Test loss: 4.85898687363
Test accuracy 0.679375
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
conv2d_1 (Conv2D)            (None, 295, 295, 128)     13952
_________________________________________________________________
max_pooling2d_1 (MaxPooling2 (None, 49, 49, 128)       0
_________________________________________________________________
conv2d_2 (Conv2D)            (None, 44, 44, 256)       1179904
_________________________________________________________________
max_pooling2d_2 (MaxPooling2 (None, 7, 7, 256)         0
_________________________________________________________________
flatten_1 (Flatten)          (None, 12544)             0
_________________________________________________________________
dense_1 (Dense)              (None, 512)               6423040
_________________________________________________________________
dropout_1 (Dropout)          (None, 512)               0
```

_____
dense_2 (Dense) (None, 512) 262656
_____
dropout_2 (Dropout) (None, 512) 0
_____
dense_3 (Dense) (None, 4) 2052
==========
Total params: 7,881,604
Trainable params: 7,881,604
Non-trainable params: 0
adadelta = Adadelta(lr=1.0, rho=0.95, epsilon=1e-08, decay=0.0)

Number of Filters	128		256			512		4
Layer Type	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dropout (0.35)	Dense()
Conv. Size	(6,6)	(6,6)	(6,6)	(6,6)				
Padding	valid		valid					
activation	relu		relu			relu		softmax

Epoch 1/30
2017-12-02 03:17:23.429044: I tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:900] successful NUMA node read from SysFS had negative value (-1), but there must be at least one NUMA node, so returning NUMA node zero
2017-12-02 03:17:23.429690: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1064] Found device 0 with properties:
name: Tesla K80 major: 3 minor: 7 memoryClockRate(GHz): 0.8235
pciBusID: 0000:00:04.0
totalMemory: 11.17GiB freeMemory: 11.03GiB
2017-12-02 03:17:23.429717: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1154] Creating TensorFlow device (/device:GPU:0) -> (device: 0, name: Tesla K80, pci bus id: 0000:00:04.0, compute capability: 3.7)
250/250 [==========] - 260s - loss: 1.3155 - acc: 0.3409 - val_loss: 0.9900 - val_acc: 0.5169
Epoch 2/30
250/250 [==========] - 252s - loss: 0.8535 - acc: 0.5711 - val_loss: 0.6104 - val_acc: 0.6616
Epoch 3/30
250/250 [==========] - 252s - loss: 0.6455 - acc: 0.6512 - val_loss: 0.5596 - val_acc: 0.6785
Epoch 4/30
250/250 [==========] - 250s - loss: 0.5791 - acc: 0.6807 - val_loss: 0.4732 - val_acc: 0.7178
Epoch 5/30
250/250 [==========] - 236s - loss: 0.5162 - acc: 0.7116 - val_loss: 0.5014 - val_acc: 0.7109
Epoch 6/30
250/250 [==========] - 238s - loss: 0.4792 - acc: 0.7281 - val_loss: 0.4227 - val_acc: 0.7444
Epoch 7/30
250/250 [==========] - 246s - loss: 0.4617 - acc: 0.7372 - val_loss: 0.4179 - val_acc: 0.7572

```
Epoch 8/30
250/250 [==============================] - 234s - loss: 0.4440 - acc: 0.7499 - val_loss: 0.4147 - val_acc: 0.7619
Epoch 9/30
250/250 [==============================] - 239s - loss: 0.4413 - acc: 0.7524 - val_loss: 0.4012 - val_acc: 0.7560
Epoch 10/30
250/250 [==============================] - 241s - loss: 0.4247 - acc: 0.7640 - val_loss: 0.4368 - val_acc: 0.7434
Epoch 11/30
250/250 [==============================] - 243s - loss: 0.4132 - acc: 0.7659 - val_loss: 0.3817 - val_acc: 0.7679
Epoch 12/30
250/250 [==============================] - 242s - loss: 0.4104 - acc: 0.7714 - val_loss: 0.4098 - val_acc: 0.7555
Epoch 13/30
250/250 [==============================] - 241s - loss: 0.3996 - acc: 0.7759 - val_loss: 0.3892 - val_acc: 0.7603
Epoch 14/30
250/250 [==============================] - 241s - loss: 0.3961 - acc: 0.7777 - val_loss: 0.3868 - val_acc: 0.7622
Epoch 15/30
250/250 [==============================] - 240s - loss: 0.3876 - acc: 0.7812 - val_loss: 0.3771 - val_acc: 0.7815
Epoch 16/30
250/250 [==============================] - 241s - loss: 0.3856 - acc: 0.7864 - val_loss: 0.4035 - val_acc: 0.7573
Epoch 17/30
250/250 [==============================] - 241s - loss: 0.3779 - acc: 0.7869 - val_loss: 0.3591 - val_acc: 0.7932
Epoch 18/30
250/250 [==============================] - 240s - loss: 0.3729 - acc: 0.7943 - val_loss: 0.3697 - val_acc: 0.7706
Epoch 19/30
250/250 [==============================] - 250s - loss: 0.3672 - acc: 0.7988 - val_loss: 0.3628 - val_acc: 0.7833
Epoch 20/30
250/250 [==============================] - 253s - loss: 0.3706 - acc: 0.7979 - val_loss: 0.3579 - val_acc: 0.7868
Epoch 21/30
250/250 [==============================] - 247s - loss: 0.3634 - acc: 0.7999 - val_loss: 0.3624 - val_acc: 0.7799
Epoch 22/30
250/250 [==============================] - 252s - loss: 0.3575 - acc: 0.8011 - val_loss: 0.3575 - val_acc: 0.7930
Epoch 23/30
250/250 [==============================] - 245s - loss: 0.3610 - acc: 0.7996 - val_loss: 0.4038 - val_acc: 0.7531
Epoch 24/30
250/250 [==============================] - 241s - loss: 0.3601 - acc: 0.8035 - val_loss: 0.3611 - val_acc: 0.7841
Epoch 25/30
250/250 [==============================] - 239s - loss: 0.3560 - acc: 0.8067 - val_loss: 0.3613 - val_acc: 0.7829
Epoch 26/30
250/250 [==============================] - 244s - loss: 0.3582 - acc: 0.8084 - val_loss: 0.3562 - val_acc: 0.7880
Epoch 27/30
250/250 [==============================] - 250s - loss: 0.3493 - acc: 0.8099 - val_loss: 0.3908 - val_acc: 0.7723
```

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Epoch 28/30
250/250 [==============================] - 249s - loss: 0.3512 - acc: 0.8096 - val_loss: 0.3550 - val_acc: 0.7905
Epoch 29/30
250/250 [==============================] - 250s - loss: 0.3554 - acc: 0.8101 - val_loss: 0.3579 - val_acc: 0.7825
Epoch 30/30
250/250 [==============================] - 249s - loss: 0.3486 - acc: 0.8160 - val_loss: 0.3526 - val_acc: 0.7875
Test loss: 5.13014283419
Test accuracy 0.67125
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
conv2d_1 (Conv2D)            (None, 295, 295, 128)     13952
_________________________________________________________________
max_pooling2d_1 (MaxPooling2 (None, 49, 49, 128)       0
_________________________________________________________________
conv2d_2 (Conv2D)            (None, 44, 44, 256)       1179904
_________________________________________________________________
max_pooling2d_2 (MaxPooling2 (None, 7, 7, 256)         0
_________________________________________________________________
flatten_1 (Flatten)          (None, 12544)             0
_________________________________________________________________
dense_1 (Dense)              (None, 512)               6423040
_________________________________________________________________
dropout_1 (Dropout)          (None, 512)               0
_________________________________________________________________
dense_2 (Dense)              (None, 512)               262656
_________________________________________________________________
dropout_2 (Dropout)          (None, 512)               0
_________________________________________________________________
dense_3 (Dense)              (None, 4)                 2052
=================================================================
Total params: 7,881,604
Trainable params: 7,881,604
Non-trainable params: 0
adamax = Adamax(lr=0.002, beta_1=0.9, beta_2=0.999, epsilon=1e-08, decay=0.0)
```

Number of Filters	64		128			512		512		512		4
Layer Type	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dropout (0.35)	Dense()	Dropout (0.35)	Dense()	Dropout (0.35)	Dense()

Conv. Size	(3,3)	(3,3)	(3,3)	(3,3)								
Padding	valid		valid									
activation	relu		relu			relu		relu		relu		softmax

```
Epoch 1/50
2017-12-05 18:25:24.690074: I tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:900] successful NUMA node read from SysFS had negative value (-1), but there must be at least one NUMA node, so returning NUMA node zero
2017-12-05 18:25:24.690469: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1064] Found device 0 with properties:
name: Tesla K80 major: 3 minor: 7 memoryClockRate(GHz): 0.8235
pciBusID: 0000:00:04.0
totalMemory: 11.17GiB freeMemory: 11.03GiB
2017-12-05 18:25:24.690522: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1154] Creating TensorFlow device (/device:GPU:0) -> (device: 0, name: Tesla K80, pci bus id: 0000:00:04.0, compute capability: 3.7)
250/250 [==============================] - 233s - loss: 1.4209 - acc: 0.2648 - val_loss: 1.3671 - val_acc: 0.3450
Epoch 2/50
250/250 [==============================] - 229s - loss: 1.2518 - acc: 0.4030 - val_loss: 1.0484 - val_acc: 0.5186
Epoch 3/50
250/250 [==============================] - 228s - loss: 1.0857 - acc: 0.4919 - val_loss: 1.0083 - val_acc: 0.5290
Epoch 4/50
250/250 [==============================] - 229s - loss: 0.9704 - acc: 0.5447 - val_loss: 0.8255 - val_acc: 0.6097
Epoch 5/50
250/250 [==============================] - 228s - loss: 0.8427 - acc: 0.5895 - val_loss: 0.7768 - val_acc: 0.6259
Epoch 6/50
250/250 [==============================] - 228s - loss: 0.7748 - acc: 0.6121 - val_loss: 0.6593 - val_acc: 0.6574
Epoch 7/50
250/250 [==============================] - 227s - loss: 0.7397 - acc: 0.6185 - val_loss: 0.7439 - val_acc: 0.6244
Epoch 8/50
250/250 [==============================] - 229s - loss: 0.6681 - acc: 0.6531 - val_loss: 0.7058 - val_acc: 0.6352
Epoch 9/50
250/250 [==============================] - 228s - loss: 0.6566 - acc: 0.6539 - val_loss: 0.5734 - val_acc: 0.6953
Epoch 10/50
250/250 [==============================] - 228s - loss: 0.6312 - acc: 0.6630 - val_loss: 0.5874 - val_acc: 0.6748
Epoch 11/50
250/250 [==============================] - 224s - loss: 0.6121 - acc: 0.6679 - val_loss: 0.6362 - val_acc: 0.6511
Epoch 12/50
250/250 [==============================] - 220s - loss: 0.5787 - acc: 0.6806 - val_loss: 0.6208 - val_acc: 0.6733
Epoch 13/50
250/250 [==============================] - 227s - loss: 0.5750 - acc: 0.6919 - val_loss: 0.5509 - val_acc: 0.6809
Epoch 14/50
250/250 [==============================] - 232s - loss: 0.5401 - acc: 0.7019 - val_loss: 0.5490 - val_acc: 0.6905
```

```
Epoch 15/50
250/250 [==============================] - 230s - loss: 0.5405 - acc: 0.7041 - val_loss: 0.4944 - val_acc: 0.7266
Epoch 16/50
250/250 [==============================] - 230s - loss: 0.5302 - acc: 0.6975 - val_loss: 0.4957 - val_acc: 0.7159
Epoch 17/50
250/250 [==============================] - 231s - loss: 0.5077 - acc: 0.7189 - val_loss: 0.5592 - val_acc: 0.6980
Epoch 18/50
250/250 [==============================] - 232s - loss: 0.5048 - acc: 0.7169 - val_loss: 0.4981 - val_acc: 0.7199
Epoch 19/50
250/250 [==============================] - 237s - loss: 0.4900 - acc: 0.7194 - val_loss: 0.4747 - val_acc: 0.7180
Epoch 20/50
250/250 [==============================] - 236s - loss: 0.4871 - acc: 0.7194 - val_loss: 0.4742 - val_acc: 0.7273
Epoch 21/50
250/250 [==============================] - 230s - loss: 0.4748 - acc: 0.7370 - val_loss: 0.4687 - val_acc: 0.7315
Epoch 22/50
250/250 [==============================] - 232s - loss: 0.4740 - acc: 0.7380 - val_loss: 0.4482 - val_acc: 0.7334
Epoch 23/50
250/250 [==============================] - 231s - loss: 0.4506 - acc: 0.7430 - val_loss: 0.4813 - val_acc: 0.7236
Epoch 24/50
250/250 [==============================] - 232s - loss: 0.4697 - acc: 0.7392 - val_loss: 0.4661 - val_acc: 0.7349
Epoch 25/50
250/250 [==============================] - 232s - loss: 0.4555 - acc: 0.7385 - val_loss: 0.4627 - val_acc: 0.7286
Epoch 26/50
250/250 [==============================] - 232s - loss: 0.4403 - acc: 0.7464 - val_loss: 0.4467 - val_acc: 0.7404
Epoch 27/50
250/250 [==============================] - 235s - loss: 0.4338 - acc: 0.7572 - val_loss: 0.4377 - val_acc: 0.7429
Epoch 28/50
250/250 [==============================] - 235s - loss: 0.4420 - acc: 0.7494 - val_loss: 0.4439 - val_acc: 0.7433
Epoch 29/50
250/250 [==============================] - 234s - loss: 0.4249 - acc: 0.7572 - val_loss: 0.4814 - val_acc: 0.7276
Epoch 30/50
250/250 [==============================] - 233s - loss: 0.4286 - acc: 0.7656 - val_loss: 0.4353 - val_acc: 0.7567
Epoch 31/50
250/250 [==============================] - 234s - loss: 0.4133 - acc: 0.7740 - val_loss: 0.5269 - val_acc: 0.7151
Epoch 32/50
250/250 [==============================] - 234s - loss: 0.4155 - acc: 0.7676 - val_loss: 0.4291 - val_acc: 0.7512
Epoch 33/50
250/250 [==============================] - 233s - loss: 0.3999 - acc: 0.7735 - val_loss: 0.4439 - val_acc: 0.7567
Epoch 34/50
250/250 [==============================] - 234s - loss: 0.4072 - acc: 0.7650 - val_loss: 0.4170 - val_acc: 0.7606
```

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Epoch 35/50
250/250 [==============================] - 235s - loss: 0.4029 - acc: 0.7755 - val_loss: 0.4342 - val_acc: 0.7495
Epoch 36/50
250/250 [==============================] - 233s - loss: 0.3853 - acc: 0.7845 - val_loss: 0.4229 - val_acc: 0.7549
Epoch 37/50
250/250 [==============================] - 230s - loss: 0.3887 - acc: 0.7876 - val_loss: 0.4252 - val_acc: 0.7620
Epoch 38/50
250/250 [==============================] - 233s - loss: 0.3891 - acc: 0.7868 - val_loss: 0.4481 - val_acc: 0.7453
Test loss: 5.97175711632
Test accuracy 0.6175
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
conv2d_1 (Conv2D)            (None, 298, 298, 64)      1792
_________________________________________________________________
max_pooling2d_1 (MaxPooling2 (None, 99, 99, 64)        0
_________________________________________________________________
conv2d_2 (Conv2D)            (None, 97, 97, 128)       73856
_________________________________________________________________
max_pooling2d_2 (MaxPooling2 (None, 32, 32, 128)       0
_________________________________________________________________
flatten_1 (Flatten)          (None, 131072)            0
_________________________________________________________________
dense_1 (Dense)              (None, 512)               67109376
_________________________________________________________________
dropout_1 (Dropout)          (None, 512)               0
_________________________________________________________________
dense_2 (Dense)              (None, 512)               262656
_________________________________________________________________
dropout_2 (Dropout)          (None, 512)               0
_________________________________________________________________
dense_3 (Dense)              (None, 512)               262656
_________________________________________________________________
dropout_3 (Dropout)          (None, 512)               0
_________________________________________________________________
dense_4 (Dense)              (None, 4)                 2052
=================================================================
Total params: 67,712,388
Trainable params: 67,712,388
Non-trainable params: 0
```

adamax = Adamax(lr=0.002, beta_1=0.9, beta_2=0.999, epsilon=1e-08, decay=0.0)

Number of Filters	64		128			512		512		512		4
Layer Type	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dropout (0.35)	Dense()	Dropout (0.35)	Dense()	Dropout (0.35)	Dense()
Conv. Size	(6,6)	(6,6)	(6,6)	(6,6)								
Padding	valid		valid									
activation	relu		relu			relu		relu		relu		softmax

2017-12-05 16:51:17.494322: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1154] Creating TensorFlow device (/device:GPU:0) -> (device: 0, name: Tesla K80, pci bus id: 0000:00:04.0, compute capability: 3.7)
250/250 [==============================] - 237s - loss: 1.3806 - acc: 0.2675 - val_loss: 1.2822 - val_acc: 0.3756
Epoch 2/50
250/250 [==============================] - 226s - loss: 1.0326 - acc: 0.4754 - val_loss: 0.7974 - val_acc: 0.5679
Epoch 3/50
250/250 [==============================] - 223s - loss: 0.7488 - acc: 0.5851 - val_loss: 0.6621 - val_acc: 0.6257
Epoch 4/50
250/250 [==============================] - 221s - loss: 0.6509 - acc: 0.6456 - val_loss: 0.5950 - val_acc: 0.6697
Epoch 5/50
250/250 [==============================] - 221s - loss: 0.6033 - acc: 0.6592 - val_loss: 0.5861 - val_acc: 0.6709
Epoch 6/50
250/250 [==============================] - 218s - loss: 0.5606 - acc: 0.6899 - val_loss: 0.4838 - val_acc: 0.7056
Epoch 7/50
250/250 [==============================] - 218s - loss: 0.5256 - acc: 0.6931 - val_loss: 0.4763 - val_acc: 0.7208
Epoch 8/50
250/250 [==============================] - 217s - loss: 0.5146 - acc: 0.7098 - val_loss: 0.4598 - val_acc: 0.7192
Epoch 9/50
250/250 [==============================] - 218s - loss: 0.4953 - acc: 0.7212 - val_loss: 0.4508 - val_acc: 0.7407
Epoch 10/50
250/250 [==============================] - 218s - loss: 0.4644 - acc: 0.7314 - val_loss: 0.4624 - val_acc: 0.7142
Epoch 11/50
250/250 [==============================] - 215s - loss: 0.4513 - acc: 0.7382 - val_loss: 0.4298 - val_acc: 0.7545
Epoch 12/50
250/250 [==============================] - 214s - loss: 0.4568 - acc: 0.7386 - val_loss: 0.4232 - val_acc: 0.7551
Epoch 13/50
250/250 [==============================] - 215s - loss: 0.4376 - acc: 0.7465 - val_loss: 0.4207 - val_acc: 0.7448
Epoch 14/50
250/250 [==============================] - 211s - loss: 0.4305 - acc: 0.7509 - val_loss: 0.3954 - val_acc: 0.7749
Epoch 15/50

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250/250 [==============================] - 212s - loss: 0.4258 - acc: 0.7484 - val_loss: 0.4669 - val_acc: 0.7412
Epoch 16/50
250/250 [==============================] - 211s - loss: 0.4196 - acc: 0.7610 - val_loss: 0.3986 - val_acc: 0.7516
Epoch 17/50
250/250 [==============================] - 218s - loss: 0.4095 - acc: 0.7576 - val_loss: 0.3861 - val_acc: 0.7693
Epoch 18/50
250/250 [==============================] - 249s - loss: 0.4028 - acc: 0.7676 - val_loss: 0.3932 - val_acc: 0.7593
Epoch 19/50
250/250 [==============================] - 230s - loss: 0.4001 - acc: 0.7686 - val_loss: 0.3706 - val_acc: 0.7841
Epoch 20/50
250/250 [==============================] - 227s - loss: 0.3929 - acc: 0.7746 - val_loss: 0.3736 - val_acc: 0.7771
Epoch 21/50
250/250 [==============================] - 222s - loss: 0.3882 - acc: 0.7764 - val_loss: 0.3736 - val_acc: 0.7670
Epoch 22/50
250/250 [==============================] - 223s - loss: 0.3877 - acc: 0.7757 - val_loss: 0.3751 - val_acc: 0.7797
Epoch 23/50
250/250 [==============================] - 220s - loss: 0.3856 - acc: 0.7742 - val_loss: 0.3724 - val_acc: 0.7694
Test loss: 4.66581215262
Test accuracy 0.683125
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
conv2d_1 (Conv2D)            (None, 295, 295, 64)      6976
_________________________________________________________________
max_pooling2d_1 (MaxPooling2 (None, 49, 49, 64)        0
_________________________________________________________________
conv2d_2 (Conv2D)            (None, 44, 44, 64)        147520
_________________________________________________________________
max_pooling2d_2 (MaxPooling2 (None, 7, 7, 64)          0
_________________________________________________________________
flatten_1 (Flatten)          (None, 3136)              0
_________________________________________________________________
dense_1 (Dense)              (None, 512)               1606144
_________________________________________________________________
dropout_1 (Dropout)          (None, 512)               0
_________________________________________________________________
dense_2 (Dense)              (None, 512)               262656
_________________________________________________________________
dropout_2 (Dropout)          (None, 512)               0
_________________________________________________________________
```

dense_3 (Dense) (None, 512) 262656
_____
dropout_3 (Dropout) (None, 512) 0
_____
dense_4 (Dense) (None, 4) 2052
==========
Total params: 2,288,004
Trainable params: 2,288,004
Non-trainable params: 0
_____
adamax = Adamax(lr=0.001, beta_1=0.9, beta_2=0.999, epsilon=1e-08, decay=0.0) #prev 0.002

Number of Filters	64		128			512		512		512		4
Layer Type	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dropout (0.35)	Dense()	Dropout (0.35)	Dense()	Dropout (0.35)	Dense()
Conv. Size	(6,6)	(6,6)	(6,6)	(6,6)								
Padding	valid		valid									
activation	relu		relu			relu		relu		relu		softmax

2017-12-05 20:54:53.786076: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1154] Creating TensorFlow device (/device:GPU:0) -> (device: 0, name: Tesla K80, pci bus id: 0000:00:04.0, compute capability: 3.7)
250/250 [==========] - 239s - loss: 1.2902 - acc: 0.3396 - val_loss: 1.0074 - val_acc: 0.4975
Epoch 2/50
250/250 [==========] - 233s - loss: 0.8306 - acc: 0.5554 - val_loss: 0.6689 - val_acc: 0.6238
Epoch 3/50
250/250 [==========] - 234s - loss: 0.6772 - acc: 0.6182 - val_loss: 0.6030 - val_acc: 0.6522
Epoch 4/50
250/250 [==========] - 237s - loss: 0.6066 - acc: 0.6525 - val_loss: 0.5645 - val_acc: 0.6641
Epoch 5/50
250/250 [==========] - 231s - loss: 0.5473 - acc: 0.6908 - val_loss: 0.4911 - val_acc: 0.7031
Epoch 6/50
250/250 [==========] - 234s - loss: 0.5156 - acc: 0.6983 - val_loss: 0.4654 - val_acc: 0.7113
Epoch 7/50
250/250 [==========] - 234s - loss: 0.4865 - acc: 0.7120 - val_loss: 0.4488 - val_acc: 0.7176
Epoch 8/50
250/250 [==========] - 232s - loss: 0.4759 - acc: 0.7204 - val_loss: 0.4219 - val_acc: 0.7428
Epoch 9/50
250/250 [==========] - 230s - loss: 0.4603 - acc: 0.7341 - val_loss: 0.4190 - val_acc: 0.7361
Epoch 10/50
250/250 [==========] - 235s - loss: 0.4435 - acc: 0.7355 - val_loss: 0.4072 - val_acc: 0.7444

```
Epoch 11/50
250/250 [==============================] - 234s - loss: 0.4243 - acc: 0.7512 - val_loss: 0.4305 - val_acc: 0.7560
Epoch 12/50
250/250 [==============================] - 234s - loss: 0.4111 - acc: 0.7509 - val_loss: 0.3996 - val_acc: 0.7667
Epoch 13/50
250/250 [==============================] - 235s - loss: 0.4065 - acc: 0.7681 - val_loss: 0.4238 - val_acc: 0.7500
Epoch 14/50
250/250 [==============================] - 236s - loss: 0.4034 - acc: 0.7592 - val_loss: 0.4195 - val_acc: 0.7403
Epoch 15/50
250/250 [==============================] - 236s - loss: 0.4014 - acc: 0.7676 - val_loss: 0.3814 - val_acc: 0.7701
Epoch 16/50
250/250 [==============================] - 237s - loss: 0.3999 - acc: 0.7692 - val_loss: 0.4275 - val_acc: 0.7476
Epoch 17/50
250/250 [==============================] - 236s - loss: 0.3914 - acc: 0.7712 - val_loss: 0.3851 - val_acc: 0.7719
Epoch 18/50
250/250 [==============================] - 236s - loss: 0.3859 - acc: 0.7696 - val_loss: 0.3792 - val_acc: 0.7712
Epoch 19/50
250/250 [==============================] - 234s - loss: 0.3769 - acc: 0.7771 - val_loss: 0.4121 - val_acc: 0.7632
Epoch 20/50
250/250 [==============================] - 234s - loss: 0.3699 - acc: 0.7856 - val_loss: 0.3736 - val_acc: 0.7797
Epoch 21/50
250/250 [==============================] - 235s - loss: 0.3721 - acc: 0.7869 - val_loss: 0.3771 - val_acc: 0.7829
Epoch 22/50
250/250 [==============================] - 236s - loss: 0.3813 - acc: 0.7864 - val_loss: 0.3658 - val_acc: 0.7891
Epoch 23/50
250/250 [==============================] - 236s - loss: 0.3623 - acc: 0.7929 - val_loss: 0.3630 - val_acc: 0.7815
Epoch 24/50
250/250 [==============================] - 235s - loss: 0.3702 - acc: 0.7868 - val_loss: 0.3681 - val_acc: 0.7710
Epoch 25/50
250/250 [==============================] - 232s - loss: 0.3658 - acc: 0.7910 - val_loss: 0.3764 - val_acc: 0.7794
Epoch 26/50
250/250 [==============================] - 233s - loss: 0.3606 - acc: 0.7935 - val_loss: 0.3560 - val_acc: 0.7836
Epoch 27/50
250/250 [==============================] - 234s - loss: 0.3538 - acc: 0.7976 - val_loss: 0.3786 - val_acc: 0.7773
Epoch 28/50
250/250 [==============================] - 236s - loss: 0.3622 - acc: 0.7980 - val_loss: 0.3701 - val_acc: 0.7736
Epoch 29/50
250/250 [==============================] - 238s - loss: 0.3540 - acc: 0.8049 - val_loss: 0.3709 - val_acc: 0.7801
Epoch 30/50
250/250 [==============================] - 233s - loss: 0.3466 - acc: 0.8096 - val_loss: 0.3560 - val_acc: 0.7869
```

Test loss: 4.95138476849
Test accuracy 0.673125

```
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
conv2d_1 (Conv2D)            (None, 295, 295, 64)      6976
_________________________________________________________________
max_pooling2d_1 (MaxPooling2 (None, 49, 49, 64)        0
_________________________________________________________________
conv2d_2 (Conv2D)            (None, 44, 44, 128)       295040
_________________________________________________________________
max_pooling2d_2 (MaxPooling2 (None, 7, 7, 128)         0
_________________________________________________________________
flatten_1 (Flatten)          (None, 6272)              0
_________________________________________________________________
dense_1 (Dense)              (None, 512)               3211776
_________________________________________________________________
dropout_1 (Dropout)          (None, 512)               0
_________________________________________________________________
dense_2 (Dense)              (None, 512)               262656
_________________________________________________________________
dropout_2 (Dropout)          (None, 512)               0
_________________________________________________________________
dense_3 (Dense)              (None, 512)               262656
_________________________________________________________________
dropout_3 (Dropout)          (None, 512)               0
_________________________________________________________________
dense_4 (Dense)              (None, 4)                 2052
=================================================================
```

Total params: 4,041,156
Trainable params: 4,041,156
Non-trainable params: 0
adam = Adam(lr=0.001, beta_1=0.9, beta_2=0.999, epsilon=1e-08, decay=0.0)

Number of Filters	128		256			512		512		512		4
Layer Type	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dropout (0.35)	Dense()	Dropout (0.35)	Dense()	Dropout (0.35)	Dense()
Conv. Size	(6,6)	(6,6)	(6,6)	(6,6)								
Padding	valid		valid									

activation	relu		relu			relu		relu		relu		softmax

Epoch 1/50
2017-12-05 23:00:00.535254: I tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:900] successful NUMA node read from SysFS had negative value (-1), but there must be at least one NUMA node, so returning NUMA node zero
2017-12-05 23:00:00.535579: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1064] Found device 0 with properties:
name: Tesla K80 major: 3 minor: 7 memoryClockRate(GHz): 0.8235 pciBusID: 0000:00:04.0
totalMemory: 11.17GiB freeMemory: 11.03GiB
2017-12-05 23:00:00.535620: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1154] Creating TensorFlow device (/device:GPU:0) -> (device: 0, name: Tesla K80, pci bus id: 0000:00:04.0, compute capability: 3.7)
250/250 [==============================] - 241s - loss: 1.5961 - acc: 0.2725 - val_loss: 1.5267 - val_acc: 0.2600
Epoch 2/50
250/250 [==============================] - 236s - loss: 1.4081 - acc: 0.2843 - val_loss: 1.3664 - val_acc: 0.2873
Epoch 3/50
250/250 [==============================] - 234s - loss: 1.3704 - acc: 0.3036 - val_loss: 1.9186 - val_acc: 0.2571
Epoch 4/50
250/250 [==============================] - 236s - loss: 1.3406 - acc: 0.3454 - val_loss: 1.3055 - val_acc: 0.3887
Epoch 5/50
250/250 [==============================] - 236s - loss: 1.2802 - acc: 0.3822 - val_loss: 1.2641 - val_acc: 0.3840
Epoch 6/50
250/250 [==============================] - 236s - loss: 1.2075 - acc: 0.4173 - val_loss: 1.2606 - val_acc: 0.3869
Epoch 7/50
250/250 [==============================] - 237s - loss: 1.1149 - acc: 0.4616 - val_loss: 1.4246 - val_acc: 0.3412
Epoch 8/50
250/250 [==============================] - 236s - loss: 0.9870 - acc: 0.5191 - val_loss: 1.6612 - val_acc: 0.2826
Epoch 9/50
250/250 [==============================] - 236s - loss: 0.8506 - acc: 0.5736 - val_loss: 0.6999 - val_acc: 0.6100
Epoch 10/50
250/250 [==============================] - 235s - loss: 0.7357 - acc: 0.6074 - val_loss: 0.7278 - val_acc: 0.6138
Epoch 11/50
250/250 [==============================] - 236s - loss: 0.7056 - acc: 0.6211 - val_loss: 0.6625 - val_acc: 0.6327
Epoch 12/50
250/250 [==============================] - 235s - loss: 0.6758 - acc: 0.6202 - val_loss: 0.6242 - val_acc: 0.6632
Epoch 13/50
250/250 [==============================] - 233s - loss: 0.6506 - acc: 0.6408 - val_loss: 1.3711 - val_acc: 0.5142
Epoch 14/50
250/250 [==============================] - 234s - loss: 0.6356 - acc: 0.6571 - val_loss: 0.6176 - val_acc: 0.6457
Epoch 15/50
250/250 [==============================] - 240s - loss: 0.6053 - acc: 0.6681 - val_loss: 0.6441 - val_acc: 0.6518
Epoch 16/50

```
250/250 [==============================] - 238s - loss: 0.6278 - acc: 0.6538 - val_loss: 0.7455 - val_acc: 0.6235
Epoch 17/50
250/250 [==============================] - 238s - loss: 0.5862 - acc: 0.6644 - val_loss: 0.8550 - val_acc: 0.6024
Epoch 18/50
250/250 [==============================] - 239s - loss: 0.5855 - acc: 0.6665 - val_loss: 0.5721 - val_acc: 0.6574
Epoch 19/50
250/250 [==============================] - 239s - loss: 0.5624 - acc: 0.6863 - val_loss: 0.6592 - val_acc: 0.6411
Epoch 20/50
250/250 [==============================] - 239s - loss: 0.5556 - acc: 0.6875 - val_loss: 0.5211 - val_acc: 0.6953
Epoch 21/50
250/250 [==============================] - 238s - loss: 0.5593 - acc: 0.6853 - val_loss: 0.5537 - val_acc: 0.6956
Epoch 22/50
250/250 [==============================] - 239s - loss: 0.5386 - acc: 0.6883 - val_loss: 0.5020 - val_acc: 0.6984
Epoch 23/50
250/250 [==============================] - 240s - loss: 0.5243 - acc: 0.6967 - val_loss: 0.4772 - val_acc: 0.7109
Epoch 24/50
250/250 [==============================] - 239s - loss: 0.5392 - acc: 0.6945 - val_loss: 0.5022 - val_acc: 0.6967
Epoch 25/50
250/250 [==============================] - 238s - loss: 0.5430 - acc: 0.6920 - val_loss: 0.4945 - val_acc: 0.7099
Epoch 26/50
250/250 [==============================] - 239s - loss: 0.5188 - acc: 0.6962 - val_loss: 0.4862 - val_acc: 0.7099
Epoch 27/50
250/250 [==============================] - 239s - loss: 0.5080 - acc: 0.7074 - val_loss: 0.5287 - val_acc: 0.7019
Test loss: 3.69877340741
Test accuracy 0.656875
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
conv2d_1 (Conv2D)            (None, 295, 295, 128)     13952
_________________________________________________________________
max_pooling2d_1 (MaxPooling2 (None, 49, 49, 128)       0
_________________________________________________________________
conv2d_2 (Conv2D)            (None, 44, 44, 256)       1179904
_________________________________________________________________
batch_normalization_1 (Batch (None, 44, 44, 256)       1024
_________________________________________________________________
max_pooling2d_2 (MaxPooling2 (None, 7, 7, 256)         0
_________________________________________________________________
flatten_1 (Flatten)          (None, 12544)             0
_________________________________________________________________
```

dense_1 (Dense) (None, 512) 6423040
_____
dropout_1 (Dropout) (None, 512) 0
_____
dense_2 (Dense) (None, 512) 262656
_____
dropout_2 (Dropout) (None, 512) 0
_____
dense_3 (Dense) (None, 512) 262656
_____
dropout_3 (Dropout) (None, 512) 0
_____
dense_4 (Dense) (None, 4) 2052
==========
Total params: 8,145,284
Trainable params: 8,144,772
Non-trainable params: 512
adam = Adam(lr=0.0005, beta_1=0.9, beta_2=0.999, epsilon=1e-08, decay=0.0) #previously 0.001

Number of Filters	128		256			512		4
Layer Type	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dropout (0.35)	Dense()
Conv. Size	(6,6)	(6,6)	(6,6)	(6,6)				
Padding	valid		valid					
activation	relu		relu			relu		softmax

Epoch 1/50
2017-12-06 20:24:26.383422: I tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:900] successful NUMA node read from SysFS had negative value (-1), but there must be at least one NUMA node, so returning NUMA node zero
2017-12-06 20:24:26.383730: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1064] Found device 0 with properties:
name: Tesla K80 major: 3 minor: 7 memoryClockRate(GHz): 0.8235 pciBusID: 0000:00:04.0
totalMemory: 11.17GiB freeMemory: 11.03GiB
2017-12-06 20:24:26.383754: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1154] Creating TensorFlow device (/device:GPU:0) -> (device: 0, name: Tesla K80, pci bus id: 0000:00:04.0, compute capability: 3.7)
250/250 [==========] - 240s - loss: 1.2786 - acc: 0.3616 - val_loss: 1.0405 - val_acc: 0.4906
Epoch 2/50
250/250 [==========] - 236s - loss: 0.8380 - acc: 0.5733 - val_loss: 0.6541 - val_acc: 0.6428
Epoch 3/50
250/250 [==========] - 231s - loss: 0.6719 - acc: 0.6408 - val_loss: 0.6153 - val_acc: 0.6522
Epoch 4/50
250/250 [==========] - 225s - loss: 0.6128 - acc: 0.6730 - val_loss: 0.5223 - val_acc: 0.7055

```
Epoch 5/50
250/250 [==============================] - 219s - loss: 0.5532 - acc: 0.7020 - val_loss: 0.5041 - val_acc: 0.7194
Epoch 6/50
250/250 [==============================] - 219s - loss: 0.5138 - acc: 0.7100 - val_loss: 0.5256 - val_acc: 0.7093
Epoch 7/50
250/250 [==============================] - 220s - loss: 0.4946 - acc: 0.7254 - val_loss: 0.5014 - val_acc: 0.7279
Epoch 8/50
250/250 [==============================] - 225s - loss: 0.4787 - acc: 0.7390 - val_loss: 0.4660 - val_acc: 0.7168
Epoch 9/50
250/250 [==============================] - 232s - loss: 0.4619 - acc: 0.7478 - val_loss: 0.4370 - val_acc: 0.7534
Epoch 10/50
250/250 [==============================] - 232s - loss: 0.4377 - acc: 0.7534 - val_loss: 0.4555 - val_acc: 0.7412
Epoch 11/50
250/250 [==============================] - 232s - loss: 0.4326 - acc: 0.7612 - val_loss: 0.4338 - val_acc: 0.7560
Epoch 12/50
250/250 [==============================] - 234s - loss: 0.4316 - acc: 0.7606 - val_loss: 0.4046 - val_acc: 0.7680
Epoch 13/50
250/250 [==============================] - 234s - loss: 0.4097 - acc: 0.7671 - val_loss: 0.4043 - val_acc: 0.7758
Epoch 14/50
250/250 [==============================] - 233s - loss: 0.4216 - acc: 0.7664 - val_loss: 0.4228 - val_acc: 0.7644
Epoch 15/50
250/250 [==============================] - 234s - loss: 0.4036 - acc: 0.7796 - val_loss: 0.4043 - val_acc: 0.7710
Epoch 16/50
250/250 [==============================] - 235s - loss: 0.3993 - acc: 0.7798 - val_loss: 0.4027 - val_acc: 0.7646
Epoch 17/50
250/250 [==============================] - 236s - loss: 0.3941 - acc: 0.7784 - val_loss: 0.3965 - val_acc: 0.7726
Epoch 18/50
250/250 [==============================] - 238s - loss: 0.3832 - acc: 0.7835 - val_loss: 0.3852 - val_acc: 0.7721
Epoch 19/50
250/250 [==============================] - 234s - loss: 0.3760 - acc: 0.7869 - val_loss: 0.3858 - val_acc: 0.7834
Epoch 20/50
250/250 [==============================] - 238s - loss: 0.3851 - acc: 0.7889 - val_loss: 0.3805 - val_acc: 0.7760
Epoch 21/50
250/250 [==============================] - 235s - loss: 0.3678 - acc: 0.7969 - val_loss: 0.3744 - val_acc: 0.7778
Epoch 22/50
250/250 [==============================] - 236s - loss: 0.3659 - acc: 0.7964 - val_loss: 0.3688 - val_acc: 0.7875
Epoch 23/50
250/250 [==============================] - 235s - loss: 0.3686 - acc: 0.7911 - val_loss: 0.3846 - val_acc: 0.7724
Epoch 24/50
250/250 [==============================] - 235s - loss: 0.3767 - acc: 0.7943 - val_loss: 0.3763 - val_acc: 0.7882
```

```
Epoch 25/50
250/250 [==============================] - 237s - loss: 0.3691 - acc: 0.7955 - val_loss: 0.3738 - val_acc: 0.7775
Epoch 26/50
250/250 [==============================] - 235s - loss: 0.3541 - acc: 0.8017 - val_loss: 0.3626 - val_acc: 0.7889
Epoch 27/50
250/250 [==============================] - 235s - loss: 0.3456 - acc: 0.8147 - val_loss: 0.3685 - val_acc: 0.7886
Epoch 28/50
250/250 [==============================] - 235s - loss: 0.3495 - acc: 0.8115 - val_loss: 0.4023 - val_acc: 0.7665
Epoch 29/50
250/250 [==============================] - 236s - loss: 0.3510 - acc: 0.8075 - val_loss: 0.3693 - val_acc: 0.7884
Epoch 30/50
250/250 [==============================] - 237s - loss: 0.3468 - acc: 0.8114 - val_loss: 0.3741 - val_acc: 0.7847
Test loss: 4.91565843821
Test accuracy 0.68625
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
conv2d_1 (Conv2D)            (None, 295, 295, 128)     13952
_________________________________________________________________
max_pooling2d_1 (MaxPooling2 (None, 49, 49, 128)       0
_________________________________________________________________
conv2d_2 (Conv2D)            (None, 44, 44, 256)       1179904
_________________________________________________________________
max_pooling2d_2 (MaxPooling2 (None, 7, 7, 256)         0
_________________________________________________________________
flatten_1 (Flatten)          (None, 12544)             0
_________________________________________________________________
dense_1 (Dense)              (None, 512)               6423040
_________________________________________________________________
dropout_1 (Dropout)          (None, 512)               0
_________________________________________________________________
dense_2 (Dense)              (None, 4)                 2052
=================================================================
Total params: 7,618,948
Trainable params: 7,618,948
Non-trainable params: 0
adamax = Adamax(lr=0.002, beta_1=0.9, beta_2=0.999, epsilon=1e-08, decay=0.0)
```

Number of Filters	128		256			512		4

Layer Type	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dropout (0.35)	Dense()
Conv. Size	(6,6)	(6,6)	(6,6)	(6,6)				
Padding	valid		valid					
activation	relu		relu			relu		softmax

Epoch 1/50

2017-12-06 22:52:14.879679: I tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:900] successful NUMA node read from SysFS had negative value (-1), but there must be at least one NUMA node, so returning NUMA node zero

2017-12-06 22:52:14.880030: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1064] Found device 0 with properties:

name: Tesla K80 major: 3 minor: 7 memoryClockRate(GHz): 0.8235

pciBusID: 0000:00:04.0 totalMemory: 11.17GiB freeMemory: 11.03GiB

2017-12-06 22:52:14.880057: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1154] Creating TensorFlow device (/device:GPU:0) -> (device: 0, name: Tesla K80, pci bus id: 0000:00:04.0, compute capability: 3.7)

1/250 [.....] - ETA: 853s - loss: 1.3844 - acc: 0.312
2/250 [.....] - ETA: 487s - loss: 1.9695 - acc: 0.250
3/250 [.....] - ETA: 365s - loss: 1.9597 - acc: 0.229
4/250 [.....] - ETA: 303s - loss: 1.8212 - acc: 0.234
5/250 [.....] - ETA: 266s - loss: 1.7404 - acc: 0.225
6/250 [.....] - ETA: 241s - loss: 1.6830 - acc: 0.218
7/250 [.....] - ETA: 223s - loss: 1.6473 - acc: 0.218
8/250 [.....] - ETA: 209s - loss: 1.6208 - acc: 0.210
9/250 [>.....] - ETA: 198s - loss: 1.5938 - acc: 0.218
10/250 [>.....] - ETA: 190s - loss: 1.5722 - acc: 0.228
11/250 [>.....] - ETA: 182s - loss: 1.5554 - acc: 0.230
12/250 [>.....] - ETA: 176s - loss: 1.5413 - acc: 0.229
13/250 [>.....] - ETA: 171s - loss: 1.5295 - acc: 0.223
14/250 [>.....] - ETA: 167s - loss: 1.5218 - acc: 0.218
15/250 [>.....] - ETA: 164s - loss: 1.5149 - acc: 0.210
16/250 [>.....] - ETA: 163s - loss: 1.5066 - acc: 0.218
17/250 [=>.....] - ETA: 162s - loss: 1.4996 - acc: 0.220
18/250 [=>.....] - ETA: 161s - loss: 1.4933 - acc: 0.225
19/250 [=>.....] - ETA: 161s - loss: 1.4876 - acc: 0.227
20/250 [=>.....] - ETA: 160s - loss: 1.4822 - acc: 0.235
21/250 [=>.....] - ETA: 159s - loss: 1.4784 - acc: 0.227
22/250 [=>.....] - ETA: 159s - loss: 1.4739 - acc: 0.231
23/250 [=>.....] - ETA: 158s - loss: 1.4700 - acc: 0.225
24/250 [=>.....] - ETA: 157s - loss: 1.4660 - acc: 0.230
25/250 [==>.....] - ETA: 156s - loss: 1.4626 - acc: 0.232
26/250 [==>.....] - ETA: 156s - loss: 1.4590 - acc: 0.240
27/250 [==>.....] - ETA: 155s - loss: 1.4573 - acc: 0.240
28/250 [==>.....] - ETA: 154s - loss: 1.4539 - acc: 0.244
29/250 [==>.....] - ETA: 153s - loss: 1.4508 - acc: 0.246
30/250 [==>.....] - ETA: 152s - loss: 1.4487 - acc: 0.247
31/250 [==>.....] - ETA: 152s - loss: 1.4466 - acc: 0.248
32/250 [==>.....] - ETA: 151s - loss: 1.4450 - acc: 0.247
33/250 [==>.....] - ETA: 150s - loss: 1.4441 - acc: 0.244
34/250 [===>.....] - ETA: 149s - loss: 1.4416 - acc: 0.247
35/250 [===>.....] - ETA: 149s - loss: 1.4403 - acc: 0.244
36/250 [===>.....] - ETA: 148s - loss: 1.4380 - acc: 0.249
37/250 [===>.....] - ETA: 147s - loss: 1.4362 - acc: 0.253
38/250 [===>.....] - ETA: 146s - loss: 1.4360 - acc: 0.252
39/250 [===>.....] - ETA: 146s - loss: 1.4350 - acc: 0.251
40/250 [===>.....] - ETA: 145s - loss: 1.4338 - acc: 0.253
41/250 [===>.....] - ETA: 144s - loss: 1.4326 - acc: 0.254
42/250 [====>.....] - ETA: 143s - loss: 1.4311 - acc: 0.256
43/250 [====>.....] - ETA: 142s - loss: 1.4305 - acc: 0.255
44/250 [====>.....] - ETA: 141s - loss: 1.4291 - acc: 0.257
45/250 [====>.....] - ETA: 140s - loss: 1.4281 - acc: 0.256
46/250 [====>.....] - ETA: 139s - loss: 1.4271 - acc: 0.258
47/250 [====>.....] - ETA: 138s - loss: 1.4263 - acc: 0.258
48/250 [====>.....] - ETA: 137s - loss: 1.4257 - acc: 0.257
49/250 [====>.....] - ETA: 137s - loss: 1.4250-acc: 0.255
50/250 [=====>.....] - ETA: 136s - loss: 1.4240-acc:0.256
51/250 [=====>.....] - ETA: 135s - loss: 1.4231-acc:0.256
52/250 [=====>.....] - ETA: 135s - loss: 1.4225-acc:0.256
53/250 [=====>.....] - ETA: 134s - loss: 1.4214-acc:0.257
54/250 [=====>.....] - ETA: 133s - loss: 1.4211-acc:0.254

```
55/250 [=====>.....] - ETA: 132s - loss: 1.4208-acc:0.252
56/250 [=====>.....] - ETA: 132s - loss: 1.4201-acc:0.253
57/250 [=====>.....] - ETA: 131s - loss: 1.4195-acc:0.254
58/250 [=====>.....] - ETA: 130s - loss: 1.4189-acc:0.254
59/250 [======>.....] - ETA: 130s - loss: 1.4179-acc: 0.255
60/250 [======>.....] - ETA: 129s - loss: 1.4174-acc: 0.255
61/250 [======>.....] - ETA: 128s - loss: 1.4168-acc: 0.255
62/250 [======>.....] - ETA: 128s - loss: 1.4157-acc: 0.257
63/250 [======>.....] - ETA: 127s - loss: 1.4149-acc: 0.258
64/250 [======>.....] - ETA: 126s - loss: 1.4139-acc: 0.259
65/250 [======>.....] - ETA: 126s - loss: 1.4130-acc: 0.258
66/250 [======>.....] - ETA: 125s - loss: 1.4139-acc: 0.259
67/250 [=======>.....] - ETA: 124s - loss: 1.4140-acc:0.256
68/250 [=======>.....] - ETA: 124s - loss: 1.4131-acc:0.256
69/250 [=======>.....] - ETA: 123s - loss: 1.4127-acc:0.257
70/250 [=======>.....] - ETA: 122s - loss: 1.4120-acc:0.258
71/250 [=======>.....] - ETA: 121s - loss: 1.4116-acc:0.257
72/250 [=======>.....] - ETA: 121s - loss: 1.4106-acc:0.260
73/250 [=======>.....] - ETA: 120s - loss: 1.4105-acc:0.259
74/250 [=======>.....] - ETA: 119s - loss: 1.4099-acc:0.260
75/250 [========>.....] - ETA: 119s - loss: 1.4095-acc: 0.260
76/250 [========>.....] - ETA: 118s - loss: 1.4096-acc: 0.259
77/250 [========>.....] - ETA: 117s - loss: 1.4092-acc: 0.260
78/250 [========>.....] - ETA: 116s - loss: 1.4092-acc: 0.259
79/250 [========>.....] - ETA: 116s - loss: 1.4085-acc: 0.260
80/250 [========>.....] - ETA: 115s - loss: 1.4083-acc: 0.259
81/250 [========>.....] - ETA: 114s - loss: 1.4073-acc: 0.259
82/250 [========>.....] - ETA: 114s - loss: 1.4065-acc: 0.260
83/250 [========>.....] - ETA: 113s - loss: 1.4067-acc: 0.259
84/250 [=========>.....] - ETA: 112s - loss: 1.4072-acc: 0.257
85/250 [=========>.....] - ETA: 111s - loss: 1.4072-acc: 0.256
86/250 [=========>.....] - ETA: 111s - loss: 1.4068-acc: 0.256
87/250 [=========>.....] - ETA: 110s - loss: 1.4063-acc: 0.256
250/250 [==============================] - 247s - loss: 1.3464 - acc: 0.3126 - val_loss: 1.2016 - val_acc: 0.4119
Epoch 2/50
250/250 [==============================] - 237s - loss: 1.0952 - acc: 0.4709 - val_loss: 0.8154 - val_acc: 0.5957
Epoch 3/50
250/250 [==============================] - 241s - loss: 0.7729 - acc: 0.5994 - val_loss: 0.6633 - val_acc: 0.6383
Epoch 4/50
250/250 [==============================] - 238s - loss: 0.6578 - acc: 0.6426 - val_loss: 0.5693 - val_acc: 0.6878
Epoch 5/50
250/250 [==============================] - 238s - loss: 0.6067 - acc: 0.6678 - val_loss: 0.5689 - val_acc: 0.6906
Epoch 6/50
250/250 [==============================] - 237s - loss: 0.5695 - acc: 0.6881 - val_loss: 0.5346 - val_acc: 0.6925
Epoch 7/50
250/250 [==============================] - 235s - loss: 0.5391 - acc: 0.7053 - val_loss: 0.4867 - val_acc: 0.7289
Epoch 8/50
250/250 [==============================] - 236s - loss: 0.5011 - acc: 0.7191 - val_loss: 0.5041 - val_acc: 0.7241
Epoch 9/50
250/250 [==============================] - 235s - loss: 0.4863 - acc: 0.7342 - val_loss: 0.4556 - val_acc: 0.7302
Epoch 10/50
250/250 [==============================] - 236s - loss: 0.4694 - acc: 0.7379 - val_loss: 0.4496 - val_acc: 0.7508
Epoch 11/50
250/250 [==============================] - 234s - loss: 0.4475 - acc: 0.7489 - val_loss: 0.4189 - val_acc: 0.7552
Epoch 12/50
250/250 [==============================] - 233s - loss: 0.4367 - acc: 0.7554 - val_loss: 0.4015 - val_acc: 0.7702
```

```
Epoch 13/50
250/250 [==============================] - 230s - loss: 0.4279 - acc: 0.7641 - val_loss: 0.4065 - val_acc: 0.7677
Epoch 14/50
250/250 [==============================] - 226s - loss: 0.4112 - acc: 0.7685 - val_loss: 0.4050 - val_acc: 0.7645
Epoch 15/50
250/250 [==============================] - 229s - loss: 0.4108 - acc: 0.7700 - val_loss: 0.4070 - val_acc: 0.7664
Epoch 16/50
250/250 [==============================] - 234s - loss: 0.4005 - acc: 0.7812 - val_loss: 0.3775 - val_acc: 0.7710
Epoch 17/50
250/250 [==============================] - 235s - loss: 0.3881 - acc: 0.7858 - val_loss: 0.3756 - val_acc: 0.7725
Epoch 18/50
250/250 [==============================] - 235s - loss: 0.3839 - acc: 0.7845 - val_loss: 0.3762 - val_acc: 0.7783
Epoch 19/50
250/250 [==============================] - 236s - loss: 0.3823 - acc: 0.7833 - val_loss: 0.3653 - val_acc: 0.7910
Epoch 20/50
250/250 [==============================] - 236s - loss: 0.3793 - acc: 0.7863 - val_loss: 0.3866 - val_acc: 0.7679
Epoch 21/50
250/250 [==============================] - 235s - loss: 0.3648 - acc: 0.7935 - val_loss: 0.3658 - val_acc: 0.7902
Epoch 22/50
250/250 [==============================] - 235s - loss: 0.3667 - acc: 0.7991 - val_loss: 0.3692 - val_acc: 0.7816
Epoch 23/50
250/250 [==============================] - 235s - loss: 0.3573 - acc: 0.7993 - val_loss: 0.3623 - val_acc: 0.7973
Epoch 24/50
250/250 [==============================] - 234s - loss: 0.3599 - acc: 0.8041 - val_loss: 0.3844 - val_acc: 0.7624
Epoch 25/50
250/250 [==============================] - 235s - loss: 0.3585 - acc: 0.7994 - val_loss: 0.3763 - val_acc: 0.7800
Epoch 26/50
250/250 [==============================] - 237s - loss: 0.3557 - acc: 0.8010 - val_loss: 0.3735 - val_acc: 0.7794
Epoch 27/50
250/250 [==============================] - 238s - loss: 0.3517 - acc: 0.8049 - val_loss: 0.3720 - val_acc: 0.7815
Test loss: 4.88308211803
Test accuracy 0.6825
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
conv2d_1 (Conv2D)            (None, 295, 295, 128)     13952
_________________________________________________________________
max_pooling2d_1 (MaxPooling2 (None, 49, 49, 128)       0
_________________________________________________________________
conv2d_2 (Conv2D)            (None, 44, 44, 256)       1179904
```

_____
max_pooling2d_2 (MaxPooling2 (None, 7, 7, 256) 0
_____
flatten_1 (Flatten) (None, 12544) 0
_____
dense_1 (Dense) (None, 512) 6423040
_____
dropout_1 (Dropout) (None, 512) 0
_____
dense_2 (Dense) (None, 4) 2052
==========
Total params: 7,618,948
Trainable params: 7,618,948
Non-trainable params: 0
adam = Adam(lr=0.0005, beta_1=0.9, beta_2=0.999, epsilon=1e-08, decay=0.0) #previously 0.001

Number of Filters	64		256			512		4
Layer Type	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dropout (0.35)	Dense()
Conv. Size	(6,6)	(6,6)	(6,6)	(6,6)				
Padding	valid		valid					
activation	relu		relu			relu		softmax

Epoch 1/50
2017-12-07 16:21:54.876559: I tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:900] successful NUMA node read from SysFS had negative value (-1), but there must be at least one NUMA node, so returning NUMA node zero
2017-12-07 16:21:54.877290: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1064] Found device 0 with properties:
name: Tesla K80 major: 3 minor: 7 memoryClockRate(GHz): 0.8235 pciBusID: 0000:00:04.0
totalMemory: 11.17GiB freeMemory: 11.03GiB
2017-12-07 16:21:54.877320: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1154] Creating TensorFlow device (/device:GPU:0) -> (device: 0, name: Tesla K80, pci bus id: 0000:00:04.0, compute capability: 3.7)
250/250 [==========] - 257s - loss: 1.1246 - acc: 0.4340 - val_loss: 0.7533 - val_acc: 0.6081
Epoch 2/50
250/250 [==========] - 248s - loss: 0.7243 - acc: 0.6163 - val_loss: 0.5933 - val_acc: 0.6797
Epoch 3/50
250/250 [==========] - 247s - loss: 0.6110 - acc: 0.6651 - val_loss: 0.5569 - val_acc: 0.6876
Epoch 4/50
250/250 [==========] - 246s - loss: 0.5743 - acc: 0.6841 - val_loss: 0.5199 - val_acc: 0.7151
Epoch 5/50
250/250 [==========] - 245s - loss: 0.5370 - acc: 0.7156 - val_loss: 0.4837 - val_acc: 0.7271
Epoch 6/50

```
250/250 [==============================] - 247s - loss: 0.4895 - acc: 0.7305 - val_loss: 0.4530 - val_acc: 0.7243
Epoch 7/50
250/250 [==============================] - 247s - loss: 0.4747 - acc: 0.7376 - val_loss: 0.4562 - val_acc: 0.7439
Epoch 8/50
250/250 [==============================] - 245s - loss: 0.4529 - acc: 0.7519 - val_loss: 0.4454 - val_acc: 0.7339
Epoch 9/50
250/250 [==============================] - 246s - loss: 0.4381 - acc: 0.7574 - val_loss: 0.4005 - val_acc: 0.7581
Epoch 10/50
250/250 [==============================] - 246s - loss: 0.4319 - acc: 0.7590 - val_loss: 0.4176 - val_acc: 0.7473
Epoch 11/50
250/250 [==============================] - 246s - loss: 0.4191 - acc: 0.7655 - val_loss: 0.4011 - val_acc: 0.7700
Epoch 12/50
250/250 [==============================] - 248s - loss: 0.4096 - acc: 0.7729 - val_loss: 0.4112 - val_acc: 0.7640
Epoch 13/50
250/250 [==============================] - 248s - loss: 0.3948 - acc: 0.7831 - val_loss: 0.3947 - val_acc: 0.7748
Epoch 14/50
250/250 [==============================] - 245s - loss: 0.4085 - acc: 0.7704 - val_loss: 0.3855 - val_acc: 0.7752
Epoch 15/50
250/250 [==============================] - 246s - loss: 0.3832 - acc: 0.7901 - val_loss: 0.3760 - val_acc: 0.7791
Epoch 16/50
250/250 [==============================] - 248s - loss: 0.3814 - acc: 0.7871 - val_loss: 0.3908 - val_acc: 0.7705
Epoch 17/50
250/250 [==============================] - 246s - loss: 0.3996 - acc: 0.7841 - val_loss: 0.3755 - val_acc: 0.7775
Epoch 18/50
250/250 [==============================] - 247s - loss: 0.3656 - acc: 0.7979 - val_loss: 0.3818 - val_acc: 0.7729
Epoch 19/50
250/250 [==============================] - 247s - loss: 0.3671 - acc: 0.7918 - val_loss: 0.3727 - val_acc: 0.7944
Epoch 20/50
250/250 [==============================] - 247s - loss: 0.3718 - acc: 0.7925 - val_loss: 0.3921 - val_acc: 0.7788
Epoch 21/50
250/250 [==============================] - 246s - loss: 0.3599 - acc: 0.8019 - val_loss: 0.3775 - val_acc: 0.7884
Epoch 22/50
250/250 [==============================] - 245s - loss: 0.3664 - acc: 0.7973 - val_loss: 0.4196 - val_acc: 0.7478
Epoch 23/50
250/250 [==============================] - 245s - loss: 0.3473 - acc: 0.8060 - val_loss: 0.3770 - val_acc: 0.7841
Test loss: 4.94794062287
Test accuracy 0.68625
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
```

conv2d_1 (Conv2D) (None, 295, 295, 64) 6976
_____
max_pooling2d_1 (MaxPooling2 (None, 49, 49, 64) 0
_____
conv2d_2 (Conv2D) (None, 44, 44, 256) 590080
_____
max_pooling2d_2 (MaxPooling2 (None, 7, 7, 256) 0
_____
flatten_1 (Flatten) (None, 12544) 0
_____
dense_1 (Dense) (None, 512) 6423040
_____
dropout_1 (Dropout) (None, 512) 0
_____
dense_2 (Dense) (None, 4) 2052
===
Total params: 7,022,148
Trainable params: 7,022,148
Non-trainable params: 0
adam = Adam(lr=0.0005, beta_1=0.9, beta_2=0.999, epsilon=1e-08, decay=0.0) #previously 0.001

Number of Filters	64		256			256		4
Layer Type	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dropout (0.35)	Dense()
Conv. Size	(6,6)	(6,6)	(6,6)	(6,6)				
Padding	valid		valid					
activation	relu		relu			relu		softmax

Epoch 1/50
2017-12-07 20:39:06.119792: I tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:900] successful NUMA node read from SysFS had negative value (-1), but there must be at least one NUMA node, so returning NUMA node zero
2017-12-07 20:39:06.120569: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1064] Found device 0 with properties:
name: Tesla K80 major: 3 minor: 7 memoryClockRate(GHz): 0.8235 pciBusID: 0000:00:04.0
totalMemory: 11.17GiB freeMemory: 11.03GiB
2017-12-07 20:39:06.120599: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1154] Creating TensorFlow device (/device:GPU:0) -> (device: 0, name: Tesla K80, pci bus id: 0000:00:04.0, compute capability: 3.7)
250/250 [==============================] - 258s - loss: 1.1554 - acc: 0.4215 - val_loss: 0.7397 - val_acc: 0.6144
Epoch 2/50
250/250 [==============================] - 248s - loss: 0.7405 - acc: 0.6124 - val_loss: 0.6412 - val_acc: 0.6462
Epoch 3/50

```
250/250 [==============================] - 247s - loss: 0.6454 - acc: 0.6580 - val_loss: 0.5492 - val_acc: 0.6895
Epoch 4/50
250/250 [==============================] - 249s - loss: 0.5975 - acc: 0.6789 - val_loss: 0.5221 - val_acc: 0.7281
Epoch 5/50
250/250 [==============================] - 248s - loss: 0.5424 - acc: 0.7004 - val_loss: 0.4768 - val_acc: 0.7397
Epoch 6/50
250/250 [==============================] - 246s - loss: 0.5190 - acc: 0.7127 - val_loss: 0.4785 - val_acc: 0.7085
Epoch 7/50
250/250 [==============================] - 246s - loss: 0.5044 - acc: 0.7220 - val_loss: 0.4305 - val_acc: 0.7574
Epoch 8/50
250/250 [==============================] - 248s - loss: 0.4810 - acc: 0.7361 - val_loss: 0.4371 - val_acc: 0.7472
Epoch 9/50
250/250 [==============================] - 247s - loss: 0.4608 - acc: 0.7489 - val_loss: 0.4231 - val_acc: 0.7445
Epoch 10/50
250/250 [==============================] - 248s - loss: 0.4550 - acc: 0.7484 - val_loss: 0.4162 - val_acc: 0.7640
Epoch 11/50
250/250 [==============================] - 248s - loss: 0.4401 - acc: 0.7575 - val_loss: 0.4262 - val_acc: 0.7614
Epoch 12/50
250/250 [==============================] - 249s - loss: 0.4321 - acc: 0.7540 - val_loss: 0.3978 - val_acc: 0.7692
Epoch 13/50
250/250 [==============================] - 247s - loss: 0.4347 - acc: 0.7596 - val_loss: 0.4060 - val_acc: 0.7525
Epoch 14/50
250/250 [==============================] - 245s - loss: 0.4169 - acc: 0.7618 - val_loss: 0.3932 - val_acc: 0.7508
Epoch 15/50
250/250 [==============================] - 250s - loss: 0.4248 - acc: 0.7616 - val_loss: 0.4151 - val_acc: 0.7555
Epoch 16/50
250/250 [==============================] - 250s - loss: 0.4124 - acc: 0.7678 - val_loss: 0.4064 - val_acc: 0.7640
Epoch 17/50
250/250 [==============================] - 246s - loss: 0.4152 - acc: 0.7715 - val_loss: 0.3939 - val_acc: 0.7724
Epoch 18/50
250/250 [==============================] - 246s - loss: 0.3944 - acc: 0.7871 - val_loss: 0.4318 - val_acc: 0.7507
Test loss: 5.17871149302
Test accuracy 0.658125
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
conv2d_1 (Conv2D)            (None, 295, 295, 64)      6976
_________________________________________________________________
max_pooling2d_1 (MaxPooling2 (None, 49, 49, 64)        0
_________________________________________________________________
```

conv2d_2 (Conv2D) (None, 44, 44, 256) 590080

max_pooling2d_2 (MaxPooling2 (None, 7, 7, 256) 0

flatten_1 (Flatten) (None, 12544) 0

dense_1 (Dense) (None, 256) 3211520

dropout_1 (Dropout) (None, 256) 0

dense_2 (Dense) (None, 4) 1028

==========

Total params: 3,809,604
Trainable params: 3,809,604
Non-trainable params: 0
adam = Adam(lr=0.0005, beta_1=0.9, beta_2=0.999, epsilon=1e-08, decay=0.0) #previously 0.001

Number of Filters	64		256			256		256		4
Layer Type	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dropout (0.35)	Dense()	Dropout (0.25)	Dense()
Conv. Size	(6,6)	(6,6)	(6,6)	(6,6)						
Padding	valid		valid							
activation	relu		relu			relu		relu		softmax

Epoch 1/50
2017-12-07 22:14:39.314790: I tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:900] successful NUMA node read from SysFS had negative value (-1), but there must be at least one NUMA node, so returning NUMA node zero
2017-12-07 22:14:39.315598: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1064] Found device 0 with properties:
name: Tesla K80 major: 3 minor: 7 memoryClockRate(GHz): 0.8235
pciBusID: 0000:00:04.0
totalMemory: 11.17GiB freeMemory: 11.03GiB
2017-12-07 22:14:39.315627: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1154] Creating TensorFlow device (/device:GPU:0) -> (device: 0, name: Tesla K80, pci bus id: 0000:00:04.0, compute capability: 3.7)
250/250 [==============================] - 249s - loss: 1.3248 - acc: 0.3322 - val_loss: 1.2087 - val_acc: 0.4144
Epoch 2/50
250/250 [==============================] - 238s - loss: 0.9903 - acc: 0.5050 - val_loss: 0.7045 - val_acc: 0.6117
Epoch 3/50
250/250 [==============================] - 238s - loss: 0.7206 - acc: 0.6036 - val_loss: 0.6625 - val_acc: 0.6286
Epoch 4/50
250/250 [==============================] - 237s - loss: 0.6510 - acc: 0.6361 - val_loss: 0.5487 - val_acc: 0.6671

```
Epoch 5/50
250/250 [==============================] - 235s - loss: 0.5698 - acc: 0.6759 - val_loss: 0.4944 - val_acc: 0.6989
Epoch 6/50
250/250 [==============================] - 235s - loss: 0.5465 - acc: 0.6925 - val_loss: 0.5114 - val_acc: 0.7195
Epoch 7/50
250/250 [==============================] - 235s - loss: 0.5161 - acc: 0.7001 - val_loss: 0.4594 - val_acc: 0.7280
Epoch 8/50
250/250 [==============================] - 235s - loss: 0.4948 - acc: 0.7137 - val_loss: 0.4456 - val_acc: 0.7417
Epoch 9/50
250/250 [==============================] - 235s - loss: 0.4782 - acc: 0.7262 - val_loss: 0.4128 - val_acc: 0.7399
Epoch 10/50
250/250 [==============================] - 234s - loss: 0.4636 - acc: 0.7272 - val_loss: 0.4164 - val_acc: 0.7591
Epoch 11/50
250/250 [==============================] - 235s - loss: 0.4525 - acc: 0.7364 - val_loss: 0.4124 - val_acc: 0.7461
Epoch 12/50
250/250 [==============================] - 236s - loss: 0.4376 - acc: 0.7481 - val_loss: 0.4309 - val_acc: 0.7564
Epoch 13/50
250/250 [==============================] - 234s - loss: 0.4247 - acc: 0.7569 - val_loss: 0.3844 - val_acc: 0.7598
Epoch 14/50
250/250 [==============================] - 235s - loss: 0.4188 - acc: 0.7541 - val_loss: 0.3903 - val_acc: 0.7586
Epoch 15/50
250/250 [==============================] - 232s - loss: 0.4031 - acc: 0.7629 - val_loss: 0.3875 - val_acc: 0.7602
Epoch 16/50
250/250 [==============================] - 231s - loss: 0.4056 - acc: 0.7736 - val_loss: 0.3834 - val_acc: 0.7534
Epoch 17/50
250/250 [==============================] - 233s - loss: 0.4141 - acc: 0.7652 - val_loss: 0.3777 - val_acc: 0.7610
Epoch 18/50
250/250 [==============================] - 233s - loss: 0.4108 - acc: 0.7710 - val_loss: 0.4240 - val_acc: 0.7569
Epoch 19/50
250/250 [==============================] - 233s - loss: 0.4013 - acc: 0.7723 - val_loss: 0.3943 - val_acc: 0.7647
Epoch 20/50
250/250 [==============================] - 234s - loss: 0.3883 - acc: 0.7755 - val_loss: 0.3668 - val_acc: 0.7797
Epoch 21/50
250/250 [==============================] - 235s - loss: 0.3847 - acc: 0.7812 - val_loss: 0.3768 - val_acc: 0.7732
Epoch 22/50
250/250 [==============================] - 235s - loss: 0.3856 - acc: 0.7784 - val_loss: 0.3881 - val_acc: 0.7661
Epoch 23/50
250/250 [==============================] - 235s - loss: 0.4068 - acc: 0.7721 - val_loss: 0.3870 - val_acc: 0.7775
Epoch 24/50
250/250 [==============================] - 235s - loss: 0.3744 - acc: 0.7946 - val_loss: 0.3736 - val_acc: 0.7750
```

Test loss: 4.62821881056
Test accuracy 0.6975

```
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
conv2d_1 (Conv2D)            (None, 295, 295, 64)      6976
_________________________________________________________________
max_pooling2d_1 (MaxPooling2 (None, 49, 49, 64)        0
_________________________________________________________________
conv2d_2 (Conv2D)            (None, 44, 44, 256)       590080
_________________________________________________________________
max_pooling2d_2 (MaxPooling2 (None, 7, 7, 256)         0
_________________________________________________________________
flatten_1 (Flatten)          (None, 12544)             0
_________________________________________________________________
dense_1 (Dense)              (None, 256)               3211520
_________________________________________________________________
dropout_1 (Dropout)          (None, 256)               0
_________________________________________________________________
dense_2 (Dense)              (None, 256)               65792
_________________________________________________________________
dropout_2 (Dropout)          (None, 256)               0
_________________________________________________________________
dense_3 (Dense)              (None, 4)                 1028
=================================================================
Total params: 3,875,396
Trainable params: 3,875,396
Non-trainable params: 0
_________________________________________________________________
```

dam = Adam(lr=0.0005, beta_1=0.9, beta_2=0.999, epsilon=1e-08, decay=0.0) #previously 0.001

Num of Filters	64		256			512		256		4
Layer Type	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dropout Gaussian (0.35)	Dense()	Dropout Gaussian (0.15)	Dense()
Conv. Size	(6,6)	(6,6)	(6,6)	(6,6)						
Padding	valid		valid							
activation	relu		relu			relu		relu		softmax

```
Epoch 1/50
2017-12-09 05:12:32.899224: I tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:900] successful NUMA node read from SysFS had negative value (-1), but there must be at least one NUMA node, so returning NUMA node zero
2017-12-09 05:12:32.900016: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1064] Found device 0 with properties:
name: Tesla K80 major: 3 minor: 7 memoryClockRate(GHz): 0.8235
pciBusID: 0000:00:04.0
totalMemory: 11.17GiB freeMemory: 11.03GiB
2017-12-09 05:12:32.900059: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1154] Creating TensorFlow device (/device:GPU:0) -> (device: 0, name: Tesla K80, pci bus id: 0000:00:04.0, compute capability: 3.7)
250/250 [==============================] - 256s - loss: 1.2635 - acc: 0.3641 - val_loss: 0.9387 - val_acc: 0.5350
Epoch 2/50
250/250 [==============================] - 249s - loss: 0.8022 - acc: 0.5781 - val_loss: 0.6272 - val_acc: 0.6589
Epoch 3/50
250/250 [==============================] - 248s - loss: 0.6434 - acc: 0.6444 - val_loss: 0.5571 - val_acc: 0.6789
Epoch 4/50
250/250 [==============================] - 247s - loss: 0.5786 - acc: 0.6831 - val_loss: 0.5369 - val_acc: 0.6920
Epoch 5/50
250/250 [==============================] - 246s - loss: 0.5442 - acc: 0.6920 - val_loss: 0.5214 - val_acc: 0.7066
Epoch 6/50
250/250 [==============================] - 247s - loss: 0.5286 - acc: 0.7067 - val_loss: 0.5141 - val_acc: 0.6980
Epoch 7/50
250/250 [==============================] - 247s - loss: 0.4953 - acc: 0.7171 - val_loss: 0.4732 - val_acc: 0.7194
Epoch 8/50
250/250 [==============================] - 247s - loss: 0.4696 - acc: 0.7380 - val_loss: 0.4296 - val_acc: 0.7394
Epoch 9/50
250/250 [==============================] - 246s - loss: 0.4495 - acc: 0.7379 - val_loss: 0.4278 - val_acc: 0.7308
Epoch 10/50
250/250 [==============================] - 246s - loss: 0.4509 - acc: 0.7452 - val_loss: 0.4218 - val_acc: 0.7443
Epoch 11/50
250/250 [==============================] - 247s - loss: 0.4245 - acc: 0.7654 - val_loss: 0.4181 - val_acc: 0.7582
Epoch 12/50
250/250 [==============================] - 247s - loss: 0.4167 - acc: 0.7594 - val_loss: 0.3937 - val_acc: 0.7655
Epoch 13/50
250/250 [==============================] - 248s - loss: 0.4264 - acc: 0.7614 - val_loss: 0.4021 - val_acc: 0.7609
```

```
Epoch 14/50
250/250 [==============================] - 247s - loss: 0.4096 - acc: 0.7644 - val_loss: 0.3961 - val_acc: 0.7653
Epoch 15/50
250/250 [==============================] - 247s - loss: 0.4082 - acc: 0.7711 - val_loss: 0.3992 - val_acc: 0.7700
Epoch 16/50
250/250 [==============================] - 247s - loss: 0.3993 - acc: 0.7757 - val_loss: 0.3824 - val_acc: 0.7732
Epoch 17/50
250/250 [==============================] - 247s - loss: 0.3960 - acc: 0.7738 - val_loss: 0.3824 - val_acc: 0.7698
Epoch 18/50
250/250 [==============================] - 246s - loss: 0.3958 - acc: 0.7772 - val_loss: 0.3929 - val_acc: 0.7456
Epoch 19/50
250/250 [==============================] - 248s - loss: 0.3817 - acc: 0.7827 - val_loss: 0.3881 - val_acc: 0.7662
Epoch 20/50
250/250 [==============================] - 248s - loss: 0.3862 - acc: 0.7826 - val_loss: 0.3930 - val_acc: 0.7600
Epoch 21/50
250/250 [==============================] - 247s - loss: 0.3867 - acc: 0.7825 - val_loss: 0.3788 - val_acc: 0.7728
Epoch 22/50
250/250 [==============================] - 247s - loss: 0.3784 - acc: 0.7776 - val_loss: 0.3741 - val_acc: 0.7733
Epoch 23/50
250/250 [==============================] - 246s - loss: 0.3688 - acc: 0.7939 - val_loss: 0.3846 - val_acc: 0.7735
Epoch 24/50
250/250 [==============================] - 246s - loss: 0.3769 - acc: 0.7871 - val_loss: 0.3749 - val_acc: 0.7776
Epoch 25/50
250/250 [==============================] - 248s - loss: 0.3719 - acc: 0.7950 - val_loss: 0.3814 - val_acc: 0.7662
Epoch 26/50
250/250 [==============================] - 252s - loss: 0.3698 - acc: 0.7959 - val_loss: 0.3750 - val_acc: 0.7695
Test loss: 4.73596389294
Test accuracy 0.685625
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
conv2d_1 (Conv2D)            (None, 295, 295, 64)      6976
_________________________________________________________________
max_pooling2d_1 (MaxPooling2 (None, 49, 49, 64)        0
```

```
_________________________________________________________________
conv2d_2 (Conv2D)            (None, 44, 44, 256)       590080
_________________________________________________________________
max_pooling2d_2 (MaxPooling2 (None, 7, 7, 256)         0
_________________________________________________________________
flatten_1 (Flatten)          (None, 12544)             0
_________________________________________________________________
dense_1 (Dense)              (None, 512)               6423040
_________________________________________________________________
gaussian_dropout_1 (Gaussian (None, 512)               0
_________________________________________________________________
dense_2 (Dense)              (None, 256)               131328
_________________________________________________________________
gaussian_dropout_2 (Gaussian (None, 256)               0
_________________________________________________________________
dense_3 (Dense)              (None, 4)                 1028
=================================================================
```

Total params: 7,152,452
Trainable params: 7,152,452
Non-trainable params: 0
Png_data
adam = Adam(lr=0.001, beta_1=0.9, beta_2=0.999, epsilon=1e-08, decay=0.0) #previously 0.001

Num of Filters	64		128			512		4
Layer Type	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dropout (0.35)	Dense()
Conv. Size	(6,6)	(6,6)	(6,6)	(6,6)				
Padding	valid		valid					
activation	relu		relu			relu		softmax

Epoch 1/50
2017-12-13 17:08:01.913355: I tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:900] successful NUMA node read from SysFS had negative value (-1), but there must be at least one NUMA node, so returning NUMA node zero
2017-12-13 17:08:01.913753: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1064] Found device 0 with properties:

```
name: Tesla K80 major: 3 minor: 7 memoryClockRate(GHz): 0.8235
pciBusID: 0000:00:04.0
totalMemory: 11.17GiB freeMemory: 11.09GiB
2017-12-13 17:08:01.913778: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1154] Creating TensorFlow device (/device:GPU:0) ->
(device: 0, name: Tesla K80, pci bus id: 0000:00:04.0, compute capability: 3.7)
125/125 [==============================] - 180s - loss: 1.2575 - acc: 0.3970 - val_loss: 0.7540 - val_acc: 0.6419
Epoch 2/50
125/125 [==============================] - 168s - loss: 0.7125 - acc: 0.6474 - val_loss: 0.5187 - val_acc: 0.7214
Epoch 3/50
125/125 [==============================] - 168s - loss: 0.5317 - acc: 0.7103 - val_loss: 0.4899 - val_acc: 0.7333
Epoch 4/50
125/125 [==============================] - 166s - loss: 0.4867 - acc: 0.7365 - val_loss: 0.6762 - val_acc: 0.6989
Epoch 5/50
125/125 [==============================] - 167s - loss: 0.4630 - acc: 0.7450 - val_loss: 0.4546 - val_acc: 0.7469
Epoch 6/50
125/125 [==============================] - 170s - loss: 0.4275 - acc: 0.7600 - val_loss: 0.4312 - val_acc: 0.7525
Epoch 7/50
125/125 [==============================] - 170s - loss: 0.4074 - acc: 0.7726 - val_loss: 0.3794 - val_acc: 0.7732
Epoch 8/50
125/125 [==============================] - 170s - loss: 0.3999 - acc: 0.7760 - val_loss: 0.5451 - val_acc: 0.7249
Epoch 9/50
125/125 [==============================] - 169s - loss: 0.3801 - acc: 0.7893 - val_loss: 0.3699 - val_acc: 0.7883
Epoch 10/50
125/125 [==============================] - 170s - loss: 0.3891 - acc: 0.7824 - val_loss: 0.3736 - val_acc: 0.7805
Epoch 11/50
125/125 [==============================] - 170s - loss: 0.3879 - acc: 0.7897 - val_loss: 0.3685 - val_acc: 0.7887
Epoch 12/50
125/125 [==============================] - 169s - loss: 0.3753 - acc: 0.7927 - val_loss: 0.4434 - val_acc: 0.7531
Epoch 13/50
125/125 [==============================] - 171s - loss: 0.3707 - acc: 0.7957 - val_loss: 0.3872 - val_acc: 0.7842
Epoch 14/50
125/125 [==============================] - 172s - loss: 0.3569 - acc: 0.8025 - val_loss: 0.3856 - val_acc: 0.7900
Epoch 15/50
125/125 [==============================] - 175s - loss: 0.3572 - acc: 0.8054 - val_loss: 0.4148 - val_acc: 0.7624
```

Test loss: 3.65027219772
Test accuracy 0.755

```
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
conv2d_1 (Conv2D)            (None, 295, 295, 64)      6976
_________________________________________________________________
max_pooling2d_1 (MaxPooling2 (None, 49, 49, 64)        0
_________________________________________________________________
conv2d_2 (Conv2D)            (None, 44, 44, 128)       295040
_________________________________________________________________
max_pooling2d_2 (MaxPooling2 (None, 7, 7, 128)         0
_________________________________________________________________
flatten_1 (Flatten)          (None, 6272)              0
_________________________________________________________________
dense_1 (Dense)              (None, 512)               3211776
_________________________________________________________________
dropout_1 (Dropout)          (None, 512)               0
_________________________________________________________________
dense_2 (Dense)              (None, 4)                 2052
=================================================================
```

Total params: 3,515,844
Trainable params: 3,515,844
Non-trainable params: 0
Png_data 200 by 200 without preprocessing during training
adam = Adam(lr=0.001, beta_1=0.9, beta_2=0.999, epsilon=1e-08, decay=0.0) #previously 0.001

Num of Filters	64		128			512		512		4
Layer Type	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dropout (0.35)	Dense()	Dropout (0.35)	Dense()
Conv. Size	(6,6)	(6,6)	(6,6)	(6,6)						
Padding	valid		valid							
activation	relu		relu			relu		relu		softmax

Epoch 1/50

```
2017-12-15 06:45:08.055877: I tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:900] successful NUMA node read from SysFS had negative value (-1), but there must be at least one NUMA node, so returning NUMA node zero
2017-12-15 06:45:08.056221: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1064] Found device 0 with properties:
name: Tesla K80 major: 3 minor: 7 memoryClockRate(GHz): 0.8235
pciBusID: 0000:00:04.0
totalMemory: 11.17GiB freeMemory: 11.09GiB
2017-12-15 06:45:08.056248: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1154] Creating TensorFlow device (/device:GPU:0) -> (device: 0, name: Tesla K80, pci bus id: 0000:00:04.0, compute capability: 3.7)
208/207 [==============================] - 55s - loss: 0.7097 - acc: 0.6957 - val_loss: 0.4251 - val_acc: 0.8447
Epoch 2/50
208/207 [==============================] - 53s - loss: 0.3218 - acc: 0.8775 - val_loss: 0.2393 - val_acc: 0.9073
Epoch 3/50
208/207 [==============================] - 53s - loss: 0.2573 - acc: 0.8991 - val_loss: 0.2278 - val_acc: 0.9078
Epoch 4/50
208/207 [==============================] - 53s - loss: 0.2260 - acc: 0.9142 - val_loss: 0.1951 - val_acc: 0.9218
Epoch 5/50
208/207 [==============================] - 52s - loss: 0.2293 - acc: 0.9134 - val_loss: 0.2206 - val_acc: 0.9160
Epoch 6/50
208/207 [==============================] - 53s - loss: 0.2107 - acc: 0.9193 - val_loss: 0.1795 - val_acc: 0.9211
Epoch 7/50
208/207 [==============================] - 51s - loss: 0.2064 - acc: 0.9230 - val_loss: 0.1769 - val_acc: 0.9266
Epoch 8/50
208/207 [==============================] - 52s - loss: 0.1878 - acc: 0.9279 - val_loss: 0.1726 - val_acc: 0.9306
Epoch 9/50
208/207 [==============================] - 52s - loss: 0.1942 - acc: 0.9276 - val_loss: 0.1812 - val_acc: 0.9222
Epoch 10/50
208/207 [==============================] - 53s - loss: 0.2068 - acc: 0.9213 - val_loss: 0.1648 - val_acc: 0.9330
Epoch 11/50
208/207 [==============================] - 52s - loss: 0.2067 - acc: 0.9215 - val_loss: 0.1861 - val_acc: 0.9193
Epoch 12/50
208/207 [==============================] - 52s - loss: 0.1930 - acc: 0.9277 - val_loss: 0.1587 - val_acc: 0.9352
Epoch 13/50
208/207 [==============================] - 52s - loss: 0.1819 - acc: 0.9280 - val_loss: 0.1661 - val_acc: 0.9271
Epoch 14/50
```

208/207 [==============================] - 52s - loss: 0.1783 - acc: 0.9301 - val_loss: 0.1742 - val_acc: 0.9236
Epoch 15/50
208/207 [==============================] - 52s - loss: 0.1825 - acc: 0.9340 - val_loss: 0.1791 - val_acc: 0.9248
Test loss: 1.07142833689
Test accuracy 0.932214765101

Layer (type)	Output Shape	Param #
conv2d_1 (Conv2D)	(None, 195, 195, 64)	6976
max_pooling2d_1 (MaxPooling2	(None, 32, 32, 64)	0
conv2d_2 (Conv2D)	(None, 27, 27, 128)	295040
max_pooling2d_2 (MaxPooling2	(None, 4, 4, 128)	0
flatten_1 (Flatten)	(None, 2048)	0
dense_1 (Dense)	(None, 512)	1049088
dropout_1 (Dropout)	(None, 512)	0
dense_2 (Dense)	(None, 512)	262656
dropout_2 (Dropout)	(None, 512)	0
dense_3 (Dense)	(None, 4)	2052

Total params: 1,615,812
Trainable params: 1,615,812
Non-trainable params: 0

Png_data 200 by 200 without preprocessing during training
adam = Adam(lr=0.001, beta_1=0.9, beta_2=0.999, epsilon=1e-08, decay=0.0) #previously 0.001

Num of Filters	64		128			512		512		4
Layer Type	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dropout (0.35)	Dense()	Dropout (0.35)	Dense()
Conv. Size	(6,6)	(6,6)	(6,6)	(6,6)						
Padding	valid		valid							
activation	relu		relu			relu		relu		softmax

```
Epoch 1/50
2017-12-15 07:08:02.061940: I tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:900] successful NUMA node read from SysFS had negative value (-1), but there must be at least one NUMA node, so returning NUMA node zero
2017-12-15 07:08:02.062258: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1064] Found device 0 with properties:
name: Tesla K80 major: 3 minor: 7 memoryClockRate(GHz): 0.8235
pciBusID: 0000:00:04.0
totalMemory: 11.17GiB freeMemory: 11.09GiB
2017-12-15 07:08:02.062283: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1154] Creating TensorFlow device (/device:GPU:0) -> (device: 0, name: Tesla K80, pci bus id: 0000:00:04.0, compute capability: 3.7)
208/207 [==============================] - 54s - loss: 0.7417 - acc: 0.6750 - val_loss: 0.2833 - val_acc: 0.8854
Epoch 2/50
208/207 [==============================] - 51s - loss: 0.2851 - acc: 0.8918 - val_loss: 0.2341 - val_acc: 0.9086
Epoch 3/50
208/207 [==============================] - 52s - loss: 0.2365 - acc: 0.9128 - val_loss: 0.1774 - val_acc: 0.9279
Epoch 4/50
208/207 [==============================] - 51s - loss: 0.2110 - acc: 0.9201 - val_loss: 0.2078 - val_acc: 0.9151
Epoch 5/50
208/207 [==============================] - 52s - loss: 0.2059 - acc: 0.9247 - val_loss: 0.1645 - val_acc: 0.9331
Epoch 6/50
208/207 [==============================] - 52s - loss: 0.1895 - acc: 0.9292 - val_loss: 0.1846 - val_acc: 0.9295
Epoch 7/50
208/207 [==============================] - 52s - loss: 0.1880 - acc: 0.9292 - val_loss: 0.1590 - val_acc: 0.9374
Epoch 8/50
208/207 [==============================] - 52s - loss: 0.1819 - acc: 0.9304 - val_loss: 0.1443 - val_acc: 0.9413
Epoch 9/50
208/207 [==============================] - 52s - loss: 0.1778 - acc: 0.9336 - val_loss: 0.1862 - val_acc: 0.9239
Epoch 10/50
```

```
208/207 [==============================] - 52s - loss: 0.1878 - acc: 0.9279 - val_loss: 0.2013 - val_acc: 0.9200
Epoch 11/50
208/207 [==============================] - 51s - loss: 0.1742 - acc: 0.9351 - val_loss: 0.1429 - val_acc: 0.9447
Epoch 12/50
208/207 [==============================] - 52s - loss: 0.1715 - acc: 0.9351 - val_loss: 0.1607 - val_acc: 0.9344
Epoch 13/50
208/207 [==============================] - 51s - loss: 0.1628 - acc: 0.9398 - val_loss: 0.1344 - val_acc: 0.9485
Epoch 14/50
208/207 [==============================] - 51s - loss: 0.1605 - acc: 0.9413 - val_loss: 0.1642 - val_acc: 0.9366
Epoch 15/50
208/207 [==============================] - 51s - loss: 0.1557 - acc: 0.9407 - val_loss: 0.1616 - val_acc: 0.9350
Epoch 16/50
208/207 [==============================] - 52s - loss: 0.1553 - acc: 0.9431 - val_loss: 0.1299 - val_acc: 0.9532
Epoch 17/50
208/207 [==============================] - 52s - loss: 0.1720 - acc: 0.9372 - val_loss: 0.1469 - val_acc: 0.9384
Epoch 18/50
208/207 [==============================] - 52s - loss: 0.1667 - acc: 0.9390 - val_loss: 0.1591 - val_acc: 0.9361
Epoch 19/50
208/207 [==============================] - 52s - loss: 0.1613 - acc: 0.9393 - val_loss: 0.1440 - val_acc: 0.9431
Test loss: 0.796894465397
Test accuracy 0.94966442953
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
conv2d_1 (Conv2D)            (None, 195, 195, 64)      6976
_________________________________________________________________
max_pooling2d_1 (MaxPooling2 (None, 32, 32, 64)        0
_________________________________________________________________
conv2d_2 (Conv2D)            (None, 27, 27, 128)       295040
_________________________________________________________________
max_pooling2d_2 (MaxPooling2 (None, 4, 4, 128)         0
_________________________________________________________________
flatten_1 (Flatten)          (None, 2048)              0
_________________________________________________________________
```

dense_1 (Dense) (None, 512) 1049088

_____

dropout_1 (Dropout) (None, 512) 0

_____

dense_2 (Dense) (None, 512) 262656

_____

dropout_2 (Dropout) (None, 512) 0

_____

dense_3 (Dense) (None, 4) 2052

==========

Total params: 1,615,812

Trainable params: 1,615,812

Non-trainable params: 0

_____

Model Summary None

Png_data 200 by 200 without preprocessing during training

```
Adadelta = Adadelta(lr=1.0, rho=0.95, epsilon=1e-08, decay=0.0)
```

Num of Filters	128		128			512		4
Layer Type	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dropout (0.35)	Dense()
Conv. Size	(6,6)	(6,6)	(3,3)	(3,3)				
Padding	valid		valid					
activation	relu		relu			relu		softmax

Epoch 1/50

2017-12-15 07:44:10.913172: I tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:900] successful NUMA node read from SysFS had negative value (-1), but there must be at least one NUMA node, so returning NUMA node zero

2017-12-15 07:44:10.913513: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1064] Found device 0 with properties:

name: Tesla K80 major: 3 minor: 7 memoryClockRate(GHz): 0.8235

pciBusID: 0000:00:04.0

totalMemory: 11.17GiB freeMemory: 11.09GiB

2017-12-15 07:44:10.913542: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1154] Creating TensorFlow device (/device:GPU:0) -> (device: 0, name: Tesla K80, pci bus id: 0000:00:04.0, compute capability: 3.7)

208/207 [==============================] - 62s - loss: 0.8218 - acc: 0.6593 - val_loss: 0.4303 - val_acc: 0.8694

```
Epoch 2/50
208/207 [==============================] - 60s - loss: 0.3282 - acc: 0.8879 - val_loss: 0.1684 - val_acc: 0.9401
Epoch 3/50
208/207 [==============================] - 59s - loss: 0.2384 - acc: 0.9163 - val_loss: 0.1797 - val_acc: 0.9414
Epoch 4/50
208/207 [==============================] - 59s - loss: 0.2023 - acc: 0.9345 - val_loss: 0.1542 - val_acc: 0.9493
Epoch 5/50
208/207 [==============================] - 59s - loss: 0.1809 - acc: 0.9355 - val_loss: 0.1156 - val_acc: 0.9645
Epoch 6/50
208/207 [==============================] - 59s - loss: 0.1796 - acc: 0.9393 - val_loss: 0.1239 - val_acc: 0.9582
Epoch 7/50
208/207 [==============================] - 60s - loss: 0.1635 - acc: 0.9441 - val_loss: 0.1352 - val_acc: 0.9550
Epoch 8/50
208/207 [==============================] - 59s - loss: 0.1559 - acc: 0.9468 - val_loss: 0.1421 - val_acc: 0.9425
Test loss: 1.02644992199
Test accuracy 0.935570469799
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
conv2d_1 (Conv2D)            (None, 195, 195, 128)     13952
_________________________________________________________________
max_pooling2d_1 (MaxPooling2 (None, 32, 32, 128)       0
_________________________________________________________________
conv2d_2 (Conv2D)            (None, 30, 30, 128)       147584
_________________________________________________________________
max_pooling2d_2 (MaxPooling2 (None, 10, 10, 128)       0
_________________________________________________________________
flatten_1 (Flatten)          (None, 12800)             0
_________________________________________________________________
dense_1 (Dense)              (None, 512)               6554112
_________________________________________________________________
dropout_1 (Dropout)          (None, 512)               0
_________________________________________________________________
dense_2 (Dense)              (None, 4)                 2052
```

==========
Total params: 6,717,700
Trainable params: 6,717,700
Non-trainable params: 0
_____

Adam optimizer

Num of Filters	64	64		64			256	256	256	4
Layer Type	CONV_2D	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dense()	Dense()	Dense()
Conv. Size	(3,3)	(6,6)	(6,6)	(6,6)	(6,6)			Dropout (0.15)	Dropout (0.15)	
Padding	valid	valid		valid						
activation	relu	relu		relu			relu	relu	relu	softmax