Below are important research of neural networks which will be implemented in the code:

Steps to create a neural network:

1. Learn a model that generates sensory data rather than classifying it. Eliminates the need for large amounts of labeled data.

2. Learn one layer of representation at a time using restricted boltzmann machines. This decomposes the overall learning task into multiple simpler tasks and eliminates the inference problems that arise in generative models.

3. Use a separate fine-tuning stage to improve the generative or discriminative abilities of the composite model.

A combination of these ideas leads to a novel and effective way of learning multiple layers of representation.

- Geoffrey E. Hinton

Optimization:

Steps to improve on a neural network from Geoffrey E. Hinton:

Allow higher-level feature detectors to communicate their needs to lower-level ones whilst also being easy to implement in layered networks of stochastic binary neurons that have activation states of 1 or 0 turned on with a probability that is a smooth non-linear function of the total input they receive.

Without the layer-by-layer learning, fine-tuning alone is hopelessly slow. Instead of fine-tuning the model to be a better at generating data, back-propagation can be used to fine-tune it to be better at discrimination. This works well.

To infer a probability distribution over the various possible settings of the hidden variables.

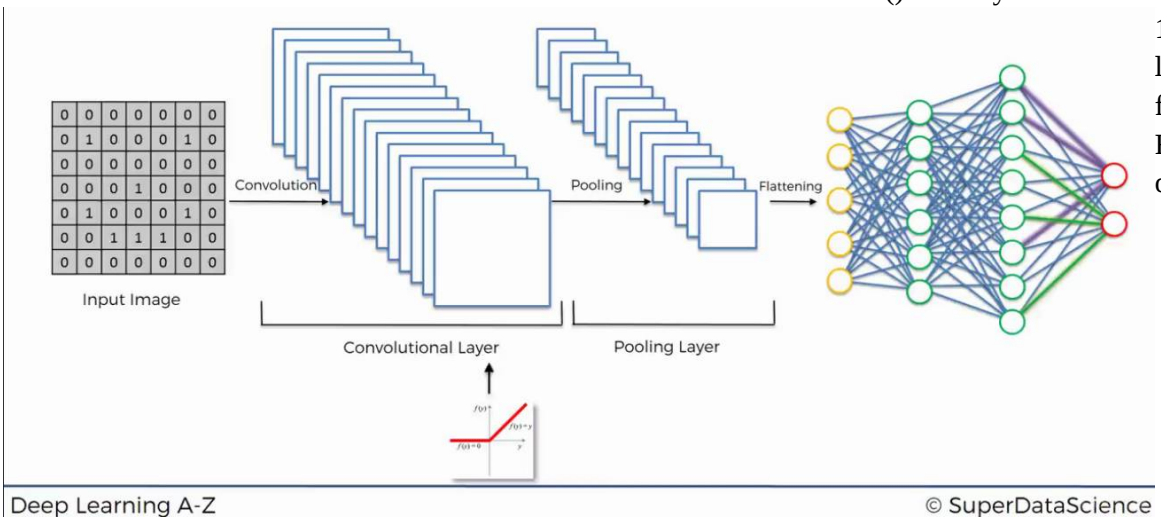
Gaussian distribution, Restricted Boltzmann Machines.

Learning feature detectors

The optimizer function in Kera's classifier.compile(optimizer, loss, metrics) is the algorithm you are going to use to find the optimal set of weights of the network. The "adam" optimizer using stochastic gradient descent algorithm that's efficient. What about the rmsprop? It computes the single gradient in batches and is slower. A sigmoid loss function is similar to logistic regression. After weight updates, the model uses metrics accuracy to improve the model's performance.

CNN Architecture:

2DConv -> ReLU -> MaxPool -> 2DConv -> ReLU -> MaxPool -> Flatten() -> Fully connected 2-layer neural network



128 neurons for the first layer -> ReLU -> 128 for hidden layer -> ReLU -> 3 neurons for output layer -> softmax

Learning/Training

The training process will use the cross-entropy error with activation functions of sigmoid or softmax. The softmax produces probability of the output. The starting loss, given at training, need to be consistent with the number of classes in the network. The training process will use stochastic gradient where the gradient is computed per input instead of in a batch. I will also try rmsprop, which is a batch training. I also forgot to use the prediction function if the output is 0/1 but that can be adjusted for a multi-class output. Here's an example from the "Deep-Learning in Python" on-line lecture that uses a simple ANN:

#Part 3: Making predictions and evaluating the model

#Predicting the test results

```
y_prediction = classifier.predict(x_test_scaled)
```

```
y_prediction = (y_prediction > 0.5)
#neural network's final output will be true if the activation function is greater than 0.5, which means greater than 50% chance of leaving the bank
#Predicting a single new observation
new_prediction = classifier.predict(sc.transform(np.array( [[0.0,0,600,1,40,3,60000,2,1,1,50000]] )))
new_prediction = (new_prediction > 0.5)
#Making the Confusion Matrix
from sklearn.metrics import confusion_matrix
cm = confusion_matrix(y_test, y_pred) #so far we just split your dataset into a training set and a test set
```

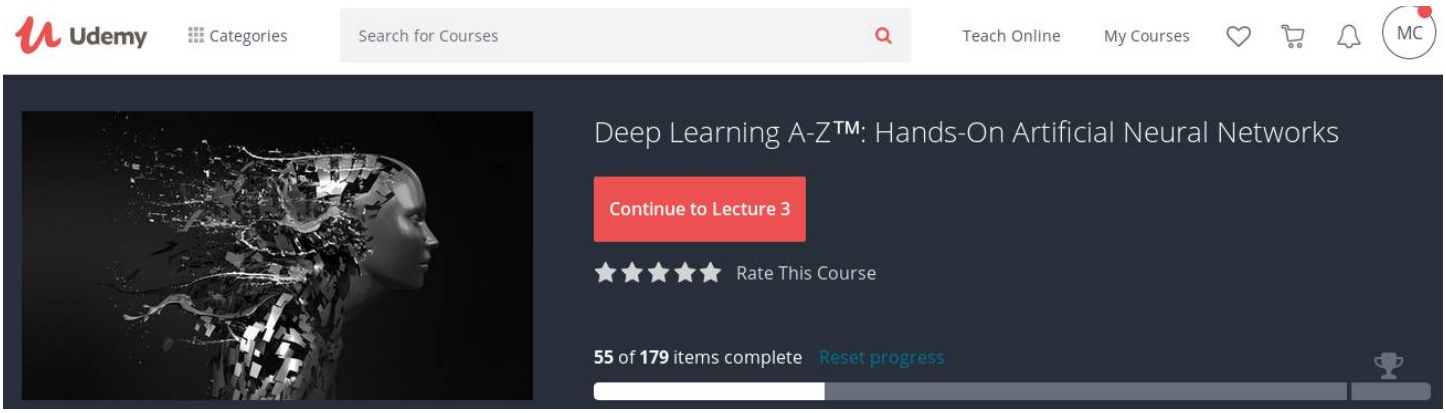
The variance problem of using validation sets is because validation sets can represent very different accuracy on another test, which is very inconsistent. Judging model on just one accuracy and one test set is not super relevant for knowing how well the model does in terms of loss, accuracy and generalization. The K-Fold Cross Validation will fix this variance problem because it splits the training set into 10 folds where k = 10 in 10 different iterations. Nine folds will represent the training set and 1 fold is to test the neural network. It is much more relevant because it takes the average.

First few weeks of September:

Research on Neural Network's and programming in Python

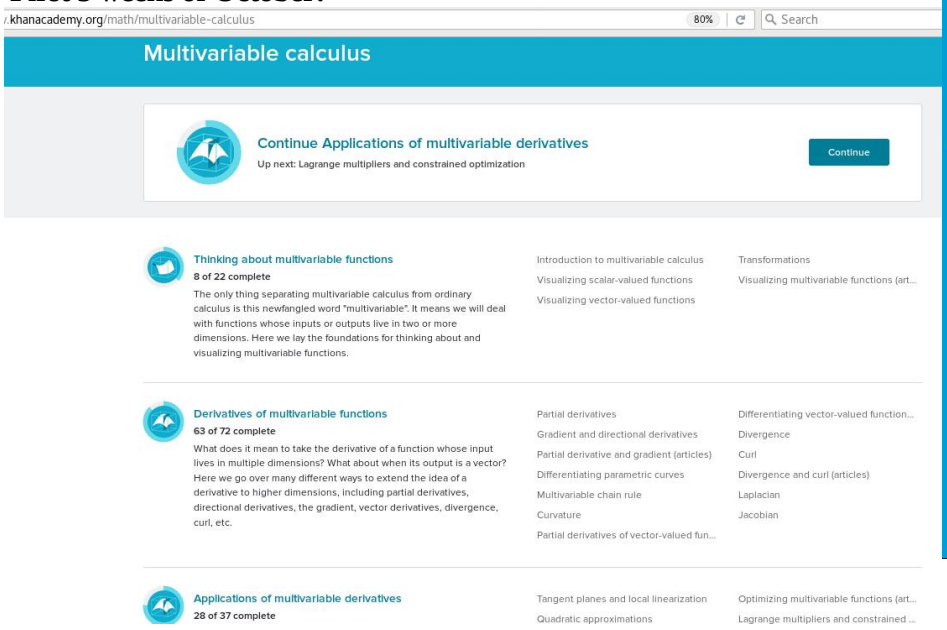
Paid $100 to go to an in-person group for deep learning, which uses the cloud to train on images of cats and dogs. The lecturer told me I should use Tensorflow or one of the popular libraries. Since I'm interested in extracting features of shapes for the neural network to learn, he told me that a convolutional network will do the job. This is because a convolutional neural network is designed to learn the pixels of images in a three dimensional output space. It does this by pooling and flattening the layers of a constant pixel size, or use padding if the size doesn't fit the dimensions of the image.

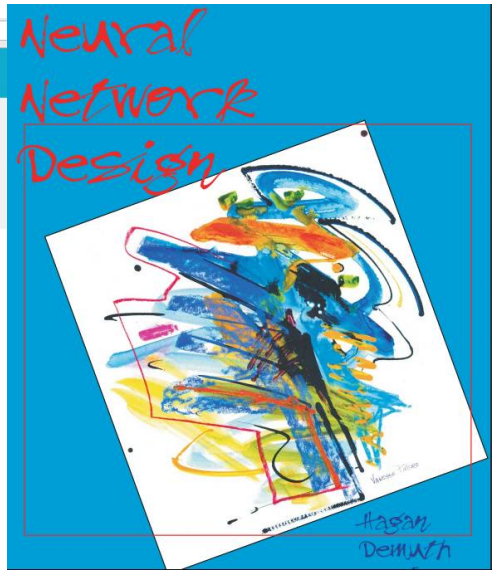
Last 3 weeks of September:



I spent this time taking udemy's online courses in learning the basics of python, first two week's of Andrew Ng's machine learning course. I have tried training a basic convolutional neural network of cats and dogs using the tutorial online but since my laptop doesn't have a Nvidia GPU I can't use GPU computation locally. It will take a couple of days just to get the output of the convolutional network.

First 3 weeks of October:





I decided to use the machine learning library Keras instead because it uses Tensorflow (in python 3) and Theano (in python 2) as backend. I spent 3 weeks reading Hagan's Neural Network Design book (2 weeks), reviewing on linear algebra (1 week) and learning and taking notes on multi-variable calculus on Kahn academy (1 week).

Week of October 23:

The baby AI image dataset is very old and has bugs in it. I wasn't able to extract the dataset by running their python program. So, I spent all this time creating my own dataset and preparing it for loading using pickle's serialization format into Google Cloud's Machine Learning Engine. I created my own python class called Draw.py, which uses multiprocessing of Pool workers in a class to draw images themselves as well as the intersection of images. Multiprocessing allows me to make as many images as possible by using parallel computing of 4 cores in a CPU.

draw.py

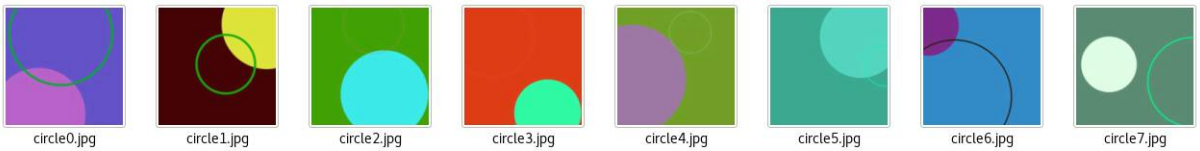
```
"""
Created on Fri Oct 27 18:41:03 2017
Draws images of shapes of circles, rectangles, squares, triangles
@author: maggie
"""
from __future__ import print_function
import cairo
import random
from multiprocessing import Pool

def draw_objects(object, filename):
    canvas = object(500,500)
    obj1 = canvas.background_color()
    canvas.fill_circle(obj1)
    obj2 = canvas.new_context()
    canvas.line_circle(obj2)
    obj3 = canvas.new_context()
    canvas.line_triangle(obj3)
    obj4 = canvas.new_context()
    canvas.fill_triangle(obj4)
    obj5 = canvas.new_context()
    canvas.line_rectangle(obj5)
    obj6 = canvas.new_context()
    canvas.fill_rectangle(obj6)
    obj7 = canvas.new_context()
    canvas.line_square(obj7)
    obj8 = canvas.new_context()
    canvas.fill_square(obj8)
    canvas.save_img(filename)

def draw_rectangle(object, filename):
    canvas = object(500,500)
    bg_obj = canvas.background_color()
    canvas.line_rectangle(bg_obj)
    context_obj = canvas.new_context()
    canvas.fill_rectangle(context_obj)
    canvas.save_img(filename)

def draw_circle(object, filename):
    canvas = object(500,500)
    bg_obj = canvas.background_color()
    canvas.fill_circle(bg_obj)
    context_obj = canvas.new_context()
    canvas.line_circle(context_obj)
    canvas.save_img(filename)

def draw_square(object, filename):
    canvas = object(500,500)
    bg_obj = canvas.background_color()
    canvas.line_square(bg_obj)
    context_obj = canvas.new_context()
    canvas.fill_square(context_obj)
    canvas.save_img(filename)

def draw_triangle(object, filename):
    canvas = object(500,500)
    bg_obj = canvas.background_color()
    canvas.line_triangle(bg_obj)
    context_obj = canvas.new_context()
    canvas.fill_triangle(context_obj)
    canvas.save_img(filename)

class Draw(object):

    def __init__(self, canvas_width, canvas_height):
        import numpy as np
        self.canvas_width = canvas_width
        self.canvas_height = canvas_height
        self.data = np.zeros ((self.canvas_width, self.canvas_height, 4),
                              dtype = np.uint64)
        self.surface = cairo.ImageSurface.create_for_data(self.data,
                                                          cairo.FORMAT_ARGB32,
                                                          self.canvas_width,
                                                          self.canvas_height)

    def run(self):
        p = Pool(processes=4)

        for x in range(2000):
            p.apply_async(draw_triangle, (Draw,str(x)) )
        p.close()
        p.join()

    def new_context(self):
        return cairo.Context(self.surface)
```

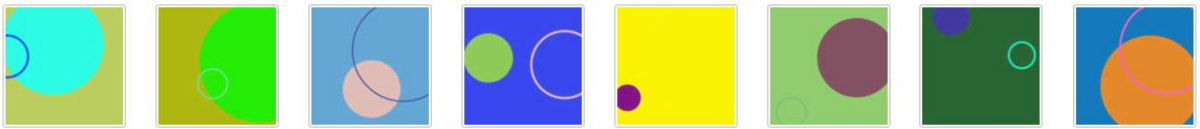
```
    #the next image drawn on background color must have
    #the parameter in background_color
    def background_color(self):
        r = random.uniform(0,1)
        g = random.uniform(0,1)
        b = random.uniform(0,1)
        name = self.new_context()
        name.set_source_rgb(r,g,b)
        name.paint()
        return name

    def fill_circle(self, object):
        import math
        r = random.uniform(0,1)
        g = random.uniform(0,1)
        b = random.uniform(0,1)
        xc = random.randint(10,500)
        yc = random.randint(10,500)
        radius = random.randint(50,250)
        object.arc(xc, yc, radius, 0, 2*math.pi)
        object.set_source_rgb(r, g, b)
        object.fill()

    def line_circle(self, object):
        import math
        r = random.uniform(0,1)
        g = random.uniform(0,1)
        b = random.uniform(0,1)
        xc = random.randint(10,500)
        yc = random.randint(10,500)
        radius = random.randint(50,250)
        w = random.uniform(0,10)
        object.arc(xc, yc, radius, 0, 2*math.pi)
        object.set_line_width(w)
        object.set_source_rgb(r, g, b)
        object.stroke()

    def fill_rectangle(self, object):
        r = random.uniform(0,1)
        g = random.uniform(0,1)
        b = random.uniform(0,1)
        x = random.randint(10,500)
        y = random.randint(10,500)
        width = random.randint(50,250)
        height = random.randint(50,250)
        object.rectangle(x, y, width, height)
        object.set_source_rgb(r, g, b)
        object.fill()

    def line_rectangle(self, object):
        r = random.uniform(0,1)
        g = random.uniform(0,1)
        b = random.uniform(0,1)
        x = random.randint(10,500)
        y = random.randint(10,500)
        w = random.uniform(0,10)
        width = random.randint(50,250)
        height = random.randint(50,250)
        object.rectangle(x, y, width, height)
        object.set_line_width(w)
        object.set_source_rgb(r, g, b)
        object.stroke()

    def fill_square(self, object):
        r = random.uniform(0,1)
        g = random.uniform(0,1)
        b = random.uniform(0,1)
        x = random.randint(10,500)
        y = random.randint(10,500)
        width = random.randint(50,250)
        object.rectangle(x, y, width, width)
        object.set_source_rgb(r, g, b)
        object.fill()

    def line_square(self, object):
        r = random.uniform(0,1)
        g = random.uniform(0,1)
        b = random.uniform(0,1)
        x = random.randint(10,500)
        y = random.randint(10,500)
        w = random.uniform(0,10)
        width = random.randint(50,250)
        object.rectangle(x, y, width, width)
        object.set_line_width(w)
        object.set_source_rgb(r, g, b)
        object.stroke()

    def fill_triangle(self, object):
        r = random.uniform(0,1)
        g = random.uniform(0,1)
        b = random.uniform(0,1)
        x = random.randint(10,500)
        y = random.randint(10,500)
        x1 = random.randint(10,500)
        y1 = random.randint(10,500)
        y2 = random.randint(10,500)
        object.move_to(x,y)
        object.line_to(x, y1)
        object.line_to(x1, y2)
        object.line_to(x, y)
        object.set_source_rgb(r, g, b)
        object.fill()

    def line_triangle(self, object):
        r = random.uniform(0,1)
        g = random.uniform(0,1)
        b = random.uniform(0,1)
        x = random.randint(10,500)
        y = random.randint(10,500)
        x1 = random.randint(10,500)
        y1 = random.randint(10,500)
        y2 = random.randint(10,500)
        w = random.uniform(0,3)
        object.move_to(x,y)
        object.line_to(x, y1)
        object.line_to(x1, y2)
        object.line_to(x, y)
        object.set_line_width(w)
        object.set_source_rgb(r, g, b)
        object.stroke()

    def save_img(self, filename):
        print (filename)
        dir = "test_set/triangle/"
        intersection = "triangle."
        self.surface.write_to_png(dir + intersection + filename + ".png")
if __name__ == '__main__':
    d = Draw(500, 500)
    d.run()
```

This file reduces the image's quality to reduce the file size:

```
"""
Created on Thu Oct 26 20:50:49 2017

@author: maggie
"""
from __future__ import print_function
from __future__ import division
from PIL import Image
import glob
import pickle
import scipy.misc
import numpy as np
from multiprocessing import Lock
from multiprocessing import Pool

def init(lock):
    global childs_lock
    childs_lock = lock

"""each pool worker gets original img data to reduce file size"""
def reduce_images(image_path):
    childs_lock.acquire()
    img = Image.open(image_path)
    childs_lock.release()
    basewidth = 300
    percent = (basewidth / float(img.size[0]))
    hsize = int((float(img.size[1]) * float(percent)))
    img = img.resize((basewidth, hsize), Image.ANTIALIAS) #ANTIALIAS reserves quality
    x_train = np.array(img)
    #x_train = np.array(img, dtype = np.uint8) #a numpy array with data type CV_8UC1
    #x_train = x_train[ : , : , 0] #slice out the color dimension
    print (x_train.shape)
    img.close()
    return x_train

#global storage variable for both main and pool of workers
result_list = []

"""result(data) is called whenever process_images(path) returns a result
result_list is modified by main process not by pool of workers"""
def result(data):
    result_list.append(data)
```

```
#create empty pickle_file first then append to file
output = open (pickle_file, 'wb')
output.close()

def result(data):
    output = open (pickle_file, 'ab')
    print ("in pickle file: " , pickle_file)
    pickle.dump(data, output, pickle.HIGHEST_PROTOCOL)
    output.close()

if __name__ == '__main__':

    shape_path = "test_set/circle1/"
    lock = Lock()
    p = Pool(processes=4, initargs = (lock, ), initializer = init)
    #for shapes in shape_path:
    for image_path in glob.glob(shape_path + "*jpg"):
        p.apply_async(process_images, (image_path, shape_path), callback = result)
    p.close() # no more tasks
    p.join() #wrap up current tasks

```


circle0.jpg circle1.jpg circle2.jpg circle3.jpg circle4.jpg circle5.jpg circle6.jpg circle7.jpg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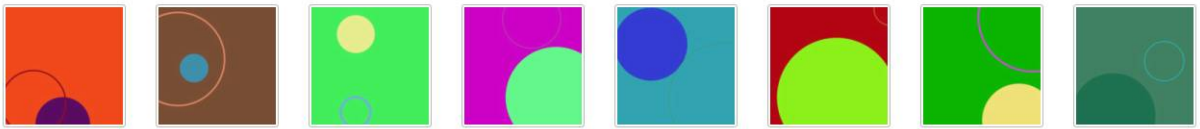
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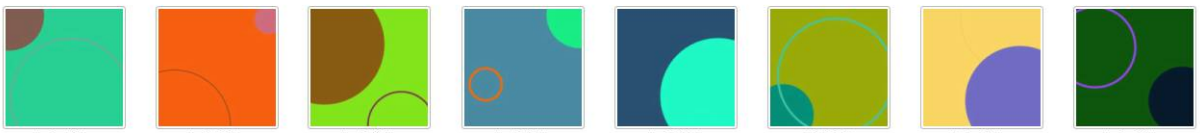
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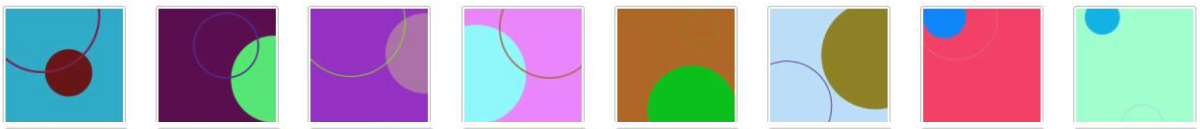
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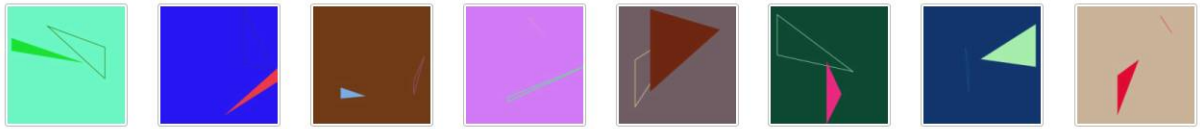
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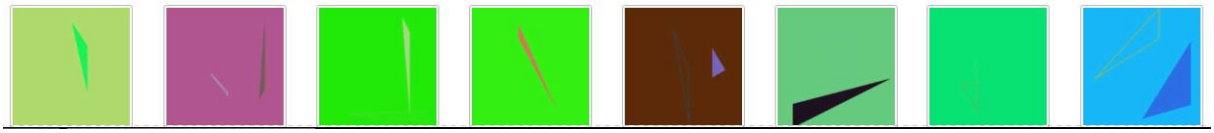
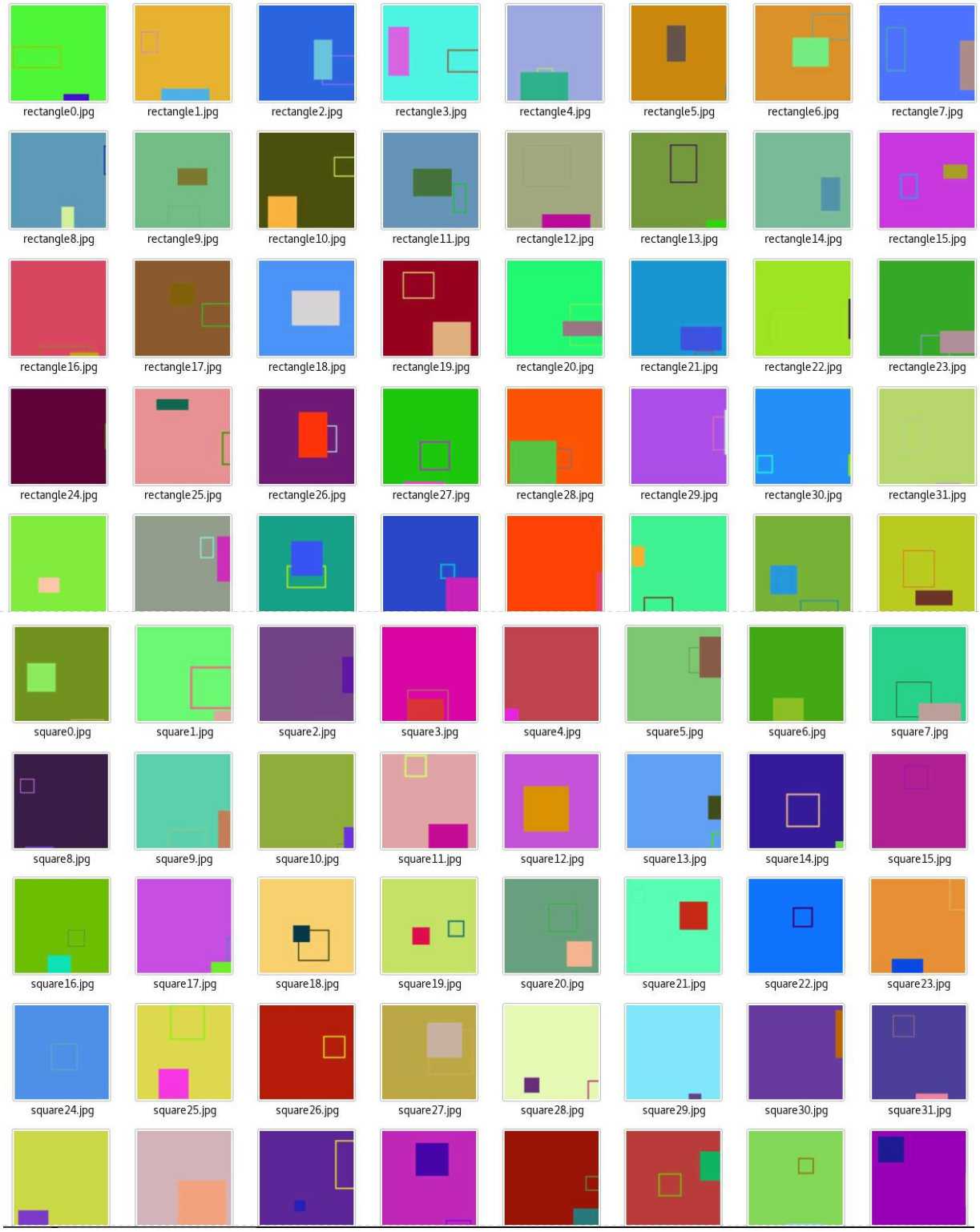
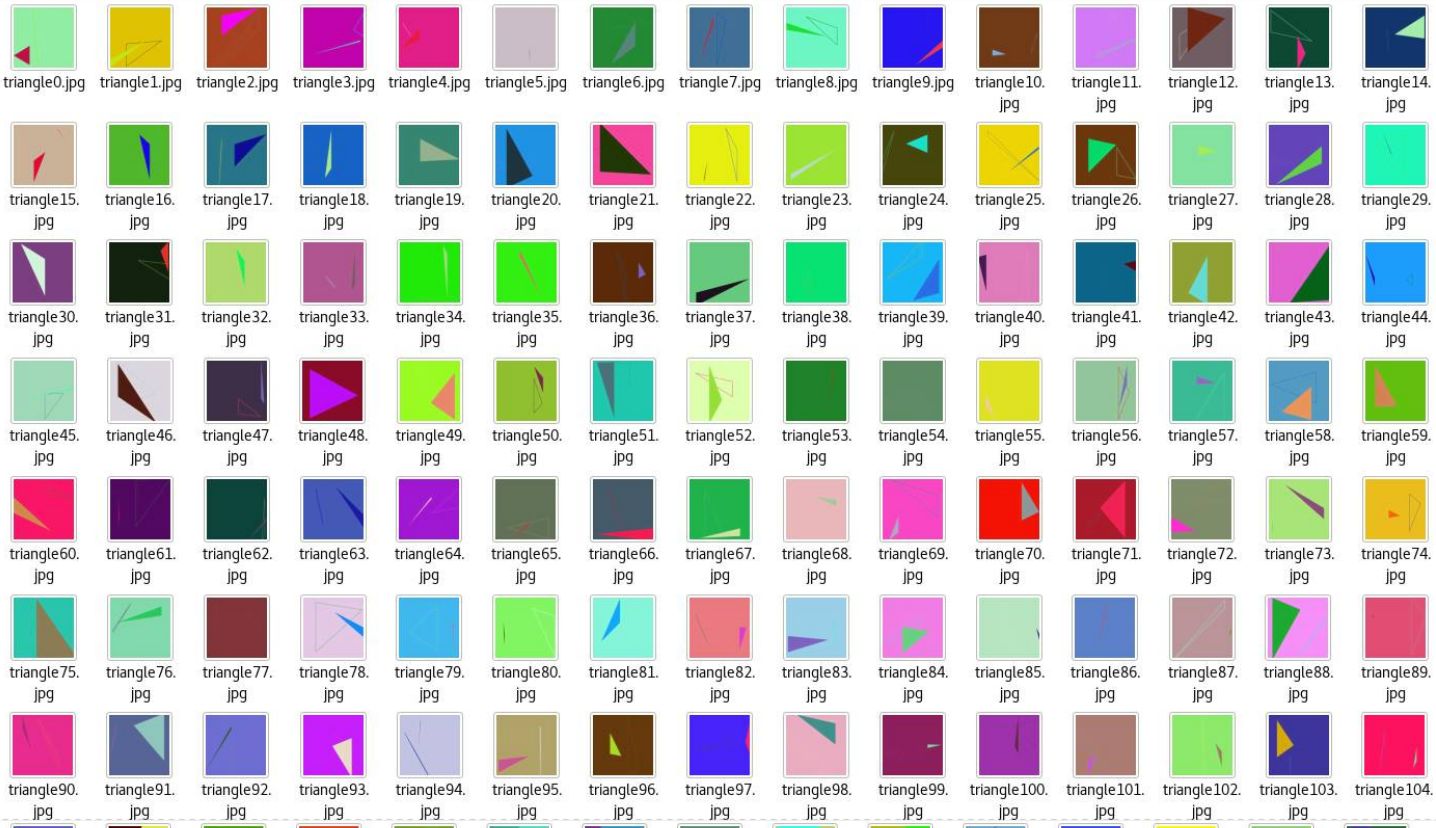




Below are more examples of the training dataset in JPEG extension: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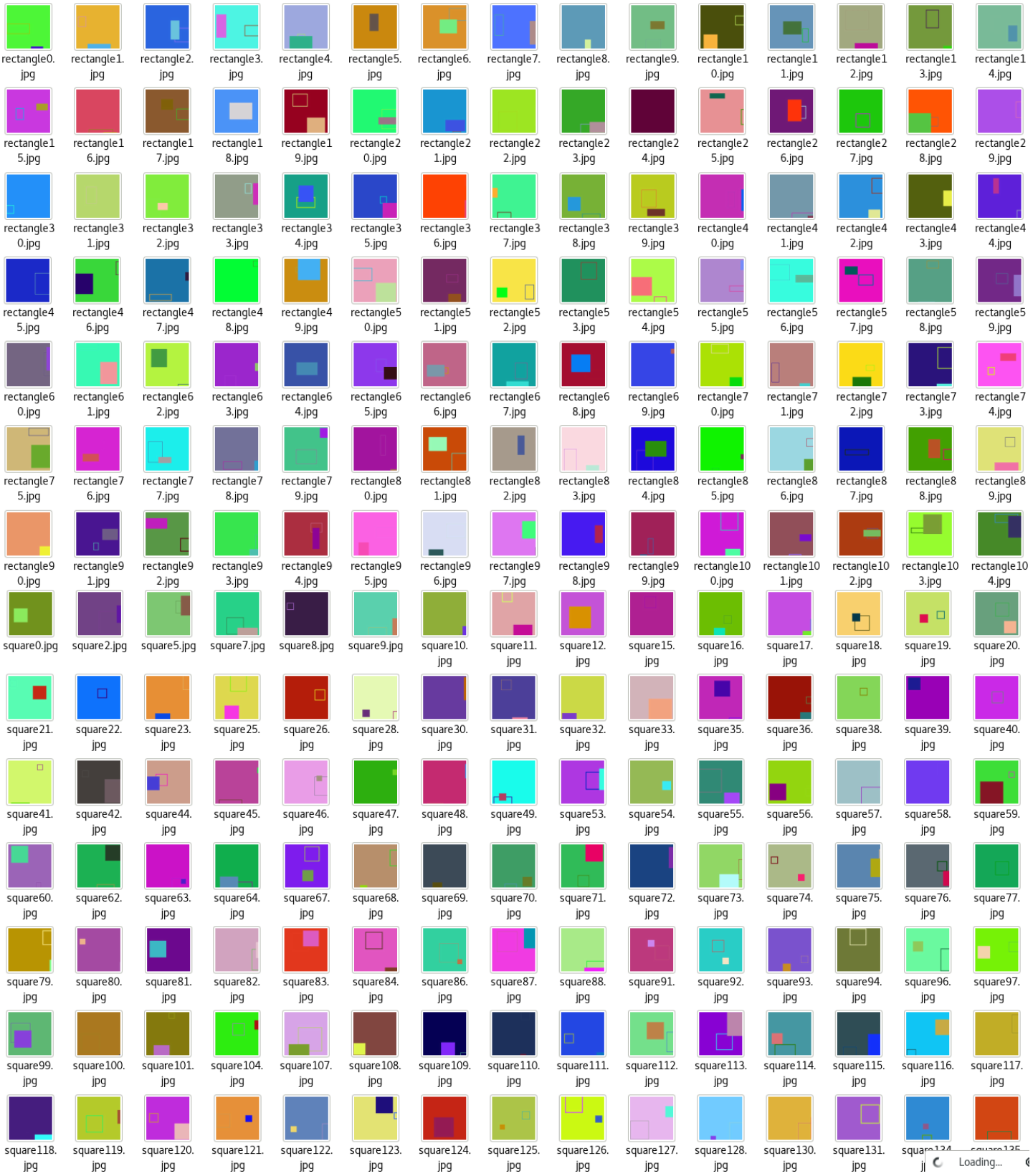

I had problems loading the images to a pickle file because I originally stored the images as a dictionary which represents in a string format. Numpy wants a float object, so I decided to use Python's list data structure to store all the numpy arrays.

```
maggie@debian:~/Downloads/Convolutional_Neural_Networks$ python trainer/cnncopy.py --job-dir ./ --train-file compressedimages.pkl
Using TensorFlow backend.
Using logs_path located at ./logs/2017-10-19T19:34:32.050048
Traceback (most recent call last):
  File "trainer/cnncopy.py", line 145, in <module>
    train_model(**arguments)
  File "trainer/cnncopy.py", line 105, in train_model
    save_format = 'jpeg'):
  File "/home/maggie/anaconda3/lib/python3.6/site-packages/keras/preprocessing/image.py", line 461, in flow
    save_format=save_format)
  File "/home/maggie/anaconda3/lib/python3.6/site-packages/keras/preprocessing/image.py", line 774, in __init__
    self.x = np.asarray(x, dtype=K.floatx())
  File "/home/maggie/anaconda3/lib/python3.6/site-packages/numpy/core/numeric.py", line 531, in asarray
    return array(a, dtype, copy=False, order=order)
ValueError: could not convert string to float: "{'dataset/training_set/cats/cat.175.jpg': <PIL.Image.Image image mode=RGB size=300x226 at 0x7F760CECD860>, 'dataset/training_set
/cats/cat.2192.jpg': <PIL.Image.Image image mode=RGB size=500x474 at 0x7F760CECDFD0>, 'dataset/training_set/cats/cat.2429.jpg': <PIL.Image.Image image mode=RGB size=499x480 at
 0x7F760CECDF28>, 'dataset/training_set/cats/cat.2652.jpg': <PIL.Image.Image image mode=RGB size=378x498 at 0x7F760CECDEB8>, 'dataset/training_set/cats/cat.3026.jpg': <PIL.Image
.Image image mode=RGB size=499x375 at 0x7F760CECDE48>, 'dataset/training_set/cats/cat.1317.jpg': <PIL.Image.Image image mode=RGB size=360x449 at 0x7F760CECDDD8>, 'dataset/train
ing_set/cats/cat.224.jpg': <PIL.Image.Image image mode=RGB size=500x374 at 0x7F760CECDD68>, 'dataset/training_set/cats/cat.3110.jpg': <PIL.Image.Image image mode=RGB size=499x3
75 at 0x7F760CECDCF8>, 'dataset/training_set/cats/cat.975.jpg': <PIL.Image.Image image mode=RGB size=384x383 at 0x7F760CECDC88>, 'dataset/training_set/cats/cat.2902.jpg': <PIL.
Image.Image image mode=RGB size=500x374 at 0x7F760CECDC18>, 'dataset/training_set/cats/cat.997.jpg': <PIL.Image.Image image mode=RGB size=500x320 at 0x7F760CECDF60>, 'dataset/t
raining_set/cats/cat.497.jpg': <PIL.Image.Image image mode=RGB size=469x303 at 0x7F760CECDEF0>, 'dataset/training_set/cats/cat.2623.jpg': <PIL.Image.Image image mode=RGB size=4
99x274 at 0x7F760DA2EDA0>, 'dataset/training_set/cats/cat.1246.jpg': <PIL.Image.Image image mode=RGB size=359x270 at 0x7F760DA2ECC0>, 'dataset/training_set/cats/cat.3521.jpg':
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set/training_set/cats/cat.1301.jpg': <PIL.Image.Image image mode=RGB size=499x375 at 0x7F760CB7CAC8>, 'dataset/training_set/cats/cat.171.jpg': <PIL.Image.Image image mode=RGB s
ize=312x280 at 0x7F760CB7CA58>, 'dataset/training_set/cats/cat.2079.jpg': <PIL.Image.Image image mode=RGB size=405x403 at 0x7F760CB7C9E8>, 'dataset/training_set/cats/cat.1736.j
pg': <PIL.Image.Image image mode=RGB size=229x448 at 0x7F760CB7C978>, 'dataset/training_set/cats/cat.2542.jpg': <PIL.Image.Image image mode=RGB size=211x250 at 0x7F760CB7C908>,
 'dataset/training_set/cats/cat.3488.jpg': <PIL.Image.Image image mode=RGB size=500x374 at 0x7F760CB7C898>, 'dataset/training_set/cats/cat.1319.jpg': <PIL.Image.Image image mod
e=RGB size=500x374 at 0x7F760CB7C828>, 'dataset/training_set/cats/cat.1683.jpg': <PIL.Image.Image image mode=RGB size=369x402 at 0x7F760CB7C7B8>, 'dataset/training_set/cats/cat
.2299.jpg': <PIL.Image.Image image mode=RGB size=500x335 at 0x7F760CB7C748>, 'dataset/training_set/cats/cat.3699.jpg': <PIL.Image.Image image mode=RGB size=140x92 at 0x7F760CB7
C6D8>, 'dataset/training_set/cats/cat.1356.jpg': <PIL.Image.Image image mode=RGB size=500x374 at 0x7F760CB7C668>, 'dataset/training_set/cats/cat.1908.jpg': <PIL.Image.Image ima
ge mode=RGB size=240x179 at 0x7F760CB7C5F8>, 'dataset/training_set/cats/cat.1053.jpg': <PIL.Image.Image image mode=RGB size=500x374 at 0x7F760CB7C588>, 'dataset/training_set/ca
ts/cat.537.jpg': <PIL.Image.Image image mode=RGB size=450x367 at 0x7F760CB7C518>, 'dataset/training_set/cats/cat.1397.jpg': <PIL.Image.Image image mode=RGB size=499x375 at 0x7F
760CB7C4A8>, 'dataset/training_set/cats/cat.881.jpg': <PIL.Image.Image image mode=RGB size=500x395 at 0x7F760CB7C438>, 'dataset/training_set/cats/cat.2151.jpg': <PIL.Image.Imag
e image mode=RGB size=349x265 at 0x7F760CB7C3C8>, 'dataset/training_set/cats/cat.464.jpg': <PIL.Image.Image image mode=RGB size=319x240 at 0x7F760CB7C358>, 'dataset/training_se
t/cats/cat.2610.jpg': <PIL.Image.Image image mode=RGB size=374x500 at 0x7F760CB7C2E8>, 'dataset/training_set/cats/cat.1191.jpg': <PIL.Image.Image image mode=RGB size=399x499 at
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.Image image mode=RGB size=407x500 at 0x7F760CB7C198>, 'dataset/training_set/cats/cat.517.jpg': <PIL.Image.Image image mode=RGB size=321x500 at 0x7F760CB7C128>, 'dataset/traini
ng_set/cats/cat.3942.jpg': <PIL.Image.Image image mode=RGB size=349x262 at 0x7F760CB7CDD8>, 'dataset/training_set/cats/cat.563.jpg': <PIL.Image.Image image mode=RGB size=499x47
6 at 0x7F760CB7CE80>, 'dataset/training_set/cats/cat.552.jpg': <PIL.Image.Image image mode=RGB size=375x499 at 0x7F760CB7CF28>, 'dataset/training_set/cats/cat.1239.jpg': <PIL.I
mage.Image image mode=RGB size=500x465 at 0x7F760CB7CF98>, 'dataset/training_set/cats/cat.3774.jpg': <PIL.Image.Image image mode=RGB size=500x374 at 0x7F760CB7CC18>, 'dataset/t
raining_set/cats/cat.2820.jpg': <PIL.Image.Image image mode=RGB size=255x192 at 0x7F760CB7CBE0>, 'dataset/training_set/cats/cat.3613.jpg': <PIL.Image.Image image mode=RGB size=
320x323 at 0x7F760CEF4128>, 'dataset/training_set/cats/cat.958.jpg': <PIL.Image.Image image mode=RGB size=425x201 at 0x7F760CEF4198>, 'dataset/training_set/cats/cat.2712.jpg':
```

10.31.17:

The training set consists of a total of 6,200 images. Before being serialized into a pickle file, the training set is organized in a tuple structure (numpy array, y_label). The numpy array is the data array processed by the PIL module in (300, 300, 3) format. The numpy array represents the matrix in float32 of the image. The y_label represents the target values of the shapes, which is the expected output of the convolutional neural network. Keras requires categorical crossentropy loss to be computed with categorical encodings. The categorical one hot encoding transfers integers (0...number of classes) into binary format. My y_label is a series of categorical hot encodings of 0, 1, 2 in binary format of three classes (circles, rectangles and squares, triangle).

I had to change the numpy array data structure from a default float to float32 bit since the loading of the pickle files in the default float structure consumes too much memory in megabytes per file. The difference almost reduced the entire file size from 3.0 GB (without compression) to 1.7 G.B. The pickle files are too huge, so I have to reduce the quality and size of each image to reduce the pickle files. Pickle loads and image creation of the shapes are created using multiprocessing of independent Pool workers. I have been trying to figure out how to create a pickle file, organize numpy arrays and store them in a huge list, dump that huge list using joblib. Use memmap to store large numpy arrays because it's inefficient for the list to increase in data memory allocation in list comprehension of pickle loading. The file below create (numpy arrays, y_label) tuples and stores them in a pickle file.

The short-term goal is to train the shapes individually first and then figure out how to get the model to generalize on the “intersection” of shapes either by using recurrent convolutional neural networks or multi-label output using supervised learning. How will the network learn? I need to adjust the architecture of the CNN. The multi-label output is simpler and much easier. This requires sigmoid activation and loss = binary_crossentropy at the output layer for multi-label output to work.

draw.py | googlecloud_config_cnn.txt | load_merge_files.py

```python
from __future__ import print_function
from PIL import Image
import glob
import pickle
import numpy as np
from multiprocessing import Lock
from multiprocessing import Pool
from keras.utils import to_categorical

"""to make lock and queue storage global to all child workers
def init(lock):
    global childs_lock
    childs_lock = lock

def process_images(image_path, shape_path):
        shape_y = None
        if shape_path == "test_set/circle1/":
            shape_y = 0
        elif shape_path == "test_set/rectangle1/":
            shape_y = 1
        elif shape_path == "test_set/triangle1/":
            shape_y = 2
    elif shape_path == "test_set/square1/":
            shape_y = 3

        ylabel = to_categorical(shape_y, num_classes = 4)
        ylabel = np.reshape(ylabel, (4))
        print ("new shape", ylabel.shape)
        print (ylabel)
        childs_lock.acquire()
        img = Image.open(image_path)
        childs_lock.release()

        np_img = np.array(img, dtype = [('img_info', np.float16)])
        '''y_label = np.empty(None, dtype = [('y_class',np.int8)])
        y_label.fill(shape_y)'''
        # Add another dimension 1 image number for keras to process
        #np_img = np_img.reshape( (-1, ) + np_img.shape)
        img.close()
        return np_img['img_info'], ylabel

#global storage variable for both main and pool of workers
pickle_file = 'test_circle.pkl'

if __name__ == '__main__':

    circle_path = "test_set/rectangle/"
    lock = Lock()
    p = Pool(processes=4, initargs = (lock, ), initializer = init)

    for image_path in glob.glob(circle_path + "*png"):
        p.apply_async(reduce_images, (image_path,), callback = result)


    p.close() # no more tasks
    p.join() #wrap up current tasks

    output = open ('test_rectangle.pkl', 'wb')
    for x in result_list:
        pickle.dump(x, output, -1)
    output.close()

    name = []
    num_files = 2000
    for i in range(num_files):
        name.append("test_set/rectangle1/rectangle" + str(i) + ".jpg")

    #save resized data to a folder
    with open('test_rectangle.pkl', 'rb') as pkl_file:
        data1 = [pickle.load(pkl_file) for i in range(num_files)]
    for i in range(num_files):
        scipy.misc.imsave(name[i], data1[i])
```

This file merges all the pickled files that each represents the individual shape data and their y_labels from training, validation and testing set.

draw.py | googlecloud_config_cnn.txt | load_merge_files.py | merge_files.py

```python
from __future__ import print_function
import pickle
import joblib
#import numpy as np
#from tempfile import mkdtemp
#import os.path as path

def load_train_or_test(files):
    with open(files, 'rb') as f:
        try:
            print ("Opening files")
            print (files)
            while True:
                yield pickle.load(f) #python version 2.7
        except EOFError:
            pass

if __name__ == '__main__':

    #include (shape array,y_labels) as a tuple returned by the pickle
    circle_dataset = [item for item in load_train_or_test ("circle.pkl")]
    triangle_dataset = [item for item in load_train_or_test ("triangle.pkl")]
    rectangle_dataset = [item for item in load_train_or_test ("rectangle.pkl")]
    square_dataset = [item for item in load_train_or_test ("square.pkl")]

    #merge the individual shape data into one train_data
    train_data = circle_dataset + triangle_dataset + rectangle_dataset + square_dataset

    validation_circle_dataset = [item for item in load_train_or_test ("validate_circle.pkl")]
    validation_triangle_dataset = [item for item in load_train_or_test ("validate_triangle.pkl")]
    validation_rectangle_dataset = [item for item in load_train_or_test ("validate_rectangle.pkl")]
    validation_square_dataset = [item for item in load_train_or_test ("validate_square.pkl")]

    validation_data = validation_circle_dataset + validation_triangle_dataset + validation_rectangle_dataset + validation_square_dataset

    pickle_file = 'shape_data.pkl'
    try:
        f = open(pickle_file, 'wb')
        save = {#'train_shape_dataset': train_shape_dataset,
                'train_data': train_data,
                'validation_data': validation_data,
                }
        #pickle.dump(save, f, pickle.HIGHEST_PROTOCOL)
        joblib.dump(save, f, compress = True)
        f.close()
    except Exception as e:
        print('Unable to save data to', pickle_file, ':', e)
        raise
```

This file uses memory mapping to store large numpy arrays, and randomize the data arrays. It then stores all the data in a compressed pickle file for Google Cloud to load. Google Cloud uses python 2, so the CNN loader file will also use python 2.

draw.py | googlecloud_config_cnn.txt | load_merge_files.py

```
from __future__ import print_function
import joblib
import pickle
import numpy as np
from tempfile import mkdtemp
import os.path as path

'''returns individual list data info and y label data in numpy arrays'''
def get_data(shape_temp_file, label_temp_file, dataset):
    #use memory mapping to store large datasets
    temp_filename = path.join(mkdtemp(), shape_temp_file)
    train_shape_dataset = np.memmap(temp_filename, dtype = np.float16, mode = 'w+', shape = (300, 300, 3))
    temp_filename1 = path.join(mkdtemp(), label_temp_file)
    train_y_dataset = np.memmap(temp_filename1, dtype = np.float16, mode = 'w+', shape = (3))

    train_shape_dataset = [x[0] for x in dataset]
    #convert list back to np array for keras to process
    train_shape_dataset = np.array(train_shape_dataset)
    print ("in get_data function for dataset")
    print (train_shape_dataset.shape)
    train_y_dataset = [x[1] for x in dataset]
    train_y_dataset = np.array(train_y_dataset)
    print (train_y_dataset.shape)

    return train_shape_dataset, train_y_dataset

if __name__ == '__main__':

    pickle_file = 'shape_data.pkl'
    np.random.seed(135)
    with open(pickle_file, 'rb') as f:
        #save = pickle.load(f)
        save = joblib.load(f)
        train_data = save['train_data']
        validation_data = save['validation_data']
        del save  # hint to help gc free up memory

    #shuffle the tuple (shape_info, y_label) dataset
    np.random.seed(135)
    np.random.shuffle(train_data)

    #split list in half
    train_data_half = train_data[ :: 3]
     #train_data_other_half = train_data[1 :: 2]
     validation_data_half = validation_data[ :: 3]

     train_shape_dataset, train_y_dataset = get_data('shapes.dat', 'shapes_y.dat', train_data_half)
     #train_shape_halfdataset, train_y_halfdataset = get_data('shapes.dat', 'shapes_y.dat', train_data_other_half)
     validate_shape_dataset, validate_y_dataset = get_data('validate_shapes.dat', 'validate_shapes_y.dat', validation_da

     print ("in main: 1/half train", train_shape_dataset.shape)
     print ("in main: 1/half y_label", train_y_dataset.shape)
     #print ("in main: 2/half train", train_shape_halfdataset.shape)
     #print ("in main: 2/half y_label", train_y_halfdataset.shape)
     print ("in main: validate", validate_shape_dataset.shape)
     print ("in main: validate y_label", validate_y_dataset.shape)

     pickle_file = 'random_shapes.pkl'
     try:
         f = open(pickle_file, 'wb')
         save = {'train_shape_dataset': train_shape_dataset,
                 'train_y_dataset': train_y_dataset,
                 #'train_shape_halfdataset': train_shape_halfdataset,
                 #'train_y_halfdataset': train_y_halfdataset,
                 'validate_shape_dataset': validate_shape_dataset,
                 'validate_y_dataset': validate_y_dataset,
                 }
         #pickle.dump(save, f, pickle.HIGHEST_PROTOCOL)
         joblib.dump(save, f, compress = True)
         f.close()
     except Exception as e:
         print('Unable to save data to', pickle_file, ':', e)
         raise
```

11.3-11.5.17:

Google cloud works locally but had errors of loading pickle file remotely on google cloud because the Cloud Compute Engine doesn't recognize python's file descriptor. I need to use tensorflow's open method, need to set gs:// for every input file data for Google Cloud to recognized it. Here are the steps to run the CNN loader file in Google Cloud:

draw.py googlecloud_config_cnn.txt

```
gsutil cp -r trainer/cloudml-gpu.yaml gs://cnninput_dataset/trainer/cloudml-gpu.yaml
gsutil cp -r trainer/__init__.py gs://cnninput_dataset/trainer/__init__.py

data folder
gsutil cp -r data/random_shapes.pkl gs://cnninput_dataset/data/random_shapes.pkl

bucket folder
gsutil cp -r setup.py gs://cnninput_dataset/setup.py


export BUCKET_NAME=cnninput_dataset
export JOB_NAME="cnncopy_train_$(date +%Y%m%d_%H%M%S)"
export JOB_DIR=gs://$BUCKET_NAME/$JOB_NAME
export REGION=us-east1

train on machine locally
gcloud ml-engine local train \
  --job-dir $JOB_DIR \
  --module-name trainer.cnncopy \
  --package-path ./trainer \
  -- \
  --train-file ./data/random_shapes.pkl

submit a job to cloud ML engine
gcloud ml-engine jobs submit training $JOB_NAME \
    --job-dir $JOB_DIR \
    --runtime-version 1.0 \
    --module-name trainer.cnncopy \
    --package-path ./trainer \
    --region $REGION \
    --config trainer/cloudml-gpu.yaml \
    -- \
    --train-file gs://$BUCKET_NAME/data/random_shapes.pkl

submit a job to cloud ML engine
gcloud ml-engine jobs submit training $JOB_NAME \
    --job-dir $JOB_DIR \
    --runtime-version 1.0 \
    --module-name trainer.cnncopy \
    --package-path ./trainer \
    --region $REGION \
    -- \
    --train-file gs://$BUCKET_NAME/data/random_shapes.pkl

```

11.6.17:

There is an memory error when running on Google Cloud's regular CPU after one set of 10 epochs for the first half of the dataset. There is not enough memory allocated and training took 1 hour, which is too slow. I decided to use yaml configuration to run on a single NVIDIA K80 GPU processor on Google Cloud Compute Engine.

11.7.17:

I executed this with no errors in Google Cloud with GPU computing on a validation set 1000 images and training set of 6000 images with roughly 60 percent accuracy, 3 percent error rate in 3 series of 10 epochs per training set each. The learning model is able to be saved. Google Cloud automatically plots the gradient on Tensorboard. The reason the error rate is so high and accuracy is low is because there are alot of background samples that the CNN intakes as pool sizes. Background colored samples are data that contains no linear information - unimportant numpy array figures. so when the network does the maxpool of background samples near the 'important line samples', if the background samples are in greater distributation than the amount of important line samples, maxpool will label that area as background sample which makes the neurons increase the weights for backgrounds instead of the contour images itself.

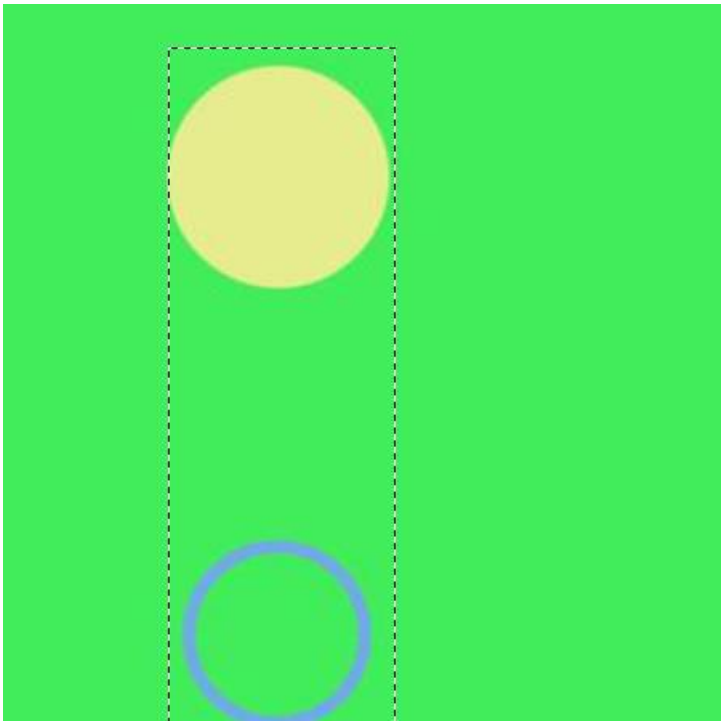
11.8.17:

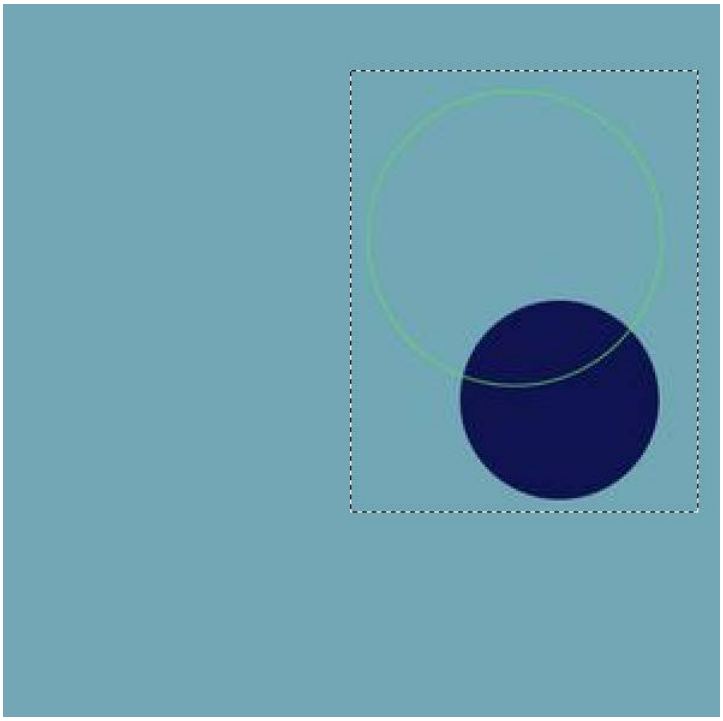
I increased the y-label output from 3 classes to 4 classes. Keras does the automatic shuffle at every epoch in fit_generator. I changed the architecture of the CNN, add drop out layers that might drop out neurons that have no data of contour characteristics being drawn or do some cropping of batches that do not consist of contour information beforehand. I increased the pool size of the CNN and changed it from adam optimizer to rms optimizer. The CNN will do fit the generator model from data augmentation in 20 epochs with validation and training inputs inputted. I also implemented the validation set correctly during the fitting of the network with real data augmentation. The CNN does poorly during training, with an accuracy of 59 percent and 6 percent loss. This is because I used 3,000 images to train the dataset, which is 1/3 of the total training set, which might not contain evenly distributed images of each type of shape. I reduced the total

training set by a third because I want to focus on getting the architecture of the CNN right and there is memory error at the Tesla K80 GPU from the loading of the images since the validation data increased by twice as much as the previous one.

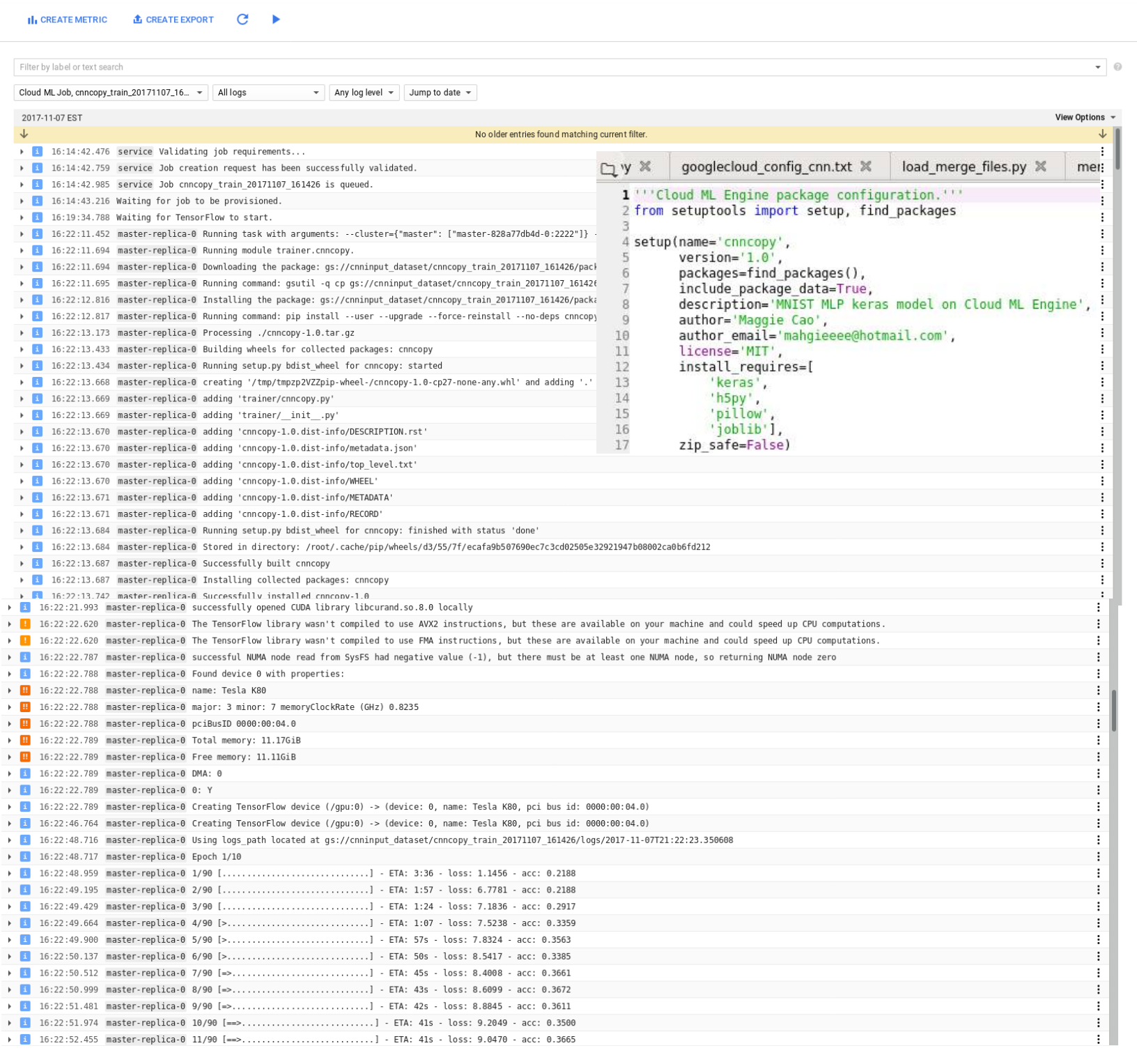
11.9.17:

Trying to figure out how to redesign the architecture of my CNN by looking back on the research I did in Neural Network Design. I also need to create my own data generator (augmentation) function that crops large scaled images to reduce unnecessary background sampling of images in Pooling. I don’t want to separate the contours and filling of the images from the background because the background plays an important part in the composition of the entire image object. Such images that need to be cropped, where the dotted lines represent the cropping location, in a generator function are:





When I ran the same code in google cloud, the machine only computed the 32 epochs for the first half of the dataset in the google cloud's regular machines, the machine returns an exit status of -9, which means that the program exited because there isn't enough memory in the machine to execute the program. I need to use a single GPU to run a simple convolutional neural network. I had to request for a quota of 2 Tesla K80 GPUs in the east-1 area from google cloud. The configuration file and output from google cloud to run using nvidia's GPU in the cloud is below. The above images represent a successful output running using GPU processing. The standard-gpu configuration only uses 1 GPU, the complex model uses 4 GPUs. There is no custom model for 2 GPUs. I will need to use google cloud's VM instance to create a machine running in 2 GPUS, install the necessary keras, tensorflow, nvidia dependencies on the machine if I decide to use 2 GPUS. But, for now, it is important to focus on getting a working architecture for the network. So, I'll use 1 GPU unless absolutely necessary for the network to develop a good generalization model. use a VM instance in the cloud. Below describes the commands to run the python code in google cloud. It requires an empty __init__.py file, setup.py file and remote linux commands.



This network is compiled using CUDA's K80 GPU. I learned that the output of the losses are wrong for the first successful compilation of the convolutional neural network in the google cloud. According to http://cs231n.github.io/, the starting loss of the CNN is -ln(1/num_of_classes) . For 3 classes, -ln(0.33) =1.1086626245, which should be the starting loss of the network. However, my starting loss ranges from 6-8%.

The output of the program is below, the compilation error is because of the syntax error in model.save so I wasn't able to save the model in the cloud directory. The test loss (3.63) is fewer than the next keras output as well as a higher accuracy (61%) than the next output, because the next version of the CNN file is being trained on 3033 images in total (1/3 of the total training set due to memory error since I increased the number of output classes from 3 to 4). The validation data was organized wrongly in this network because it was just fit into the network. Training should consist of a validation set and training set. This version of the CNN is trained using stochastic gradient training on a total of 6200 images, with half

```
16:22:52.946 master-replica-0 12/90 [==>.....] - ETA: 40s - loss: 9.0906 - acc: 0.3698
16:22:53.441 master-replica-0 13/90 [==>.....] - ETA: 39s - loss: 9.1079 - acc: 0.3726
16:22:53.934 master-replica-0 14/90 [==>.....] - ETA: 39s - loss: 8.8979 - acc: 0.3884
16:22:54.423 master-replica-0 15/90 [==>.....] - ETA: 38s - loss: 8.7307 - acc: 0.4000
16:22:54.905 master-replica-0 16/90 [===>.....] - ETA: 37s - loss: 8.5082 - acc: 0.4160
16:22:55.391 master-replica-0 17/90 [===>.....] - ETA: 37s - loss: 8.5411 - acc: 0.4136
16:22:55.887 master-replica-0 18/90 [===>.....] - ETA: 36s - loss: 8.3572 - acc: 0.4149
16:22:56.387 master-replica-0 19/90 [====>.....] - ETA: 36s - loss: 8.0705 - acc: 0.4194
16:22:56.874 master-replica-0 20/90 [====>.....] - ETA: 35s - loss: 7.7490 - acc: 0.4141
16:22:57.371 master-replica-0 21/90 [====>.....] - ETA: 35s - loss: 7.4609 - acc: 0.4077
16:22:57.868 master-replica-0 22/90 [=====>.....] - ETA: 34s - loss: 7.1898 - acc: 0.4034
16:22:58.349 master-replica-0 23/90 [=====>.....] - ETA: 34s - loss: 6.9293 - acc: 0.4022
16:22:58.824 master-replica-0 24/90 [=====>.....] - ETA: 33s - loss: 6.6899 - acc: 0.3997
16:22:59.318 master-replica-0 25/90 [======>.....] - ETA: 32s - loss: 6.4653 - acc: 0.4012
16:22:59.802 master-replica-0 26/90 [======>.....] - ETA: 32s - loss: 6.2582 - acc: 0.4026
16:23:00.281 master-replica-0 27/90 [======>.....] - ETA: 31s - loss: 6.0662 - acc: 0.4028
16:23:00.775 master-replica-0 28/90 [=======>.....] - ETA: 31s - loss: 5.8884 - acc: 0.4051
16:23:01.258 master-replica-0 29/90 [=======>.....] - ETA: 30s - loss: 5.7216 - acc: 0.4052
16:23:01.814 master-replica-0 30/90 [=======>.....] - ETA: 30s - loss: 5.5683 - acc: 0.4021
16:23:02.054 master-replica-0 31/90 [========>.....] - ETA: 29s - loss: 5.4356 - acc: 0.4020
16:23:02.537 master-replica-0 32/90 [========>.....] - ETA: 28s - loss: 5.3016 - acc: 0.4031
16:23:03.021 master-replica-0 33/90 [========>.....] - ETA: 28s - loss: 5.1739 - acc: 0.4023
16:23:03.514 master-replica-0 34/90 [=========>.....] - ETA: 27s - loss: 5.0556 - acc: 0.3987
16:23:03.997 master-replica-0 35/90 [=========>.....] - ETA: 27s - loss: 4.9434 - acc: 0.3945
16:23:04.482 master-replica-0 36/90 [=========>.....] - ETA: 26s - loss: 4.8363 - acc: 0.3974
16:23:04.966 master-replica-0 37/90 [==========>.....] - ETA: 26s - loss: 4.7379 - acc: 0.3959
16:23:05.447 master-replica-0 38/90 [==========>.....] - ETA: 25s - loss: 4.6428 - acc: 0.3929
16:23:05.931 master-replica-0 39/90 [==========>.....] - ETA: 25s - loss: 4.5538 - acc: 0.3925
16:23:06.423 master-replica-0 40/90 [===========>.....] - ETA: 24s - loss: 4.4677 - acc: 0.3897
```

Cloud ML Job, cnncopy_train_20171107_16… | All logs | Any log level | Jump to date

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```
16:40:31.456 master-replica-0 29/37 [=====================>.......] - ETA: 3s - loss: 0.8362 - acc: 0.6218
16:40:31.920 master-replica-0 30/37 [=====================>.......] - ETA: 3s - loss: 0.8344 - acc: 0.6198
16:40:32.375 master-replica-0 31/37 [=====================>.......] - ETA: 3s - loss: 0.8322 - acc: 0.6210
16:40:32.829 master-replica-0 32/37 [======================>.....] - ETA: 2s - loss: 0.8322 - acc: 0.6182
16:40:33.293 master-replica-0 33/37 [======================>.....] - ETA: 2s - loss: 0.8327 - acc: 0.6184
16:40:33.757 master-replica-0 34/37 [======================>....] - ETA: 1s - loss: 0.8312 - acc: 0.6195
16:40:34.233 master-replica-0 35/37 [=======================>...] - ETA: 1s - loss: 0.8309 - acc: 0.6196
16:40:34.707 master-replica-0 36/37 [=======================>...] - ETA: 0s - loss: 0.8332 - acc: 0.6181
16:40:34.856 master-replica-0 37/37 [=======================>...] - ETA: 0s - loss: 0.8354 - acc: 0.6174
16:40:34.856 master-replica-0 38/37 [==============================] - 17s 460ms/step - loss: 0.8323 - acc: 0.6208
16:40:45.688 master-replica-0 Traceback (most recent call last): File "/usr/lib/python2.7/runpy.py", line 162, in _run_module_as_main "__main__", fname, loader, pkg_…
16:40:46.117 master-replica-0 Test loss: 3.633359828
16:40:46.117 master-replica-0 Test accuracy 0.61
16:40:46.249 master-replica-0 Command '['python', '-m', u'trainer.cnncopy', u'--train-file', u'gs://cnninput_dataset/data/random_shapes.pkl', '--job-dir', u'gs://cnn…
16:40:46.250 master-replica-0 Module completed; cleaning up.
16:40:46.250 master-replica-0 Clean up finished.
16:41:12.919 The replica master 0 exited with a non-zero status of 1. Termination reason: Error. Traceback (most recent call last): File "/usr/lib/python2.7/runpy.py…
16:42:24.882 Finished tearing down TensorFlow.
16:43:09.789 Job failed.
```

the dataset in one generator and the other half in another generator, fitting into the CNN using real-data augmentation. The validation data, consisting of roughly 1800 images, isn't incorporated with the 2 training generators. The validation data is just incorporated separately as an additional generator. This just means that Keras will treat it as an additional input batch of data. Below is my CNN file in Keras of the above output:

```python
def train_model(loader = 'random_shapes.pkl', job_dir = './', **args):
    from keras.models import Sequential
    from keras.layers import Conv2D
    from keras.layers import MaxPooling2D
    from keras.layers import Flatten
    from keras.layers import Dense
    from keras.preprocessing.image import ImageDataGenerator
    from datetime import datetime # for filename conventions
    from tensorflow.python.lib.io import file_io # for better file I/O
    #import h5py # for saving the model
    import joblib

    #set the loggining path for ML Engine logging to storage bucket
    logs_path = job_dir + '/logs/' + datetime.now().isoformat()
    print('Using logs_path located at {}'.format(logs_path))

    with open(loader, 'rb') as f:
        save = joblib.load(f)
        train_shape_dataset = save['train_shape_dataset']
        train_y_dataset = save['train_y_dataset']
        train_shape_halfdataset = save['train_shape_halfdataset']
        train_y_halfdataset = save['train_y_halfdataset']
        #test_shape_dataset = save['test_shape_dataset']
        #test_y_dataset = save['test_y_dataset']
        #rectangle_ylabel = save['rectangle_ylabel']
        del save  # hint to help gc free up memory

    # Initialising the CNN, adding a layer
    classifier = Sequential()

    # Step 1 - Convolution
    classifier.add(Conv2D(32, (3, 3), input_shape = (300, 300, 3), activation

    # Step 2 - Pooling
    classifier.add(MaxPooling2D(pool_size = (2, 2)))

    # Adding a second convolutional layer
    classifier.add(Conv2D(32, (3, 3), activation = 'relu'))

    classifier.add(MaxPooling2D(pool_size = (2, 2)))

    # Step 3 - Flattening
    classifier.add(Flatten())

    #Dense function is used to add a fully connected layer at the end
    # Step 4 - Full connection
    classifier.add(Dense(units = 128, activation = 'relu'))
    classifier.add(Dense(units = 3, activation = 'softmax'))

    # Compiling the CNN #change 'binary_crossentropy to categorical'
    classifier.compile(optimizer = 'adam', loss = 'categorical_crossentropy', metrics = ['accuracy'])

    # Part 2 - Fitting the CNN to the images

    #augmentation configuration to prevent overfitting
    datagen = ImageDataGenerator(rescale = 1./255,
                                 shear_range = 0.2,
                                 zoom_range = 0.2,
                                 horizontal_flip = True)

    #augmentation configuration for rescaling test images
    test_datagen = ImageDataGenerator(rescale = 1./255)

    #circle_train = np.array(circle_train)
    #circle_ylabel = np.array(circle_ylabel)

    datagen.fit(train_shape_dataset)

    batches = 0
    #flow() creates batches of randomly transformed images
    for x_batch, y_batch in datagen.flow(train_shape_dataset,
                                         train_y_dataset,
                                         batch_size = 32,
                                         save_to_dir = "shapes/train/",
                                         save_prefix = "shapes",
                                         save_format = "jpeg"):
        #datagen.fit(x_batch) #or (x_batch, y_batch for output of classes)
        classifier.fit(x_batch, y_batch)
        batches += 1
        if batches >= len(train_shape_dataset) / 32:
            break #without break, generator will loop indefinitely

    datagen.fit(train_shape_halfdataset)

    batches1 = 0
    #flow() creates batches of randomly transformed images
    for x_batch1, y_batch1 in datagen.flow(train_shape_halfdataset,
                                           train_y_halfdataset,
                                           batch_size = 32,
                                           save_to_dir = "shapes/train/",
                                           save_prefix = "half_shapes",
                                           save_format = "jpeg"):
        #datagen.fit(x_batch) #or (x_batch, y_batch for output of classes)
        classifier.fit(x_batch1, y_batch1)
        batches1 += 1
        if batches >= len(train_shape_halfdataset) / 32:
            break #without break, generator will loop indefinitely

    datagen.fit(rectangle_train)

    batches2 = 0
    '''#flow() creates batches of randomly transformed images
    for x_batch2, y_batch2 in datagen.flow(rectangle_train,
                                           rectangle_ylabel,
                                           batch_size = 32,
                                           save_to_dir = "shapes/",
                                           save_prefix = "rectangles",
                                           save_format = "jpeg"):
        #datagen.fit(x_batch) #or (x_batch, y_batch for output of classes)
        classifier.fit(x_batch2, y_batch2)
        batches2 += 1
        if batches >= len(rectangle_train) / 32:
            break #without break, generator will loop indefinitely'''


    #classifier.summary() ?

    # Save the model locally
    classifier.save('model.h5')

    # Save the model to the Cloud Storage bucket's jobs directory
    with file_io.FileIO('classifiermodel.h5', mode='r') as input_f:
        with file_io.FileIO(job_dir + '/model.h5', mode='w+') as output_f:
            output_f.write(input_f.read())
```

I don’t know how the memory error occurred during pickle loading in the next version of the CNN. The data input that failed on memory error consists of 2100 circles, 2450 squares, 2100 triangles and 2450 squares for the training set, which is a total of 9100 images. The validation set contains 900 circles, 1050 rectangles, 1050 squares and 900 triangles, which is a total of 3900 images. The loading of the validation set is probably where the memory error occurred because joblib won’t be able to load a large numpy array of images greater than approximately 3500 images. In addition, the loss is greater and accuracy is less because this versions uses rmsprop, where the gradient is computed on a batch of data instead of for every input data. Rmsprop optimizer divides the gradient by a running average of its recent magnitude. According to fchollet, the designer of Keras, it is recommended to leave the parameters of the optimizer at their default values, except the learning rate which could be freely tuned. Fchollet also says that this optimizer is usually a good choice for recurrent neural networks, but I’m using a CNN network so I will go back to either Adam or SGD as optimizer. The test dataset consists of 2000 images for each shape. Here is the modification of the first Keras code:

```
def train_model(train_file = 'gs://cnninput_dataset/data/random_shapes.pkl',
                job_dir = './',
                **args):
    # set the loggining path for ML Engine logging to storage bucket
    logs_path = job_dir + '/logs/' + datetime.now().isoformat()
    print('Using logs_path located at {}'.format(logs_path))

    # need tensorflow to open file descriptor in order for google cloud to
    # process it (instead of 'with open(loader, 'rb' as f:')
    with file_io.FileIO(train_file, mode='r') as f:
        # joblib loads compressed files consistenting of large datasets
        # efficiently.
        save = joblib.load(f)
        train_shape_dataset = save['train_shape_dataset']
        train_y_dataset = save['train_y_dataset']
        #train_shape_halfdataset = save['train_shape_halfdataset']
        #train_y_halfdataset = save['train_y_halfdataset']
        validate_shape_dataset = save['validate_shape_dataset']
        validate_y_dataset = save['validate_y_dataset']
        del save  # hint to help gc free up memory

    # Initialising the CNN by adding a simple sequential layer
    classifier = Sequential()

    # Step 1:
    # Sequential layer consists of Convolution of type 3 by 3 convolutional
    # window with 32 output filters(dimensionality of output space) for each
    # input image uses reLU layers, which is a
    # ''a nonlinear layer, network with relu is trained faster without creating
    # a decrease in accuracy  @ adeshpande3.github.io''
    classifier.add(Conv2D(32, (3, 3), input_shape = (300, 300, 3), activation =

    # Step 2:
    # Max Pooling downsamples the number pixels per neuron and create a max
    # number that describes those features in a pool_size of 2 by 2
    # change pool size from (2,2) to (8,8) to (4,4)
    classifier.add(MaxPooling2D(pool_size = (4, 4)))

    # Adding a second convolutional layer, which is the same as the first one
    classifier.add(Conv2D(32, (3, 3), activation = 'relu'))
    # change pool size from (2,2) to (8,8)
    classifier.add(MaxPooling2D(pool_size = (4, 4)))
    # Dropout layers at the second convolutional layer before flattening
    classifier.add(Dropout(0.25))

    # Step 3: Flattening the convolutional layers for input into a fully
    # connected layer
    classifier.add(Flatten())

    # Step 4:
    # Fully connected: Dense function is used to add a fully connected
    # 3 layer perceptron at the end
    classifier.add(Dense(units = 128, activation = 'relu'))
    # dropout at the first layer perceptron
    classifier.add(Dropout(0.25))
    # adding second hidden layer - remove if accuracy decreases or loss increases
    classifier.add(Dense(units = 128, activation = 'relu'))
    classifier.add(Dropout(0.35))
    # softmax classifier as an activation from the last layer perceptron
    # units represent number of output classes
    # the output classes are triangle, rectangle, square, circle
    classifier.add(Dense(units = 4, activation = 'softmax'))

    # Compiling the CNN:
    # check if optimizer adam is good, categorical_crossentropy is for
    # multi-class network, multilabel with intersection needs binary_crossentropy
    # and sigmoid activations
    # change from adam to rmsprop
    classifier.compile(optimizer = 'adam',
                       loss = 'categorical_crossentropy',
                       metrics = ['accuracy'])

    # Part 2:
    # Feeding CNN the input images and fitting the CNN
    # CNN uses data augmentation configuration to prevent overfitting
    # datagen augmentation is for training data input
    datagen = ImageDataGenerator(rescale = 1./255,
                                 shear_range = 0.2,
                                 zoom_range = 0.2,
                                 horizontal_flip = True)

    # augmentation configuration for rescaling images used for validation
    validate_datagen = ImageDataGenerator(rescale = 1./255)
    # the test set data augmentation only rescales the images
    # is this enough to test the network correctly? if you want a more manual
    # representation of fitting the input data use for loop
    validate_datagen.fit(validate_shape_dataset)
    validate_generator = datagen.flow(validate_shape_dataset,
                                      validate_y_dataset,
                                      batch_size = 32)

    # the code below fits the training data that is loaded by pickle file
    # to prevent memory error, 1/2 of the number of data inputs are feed first
    # an epoch define the input being run once from
    # the architecture of the cnn is:
    # 2DConv -> ReLU -> MaxPool -> 2DConv -> ReLU -> MaxPool -> Flatten() ->
    # Fully connected 2-layer neural network
    # 128 neurons for the first layer -> ReLU -> 128 for hidden layer -> ReLU
    # -> 3 neurons for output layer -> softmax

    # compute quantities required for featurewise normalization
    datagen.fit(train_shape_dataset)
    #early_stopping = EarlyStopping(monitor = 'val_loss', patience = 2)
    # fits the model on batches with real-time data augmentation
    train_generator = datagen.flow(train_shape_dataset,
                                   train_y_dataset,
                                   batch_size = 32)
    classifier.fit_generator(train_generator, #train generator
                             steps_per_epoch = len(train_shape_dataset) / 32,
                             epochs = 20,
                             validation_data =  validate_generator,
                             validation_steps = 300)

    '''#early stopping prevent overfitting after the second half
    early_stopping = EarlyStopping(monitor = 'val_loss', patience = 2)
    # feed the same data generator the other half of the dataset
    datagen.fit(train_shape_halfdataset)
    train_generator_half = datagen.flow(train_shape_halfdataset,
                                        train_y_halfdataset,
                                        batch_size = 32)
    classifier.fit_generator(train_generator_half,
                             steps_per_epoch = len(train_shape_halfdataset) / 32,
                             epochs = 20,
                             callbacks = [early_stopping],
                               validation_data =  validate_generator,
                               validation_steps = 300)'''

     #evaluate the model
     score = classifier.evaluate(validate_shape_dataset,
                                 validate_y_dataset,
                                 verbose = 0)
     print ("Test loss: ", score[0])
     print ("Test accuracy", score[1])

     classifier.save('model.h5')

     # Save the model to the Cloud Storage bucket's jobs directory
     with file_io.FileIO('model.h5', mode='r') as input_f:
         with file_io.FileIO(job_dir + '/model.h5', mode='w+') as output_f:
             output_f.write(input_f.read())


if __name__ == '__main__':
    # Parse the input arguments for common Cloud ML Engine options
    parser = argparse.ArgumentParser()
    parser.add_argument('--train-file',
                        help='local path of pickle file')
    parser.add_argument('--job-dir',
                        help='Cloud storage bucket to export the model')
    args = parser.parse_args()
    arguments = args.__dict__
    train_model(**arguments)
```

The loss at the beginning of training for this CNN modification is correct because -ln(1/4) = 1.3862943611, which is very close as indicated in the output of the CNN.

Here is the output from Google Cloud Machine Learning Engine executed on November 9th, 2017.

```
E  Using TensorFlow backend.
I  successfully opened CUDA library libcublas.so.8.0 locally
I  successfully opened CUDA library libcudnn.so.5 locally
I  successfully opened CUDA library libcufft.so.8.0 locally
I  successfully opened CUDA library libcuda.so.1 locally
I  successfully opened CUDA library libcurand.so.8.0 locally
W  The TensorFlow library wasn't compiled to use AVX2 instructions, but these are available on your machine and could speed up CPU computations.
W  The TensorFlow library wasn't compiled to use FMA instructions, but these are available on your machine and could speed up CPU computations.
I  successful NUMA node read from SysFS had negative value (-1), but there must be at least one NUMA node, so returning NUMA node zero
I  Found device 0 with properties:
E  name: Tesla K80
E  major: 3 minor: 7 memoryClockRate (GHz) 0.8235
E  pciBusID 0000:00:04.0
E  Total memory: 11.17GiB
E  Free memory: 11.11GiB
I  DMA: 0
I  0:   Y
I  Creating TensorFlow device (/gpu:0) -> (device: 0, name: Tesla K80, pci bus id: 0000:00:04.0)
I  Creating TensorFlow device (/gpu:0) -> (device: 0, name: Tesla K80, pci bus id: 0000:00:04.0)
I  Using logs_path located at gs://cnninput_dataset/cnncopy_train_20171109_022628/logs/2017-11-09T07:26:51.959549
Epoch 1/20
 1/94 [..............................] - ETA: 2:51 - loss: 1.4025 - acc: 0.2188
 2/94 [..............................] - ETA: 1:31 - loss: 1.3896 - acc: 0.2500
 3/94 [..............................] - ETA: 1:04 - loss: 1.3566 - acc: 0.2917
 4/94 [>.............................] - ETA: 51s - loss: 1.4008 - acc: 0.2734
 5/94 [>.............................] - ETA: 46s - loss: 1.4005 - acc: 0.2750
 6/94 [>.............................] - ETA: 45s - loss: 1.4118 - acc: 0.2500
 7/94 [=>............................] - ETA: 44s - loss: 1.4092 - acc: 0.2500
 8/94 [=>............................] - ETA: 43s - loss: 1.4071 - acc: 0.2500
 9/94 [=>............................] - ETA: 43s - loss: 1.4063 - acc: 0.2604
10/94 [==>...........................] - ETA: 42s - loss: 1.4048 - acc: 0.2531
11/94 [==>...........................] - ETA: 41s - loss: 1.3998 - acc: 0.2614
12/94 [==>...........................] - ETA: 41s - loss: 1.4031 - acc: 0.2578
13/94 [===>..........................] - ETA: 40s - loss: 1.4018 - acc: 0.2644
14/94 [===>..........................] - ETA: 39s - loss: 1.3994 - acc: 0.2723
15/94 [===>..........................] - ETA: 39s - loss: 1.3985 - acc: 0.2729
16/94 [====>.........................] - ETA: 38s - loss: 1.3972 - acc: 0.2773
17/94 [====>.........................] - ETA: 38s - loss: 1.3968 - acc: 0.2757
18/94 [====>.........................] - ETA: 37s - loss: 1.3973 - acc: 0.2691
19/94 [=====>........................] - ETA: 37s - loss: 1.3966 - acc: 0.2671
20/94 [=====>........................] - ETA: 36s - loss: 1.3944 - acc: 0.2694
21/94 [=====>........................] - ETA: 35s - loss: 1.3923 - acc: 0.2714
22/94 [=====>........................] - ETA: 35s - loss: 1.3947 - acc: 0.2676
23/94 [======>.......................] - ETA: 34s - loss: 1.3939 - acc: 0.2709
24/94 [======>.......................] - ETA: 34s - loss: 1.3934 - acc: 0.2726
25/94 [======>.......................] - ETA: 33s - loss: 1.3936 - acc: 0.2680
26/94 [=======>......................] - ETA: 33s - loss: 1.3926 - acc: 0.2709
27/94 [=======>......................] - ETA: 32s - loss: 1.3919 - acc: 0.2690
28/94 [=======>......................] - ETA: 32s - loss: 1.3923 - acc: 0.2683
29/94 [========>.....................] - ETA: 31s - loss: 1.3920 - acc: 0.2655
30/94 [========>.....................] - ETA: 31s - loss: 1.3912 - acc: 0.2650
31/94 [========>.....................] - ETA: 30s - loss: 1.3910 - acc: 0.2665
32/94 [=========>....................] - ETA: 30s - loss: 1.3908 - acc: 0.2680
33/94 [=========>....................] - ETA: 29s - loss: 1.3905 - acc: 0.2674
34/94 [=========>....................] - ETA: 29s - loss: 1.3910 - acc: 0.2651
35/94 [==========>...................] - ETA: 29s - loss: 1.3909 - acc: 0.2646
36/94 [==========>...................] - ETA: 28s - loss: 1.3908 - acc: 0.2660
37/94 [==========>...................] - ETA: 28s - loss: 1.3905 - acc: 0.2672
38/94 [==========>...................] - ETA: 27s - loss: 1.3901 - acc: 0.2676
39/94 [==========>...................] - ETA: 27s - loss: 1.3900 - acc: 0.2695
40/94 [==========>...................] - ETA: 26s - loss: 1.3897 - acc: 0.2698
41/94 [==========>...................] - ETA: 26s - loss: 1.3892 - acc: 0.2701
42/94 [===========>..................] - ETA: 25s - loss: 1.3885 - acc: 0.2711
43/94 [===========>..................] - ETA: 25s - loss: 1.3887 - acc: 0.2728
44/94 [===========>..................] - ETA: 24s - loss: 1.3878 - acc: 0.2751
45/94 [===========>..................] - ETA: 24s - loss: 1.3864 - acc: 0.2767
46/94 [============>.................] - ETA: 23s - loss: 1.3869 - acc: 0.2747
47/94 [============>.................] - ETA: 23s - loss: 1.3866 - acc: 0.2775
48/94 [============>.................] - ETA: 22s - loss: 1.3867 - acc: 0.2756
49/94 [============>.................] - ETA: 22s - loss: 1.3862 - acc: 0.2758
50/94 [============>.................] - ETA: 21s - loss: 1.3869 - acc: 0.2740
51/94 [=============>................] - ETA: 21s - loss: 1.3871 - acc: 0.2735
52/94 [=============>................] - ETA: 20s - loss: 1.3871 - acc: 0.2743
53/94 [=============>................] - ETA: 20s - loss: 1.3867 - acc: 0.2779
54/94 [==============>...............] - ETA: 19s - loss: 1.3867 - acc: 0.2780
55/94 [==============>...............] - ETA: 19s - loss: 1.3862 - acc: 0.2798
56/94 [==============>...............] - ETA: 18s - loss: 1.3862 - acc: 0.2792
57/94 [===============>..............] - ETA: 18s - loss: 1.3858 - acc: 0.2804
58/94 [===============>..............] - ETA: 17s - loss: 1.3853 - acc: 0.2831
59/94 [===============>..............] - ETA: 17s - loss: 1.3853 - acc: 0.2804
60/94 [===============>..............] - ETA: 16s - loss: 1.3848 - acc: 0.2825
61/94 [================>.............] - ETA: 16s - loss: 1.3847 - acc: 0.2835
62/94 [================>.............] - ETA: 15s - loss: 1.3838 - acc: 0.2845
63/94 [================>.............] - ETA: 15s - loss: 1.3838 - acc: 0.2849
64/94 [=================>............] - ETA: 14s - loss: 1.3835 - acc: 0.2853
65/94 [=================>............] - ETA: 14s - loss: 1.3835 - acc: 0.2862
66/94 [=================>............] - ETA: 13s - loss: 1.3832 - acc: 0.2843
67/94 [==================>...........] - ETA: 13s - loss: 1.3830 - acc: 0.2838
68/94 [==================>...........] - ETA: 12s - loss: 1.3829 - acc: 0.2833
69/94 [==================>...........] - ETA: 12s - loss: 1.3830 - acc: 0.2819
70/94 [===================>..........] - ETA: 12s - loss: 1.3833 - acc: 0.2810
71/94 [===================>..........] - ETA: 11s - loss: 1.3830 - acc: 0.2819
72/94 [===================>..........] - ETA: 11s - loss: 1.3822 - acc: 0.2845
73/94 [====================>.........] - ETA: 10s - loss: 1.3810 - acc: 0.2853
74/94 [====================>.........] - ETA: 10s - loss: 1.3813 - acc: 0.2844
75/94 [====================>.........] - ETA: 9s - loss: 1.3810 - acc: 0.2847
76/94 [=====================>........] - ETA: 9s - loss: 1.3805 - acc: 0.2843
77/94 [=====================>........] - ETA: 8s - loss: 1.3804 - acc: 0.2847
78/94 [=====================>........] - ETA: 8s - loss: 1.3797 - acc: 0.2854
79/94 [=====================>........] - ETA: 7s - loss: 1.3790 - acc: 0.2865
80/94 [======================>.......] - ETA: 7s - loss: 1.3787 - acc: 0.2861
81/94 [======================>.......] - ETA: 6s - loss: 1.3777 - acc: 0.2876
82/94 [======================>.......] - ETA: 6s - loss: 1.3775 - acc: 0.2890
83/94 [=======================>......] - ETA: 5s - loss: 1.3768 - acc: 0.2897
84/94 [=======================>......] - ETA: 5s - loss: 1.3761 - acc: 0.2896
85/94 [=======================>......] - ETA: 4s - loss: 1.3761 - acc: 0.2898
86/94 [=======================>...] - ETA: 4s - loss: 1.3755 - acc: 0.2919
87/94 [=======================>...] - ETA: 3s - loss: 1.3748 - acc: 0.2932
88/94 [=======================>...] - ETA: 3s - loss: 1.3741 - acc: 0.2938
89/94 [========================>..] - ETA: 2s - loss: 1.3737 - acc: 0.2947
90/94 [========================>..] - ETA: 2s - loss: 1.3737 - acc: 0.2942
91/94 [========================>..] - ETA: 1s - loss: 1.3733 - acc: 0.2948
92/94 [========================>.] - ETA: 1s - loss: 1.3726 - acc: 0.2963
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93/94 [==============================>.] - ETA: 0s - loss: 1.3719 - acc: 0.2975
94/94 [==============================>.] - ETA: 0s - loss: 1.3710 - acc: 0.2983
95/94 [==============================] - 192s 2s/step - loss: 1.3712 - acc: 0.2991 - val_loss: 1.3440 - val_acc: 0.3217
Epoch 2/20
1/94 [..............................] - ETA: 15s - loss: 1.2812 - acc: 0.5312
2/94 [..............................] - ETA: 15s - loss: 1.2861 - acc: 0.5000
3/94 [..............................] - ETA: 14s - loss: 1.2933 - acc: 0.4375
4/94 [>.............................] - ETA: 13s - loss: 1.2907 - acc: 0.4141
5/94 [>.............................] - ETA: 13s - loss: 1.3040 - acc: 0.4062
6/94 [>.............................] - ETA: 13s - loss: 1.3295 - acc: 0.3750
7/94 [=>............................] - ETA: 12s - loss: 1.3309 - acc: 0.3750
8/94 [=>............................] - ETA: 12s - loss: 1.3210 - acc: 0.3867
9/94 [=>............................] - ETA: 12s - loss: 1.3127 - acc: 0.3785
10/94 [==>...........................] - ETA: 11s - loss: 1.3131 - acc: 0.3688
11/94 [==>...........................] - ETA: 11s - loss: 1.3116 - acc: 0.3693
12/94 [==>...........................] - ETA: 11s - loss: 1.3048 - acc: 0.3698
13/94 [===>..........................] - ETA: 11s - loss: 1.3051 - acc: 0.3750
14/94 [===>..........................] - ETA: 11s - loss: 1.3101 - acc: 0.3705
15/94 [===>..........................] - ETA: 12s - loss: 1.3149 - acc: 0.3604
16/94 [====>.........................] - ETA: 13s - loss: 1.3105 - acc: 0.3691
17/94 [====>.........................] - ETA: 14s - loss: 1.3127 - acc: 0.3658
18/94 [====>.........................] - ETA: 15s - loss: 1.3196 - acc: 0.3576
19/94 [=====>........................] - ETA: 16s - loss: 1.3164 - acc: 0.3569
20/94 [=====>........................] - ETA: 17s - loss: 1.3168 - acc: 0.3563
21/94 [=====>........................] - ETA: 18s - loss: 1.3185 - acc: 0.3542
22/94 [=====>........................] - ETA: 18s - loss: 1.3201 - acc: 0.3537
23/94 [======>.......................] - ETA: 19s - loss: 1.3239 - acc: 0.3519
24/94 [======>.......................] - ETA: 19s - loss: 1.3231 - acc: 0.3529
25/94 [======>.......................] - ETA: 19s - loss: 1.3233 - acc: 0.3550
26/94 [=======>......................] - ETA: 20s - loss: 1.3211 - acc: 0.3522
27/94 [=======>......................] - ETA: 20s - loss: 1.3255 - acc: 0.3484
28/94 [=======>......................] - ETA: 20s - loss: 1.3289 - acc: 0.3460
29/94 [========>.....................] - ETA: 20s - loss: 1.3291 - acc: 0.3416
30/94 [========>.....................] - ETA: 20s - loss: 1.3266 - acc: 0.3479
31/94 [========>.....................] - ETA: 20s - loss: 1.3252 - acc: 0.3508
32/94 [=========>....................] - ETA: 20s - loss: 1.3233 - acc: 0.3535
33/94 [=========>....................] - ETA: 20s - loss: 1.3218 - acc: 0.3532
34/94 [=========>....................] - ETA: 20s - loss: 1.3186 - acc: 0.3575
35/94 [==========>...................] - ETA: 20s - loss: 1.3187 - acc: 0.3536
36/94 [==========>...................] - ETA: 20s - loss: 1.3237 - acc: 0.3498
37/94 [==========>...................] - ETA: 20s - loss: 1.3223 - acc: 0.3539
38/94 [===========>..................] - ETA: 20s - loss: 1.3194 - acc: 0.3569
39/94 [===========>..................] - ETA: 20s - loss: 1.3183 - acc: 0.3542
40/94 [===========>..................] - ETA: 19s - loss: 1.3132 - acc: 0.3586
41/94 [===========>..................] - ETA: 19s - loss: 1.3206 - acc: 0.3567
42/94 [============>.................] - ETA: 19s - loss: 1.3201 - acc: 0.3579
43/94 [============>.................] - ETA: 19s - loss: 1.3181 - acc: 0.3612
44/94 [============>.................] - ETA: 19s - loss: 1.3178 - acc: 0.3629
45/94 [=============>................] - ETA: 18s - loss: 1.3157 - acc: 0.3646
46/94 [=============>................] - ETA: 18s - loss: 1.3162 - acc: 0.3628
47/94 [=============>................] - ETA: 18s - loss: 1.3156 - acc: 0.3617
48/94 [==============>...............] - ETA: 17s - loss: 1.3155 - acc: 0.3607
49/94 [==============>...............] - ETA: 17s - loss: 1.3161 - acc: 0.3610
51/94 [===============>..............] - ETA: 17s - loss: 1.3130 - acc: 0.3627
52/94 [===============>..............] - ETA: 16s - loss: 1.3134 - acc: 0.3624
53/94 [===============>..............] - ETA: 16s - loss: 1.3128 - acc: 0.3620
54/94 [================>.............] - ETA: 16s - loss: 1.3173 - acc: 0.3605
55/94 [================>.............] - ETA: 15s - loss: 1.3165 - acc: 0.3597
56/94 [================>.............] - ETA: 15s - loss: 1.3159 - acc: 0.3583
57/94 [================>.............] - ETA: 15s - loss: 1.3159 - acc: 0.3575
58/94 [================>.............] - ETA: 14s - loss: 1.3164 - acc: 0.3567
59/94 [================>.............] - ETA: 14s - loss: 1.3159 - acc: 0.3575
60/94 [================>.............] - ETA: 14s - loss: 1.3158 - acc: 0.3578
61/94 [=================>............] - ETA: 13s - loss: 1.3152 - acc: 0.3576
62/94 [=================>............] - ETA: 13s - loss: 1.3160 - acc: 0.3564
63/94 [=================>............] - ETA: 13s - loss: 1.3142 - acc: 0.3562
64/94 [==================>...........] - ETA: 12s - loss: 1.3132 - acc: 0.3569
65/94 [==================>...........] - ETA: 12s - loss: 1.3112 - acc: 0.3577
66/94 [==================>...........] - ETA: 11s - loss: 1.3109 - acc: 0.3556
67/94 [==================>...........] - ETA: 11s - loss: 1.3127 - acc: 0.3540
68/94 [==================>...........] - ETA: 11s - loss: 1.3129 - acc: 0.3543
69/94 [==================>...........] - ETA: 10s - loss: 1.3124 - acc: 0.3528
70/94 [===================>..........] - ETA: 10s - loss: 1.3116 - acc: 0.3540
71/94 [===================>..........] - ETA: 9s - loss: 1.3121 - acc: 0.3526
72/94 [===================>..........] - ETA: 9s - loss: 1.3127 - acc: 0.3494
73/94 [===================>..........] - ETA: 9s - loss: 1.3123 - acc: 0.3510
74/94 [===================>..........] - ETA: 8s - loss: 1.3122 - acc: 0.3497
75/94 [===================>..........] - ETA: 8s - loss: 1.3134 - acc: 0.3479
76/94 [====================>.........] - ETA: 7s - loss: 1.3137 - acc: 0.3458
77/94 [====================>.........] - ETA: 7s - loss: 1.3126 - acc: 0.3468
78/94 [====================>.........] - ETA: 7s - loss: 1.3112 - acc: 0.3480
79/94 [====================>.........] - ETA: 6s - loss: 1.3111 - acc: 0.3483
80/94 [====================>.....] - ETA: 6s - loss: 1.3115 - acc: 0.3475
81/94 [====================>.....] - ETA: 5s - loss: 1.3100 - acc: 0.3486
82/94 [====================>.....] - ETA: 5s - loss: 1.3087 - acc: 0.3497
83/94 [=====================>....] - ETA: 5s - loss: 1.3075 - acc: 0.3496
84/94 [=====================>....] - ETA: 4s - loss: 1.3076 - acc: 0.3495
85/94 [=====================>....] - ETA: 4s - loss: 1.3078 - acc: 0.3480
86/94 [=====================>...] - ETA: 3s - loss: 1.3065 - acc: 0.3479
87/94 [=====================>...] - ETA: 3s - loss: 1.3061 - acc: 0.3483
88/94 [=====================>...] - ETA: 2s - loss: 1.3055 - acc: 0.3496
89/94 [======================>..] - ETA: 2s - loss: 1.3051 - acc: 0.3496
90/94 [======================>..] - ETA: 2s - loss: 1.3068 - acc: 0.3478
91/94 [======================>..] - ETA: 1s - loss: 1.3080 - acc: 0.3467
92/94 [==============================>.] - ETA: 1s - loss: 1.3063 - acc: 0.3477
93/94 [==============================>.] - ETA: 0s - loss: 1.3057 - acc: 0.3483
94/94 [==============================>.] - ETA: 0s - loss: 1.3046 - acc: 0.3492
95/94 [==============================] - 191s 2s/step - loss: 1.3037 - acc: 0.3508 - val_loss: 1.2360 - val_acc: 0.3800
Epoch 3/20
1/94 [..............................] - ETA: 15s - loss: 1.3007 - acc: 0.4375
2/94 [..............................] - ETA: 15s - loss: 1.2292 - acc: 0.4375
3/94 [..............................] - ETA: 15s - loss: 1.2295 - acc: 0.4271
4/94 [>.............................] - ETA: 14s - loss: 1.2406 - acc: 0.3906
5/94 [>.............................] - ETA: 13s - loss: 1.2271 - acc: 0.3812
6/94 [>.............................] - ETA: 13s - loss: 1.2247 - acc: 0.3802
7/94 [=>............................] - ETA: 13s - loss: 1.2183 - acc: 0.3839
8/94 [=>............................] - ETA: 12s - loss: 1.2190 - acc: 0.3867
9/94 [=>............................] - ETA: 12s - loss: 1.2302 - acc: 0.3958
10/94 [==>...........................] - ETA: 12s - loss: 1.2274 - acc: 0.3937
11/94 [==>...........................] - ETA: 11s - loss: 1.2316 - acc: 0.3864
12/94 [==>...........................] - ETA: 11s - loss: 1.2356 - acc: 0.3906
13/94 [===>..........................] - ETA: 11s - loss: 1.2288 - acc: 0.3942
14/94 [===>..........................] - ETA: 11s - loss: 1.2555 - acc: 0.3839
15/94 [===>..........................] - ETA: 12s - loss: 1.2673 - acc: 0.3792
16/94 [====>.........................] - ETA: 13s - loss: 1.2665 - acc: 0.3789
17/94 [====>.........................] - ETA: 15s - loss: 1.2650 - acc: 0.3842

18/94 [====>.....] - ETA: 16s - loss: 1.2606 - acc: 0.3837
19/94 [=====>.....] - ETA: 17s - loss: 1.2560 - acc: 0.3849
20/94 [=====>.....] - ETA: 17s - loss: 1.2544 - acc: 0.3844
21/94 [=====>.....] - ETA: 18s - loss: 1.2544 - acc: 0.3839
22/94 [=====>.....] - ETA: 18s - loss: 1.2486 - acc: 0.3864
23/94 [======>.....] - ETA: 19s - loss: 1.2472 - acc: 0.3859
24/94 [======>.....] - ETA: 19s - loss: 1.2480 - acc: 0.3854
25/94 [======>.....] - ETA: 20s - loss: 1.2542 - acc: 0.3787
26/94 [=======>.....] - ETA: 20s - loss: 1.2524 - acc: 0.3798
27/94 [=======>.....] - ETA: 20s - loss: 1.2482 - acc: 0.3785
28/94 [=======>.....] - ETA: 20s - loss: 1.2450 - acc: 0.3750
29/94 [========>.....] - ETA: 20s - loss: 1.2427 - acc: 0.3772
30/94 [========>.....] - ETA: 20s - loss: 1.2419 - acc: 0.3833
31/94 [========>.....] - ETA: 20s - loss: 1.2435 - acc: 0.3790
32/94 [=========>.....] - ETA: 20s - loss: 1.2415 - acc: 0.3789
33/94 [=========>.....] - ETA: 20s - loss: 1.2396 - acc: 0.3788
34/94 [=========>.....] - ETA: 20s - loss: 1.2383 - acc: 0.3778
35/94 [==========>.....] - ETA: 20s - loss: 1.2356 - acc: 0.3768
36/94 [==========>.....] - ETA: 20s - loss: 1.2415 - acc: 0.3741
37/94 [==========>.....] - ETA: 20s - loss: 1.2405 - acc: 0.3725
38/94 [===========>.....] - ETA: 20s - loss: 1.2384 - acc: 0.3750
39/94 [===========>.....] - ETA: 20s - loss: 1.2377 - acc: 0.3758
40/94 [===========>.....] - ETA: 20s - loss: 1.2381 - acc: 0.3789
41/94 [===========>.....] - ETA: 19s - loss: 1.2392 - acc: 0.3788
42/94 [============>.....] - ETA: 19s - loss: 1.2407 - acc: 0.3802
43/94 [============>.....] - ETA: 19s - loss: 1.2415 - acc: 0.3808
44/94 [============>.....] - ETA: 19s - loss: 1.2408 - acc: 0.3814
45/94 [=============>.....] - ETA: 18s - loss: 1.2400 - acc: 0.3812
46/94 [=============>.....] - ETA: 18s - loss: 1.2392 - acc: 0.3784
47/94 [=============>.....] - ETA: 18s - loss: 1.2352 - acc: 0.3836
48/94 [==============>.....] - ETA: 18s - loss: 1.2343 - acc: 0.3861
49/94 [==============>.....] - ETA: 17s - loss: 1.2338 - acc: 0.3865
50/94 [==============>.....] - ETA: 17s - loss: 1.2354 - acc: 0.3862
51/94 [===============>.....] - ETA: 17s - loss: 1.2324 - acc: 0.3897
52/94 [===============>.....] - ETA: 16s - loss: 1.2323 - acc: 0.3882
53/94 [===============>.....] - ETA: 16s - loss: 1.2330 - acc: 0.3915
54/94 [================>.....] - ETA: 16s - loss: 1.2323 - acc: 0.3889
55/94 [================>.....] - ETA: 15s - loss: 1.2344 - acc: 0.3881
56/94 [================>.....] - ETA: 15s - loss: 1.2340 - acc: 0.3895
57/94 [================>.....] - ETA: 15s - loss: 1.2328 - acc: 0.3893
58/94 [=================>.....] - ETA: 14s - loss: 1.2308 - acc: 0.3901
59/94 [=================>.....] - ETA: 14s - loss: 1.2280 - acc: 0.3935
60/94 [=================>.....] - ETA: 14s - loss: 1.2261 - acc: 0.3932
61/94 [==================>.....] - ETA: 13s - loss: 1.2246 - acc: 0.3945
62/94 [==================>.....] - ETA: 13s - loss: 1.2274 - acc: 0.3942
63/94 [==================>.....] - ETA: 13s - loss: 1.2294 - acc: 0.3924
64/94 [==================>.....] - ETA: 12s - loss: 1.2307 - acc: 0.3906
65/94 [==================>.....] - ETA: 12s - loss: 1.2310 - acc: 0.3904
66/94 [==================>.....] - ETA: 11s - loss: 1.2294 - acc: 0.3906
67/94 [===================>.....] - ETA: 11s - loss: 1.2279 - acc: 0.3913
68/94 [===================>.....] - ETA: 11s - loss: 1.2292 - acc: 0.3906
69/94 [===================>.....] - ETA: 10s - loss: 1.2281 - acc: 0.3913
70/94 [====================>.....] - ETA: 10s - loss: 1.2291 - acc: 0.3897
71/94 [====================>.....] - ETA: 9s - loss: 1.2307 - acc: 0.3895
72/94 [====================>.....] - ETA: 9s - loss: 1.2280 - acc: 0.3911
73/94 [=====================>.....] - ETA: 9s - loss: 1.2269 - acc: 0.3908
74/94 [=====================>.....] - ETA: 8s - loss: 1.2251 - acc: 0.3923
75/94 [=====================>.....] - ETA: 8s - loss: 1.2265 - acc: 0.3917
76/94 [=====================>.....] - ETA: 7s - loss: 1.2276 - acc: 0.3898
77/94 [=====================>.....] - ETA: 7s - loss: 1.2294 - acc: 0.3872
78/94 [=====================>.....] - ETA: 7s - loss: 1.2282 - acc: 0.3894
79/94 [=====================>.....] - ETA: 6s - loss: 1.2277 - acc: 0.3892
80/94 [=====================>.....] - ETA: 6s - loss: 1.2275 - acc: 0.3895
81/94 [=====================>.....] - ETA: 5s - loss: 1.2257 - acc: 0.3912
82/94 [=====================>.....] - ETA: 5s - loss: 1.2241 - acc: 0.3914
83/94 [======================>....] - ETA: 5s - loss: 1.2242 - acc: 0.3912
84/94 [======================>....] - ETA: 4s - loss: 1.2232 - acc: 0.3917
85/94 [======================>....] - ETA: 4s - loss: 1.2236 - acc: 0.3917
86/94 [======================>...] - ETA: 3s - loss: 1.2240 - acc: 0.3907
87/94 [======================>...] - ETA: 3s - loss: 1.2240 - acc: 0.3895
88/94 [======================>...] - ETA: 2s - loss: 1.2229 - acc: 0.3893
89/94 [=======================>..] - ETA: 2s - loss: 1.2219 - acc: 0.3902
90/94 [=======================>..] - ETA: 2s - loss: 1.2202 - acc: 0.3918
91/94 [=======================>..] - ETA: 1s - loss: 1.2204 - acc: 0.3916
92/94 [========================>.] - ETA: 1s - loss: 1.2192 - acc: 0.3917
93/94 [========================>.] - ETA: 0s - loss: 1.2203 - acc: 0.3912
94/94 [========================>.] - ETA: 0s - loss: 1.2219 - acc: 0.3904
95/94 [==============================] - 188s 2s/step - loss: 1.2214 - acc: 0.3915 - val_loss: 1.1272 - val_acc: 0.4431
Epoch 4/20
 1/94 [.....] - ETA: 16s - loss: 1.0405 - acc: 0.5000
 2/94 [.....] - ETA: 15s - loss: 1.0678 - acc: 0.5312
 3/94 [.....] - ETA: 14s - loss: 1.0883 - acc: 0.4896
 4/94 [>.....] - ETA: 14s - loss: 1.0864 - acc: 0.4609
 5/94 [>.....] - ETA: 13s - loss: 1.0686 - acc: 0.4625
 6/94 [>.....] - ETA: 13s - loss: 1.0807 - acc: 0.4635
 7/94 [=>.....] - ETA: 12s - loss: 1.0831 - acc: 0.4688
 8/94 [=>.....] - ETA: 12s - loss: 1.0931 - acc: 0.4531
 9/94 [=>.....] - ETA: 12s - loss: 1.1091 - acc: 0.4514
10/94 [==>.....] - ETA: 11s - loss: 1.0966 - acc: 0.4594
11/94 [==>.....] - ETA: 11s - loss: 1.0954 - acc: 0.4517
12/94 [==>.....] - ETA: 11s - loss: 1.0997 - acc: 0.4375
13/94 [===>.....] - ETA: 11s - loss: 1.0926 - acc: 0.4423
14/94 [===>.....] - ETA: 10s - loss: 1.0966 - acc: 0.4327
15/94 [===>.....] - ETA: 11s - loss: 1.0887 - acc: 0.4330
16/94 [====>.....] - ETA: 13s - loss: 1.0804 - acc: 0.4411
17/94 [====>.....] - ETA: 14s - loss: 1.0888 - acc: 0.4409
18/94 [====>.....] - ETA: 15s - loss: 1.0871 - acc: 0.4407
19/94 [=====>.....] - ETA: 16s - loss: 1.0821 - acc: 0.4471
20/94 [=====>.....] - ETA: 17s - loss: 1.0871 - acc: 0.4435
21/94 [=====>.....] - ETA: 17s - loss: 1.0870 - acc: 0.4417
22/94 [=====>.....] - ETA: 18s - loss: 1.0884 - acc: 0.4373
23/94 [======>.....] - ETA: 18s - loss: 1.0873 - acc: 0.4332
24/94 [======>.....] - ETA: 19s - loss: 1.0986 - acc: 0.4230
25/94 [======>.....] - ETA: 19s - loss: 1.1035 - acc: 0.4223
26/94 [=======>.....] - ETA: 19s - loss: 1.1002 - acc: 0.4277
27/94 [=======>.....] - ETA: 20s - loss: 1.0980 - acc: 0.4292
28/94 [=======>.....] - ETA: 20s - loss: 1.0948 - acc: 0.4340
29/94 [========>.....] - ETA: 20s - loss: 1.0880 - acc: 0.4406
30/94 [========>.....] - ETA: 20s - loss: 1.0871 - acc: 0.4384
31/94 [========>.....] - ETA: 20s - loss: 1.0859 - acc: 0.4394
32/94 [=========>.....] - ETA: 20s - loss: 1.0823 - acc: 0.4393
33/94 [=========>.....] - ETA: 20s - loss: 1.0814 - acc: 0.4383
34/94 [=========>.....] - ETA: 20s - loss: 1.0887 - acc: 0.4318
35/94 [==========>.....] - ETA: 20s - loss: 1.0990 - acc: 0.4293
36/94 [==========>.....] - ETA: 20s - loss: 1.1002 - acc: 0.4304
37/94 [==========>.....] - ETA: 20s - loss: 1.0999 - acc: 0.4298
38/94 [===========>.....] - ETA: 19s - loss: 1.1019 - acc: 0.4300

39/94 [===========>..................] - ETA: 19s - loss: 1.0984 - acc: 0.4302
40/94 [===========>..................] - ETA: 19s - loss: 1.0950 - acc: 0.4335
41/94 [===========>..................] - ETA: 19s - loss: 1.0976 - acc: 0.4320
42/94 [===========>..................] - ETA: 19s - loss: 1.0961 - acc: 0.4299
43/94 [===========>..................] - ETA: 19s - loss: 1.0933 - acc: 0.4338
44/94 [===========>..................] - ETA: 18s - loss: 1.0939 - acc: 0.4338
45/94 [============>.................] - ETA: 18s - loss: 1.0960 - acc: 0.4311
46/94 [============>.................] - ETA: 18s - loss: 1.0967 - acc: 0.4286
47/94 [============>.................] - ETA: 18s - loss: 1.0972 - acc: 0.4281
48/94 [============>.................] - ETA: 17s - loss: 1.0944 - acc: 0.4296
49/94 [============>.................] - ETA: 17s - loss: 1.0937 - acc: 0.4310
50/94 [============>.................] - ETA: 17s - loss: 1.0922 - acc: 0.4343
51/94 [=============>................] - ETA: 16s - loss: 1.0902 - acc: 0.4362
52/94 [=============>................] - ETA: 16s - loss: 1.0879 - acc: 0.4386
53/94 [=============>................] - ETA: 16s - loss: 1.0859 - acc: 0.4398
54/94 [=============>................] - ETA: 15s - loss: 1.0852 - acc: 0.4403
55/94 [=============>................] - ETA: 15s - loss: 1.0839 - acc: 0.4385
56/94 [=============>................] - ETA: 15s - loss: 1.0849 - acc: 0.4396
57/94 [==============>...............] - ETA: 14s - loss: 1.0983 - acc: 0.4380
58/94 [==============>...............] - ETA: 14s - loss: 1.0957 - acc: 0.4396
59/94 [==============>...............] - ETA: 14s - loss: 1.0959 - acc: 0.4401
60/94 [==============>...............] - ETA: 13s - loss: 1.0950 - acc: 0.4421
61/94 [===============>..............] - ETA: 13s - loss: 1.0949 - acc: 0.4405
62/94 [===============>..............] - ETA: 13s - loss: 1.0918 - acc: 0.4425
63/94 [===============>..............] - ETA: 12s - loss: 1.0892 - acc: 0.4434
64/94 [===============>..............] - ETA: 12s - loss: 1.0893 - acc: 0.4433
65/94 [===============>..............] - ETA: 12s - loss: 1.0917 - acc: 0.4408
66/94 [================>.............] - ETA: 11s - loss: 1.0943 - acc: 0.4412
67/94 [================>.............] - ETA: 11s - loss: 1.0930 - acc: 0.4412
68/94 [================>.............] - ETA: 10s - loss: 1.0901 - acc: 0.4425
69/94 [================>.............] - ETA: 10s - loss: 1.0891 - acc: 0.4420
70/94 [================>.............] - ETA: 10s - loss: 1.0889 - acc: 0.4414
71/94 [================>.............] - ETA: 9s - loss: 1.0887 - acc: 0.4396
72/94 [================>.............] - ETA: 9s - loss: 1.0869 - acc: 0.4405
73/94 [=================>............] - ETA: 9s - loss: 1.0856 - acc: 0.4404
74/94 [=================>............] - ETA: 8s - loss: 1.0861 - acc: 0.4387
75/94 [=================>............] - ETA: 8s - loss: 1.0853 - acc: 0.4379
76/94 [=================>............] - ETA: 7s - loss: 1.0834 - acc: 0.4399
77/94 [=================>............] - ETA: 7s - loss: 1.0822 - acc: 0.4399
78/94 [=================>............] - ETA: 7s - loss: 1.0821 - acc: 0.4398
79/94 [=================>............] - ETA: 6s - loss: 1.0802 - acc: 0.4422
80/94 [==================>...........] - ETA: 6s - loss: 1.0793 - acc: 0.4433
81/94 [==================>...........] - ETA: 5s - loss: 1.0790 - acc: 0.4417
82/94 [==================>...........] - ETA: 5s - loss: 1.0774 - acc: 0.4416
83/94 [==================>...........] - ETA: 4s - loss: 1.0744 - acc: 0.4442
84/94 [==================>...........] - ETA: 4s - loss: 1.0736 - acc: 0.4441
85/94 [==================>...........] - ETA: 4s - loss: 1.0732 - acc: 0.4452
86/94 [==================>...........] - ETA: 3s - loss: 1.0734 - acc: 0.4458
87/94 [==================>...........] - ETA: 3s - loss: 1.0758 - acc: 0.4461
88/94 [==================>...........] - ETA: 2s - loss: 1.0743 - acc: 0.4470
89/94 [==================>...........] - ETA: 2s - loss: 1.0736 - acc: 0.4480
90/94 [==================>...........] - ETA: 2s - loss: 1.0729 - acc: 0.4489
91/94 [==================>...........] - ETA: 1s - loss: 1.0723 - acc: 0.4505
92/94 [==================>...........] - ETA: 1s - loss: 1.0704 - acc: 0.4524
93/94 [==================>...........] - ETA: 0s - loss: 1.0695 - acc: 0.4522
94/94 [==================>...........] - ETA: 0s - loss: 1.0665 - acc: 0.4541
95/94 [==============================] - 188s 2s/step - loss: 1.0646 - acc: 0.4565 - val_loss: 0.9222 - val_acc: 0.5043
Epoch 5/20
1/94 [..............................] - ETA: 15s - loss: 0.9727 - acc: 0.5625
2/94 [..............................] - ETA: 15s - loss: 0.9740 - acc: 0.5469
3/94 [..............................] - ETA: 14s - loss: 1.0323 - acc: 0.5312
4/94 [>.............................] - ETA: 14s - loss: 1.0174 - acc: 0.5078
5/94 [>.............................] - ETA: 13s - loss: 1.0071 - acc: 0.5062
6/94 [>.............................] - ETA: 13s - loss: 1.0059 - acc: 0.4948
7/94 [=>............................] - ETA: 12s - loss: 1.0033 - acc: 0.4866
8/94 [=>............................] - ETA: 12s - loss: 0.9894 - acc: 0.4883
9/94 [=>............................] - ETA: 12s - loss: 0.9813 - acc: 0.5000
10/94 [==>...........................] - ETA: 11s - loss: 0.9744 - acc: 0.5031
11/94 [==>...........................] - ETA: 11s - loss: 0.9634 - acc: 0.5142
12/94 [==>...........................] - ETA: 11s - loss: 0.9566 - acc: 0.5130
13/94 [===>..........................] - ETA: 11s - loss: 0.9537 - acc: 0.5120
14/94 [===>..........................] - ETA: 11s - loss: 0.9671 - acc: 0.5022
15/94 [===>..........................] - ETA: 12s - loss: 0.9876 - acc: 0.4917
16/94 [====>.........................] - ETA: 13s - loss: 1.0053 - acc: 0.4785
17/94 [====>.........................] - ETA: 14s - loss: 1.0006 - acc: 0.4835
18/94 [====>.........................] - ETA: 15s - loss: 0.9983 - acc: 0.4844
19/94 [=====>........................] - ETA: 16s - loss: 0.9977 - acc: 0.4819
20/94 [=====>........................] - ETA: 17s - loss: 0.9940 - acc: 0.4813
21/94 [=====>........................] - ETA: 18s - loss: 0.9878 - acc: 0.4851
22/94 [=====>........................] - ETA: 18s - loss: 0.9852 - acc: 0.4858
23/94 [======>.......................] - ETA: 18s - loss: 0.9834 - acc: 0.4831
24/94 [======>.......................] - ETA: 19s - loss: 0.9864 - acc: 0.4877
25/94 [======>.......................] - ETA: 19s - loss: 0.9834 - acc: 0.4957
26/94 [=======>......................] - ETA: 19s - loss: 0.9762 - acc: 0.5018
27/94 [=======>......................] - ETA: 20s - loss: 0.9737 - acc: 0.4995
28/94 [=======>......................] - ETA: 20s - loss: 0.9776 - acc: 0.4928
29/94 [========>.....................] - ETA: 20s - loss: 0.9749 - acc: 0.4941
30/94 [========>.....................] - ETA: 20s - loss: 0.9764 - acc: 0.4933
31/94 [========>.....................] - ETA: 20s - loss: 0.9733 - acc: 0.4975
32/94 [=========>....................] - ETA: 20s - loss: 0.9716 - acc: 0.4995
33/94 [=========>....................] - ETA: 20s - loss: 0.9742 - acc: 0.4967
34/94 [=========>....................] - ETA: 20s - loss: 0.9761 - acc: 0.4941
35/94 [==========>...................] - ETA: 20s - loss: 0.9763 - acc: 0.4916
36/94 [==========>...................] - ETA: 20s - loss: 0.9817 - acc: 0.4883
37/94 [==========>...................] - ETA: 20s - loss: 0.9837 - acc: 0.4878
38/94 [===========>..................] - ETA: 20s - loss: 0.9872 - acc: 0.4840
39/94 [===========>..................] - ETA: 19s - loss: 0.9835 - acc: 0.4892
40/94 [===========>..................] - ETA: 19s - loss: 0.9829 - acc: 0.4903
41/94 [===========>..................] - ETA: 19s - loss: 0.9791 - acc: 0.4936
42/94 [============>.................] - ETA: 19s - loss: 0.9771 - acc: 0.4959
43/94 [============>.................] - ETA: 19s - loss: 0.9766 - acc: 0.4960
44/94 [============>.................] - ETA: 18s - loss: 0.9750 - acc: 0.4947
45/94 [=============>................] - ETA: 18s - loss: 0.9789 - acc: 0.4934
46/94 [=============>................] - ETA: 18s - loss: 0.9802 - acc: 0.4922
47/94 [=============>................] - ETA: 18s - loss: 0.9806 - acc: 0.4917
48/94 [==============>...............] - ETA: 17s - loss: 0.9807 - acc: 0.4945
49/94 [==============>...............] - ETA: 17s - loss: 0.9814 - acc: 0.4933
50/94 [==============>...............] - ETA: 17s - loss: 0.9795 - acc: 0.4947
51/94 [===============>..............] - ETA: 16s - loss: 0.9775 - acc: 0.4954
52/94 [===============>..............] - ETA: 16s - loss: 0.9754 - acc: 0.4997
53/94 [===============>..............] - ETA: 16s - loss: 0.9749 - acc: 0.4997
54/94 [================>.............] - ETA: 16s - loss: 0.9730 - acc: 0.5009
55/94 [================>.............] - ETA: 15s - loss: 0.9713 - acc: 0.5037
56/94 [================>.............] - ETA: 15s - loss: 0.9716 - acc: 0.5025
57/94 [=================>............] - ETA: 15s - loss: 0.9753 - acc: 0.5014
58/94 [=================>............] - ETA: 14s - loss: 0.9797 - acc: 0.5003
59/94 [=================>............] - ETA: 14s - loss: 0.9784 - acc: 0.5008

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60/94 [=================>............] - ETA: 14s - loss: 0.9771 - acc: 0.5024
61/94 [=================>............] - ETA: 13s - loss: 0.9771 - acc: 0.5044
62/94 [=================>............] - ETA: 13s - loss: 0.9771 - acc: 0.5058
63/94 [=================>............] - ETA: 12s - loss: 0.9768 - acc: 0.5062
64/94 [==================>...........] - ETA: 12s - loss: 0.9751 - acc: 0.5071
65/94 [==================>...........] - ETA: 12s - loss: 0.9732 - acc: 0.5075
66/94 [==================>...........] - ETA: 11s - loss: 0.9752 - acc: 0.5045
67/94 [==================>...........] - ETA: 11s - loss: 0.9750 - acc: 0.5044
68/94 [==================>...........] - ETA: 11s - loss: 0.9748 - acc: 0.5053
69/94 [==================>...........] - ETA: 10s - loss: 0.9739 - acc: 0.5057
70/94 [==================>...........] - ETA: 10s - loss: 0.9737 - acc: 0.5060
71/94 [==================>...........] - ETA: 9s - loss: 0.9761 - acc: 0.5051
72/94 [==================>...........] - ETA: 9s - loss: 0.9779 - acc: 0.5037
73/94 [==================>...........] - ETA: 9s - loss: 0.9787 - acc: 0.5032
74/94 [==================>...........] - ETA: 8s - loss: 0.9772 - acc: 0.5023
75/94 [==================>...........] - ETA: 8s - loss: 0.9767 - acc: 0.5031
76/94 [==================>...........] - ETA: 7s - loss: 0.9789 - acc: 0.5019
77/94 [==================>...........] - ETA: 7s - loss: 0.9782 - acc: 0.5031
78/94 [==================>...........] - ETA: 7s - loss: 0.9765 - acc: 0.5038
79/94 [==================>...........] - ETA: 6s - loss: 0.9769 - acc: 0.5046
80/94 [==================>...........] - ETA: 6s - loss: 0.9759 - acc: 0.5053
81/94 [==================>...........] - ETA: 5s - loss: 0.9743 - acc: 0.5060
82/94 [==================>...........] - ETA: 5s - loss: 0.9738 - acc: 0.5059
83/94 [==================>...........] - ETA: 5s - loss: 0.9742 - acc: 0.5055
84/94 [==================>...........] - ETA: 4s - loss: 0.9735 - acc: 0.5062
85/94 [==================>...........] - ETA: 4s - loss: 0.9717 - acc: 0.5072
86/94 [==================>...........] - ETA: 3s - loss: 0.9709 - acc: 0.5075
87/94 [==================>...........] - ETA: 3s - loss: 0.9718 - acc: 0.5056
88/94 [==================>...........] - ETA: 2s - loss: 0.9712 - acc: 0.5066
89/94 [==================>...........] - ETA: 2s - loss: 0.9698 - acc: 0.5062
90/94 [==================>...........] - ETA: 2s - loss: 0.9692 - acc: 0.5075
91/94 [==================>...........] - ETA: 1s - loss: 0.9672 - acc: 0.5101
92/94 [==================>...........] - ETA: 1s - loss: 0.9662 - acc: 0.5111
93/94 [==================>...........] - ETA: 0s - loss: 0.9641 - acc: 0.5133
94/94 [==================>...........] - ETA: 0s - loss: 0.9630 - acc: 0.5135
95/94 [==============================] - 187s 2s/step - loss: 0.9621 - acc: 0.5140 - val_loss: 0.9246 - val_acc: 0.5083
Epoch 6/20
 1/94 [..............................] - ETA: 16s - loss: 0.8693 - acc: 0.6562
 2/94 [..............................] - ETA: 15s - loss: 0.8050 - acc: 0.6875
 3/94 [..............................] - ETA: 14s - loss: 0.9105 - acc: 0.6250
 4/94 [>.............................] - ETA: 13s - loss: 0.9405 - acc: 0.5938
 5/94 [>.............................] - ETA: 13s - loss: 0.9167 - acc: 0.5687
 6/94 [>.............................] - ETA: 12s - loss: 0.9249 - acc: 0.5885
 7/94 [=>............................] - ETA: 12s - loss: 0.9378 - acc: 0.5714
 8/94 [=>............................] - ETA: 12s - loss: 0.9210 - acc: 0.5703
 9/94 [=>............................] - ETA: 12s - loss: 0.9154 - acc: 0.5764
10/94 [==>...........................] - ETA: 11s - loss: 0.9117 - acc: 0.5563
11/94 [==>...........................] - ETA: 11s - loss: 0.9176 - acc: 0.5483
12/94 [==>...........................] - ETA: 11s - loss: 0.9094 - acc: 0.5365
13/94 [===>..........................] - ETA: 11s - loss: 0.9183 - acc: 0.5264
14/94 [===>..........................] - ETA: 11s - loss: 0.9137 - acc: 0.5246
15/94 [===>..........................] - ETA: 12s - loss: 0.9150 - acc: 0.5292
16/94 [====>.........................] - ETA: 13s - loss: 0.9105 - acc: 0.5352
17/94 [====>.........................] - ETA: 15s - loss: 0.9114 - acc: 0.5331
18/94 [====>.........................] - ETA: 16s - loss: 0.9014 - acc: 0.5312
19/94 [=====>........................] - ETA: 16s - loss: 0.8955 - acc: 0.5312
20/94 [=====>........................] - ETA: 17s - loss: 0.8967 - acc: 0.5328
21/94 [=====>........................] - ETA: 18s - loss: 0.9097 - acc: 0.5268
22/94 [=====>........................] - ETA: 18s - loss: 0.9141 - acc: 0.5312
23/94 [======>.......................] - ETA: 19s - loss: 0.9107 - acc: 0.5285
24/94 [======>.......................] - ETA: 19s - loss: 0.9044 - acc: 0.5326
25/94 [======>.......................] - ETA: 20s - loss: 0.9005 - acc: 0.5363
26/94 [=======>......................] - ETA: 20s - loss: 0.8961 - acc: 0.5397
27/94 [=======>......................] - ETA: 20s - loss: 0.8902 - acc: 0.5417
28/94 [=======>......................] - ETA: 20s - loss: 0.8860 - acc: 0.5413
29/94 [========>.....................] - ETA: 20s - loss: 0.8882 - acc: 0.5366
30/94 [========>.....................] - ETA: 20s - loss: 0.8894 - acc: 0.5323
31/94 [========>.....................] - ETA: 20s - loss: 0.8908 - acc: 0.5343
32/94 [=========>....................] - ETA: 20s - loss: 0.8922 - acc: 0.5303
33/94 [=========>....................] - ETA: 20s - loss: 0.8972 - acc: 0.5275
34/94 [=========>....................] - ETA: 20s - loss: 0.8968 - acc: 0.5248
35/94 [==========>...................] - ETA: 20s - loss: 0.8930 - acc: 0.5268
36/94 [==========>...................] - ETA: 20s - loss: 0.8909 - acc: 0.5278
37/94 [==========>...................] - ETA: 20s - loss: 0.8891 - acc: 0.5279
38/94 [===========>..................] - ETA: 20s - loss: 0.8883 - acc: 0.5247
39/94 [===========>..................] - ETA: 20s - loss: 0.8917 - acc: 0.5232
40/94 [===========>..................] - ETA: 19s - loss: 0.8917 - acc: 0.5250
41/94 [===========>..................] - ETA: 19s - loss: 0.8936 - acc: 0.5252
42/94 [============>.................] - ETA: 19s - loss: 0.8918 - acc: 0.5253
43/94 [============>.................] - ETA: 19s - loss: 0.8885 - acc: 0.5276
44/94 [============>.................] - ETA: 19s - loss: 0.8846 - acc: 0.5298
45/94 [=============>................] - ETA: 18s - loss: 0.8868 - acc: 0.5278
46/94 [=============>................] - ETA: 18s - loss: 0.8976 - acc: 0.5265
47/94 [=============>................] - ETA: 18s - loss: 0.8993 - acc: 0.5219
48/94 [==============>...............] - ETA: 18s - loss: 0.9008 - acc: 0.5215
49/94 [==============>...............] - ETA: 17s - loss: 0.8977 - acc: 0.5230
50/94 [==============>...............] - ETA: 17s - loss: 0.8961 - acc: 0.5250
51/94 [===============>..............] - ETA: 17s - loss: 0.8936 - acc: 0.5263
52/94 [===============>..............] - ETA: 16s - loss: 0.8933 - acc: 0.5270
53/94 [===============>..............] - ETA: 16s - loss: 0.8923 - acc: 0.5271
54/94 [===============>..............] - ETA: 16s - loss: 0.8911 - acc: 0.5272
55/94 [===============>..............] - ETA: 15s - loss: 0.8950 - acc: 0.5267
56/94 [===============>..............] - ETA: 15s - loss: 0.8963 - acc: 0.5285
57/94 [================>.............] - ETA: 15s - loss: 0.8995 - acc: 0.5263
58/94 [================>.............] - ETA: 14s - loss: 0.8975 - acc: 0.5275
59/94 [================>.............] - ETA: 14s - loss: 0.8975 - acc: 0.5270
60/94 [================>.............] - ETA: 14s - loss: 0.8974 - acc: 0.5271
61/94 [=================>............] - ETA: 13s - loss: 0.8998 - acc: 0.5277
62/94 [=================>............] - ETA: 13s - loss: 0.8986 - acc: 0.5282
63/94 [=================>............] - ETA: 13s - loss: 0.8986 - acc: 0.5283
64/94 [==================>...........] - ETA: 12s - loss: 0.8990 - acc: 0.5273
65/94 [==================>...........] - ETA: 12s - loss: 0.8965 - acc: 0.5288
66/94 [==================>...........] - ETA: 11s - loss: 0.8943 - acc: 0.5308
67/94 [==================>...........] - ETA: 11s - loss: 0.8935 - acc: 0.5308
68/94 [==================>...........] - ETA: 11s - loss: 0.8927 - acc: 0.5308
69/94 [==================>...........] - ETA: 10s - loss: 0.8917 - acc: 0.5303
70/94 [==================>...........] - ETA: 10s - loss: 0.8909 - acc: 0.5304
71/94 [==================>...........] - ETA: 10s - loss: 0.8908 - acc: 0.5299
72/94 [==================>...........] - ETA: 9s - loss: 0.8933 - acc: 0.5282
73/94 [==================>...........] - ETA: 9s - loss: 0.8927 - acc: 0.5283
74/94 [==================>...........] - ETA: 8s - loss: 0.8914 - acc: 0.5291
75/94 [==================>...........] - ETA: 8s - loss: 0.8890 - acc: 0.5313
76/94 [==================>...........] - ETA: 7s - loss: 0.8893 - acc: 0.5305
77/94 [==================>...........] - ETA: 7s - loss: 0.8889 - acc: 0.5309
78/94 [==================>...........] - ETA: 7s - loss: 0.8912 - acc: 0.5297
79/94 [==================>...........] - ETA: 6s - loss: 0.8899 - acc: 0.5285
80/94 [==================>...........] - ETA: 6s - loss: 0.8881 - acc: 0.5294
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81/94 [=========================>.....] - ETA: 5s - loss: 0.8870 - acc: 0.5290
82/94 [=========================>.....] - ETA: 5s - loss: 0.8882 - acc: 0.5290
83/94 [=========================>....] - ETA: 5s - loss: 0.8861 - acc: 0.5302
84/94 [=========================>....] - ETA: 4s - loss: 0.8869 - acc: 0.5302
85/94 [=========================>....] - ETA: 4s - loss: 0.8878 - acc: 0.5306
86/94 [=========================>...] - ETA: 3s - loss: 0.8870 - acc: 0.5320
87/94 [=========================>...] - ETA: 3s - loss: 0.8858 - acc: 0.5327
88/94 [=========================>...] - ETA: 2s - loss: 0.8852 - acc: 0.5309
89/94 [=========================>..] - ETA: 2s - loss: 0.8834 - acc: 0.5327
90/94 [=========================>..] - ETA: 2s - loss: 0.8827 - acc: 0.5344
91/94 [=========================>..] - ETA: 1s - loss: 0.8830 - acc: 0.5334
92/94 [=========================>.] - ETA: 1s - loss: 0.8826 - acc: 0.5323
93/94 [=========================>.] - ETA: 0s - loss: 0.8811 - acc: 0.5337
94/94 [=========================>.] - ETA: 0s - loss: 0.8788 - acc: 0.5340
95/94 [==============================] - 187s 2s/step - loss: 0.8789 - acc: 0.5333 - val_loss: 0.7766 - val_acc: 0.5766
Epoch 7/20
 1/94 [.............................] - ETA: 16s - loss: 0.6336 - acc: 0.7188
 2/94 [.............................] - ETA: 15s - loss: 0.8330 - acc: 0.5781
 3/94 [.............................] - ETA: 14s - loss: 0.8658 - acc: 0.6146
 4/94 [>............................] - ETA: 14s - loss: 0.9146 - acc: 0.5391
 5/94 [>............................] - ETA: 13s - loss: 0.9345 - acc: 0.5375
 6/94 [>............................] - ETA: 13s - loss: 0.9462 - acc: 0.5365
 7/94 [=>...........................] - ETA: 12s - loss: 0.9307 - acc: 0.5268
 8/94 [=>...........................] - ETA: 12s - loss: 0.9329 - acc: 0.5156
 9/94 [=>...........................] - ETA: 12s - loss: 0.9286 - acc: 0.5312
10/94 [==>..........................] - ETA: 12s - loss: 0.9009 - acc: 0.5437
11/94 [==>..........................] - ETA: 11s - loss: 0.9035 - acc: 0.5369
12/94 [==>..........................] - ETA: 11s - loss: 0.8968 - acc: 0.5312
13/94 [===>.........................] - ETA: 11s - loss: 0.8845 - acc: 0.5385
14/94 [===>.........................] - ETA: 11s - loss: 0.8769 - acc: 0.5446
15/94 [===>.........................] - ETA: 11s - loss: 0.8792 - acc: 0.5417
16/94 [====>........................] - ETA: 13s - loss: 0.8809 - acc: 0.5371
17/94 [====>........................] - ETA: 14s - loss: 0.8713 - acc: 0.5423
18/94 [====>........................] - ETA: 15s - loss: 0.8752 - acc: 0.5399
19/94 [=====>.......................] - ETA: 16s - loss: 0.8806 - acc: 0.5312
20/94 [=====>.......................] - ETA: 17s - loss: 0.8810 - acc: 0.5281
21/94 [=====>.......................] - ETA: 18s - loss: 0.8754 - acc: 0.5298
22/94 [=====>.......................] - ETA: 18s - loss: 0.8761 - acc: 0.5284
23/94 [======>......................] - ETA: 19s - loss: 0.8691 - acc: 0.5312
24/94 [======>......................] - ETA: 19s - loss: 0.8659 - acc: 0.5326
25/94 [======>......................] - ETA: 19s - loss: 0.8709 - acc: 0.5288
26/94 [=======>.....................] - ETA: 20s - loss: 0.8698 - acc: 0.5276
27/94 [=======>.....................] - ETA: 20s - loss: 0.8798 - acc: 0.5220
28/94 [=======>.....................] - ETA: 20s - loss: 0.8844 - acc: 0.5234
29/94 [========>....................] - ETA: 20s - loss: 0.8787 - acc: 0.5291
30/94 [========>....................] - ETA: 20s - loss: 0.8754 - acc: 0.5302
31/94 [========>....................] - ETA: 20s - loss: 0.8720 - acc: 0.5312
32/94 [=========>...................] - ETA: 20s - loss: 0.8707 - acc: 0.5293
33/94 [=========>...................] - ETA: 20s - loss: 0.8701 - acc: 0.5284
34/94 [=========>...................] - ETA: 20s - loss: 0.8660 - acc: 0.5312
35/94 [==========>..................] - ETA: 20s - loss: 0.8638 - acc: 0.5330
36/94 [==========>..................] - ETA: 20s - loss: 0.8635 - acc: 0.5330
37/94 [==========>..................] - ETA: 20s - loss: 0.8692 - acc: 0.5346
38/94 [===========>.................] - ETA: 20s - loss: 0.8691 - acc: 0.5378
39/94 [===========>.................] - ETA: 20s - loss: 0.8669 - acc: 0.5385
40/94 [===========>.................] - ETA: 19s - loss: 0.8636 - acc: 0.5398
41/94 [===========>.................] - ETA: 19s - loss: 0.8604 - acc: 0.5442
42/94 [============>................] - ETA: 19s - loss: 0.8595 - acc: 0.5424
43/94 [============>................] - ETA: 19s - loss: 0.8587 - acc: 0.5465
44/94 [============>................] - ETA: 19s - loss: 0.8641 - acc: 0.5447
45/94 [=============>...............] - ETA: 18s - loss: 0.8661 - acc: 0.5424
46/94 [=============>...............] - ETA: 18s - loss: 0.8672 - acc: 0.5421
47/94 [=============>...............] - ETA: 18s - loss: 0.8658 - acc: 0.5419
48/94 [==============>..............] - ETA: 17s - loss: 0.8628 - acc: 0.5449
49/94 [==============>..............] - ETA: 17s - loss: 0.8638 - acc: 0.5446
50/94 [==============>..............] - ETA: 17s - loss: 0.8619 - acc: 0.5463
51/94 [===============>.............] - ETA: 17s - loss: 0.8599 - acc: 0.5472
52/94 [===============>.............] - ETA: 16s - loss: 0.8559 - acc: 0.5493
53/94 [===============>.............] - ETA: 16s - loss: 0.8532 - acc: 0.5495
54/94 [================>............] - ETA: 16s - loss: 0.8511 - acc: 0.5498
55/94 [================>............] - ETA: 15s - loss: 0.8544 - acc: 0.5500
56/94 [================>............] - ETA: 15s - loss: 0.8552 - acc: 0.5497
57/94 [=================>...........] - ETA: 15s - loss: 0.8522 - acc: 0.5521
58/94 [=================>...........] - ETA: 14s - loss: 0.8478 - acc: 0.5550
59/94 [=================>...........] - ETA: 14s - loss: 0.8494 - acc: 0.5551
60/94 [=================>...........] - ETA: 14s - loss: 0.8469 - acc: 0.5557
61/94 [==================>..........] - ETA: 13s - loss: 0.8490 - acc: 0.5538
62/94 [==================>..........] - ETA: 13s - loss: 0.8526 - acc: 0.5534
63/94 [==================>..........] - ETA: 13s - loss: 0.8504 - acc: 0.5531
64/94 [===================>.........] - ETA: 12s - loss: 0.8482 - acc: 0.5527
65/94 [===================>.........] - ETA: 12s - loss: 0.8464 - acc: 0.5548
66/94 [===================>.........] - ETA: 11s - loss: 0.8469 - acc: 0.5540
67/94 [====================>........] - ETA: 11s - loss: 0.8472 - acc: 0.5504
68/94 [====================>........] - ETA: 11s - loss: 0.8458 - acc: 0.5519
69/94 [====================>........] - ETA: 10s - loss: 0.8440 - acc: 0.5525
70/94 [=====================>.......] - ETA: 10s - loss: 0.8401 - acc: 0.5558
71/94 [=====================>.......] - ETA: 9s - loss: 0.8425 - acc: 0.5546
72/94 [=====================>.......] - ETA: 9s - loss: 0.8438 - acc: 0.5538
73/94 [======================>......] - ETA: 9s - loss: 0.8431 - acc: 0.5557
74/94 [======================>......] - ETA: 8s - loss: 0.8416 - acc: 0.5557
75/94 [======================>......] - ETA: 8s - loss: 0.8387 - acc: 0.5575
76/94 [=======================>.....] - ETA: 7s - loss: 0.8371 - acc: 0.5563
77/94 [=======================>.....] - ETA: 7s - loss: 0.8361 - acc: 0.5572
78/94 [=======================>.....] - ETA: 7s - loss: 0.8344 - acc: 0.5577
79/94 [=======================>.....] - ETA: 6s - loss: 0.8331 - acc: 0.5562
80/94 [========================>....] - ETA: 6s - loss: 0.8317 - acc: 0.5559
81/94 [========================>....] - ETA: 5s - loss: 0.8297 - acc: 0.5567
82/94 [========================>....] - ETA: 5s - loss: 0.8266 - acc: 0.5583
83/94 [========================>....] - ETA: 5s - loss: 0.8277 - acc: 0.5584
84/94 [========================>....] - ETA: 4s - loss: 0.8287 - acc: 0.5584
85/94 [========================>....] - ETA: 4s - loss: 0.8301 - acc: 0.5585
86/94 [=========================>...] - ETA: 3s - loss: 0.8298 - acc: 0.5600
87/94 [=========================>...] - ETA: 3s - loss: 0.8281 - acc: 0.5607
88/94 [=========================>...] - ETA: 2s - loss: 0.8263 - acc: 0.5607
89/94 [=========================>..] - ETA: 2s - loss: 0.8259 - acc: 0.5600
90/94 [=========================>..] - ETA: 2s - loss: 0.8268 - acc: 0.5611
91/94 [=========================>..] - ETA: 1s - loss: 0.8256 - acc: 0.5604
92/94 [=========================>.] - ETA: 1s - loss: 0.8260 - acc: 0.5601
93/94 [=========================>.] - ETA: 0s - loss: 0.8276 - acc: 0.5595
94/94 [=========================>.] - ETA: 0s - loss: 0.8274 - acc: 0.5612
95/94 [==============================] - 186s 2s/step - loss: 0.8278 - acc: 0.5612 - val_loss: 0.8265 - val_acc: 0.5536
Epoch 8/20
 1/94 [.............................] - ETA: 15s - loss: 0.9398 - acc: 0.5938
 2/94 [.............................] - ETA: 15s - loss: 0.9462 - acc: 0.5156
 3/94 [.............................] - ETA: 14s - loss: 0.8624 - acc: 0.5833
 4/94 [>............................] - ETA: 14s - loss: 0.8305 - acc: 0.5859

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 5/94 [>.............................] - ETA: 13s - loss: 0.8329 - acc: 0.5687
 6/94 [>.............................] - ETA: 13s - loss: 0.8122 - acc: 0.5573
 7/94 [=>............................] - ETA: 12s - loss: 0.8000 - acc: 0.5804
 8/94 [=>............................] - ETA: 12s - loss: 0.7931 - acc: 0.5781
 9/94 [=>............................] - ETA: 11s - loss: 0.7819 - acc: 0.5823
10/94 [==>...........................] - ETA: 11s - loss: 0.7858 - acc: 0.5803
11/94 [==>...........................] - ETA: 11s - loss: 0.7791 - acc: 0.5844
12/94 [==>...........................] - ETA: 11s - loss: 0.7845 - acc: 0.5799
13/94 [===>..........................] - ETA: 11s - loss: 0.7823 - acc: 0.5882
14/94 [===>..........................] - ETA: 10s - loss: 0.7811 - acc: 0.5864
15/94 [===>..........................] - ETA: 11s - loss: 0.7768 - acc: 0.5889
16/94 [====>.........................] - ETA: 13s - loss: 0.7762 - acc: 0.5892
17/94 [====>.........................] - ETA: 14s - loss: 0.7801 - acc: 0.5932
18/94 [====>.........................] - ETA: 15s - loss: 0.7820 - acc: 0.6002
19/94 [=====>........................] - ETA: 16s - loss: 0.7712 - acc: 0.6064
20/94 [=====>........................] - ETA: 17s - loss: 0.7648 - acc: 0.6120
21/94 [=====>........................] - ETA: 18s - loss: 0.7682 - acc: 0.6097
22/94 [=====>........................] - ETA: 18s - loss: 0.7609 - acc: 0.6104
23/94 [======>.......................] - ETA: 19s - loss: 0.7675 - acc: 0.6056
24/94 [======>.......................] - ETA: 19s - loss: 0.7836 - acc: 0.6012
25/94 [======>.......................] - ETA: 19s - loss: 0.7833 - acc: 0.6021
26/94 [=======>......................] - ETA: 20s - loss: 0.7845 - acc: 0.5970
27/94 [=======>......................] - ETA: 20s - loss: 0.7806 - acc: 0.5946
28/94 [=======>......................] - ETA: 20s - loss: 0.7763 - acc: 0.5968
29/94 [========>.....................] - ETA: 20s - loss: 0.7735 - acc: 0.5967
30/94 [========>.....................] - ETA: 20s - loss: 0.7708 - acc: 0.5966
31/94 [========>.....................] - ETA: 20s - loss: 0.7675 - acc: 0.5965
32/94 [=========>....................] - ETA: 20s - loss: 0.7733 - acc: 0.5954
33/94 [=========>....................] - ETA: 20s - loss: 0.7865 - acc: 0.5925
34/94 [=========>....................] - ETA: 20s - loss: 0.7877 - acc: 0.5916
35/94 [==========>...................] - ETA: 20s - loss: 0.7867 - acc: 0.5926
36/94 [==========>...................] - ETA: 20s - loss: 0.7873 - acc: 0.5883
37/94 [==========>...................] - ETA: 20s - loss: 0.7864 - acc: 0.5910
38/94 [==========>...................] - ETA: 20s - loss: 0.7848 - acc: 0.5919
39/94 [==========>...................] - ETA: 20s - loss: 0.7807 - acc: 0.5919
40/94 [==========>...................] - ETA: 19s - loss: 0.7787 - acc: 0.5919
41/94 [==========>...................] - ETA: 19s - loss: 0.7816 - acc: 0.5897
42/94 [===========>..................] - ETA: 19s - loss: 0.7829 - acc: 0.5876
43/94 [===========>..................] - ETA: 19s - loss: 0.7845 - acc: 0.5863
44/94 [===========>..................] - ETA: 19s - loss: 0.7842 - acc: 0.5871
45/94 [============>.................] - ETA: 18s - loss: 0.7846 - acc: 0.5852
46/94 [============>.................] - ETA: 18s - loss: 0.7850 - acc: 0.5854
47/94 [============>.................] - ETA: 18s - loss: 0.7821 - acc: 0.5862
48/94 [==============>...............] - ETA: 17s - loss: 0.7823 - acc: 0.5857
49/94 [==============>...............] - ETA: 17s - loss: 0.7795 - acc: 0.5872
50/94 [==============>...............] - ETA: 17s - loss: 0.7802 - acc: 0.5879
51/94 [==============>...............] - ETA: 17s - loss: 0.7796 - acc: 0.5874
52/94 [==============>...............] - ETA: 16s - loss: 0.7790 - acc: 0.5870
53/94 [==============>...............] - ETA: 16s - loss: 0.7752 - acc: 0.5894
54/94 [===============>..............] - ETA: 16s - loss: 0.7744 - acc: 0.5895
55/94 [===============>..............] - ETA: 15s - loss: 0.7742 - acc: 0.5902
56/94 [===============>..............] - ETA: 15s - loss: 0.7759 - acc: 0.5880
57/94 [================>.............] - ETA: 15s - loss: 0.7779 - acc: 0.5881
58/94 [================>.............] - ETA: 14s - loss: 0.7756 - acc: 0.5871
59/94 [================>.............] - ETA: 14s - loss: 0.7759 - acc: 0.5856
60/94 [================>.............] - ETA: 14s - loss: 0.7777 - acc: 0.5868
61/94 [=================>............] - ETA: 13s - loss: 0.7800 - acc: 0.5854
62/94 [=================>............] - ETA: 13s - loss: 0.7790 - acc: 0.5865
63/94 [=================>............] - ETA: 12s - loss: 0.7779 - acc: 0.5867
64/94 [=================>............] - ETA: 12s - loss: 0.7778 - acc: 0.5858
65/94 [=================>............] - ETA: 12s - loss: 0.7755 - acc: 0.5874
66/94 [=================>............] - ETA: 11s - loss: 0.7732 - acc: 0.5889
67/94 [==================>...........] - ETA: 11s - loss: 0.7744 - acc: 0.5885
68/94 [==================>...........] - ETA: 11s - loss: 0.7729 - acc: 0.5904
69/94 [==================>...........] - ETA: 10s - loss: 0.7724 - acc: 0.5909
70/94 [===================>..........] - ETA: 10s - loss: 0.7711 - acc: 0.5923
71/94 [===================>..........] - ETA: 9s - loss: 0.7704 - acc: 0.5927
72/94 [===================>..........] - ETA: 9s - loss: 0.7699 - acc: 0.5906
73/94 [====================>.........] - ETA: 9s - loss: 0.7727 - acc: 0.5898
74/94 [====================>.........] - ETA: 8s - loss: 0.7731 - acc: 0.5898
75/94 [====================>.........] - ETA: 8s - loss: 0.7720 - acc: 0.5899
76/94 [=====================>........] - ETA: 7s - loss: 0.7727 - acc: 0.5891
77/94 [=====================>........] - ETA: 7s - loss: 0.7741 - acc: 0.5883
78/94 [=====================>........] - ETA: 7s - loss: 0.7738 - acc: 0.5884
79/94 [=====================>........] - ETA: 6s - loss: 0.7731 - acc: 0.5889
80/94 [======================>.....] - ETA: 6s - loss: 0.7732 - acc: 0.5882
81/94 [======================>.....] - ETA: 5s - loss: 0.7731 - acc: 0.5882
82/94 [======================>.....] - ETA: 5s - loss: 0.7735 - acc: 0.5856
83/94 [======================>.....] - ETA: 5s - loss: 0.7740 - acc: 0.5854
84/94 [======================>.....] - ETA: 4s - loss: 0.7735 - acc: 0.5847
85/94 [======================>.....] - ETA: 4s - loss: 0.7724 - acc: 0.5844
86/94 [=======================>....] - ETA: 3s - loss: 0.7697 - acc: 0.5860
87/94 [=======================>....] - ETA: 3s - loss: 0.7738 - acc: 0.5854
88/94 [=======================>....] - ETA: 2s - loss: 0.7742 - acc: 0.5865
89/94 [=======================>....] - ETA: 2s - loss: 0.7746 - acc: 0.5856
90/94 [=======================>....] - ETA: 2s - loss: 0.7746 - acc: 0.5853
91/94 [=======================>....] - ETA: 1s - loss: 0.7741 - acc: 0.5844
92/94 [========================>...] - ETA: 1s - loss: 0.7724 - acc: 0.5858
93/94 [========================>...] - ETA: 0s - loss: 0.7739 - acc: 0.5849
94/94 [========================>...] - ETA: 0s - loss: 0.7767 - acc: 0.5853
95/94 [==============================] - 187s 2s/step - loss: 0.7757 - acc: 0.5858 - val_loss: 0.7457 - val_acc:
0.5831
Epoch 9/20
 1/94 [.............................] - ETA: 16s - loss: 0.6925 - acc: 0.5625
 2/94 [.............................] - ETA: 15s - loss: 0.7230 - acc: 0.6094
 3/94 [.............................] - ETA: 15s - loss: 0.7409 - acc: 0.5625
 4/94 [>............................] - ETA: 14s - loss: 0.7451 - acc: 0.5781
 5/94 [>............................] - ETA: 13s - loss: 0.7328 - acc: 0.5875
 6/94 [>............................] - ETA: 13s - loss: 0.7646 - acc: 0.5833
 7/94 [=>...........................] - ETA: 13s - loss: 0.7831 - acc: 0.5714
 8/94 [=>...........................] - ETA: 12s - loss: 0.7730 - acc: 0.5781
 9/94 [=>...........................] - ETA: 12s - loss: 0.7771 - acc: 0.5833
10/94 [==>..........................] - ETA: 12s - loss: 0.7606 - acc: 0.5875
11/94 [==>..........................] - ETA: 11s - loss: 0.7471 - acc: 0.6040
12/94 [==>..........................] - ETA: 11s - loss: 0.7427 - acc: 0.6136
13/94 [===>.........................] - ETA: 11s - loss: 0.7434 - acc: 0.6217
14/94 [===>.........................] - ETA: 11s - loss: 0.7561 - acc: 0.6264
15/94 [===>.........................] - ETA: 12s - loss: 0.7669 - acc: 0.6138
16/94 [====>........................] - ETA: 13s - loss: 0.7730 - acc: 0.6164
17/94 [====>........................] - ETA: 15s - loss: 0.7620 - acc: 0.6316
18/94 [====>........................] - ETA: 16s - loss: 0.7524 - acc: 0.6313
19/94 [=====>.......................] - ETA: 17s - loss: 0.7611 - acc: 0.6260
20/94 [=====>.......................] - ETA: 17s - loss: 0.7554 - acc: 0.6275
21/94 [=====>.......................] - ETA: 18s - loss: 0.7603 - acc: 0.6185
22/94 [=====>.......................] - ETA: 19s - loss: 0.7611 - acc: 0.6174
23/94 [======>......................] - ETA: 19s - loss: 0.7673 - acc: 0.6082
24/94 [======>......................] - ETA: 19s - loss: 0.7664 - acc: 0.6089
25/94 [======>......................] - ETA: 20s - loss: 0.7680 - acc: 0.6058
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26/94 [=======>......................] - ETA: 20s - loss: 0.7648 - acc: 0.6077
27/94 [=======>......................] - ETA: 20s - loss: 0.7623 - acc: 0.6084
28/94 [=======>......................] - ETA: 20s - loss: 0.7643 - acc: 0.6101
29/94 [========>.....................] - ETA: 20s - loss: 0.7682 - acc: 0.6106
30/94 [========>.....................] - ETA: 20s - loss: 0.7663 - acc: 0.6100
31/94 [========>.....................] - ETA: 20s - loss: 0.7655 - acc: 0.6085
32/94 [=========>....................] - ETA: 20s - loss: 0.7620 - acc: 0.6090
33/94 [=========>....................] - ETA: 20s - loss: 0.7612 - acc: 0.6066
34/94 [=========>....................] - ETA: 20s - loss: 0.7662 - acc: 0.6063
35/94 [==========>...................] - ETA: 20s - loss: 0.7712 - acc: 0.6023
36/94 [==========>...................] - ETA: 20s - loss: 0.7757 - acc: 0.6004
37/94 [==========>...................] - ETA: 20s - loss: 0.7748 - acc: 0.5976
38/94 [===========>..................] - ETA: 20s - loss: 0.7723 - acc: 0.5967
39/94 [===========>..................] - ETA: 20s - loss: 0.7747 - acc: 0.5966
40/94 [===========>..................] - ETA: 20s - loss: 0.7720 - acc: 0.5966
41/94 [===========>..................] - ETA: 19s - loss: 0.7695 - acc: 0.5988
42/94 [============>.................] - ETA: 19s - loss: 0.7692 - acc: 0.5927
43/94 [============>.................] - ETA: 19s - loss: 0.7700 - acc: 0.5898
44/94 [============>.................] - ETA: 19s - loss: 0.7674 - acc: 0.5928
45/94 [=============>................] - ETA: 18s - loss: 0.7672 - acc: 0.5914
46/94 [=============>................] - ETA: 18s - loss: 0.7675 - acc: 0.5915
47/94 [=============>................] - ETA: 18s - loss: 0.7661 - acc: 0.5902
48/94 [==============>...............] - ETA: 18s - loss: 0.7666 - acc: 0.5909
49/94 [==============>...............] - ETA: 17s - loss: 0.7629 - acc: 0.5922
50/94 [==============>...............] - ETA: 17s - loss: 0.7624 - acc: 0.5916
51/94 [===============>..............] - ETA: 17s - loss: 0.7596 - acc: 0.5947
52/94 [===============>..............] - ETA: 16s - loss: 0.7581 - acc: 0.5965
53/94 [===============>..............] - ETA: 16s - loss: 0.7575 - acc: 0.5965
54/94 [================>.............] - ETA: 16s - loss: 0.7574 - acc: 0.5976
55/94 [================>.............] - ETA: 15s - loss: 0.7563 - acc: 0.5947
56/94 [================>.............] - ETA: 15s - loss: 0.7553 - acc: 0.5969
57/94 [=================>............] - ETA: 15s - loss: 0.7537 - acc: 0.5968
58/94 [=================>............] - ETA: 14s - loss: 0.7505 - acc: 0.5984
59/94 [=================>............] - ETA: 14s - loss: 0.7492 - acc: 0.5978
60/94 [=================>............] - ETA: 14s - loss: 0.7478 - acc: 0.5972
61/94 [==================>...........] - ETA: 13s - loss: 0.7449 - acc: 0.5987
62/94 [==================>...........] - ETA: 13s - loss: 0.7445 - acc: 0.5971
63/94 [==================>...........] - ETA: 13s - loss: 0.7481 - acc: 0.5955
64/94 [===================>..........] - ETA: 12s - loss: 0.7531 - acc: 0.5931
65/94 [===================>..........] - ETA: 12s - loss: 0.7562 - acc: 0.5912
66/94 [===================>..........] - ETA: 11s - loss: 0.7555 - acc: 0.5907
67/94 [====================>.........] - ETA: 11s - loss: 0.7557 - acc: 0.5903
68/94 [====================>.........] - ETA: 11s - loss: 0.7545 - acc: 0.5904
69/94 [====================>.........] - ETA: 10s - loss: 0.7562 - acc: 0.5913
70/94 [=====================>........] - ETA: 10s - loss: 0.7566 - acc: 0.5922
71/94 [=====================>........] - ETA: 9s - loss: 0.7578 - acc: 0.5901
72/94 [=====================>........] - ETA: 9s - loss: 0.7574 - acc: 0.5910
73/94 [======================>.......] - ETA: 9s - loss: 0.7557 - acc: 0.5902
74/94 [======================>.......] - ETA: 8s - loss: 0.7543 - acc: 0.5902
75/94 [======================>.......] - ETA: 8s - loss: 0.7560 - acc: 0.5898
76/94 [=======================>......] - ETA: 7s - loss: 0.7541 - acc: 0.5911
77/94 [=======================>......] - ETA: 7s - loss: 0.7571 - acc: 0.5899
78/94 [=======================>......] - ETA: 7s - loss: 0.7562 - acc: 0.5896
79/94 [=======================>......] - ETA: 6s - loss: 0.7545 - acc: 0.5908
80/94 [========================>.....] - ETA: 6s - loss: 0.7539 - acc: 0.5901
81/94 [========================>.....] - ETA: 5s - loss: 0.7555 - acc: 0.5909
82/94 [========================>.....] - ETA: 5s - loss: 0.7582 - acc: 0.5886
83/94 [=========================>....] - ETA: 5s - loss: 0.7565 - acc: 0.5895
84/94 [=========================>....] - ETA: 4s - loss: 0.7557 - acc: 0.5891
85/94 [=========================>....] - ETA: 4s - loss: 0.7545 - acc: 0.5899
86/94 [==========================>...] - ETA: 3s - loss: 0.7540 - acc: 0.5903
87/94 [==========================>...] - ETA: 3s - loss: 0.7541 - acc: 0.5900
88/94 [==========================>...] - ETA: 2s - loss: 0.7544 - acc: 0.5894
89/94 [==========================>..] - ETA: 2s - loss: 0.7549 - acc: 0.5894
90/94 [==========================>..] - ETA: 2s - loss: 0.7534 - acc: 0.5905
91/94 [==========================>..] - ETA: 1s - loss: 0.7528 - acc: 0.5905
92/94 [===========================>.] - ETA: 1s - loss: 0.7510 - acc: 0.5923
93/94 [===========================>.] - ETA: 0s - loss: 0.7503 - acc: 0.5926
94/94 [===========================>.] - ETA: 0s - loss: 0.7508 - acc: 0.5920
95/94 [==============================] - 187s 2s/step - loss: 0.7514 - acc: 0.5916 - val_loss: 0.7268 - val_acc:
0.6072
Epoch 10/20
 1/94 [..............................] - ETA: 16s - loss: 0.7006 - acc: 0.7188
 2/94 [..............................] - ETA: 15s - loss: 0.7390 - acc: 0.6719
 3/94 [..............................] - ETA: 15s - loss: 0.7503 - acc: 0.6562
 4/94 [>.............................] - ETA: 14s - loss: 0.7322 - acc: 0.6719
 5/94 [>.............................] - ETA: 14s - loss: 0.7379 - acc: 0.6500
 6/94 [>.............................] - ETA: 13s - loss: 0.7310 - acc: 0.6302
 7/94 [=>............................] - ETA: 13s - loss: 0.7295 - acc: 0.6250
 8/94 [=>............................] - ETA: 12s - loss: 0.7463 - acc: 0.6172
 9/94 [=>............................] - ETA: 12s - loss: 0.7632 - acc: 0.6007
10/94 [==>...........................] - ETA: 12s - loss: 0.7635 - acc: 0.6062
11/94 [==>...........................] - ETA: 12s - loss: 0.7568 - acc: 0.6051
12/94 [==>...........................] - ETA: 11s - loss: 0.7582 - acc: 0.6042
13/94 [===>..........................] - ETA: 11s - loss: 0.7585 - acc: 0.5938
14/94 [===>..........................] - ETA: 11s - loss: 0.7559 - acc: 0.5915
15/94 [===>..........................] - ETA: 12s - loss: 0.7480 - acc: 0.5979
16/94 [====>.........................] - ETA: 13s - loss: 0.7493 - acc: 0.6035
17/94 [====>.........................] - ETA: 14s - loss: 0.7415 - acc: 0.6121
18/94 [====>.........................] - ETA: 16s - loss: 0.7387 - acc: 0.6163
19/94 [=====>........................] - ETA: 17s - loss: 0.7446 - acc: 0.6201
20/94 [=====>........................] - ETA: 17s - loss: 0.7362 - acc: 0.6266
21/94 [=====>........................] - ETA: 18s - loss: 0.7296 - acc: 0.6280
22/94 [=====>........................] - ETA: 18s - loss: 0.7245 - acc: 0.6307
23/94 [======>.......................] - ETA: 19s - loss: 0.7246 - acc: 0.6277
24/94 [======>.......................] - ETA: 19s - loss: 0.7272 - acc: 0.6250
25/94 [======>.......................] - ETA: 20s - loss: 0.7247 - acc: 0.6275
26/94 [=======>......................] - ETA: 20s - loss: 0.7226 - acc: 0.6310
27/94 [=======>......................] - ETA: 20s - loss: 0.7270 - acc: 0.6285
28/94 [=======>......................] - ETA: 20s - loss: 0.7276 - acc: 0.6272
29/94 [========>.....................] - ETA: 20s - loss: 0.7273 - acc: 0.6239
30/94 [========>.....................] - ETA: 21s - loss: 0.7250 - acc: 0.6281
31/94 [========>.....................] - ETA: 21s - loss: 0.7273 - acc: 0.6250
32/94 [=========>....................] - ETA: 21s - loss: 0.7245 - acc: 0.6260
33/94 [=========>....................] - ETA: 21s - loss: 0.7208 - acc: 0.6278
34/94 [=========>....................] - ETA: 20s - loss: 0.7186 - acc: 0.6259
35/94 [==========>...................] - ETA: 20s - loss: 0.7133 - acc: 0.6286
36/94 [==========>...................] - ETA: 20s - loss: 0.7116 - acc: 0.6267
37/94 [==========>...................] - ETA: 20s - loss: 0.7150 - acc: 0.6267
38/94 [===========>..................] - ETA: 20s - loss: 0.7126 - acc: 0.6275
39/94 [===========>..................] - ETA: 20s - loss: 0.7119 - acc: 0.6266
40/94 [===========>..................] - ETA: 20s - loss: 0.7092 - acc: 0.6281
41/94 [===========>..................] - ETA: 19s - loss: 0.7076 - acc: 0.6288
42/94 [============>.................] - ETA: 19s - loss: 0.7101 - acc: 0.6257
43/94 [============>.................] - ETA: 19s - loss: 0.7142 - acc: 0.6265
44/94 [============>.................] - ETA: 19s - loss: 0.7131 - acc: 0.6264
45/94 [=============>................] - ETA: 18s - loss: 0.7094 - acc: 0.6271
46/94 [=============>................] - ETA: 18s - loss: 0.7113 - acc: 0.6257
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47/94 [==============>..............] - ETA: 18s - loss: 0.7095 - acc: 0.6277
48/94 [==============>..............] - ETA: 18s - loss: 0.7097 - acc: 0.6270
49/94 [==============>..............] - ETA: 17s - loss: 0.7118 - acc: 0.6237
50/94 [==============>..............] - ETA: 17s - loss: 0.7162 - acc: 0.6225
51/94 [==============>..............] - ETA: 17s - loss: 0.7161 - acc: 0.6225
52/94 [==============>..............] - ETA: 16s - loss: 0.7127 - acc: 0.6244
53/94 [==============>..............] - ETA: 16s - loss: 0.7103 - acc: 0.6262
54/94 [===============>.............] - ETA: 16s - loss: 0.7116 - acc: 0.6256
55/94 [===============>.............] - ETA: 15s - loss: 0.7150 - acc: 0.6233
56/94 [===============>.............] - ETA: 15s - loss: 0.7121 - acc: 0.6267
57/94 [===============>.............] - ETA: 15s - loss: 0.7131 - acc: 0.6255
58/94 [===============>.............] - ETA: 14s - loss: 0.7143 - acc: 0.6250
59/94 [===============>.............] - ETA: 14s - loss: 0.7141 - acc: 0.6261
60/94 [===============>.............] - ETA: 14s - loss: 0.7155 - acc: 0.6240
61/94 [================>............] - ETA: 13s - loss: 0.7143 - acc: 0.6245
62/94 [================>............] - ETA: 13s - loss: 0.7152 - acc: 0.6220
63/94 [================>............] - ETA: 13s - loss: 0.7140 - acc: 0.6230
64/94 [================>............] - ETA: 12s - loss: 0.7132 - acc: 0.6230
65/94 [================>............] - ETA: 12s - loss: 0.7127 - acc: 0.6221
66/94 [================>............] - ETA: 11s - loss: 0.7133 - acc: 0.6207
67/94 [=================>............] - ETA: 11s - loss: 0.7146 - acc: 0.6213
68/94 [=================>............] - ETA: 11s - loss: 0.7155 - acc: 0.6204
69/94 [=================>............] - ETA: 10s - loss: 0.7169 - acc: 0.6200
70/94 [=================>............] - ETA: 10s - loss: 0.7178 - acc: 0.6188
71/94 [=================>............] - ETA: 10s - loss: 0.7176 - acc: 0.6206
72/94 [=================>............] - ETA: 9s - loss: 0.7158 - acc: 0.6211
73/94 [=================>............] - ETA: 9s - loss: 0.7143 - acc: 0.6211
74/94 [=================>............] - ETA: 8s - loss: 0.7142 - acc: 0.6220
75/94 [=================>............] - ETA: 8s - loss: 0.7148 - acc: 0.6212
76/94 [=================>............] - ETA: 8s - loss: 0.7136 - acc: 0.6221
77/94 [=================>............] - ETA: 7s - loss: 0.7121 - acc: 0.6222
78/94 [=================>............] - ETA: 7s - loss: 0.7113 - acc: 0.6221
79/94 [=================>............] - ETA: 6s - loss: 0.7127 - acc: 0.6197
80/94 [=================>............] - ETA: 6s - loss: 0.7122 - acc: 0.6202
81/94 [=================>............] - ETA: 5s - loss: 0.7120 - acc: 0.6206
82/94 [=================>............] - ETA: 5s - loss: 0.7089 - acc: 0.6215
83/94 [==================>...........] - ETA: 5s - loss: 0.7098 - acc: 0.6207
84/94 [==================>...........] - ETA: 4s - loss: 0.7097 - acc: 0.6197
85/94 [==================>...........] - ETA: 4s - loss: 0.7093 - acc: 0.6194
86/94 [==================>...........] - ETA: 3s - loss: 0.7094 - acc: 0.6191
87/94 [==================>...........] - ETA: 3s - loss: 0.7092 - acc: 0.6199
88/94 [==================>...........] - ETA: 2s - loss: 0.7080 - acc: 0.6210
89/94 [==================>...........] - ETA: 2s - loss: 0.7062 - acc: 0.6224
90/94 [==================>...........] - ETA: 2s - loss: 0.7069 - acc: 0.6221
91/94 [==================>...........] - ETA: 1s - loss: 0.7068 - acc: 0.6232
92/94 [==================>...........] - ETA: 1s - loss: 0.7057 - acc: 0.6235
93/94 [==================>...........] - ETA: 0s - loss: 0.7050 - acc: 0.6242
94/94 [==================>...........] - ETA: 0s - loss: 0.7047 - acc: 0.6249
95/94 [==============================] - 187s 2s/step - loss: 0.7049 - acc: 0.6246 - val_loss: 0.6672 - val_acc:
0.6261
Epoch 11/20
 1/94 [..............................] - ETA: 16s - loss: 0.6236 - acc: 0.6250
 2/94 [..............................] - ETA: 15s - loss: 0.5878 - acc: 0.6406
 3/94 [..............................] - ETA: 14s - loss: 0.6668 - acc: 0.6250
 4/94 [>.............................] - ETA: 14s - loss: 0.6746 - acc: 0.6250
 5/94 [>.............................] - ETA: 13s - loss: 0.6631 - acc: 0.6188
 6/94 [>.............................] - ETA: 13s - loss: 0.6572 - acc: 0.6302
 7/94 [=>............................] - ETA: 13s - loss: 0.6411 - acc: 0.6250
 8/94 [=>............................] - ETA: 12s - loss: 0.6337 - acc: 0.6367
 9/94 [=>............................] - ETA: 12s - loss: 0.6253 - acc: 0.6597
10/94 [==>...........................] - ETA: 12s - loss: 0.6284 - acc: 0.6687
11/94 [==>...........................] - ETA: 11s - loss: 0.6363 - acc: 0.6705
12/94 [==>...........................] - ETA: 11s - loss: 0.6376 - acc: 0.6536
13/94 [===>..........................] - ETA: 11s - loss: 0.6351 - acc: 0.6587
14/94 [===>..........................] - ETA: 11s - loss: 0.6402 - acc: 0.6562
15/94 [===>..........................] - ETA: 12s - loss: 0.6530 - acc: 0.6542
16/94 [====>.........................] - ETA: 13s - loss: 0.6514 - acc: 0.6621
17/94 [====>.........................] - ETA: 14s - loss: 0.6530 - acc: 0.6562
18/94 [====>.........................] - ETA: 16s - loss: 0.6589 - acc: 0.6562
19/94 [=====>........................] - ETA: 16s - loss: 0.6594 - acc: 0.6546
20/94 [=====>........................] - ETA: 17s - loss: 0.6690 - acc: 0.6500
21/94 [=====>........................] - ETA: 18s - loss: 0.6715 - acc: 0.6503
22/94 [=====>........................] - ETA: 18s - loss: 0.6729 - acc: 0.6463
23/94 [======>.......................] - ETA: 19s - loss: 0.6705 - acc: 0.6427
24/94 [======>.......................] - ETA: 19s - loss: 0.6641 - acc: 0.6445
25/94 [======>.......................] - ETA: 19s - loss: 0.6641 - acc: 0.6412
26/94 [=======>......................] - ETA: 20s - loss: 0.6664 - acc: 0.6394
27/94 [=======>......................] - ETA: 20s - loss: 0.6702 - acc: 0.6366
28/94 [=======>......................] - ETA: 20s - loss: 0.6775 - acc: 0.6384
29/94 [========>.....................] - ETA: 20s - loss: 0.6832 - acc: 0.6379
30/94 [========>.....................] - ETA: 20s - loss: 0.6852 - acc: 0.6385
31/94 [========>.....................] - ETA: 20s - loss: 0.6835 - acc: 0.6411
32/94 [=========>....................] - ETA: 20s - loss: 0.6849 - acc: 0.6387
33/94 [=========>....................] - ETA: 20s - loss: 0.6859 - acc: 0.6383
34/94 [=========>....................] - ETA: 20s - loss: 0.6841 - acc: 0.6379
35/94 [==========>...................] - ETA: 20s - loss: 0.6869 - acc: 0.6384
36/94 [==========>...................] - ETA: 20s - loss: 0.6863 - acc: 0.6415
37/94 [==========>...................] - ETA: 20s - loss: 0.6842 - acc: 0.6419
38/94 [===========>..................] - ETA: 20s - loss: 0.6835 - acc: 0.6402
39/94 [===========>..................] - ETA: 19s - loss: 0.6798 - acc: 0.6414
40/94 [===========>..................] - ETA: 19s - loss: 0.6781 - acc: 0.6402
41/94 [===========>..................] - ETA: 19s - loss: 0.6774 - acc: 0.6436
42/94 [============>.................] - ETA: 19s - loss: 0.6767 - acc: 0.6447
43/94 [============>.................] - ETA: 19s - loss: 0.6799 - acc: 0.6435
44/94 [============>.................] - ETA: 18s - loss: 0.6786 - acc: 0.6438
45/94 [=============>................] - ETA: 18s - loss: 0.6793 - acc: 0.6406
46/94 [=============>................] - ETA: 18s - loss: 0.6783 - acc: 0.6396
47/94 [=============>................] - ETA: 18s - loss: 0.6793 - acc: 0.6379
48/94 [=============>................] - ETA: 17s - loss: 0.6802 - acc: 0.6383
49/94 [=============>................] - ETA: 17s - loss: 0.6813 - acc: 0.6387
50/94 [==============>...............] - ETA: 17s - loss: 0.6832 - acc: 0.6397
51/94 [==============>...............] - ETA: 16s - loss: 0.6885 - acc: 0.6382
52/94 [==============>...............] - ETA: 16s - loss: 0.6889 - acc: 0.6361
53/94 [==============>...............] - ETA: 16s - loss: 0.6890 - acc: 0.6353
54/94 [===============>..............] - ETA: 15s - loss: 0.6919 - acc: 0.6328
55/94 [===============>..............] - ETA: 15s - loss: 0.6913 - acc: 0.6349
56/94 [===============>..............] - ETA: 15s - loss: 0.6902 - acc: 0.6336
57/94 [================>.............] - ETA: 15s - loss: 0.6909 - acc: 0.6313
58/94 [================>.............] - ETA: 14s - loss: 0.6939 - acc: 0.6296
59/94 [================>.............] - ETA: 14s - loss: 0.6978 - acc: 0.6263
60/94 [================>.............] - ETA: 13s - loss: 0.6973 - acc: 0.6263
61/94 [=================>............] - ETA: 13s - loss: 0.6960 - acc: 0.6247
62/94 [=================>............] - ETA: 13s - loss: 0.6964 - acc: 0.6237
63/94 [=================>............] - ETA: 12s - loss: 0.6955 - acc: 0.6247
64/94 [==================>...........] - ETA: 12s - loss: 0.6943 - acc: 0.6257
65/94 [==================>...........] - ETA: 12s - loss: 0.6950 - acc: 0.6252
66/94 [==================>...........] - ETA: 11s - loss: 0.6943 - acc: 0.6243
67/94 [==================>...........] - ETA: 11s - loss: 0.6936 - acc: 0.6233
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68/94 [====================>.....] - ETA: 11s - loss: 0.6913 - acc: 0.6243
69/94 [====================>.....] - ETA: 10s - loss: 0.6892 - acc: 0.6252
70/94 [====================>.....] - ETA: 10s - loss: 0.6912 - acc: 0.6234
71/94 [====================>.....] - ETA: 9s - loss: 0.6894 - acc: 0.6248
72/94 [====================>.....] - ETA: 9s - loss: 0.6895 - acc: 0.6226
73/94 [=====================>.....] - ETA: 9s - loss: 0.6883 - acc: 0.6222
74/94 [=====================>.....] - ETA: 8s - loss: 0.6857 - acc: 0.6248
75/94 [=====================>.....] - ETA: 8s - loss: 0.6862 - acc: 0.6239
76/94 [=====================>.....] - ETA: 7s - loss: 0.6900 - acc: 0.6215
77/94 [=====================>.....] - ETA: 7s - loss: 0.6932 - acc: 0.6207
78/94 [=====================>.....] - ETA: 7s - loss: 0.6911 - acc: 0.6224
79/94 [=====================>.....] - ETA: 6s - loss: 0.6933 - acc: 0.6216
80/94 [======================>.....] - ETA: 6s - loss: 0.6950 - acc: 0.6201
81/94 [======================>.....] - ETA: 5s - loss: 0.6944 - acc: 0.6209
82/94 [======================>.....] - ETA: 5s - loss: 0.6942 - acc: 0.6198
83/94 [======================>....] - ETA: 5s - loss: 0.6943 - acc: 0.6222
84/94 [======================>....] - ETA: 4s - loss: 0.6933 - acc: 0.6237
85/94 [======================>....] - ETA: 4s - loss: 0.6918 - acc: 0.6237
86/94 [======================>...] - ETA: 3s - loss: 0.6894 - acc: 0.6244
87/94 [======================>...] - ETA: 3s - loss: 0.6886 - acc: 0.6252
88/94 [======================>...] - ETA: 2s - loss: 0.6880 - acc: 0.6262
89/94 [=======================>..] - ETA: 2s - loss: 0.6869 - acc: 0.6262
90/94 [=======================>..] - ETA: 2s - loss: 0.6873 - acc: 0.6248
91/94 [=======================>..] - ETA: 1s - loss: 0.6883 - acc: 0.6234
92/94 [=======================>.] - ETA: 1s - loss: 0.6885 - acc: 0.6224
93/94 [=======================>.] - ETA: 0s - loss: 0.6889 - acc: 0.6221
94/94 [=======================>.] - ETA: 0s - loss: 0.6879 - acc: 0.6235
95/94 [==============================] - 187s 2s/step - loss: 0.6871 - acc: 0.6238 - val_loss: 0.6472 - val_acc:
0.6340
Epoch 12/20
 1/94 [..............................] - ETA: 15s - loss: 0.6703 - acc: 0.5000
 2/94 [..............................] - ETA: 15s - loss: 0.5116 - acc: 0.7031
 3/94 [..............................] - ETA: 14s - loss: 0.5416 - acc: 0.6667
 4/94 [>.............................] - ETA: 13s - loss: 0.5488 - acc: 0.6641
 5/94 [>.............................] - ETA: 13s - loss: 0.5682 - acc: 0.6875
 6/94 [>.............................] - ETA: 12s - loss: 0.5836 - acc: 0.6823
 7/94 [=>............................] - ETA: 12s - loss: 0.5846 - acc: 0.6741
 8/94 [=>............................] - ETA: 12s - loss: 0.6004 - acc: 0.6836
 9/94 [=>............................] - ETA: 12s - loss: 0.5885 - acc: 0.7049
10/94 [==>...........................] - ETA: 11s - loss: 0.6108 - acc: 0.6844
11/94 [==>...........................] - ETA: 11s - loss: 0.6245 - acc: 0.6705
12/94 [==>...........................] - ETA: 11s - loss: 0.6259 - acc: 0.6693
13/94 [===>..........................] - ETA: 11s - loss: 0.6284 - acc: 0.6707
14/94 [===>..........................] - ETA: 11s - loss: 0.6332 - acc: 0.6652
15/94 [===>..........................] - ETA: 12s - loss: 0.6220 - acc: 0.6771
16/94 [====>.........................] - ETA: 13s - loss: 0.6171 - acc: 0.6797
17/94 [====>.........................] - ETA: 14s - loss: 0.6230 - acc: 0.6783
18/94 [====>.........................] - ETA: 15s - loss: 0.6355 - acc: 0.6701
19/94 [=====>........................] - ETA: 16s - loss: 0.6380 - acc: 0.6694
20/94 [=====>........................] - ETA: 17s - loss: 0.6443 - acc: 0.6641
21/94 [=====>........................] - ETA: 18s - loss: 0.6468 - acc: 0.6548
22/94 [=====>........................] - ETA: 18s - loss: 0.6446 - acc: 0.6562
23/94 [======>.......................] - ETA: 19s - loss: 0.6525 - acc: 0.6454
24/94 [======>.......................] - ETA: 19s - loss: 0.6589 - acc: 0.6445
25/94 [======>.......................] - ETA: 20s - loss: 0.6531 - acc: 0.6512
26/94 [=======>......................] - ETA: 20s - loss: 0.6507 - acc: 0.6526
27/94 [=======>......................] - ETA: 20s - loss: 0.6529 - acc: 0.6516
28/94 [=======>......................] - ETA: 20s - loss: 0.6550 - acc: 0.6507
29/94 [========>.....................] - ETA: 20s - loss: 0.6577 - acc: 0.6487
30/94 [========>.....................] - ETA: 21s - loss: 0.6614 - acc: 0.6469
31/94 [========>.....................] - ETA: 21s - loss: 0.6554 - acc: 0.6492
32/94 [=========>....................] - ETA: 21s - loss: 0.6601 - acc: 0.6445
33/94 [=========>....................] - ETA: 21s - loss: 0.6597 - acc: 0.6449
34/94 [=========>....................] - ETA: 20s - loss: 0.6604 - acc: 0.6443
35/94 [==========>...................] - ETA: 20s - loss: 0.6643 - acc: 0.6455
36/94 [==========>...................] - ETA: 20s - loss: 0.6660 - acc: 0.6441
37/94 [==========>...................] - ETA: 20s - loss: 0.6628 - acc: 0.6470
38/94 [===========>..................] - ETA: 20s - loss: 0.6641 - acc: 0.6488
39/94 [===========>..................] - ETA: 20s - loss: 0.6643 - acc: 0.6474
40/94 [===========>..................] - ETA: 20s - loss: 0.6629 - acc: 0.6500
41/94 [===========>..................] - ETA: 19s - loss: 0.6601 - acc: 0.6494
42/94 [============>.................] - ETA: 19s - loss: 0.6603 - acc: 0.6458
43/94 [============>.................] - ETA: 19s - loss: 0.6635 - acc: 0.6424
44/94 [============>.................] - ETA: 19s - loss: 0.6628 - acc: 0.6428
45/94 [=============>................] - ETA: 18s - loss: 0.6610 - acc: 0.6417
46/94 [=============>................] - ETA: 18s - loss: 0.6596 - acc: 0.6440
47/94 [=============>................] - ETA: 18s - loss: 0.6617 - acc: 0.6426
48/94 [=============>................] - ETA: 18s - loss: 0.6629 - acc: 0.6409
49/94 [=============>................] - ETA: 17s - loss: 0.6645 - acc: 0.6393
50/94 [=============>................] - ETA: 17s - loss: 0.6670 - acc: 0.6390
51/94 [==============>...............] - ETA: 17s - loss: 0.6646 - acc: 0.6431
52/94 [==============>...............] - ETA: 16s - loss: 0.6642 - acc: 0.6433
53/94 [==============>...............] - ETA: 16s - loss: 0.6644 - acc: 0.6453
54/94 [==============>...............] - ETA: 16s - loss: 0.6696 - acc: 0.6420
55/94 [==============>...............] - ETA: 15s - loss: 0.6699 - acc: 0.6417
56/94 [==============>...............] - ETA: 15s - loss: 0.6714 - acc: 0.6420
57/94 [===============>..............] - ETA: 15s - loss: 0.6724 - acc: 0.6406
58/94 [===============>..............] - ETA: 14s - loss: 0.6708 - acc: 0.6414
59/94 [===============>..............] - ETA: 14s - loss: 0.6697 - acc: 0.6406
60/94 [===============>..............] - ETA: 14s - loss: 0.6709 - acc: 0.6398
61/94 [================>.............] - ETA: 13s - loss: 0.6693 - acc: 0.6416
62/94 [================>.............] - ETA: 13s - loss: 0.6691 - acc: 0.6419
63/94 [================>.............] - ETA: 13s - loss: 0.6674 - acc: 0.6446
64/94 [=================>............] - ETA: 12s - loss: 0.6666 - acc: 0.6448
65/94 [=================>............] - ETA: 12s - loss: 0.6658 - acc: 0.6459
66/94 [=================>............] - ETA: 11s - loss: 0.6653 - acc: 0.6451
67/94 [==================>...........] - ETA: 11s - loss: 0.6658 - acc: 0.6429
68/94 [==================>...........] - ETA: 11s - loss: 0.6651 - acc: 0.6450
69/94 [==================>...........] - ETA: 10s - loss: 0.6645 - acc: 0.6460
70/94 [==================>...........] - ETA: 10s - loss: 0.6639 - acc: 0.6466
71/94 [==================>...........] - ETA: 10s - loss: 0.6653 - acc: 0.6450
72/94 [==================>...........] - ETA: 9s - loss: 0.6634 - acc: 0.6456
73/94 [===================>..........] - ETA: 9s - loss: 0.6633 - acc: 0.6457
74/94 [===================>..........] - ETA: 8s - loss: 0.6658 - acc: 0.6446
75/94 [===================>..........] - ETA: 8s - loss: 0.6655 - acc: 0.6452
76/94 [===================>..........] - ETA: 8s - loss: 0.6674 - acc: 0.6445
77/94 [===================>..........] - ETA: 7s - loss: 0.6655 - acc: 0.6459
78/94 [===================>..........] - ETA: 7s - loss: 0.6657 - acc: 0.6444
79/94 [===================>..........] - ETA: 6s - loss: 0.6639 - acc: 0.6454
80/94 [====================>.........] - ETA: 6s - loss: 0.6665 - acc: 0.6428
81/94 [====================>.........] - ETA: 5s - loss: 0.6681 - acc: 0.6418
82/94 [====================>.........] - ETA: 5s - loss: 0.6797 - acc: 0.6381
83/94 [====================>.........] - ETA: 5s - loss: 0.6791 - acc: 0.6391
84/94 [====================>.........] - ETA: 4s - loss: 0.6810 - acc: 0.6393
85/94 [====================>.........] - ETA: 4s - loss: 0.6810 - acc: 0.6384
86/94 [====================>.........] - ETA: 3s - loss: 0.6805 - acc: 0.6390
87/94 [====================>.........] - ETA: 3s - loss: 0.6781 - acc: 0.6403
88/94 [====================>.........] - ETA: 2s - loss: 0.6779 - acc: 0.6394
```

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89/94 [===========================>..] - ETA: 2s - loss: 0.6767 - acc: 0.6392
90/94 [===========================>..] - ETA: 2s - loss: 0.6747 - acc: 0.6404
91/94 [===========================>..] - ETA: 1s - loss: 0.6737 - acc: 0.6406
92/94 [===========================>.] - ETA: 1s - loss: 0.6732 - acc: 0.6418
93/94 [===========================>.] - ETA: 0s - loss: 0.6752 - acc: 0.6423
94/94 [===========================>.] - ETA: 0s - loss: 0.6743 - acc: 0.6421
95/94 [==============================] - 187s 2s/step - loss: 0.6725 - acc: 0.6426 - val_loss: 0.6551 - val_acc:
0.6422
Epoch 13/20
 1/94 [.............................] - ETA: 16s - loss: 0.4698 - acc: 0.8438
 2/94 [.............................] - ETA: 14s - loss: 0.5291 - acc: 0.7680
 3/94 [.............................] - ETA: 13s - loss: 0.5527 - acc: 0.7099
 4/94 [>............................] - ETA: 13s - loss: 0.5585 - acc: 0.7121
 5/94 [>............................] - ETA: 13s - loss: 0.5838 - acc: 0.6822
 6/94 [>............................] - ETA: 12s - loss: 0.6014 - acc: 0.6675
 7/94 [=>...........................] - ETA: 12s - loss: 0.5991 - acc: 0.6659
 8/94 [=>...........................] - ETA: 12s - loss: 0.6054 - acc: 0.6569
 9/94 [=>...........................] - ETA: 12s - loss: 0.5964 - acc: 0.6637
10/94 [==>..........................] - ETA: 11s - loss: 0.6148 - acc: 0.6692
11/94 [==>..........................] - ETA: 11s - loss: 0.6167 - acc: 0.6766
12/94 [==>..........................] - ETA: 11s - loss: 0.6298 - acc: 0.6697
13/94 [===>.........................] - ETA: 11s - loss: 0.6278 - acc: 0.6734
14/94 [===>.........................] - ETA: 11s - loss: 0.6281 - acc: 0.6700
15/94 [===>.........................] - ETA: 11s - loss: 0.6241 - acc: 0.6691
16/94 [====>........................] - ETA: 13s - loss: 0.6197 - acc: 0.6702
17/94 [====>........................] - ETA: 14s - loss: 0.6212 - acc: 0.6694
18/94 [====>........................] - ETA: 15s - loss: 0.6276 - acc: 0.6669
19/94 [=====>.......................] - ETA: 16s - loss: 0.6225 - acc: 0.6631
20/94 [=====>.......................] - ETA: 17s - loss: 0.6233 - acc: 0.6534
21/94 [=====>.......................] - ETA: 18s - loss: 0.6351 - acc: 0.6520
22/94 [=====>.......................] - ETA: 18s - loss: 0.6386 - acc: 0.6508
23/94 [======>......................] - ETA: 19s - loss: 0.6299 - acc: 0.6578
24/94 [======>......................] - ETA: 19s - loss: 0.6259 - acc: 0.6565
25/94 [======>......................] - ETA: 19s - loss: 0.6259 - acc: 0.6514
26/94 [=======>.....................] - ETA: 20s - loss: 0.6348 - acc: 0.6504
27/94 [=======>.....................] - ETA: 20s - loss: 0.6333 - acc: 0.6472
28/94 [=======>.....................] - ETA: 20s - loss: 0.6377 - acc: 0.6441
29/94 [========>....................] - ETA: 20s - loss: 0.6400 - acc: 0.6435
30/94 [========>....................] - ETA: 20s - loss: 0.6350 - acc: 0.6439
31/94 [========>....................] - ETA: 20s - loss: 0.6318 - acc: 0.6453
32/94 [=========>...................] - ETA: 20s - loss: 0.6323 - acc: 0.6447
33/94 [=========>...................] - ETA: 20s - loss: 0.6318 - acc: 0.6469
34/94 [=========>...................] - ETA: 20s - loss: 0.6387 - acc: 0.6435
35/94 [==========>..................] - ETA: 20s - loss: 0.6414 - acc: 0.6403
36/94 [==========>..................] - ETA: 20s - loss: 0.6412 - acc: 0.6425
37/94 [==========>..................] - ETA: 20s - loss: 0.6411 - acc: 0.6437
38/94 [==========>..................] - ETA: 20s - loss: 0.6379 - acc: 0.6457
39/94 [==========>..................] - ETA: 19s - loss: 0.6390 - acc: 0.6452
40/94 [==========>..................] - ETA: 19s - loss: 0.6357 - acc: 0.6447
41/94 [==========>..................] - ETA: 19s - loss: 0.6352 - acc: 0.6457
42/94 [===========>.................] - ETA: 19s - loss: 0.6327 - acc: 0.6474
43/94 [===========>.................] - ETA: 19s - loss: 0.6311 - acc: 0.6491
44/94 [===========>.................] - ETA: 18s - loss: 0.6289 - acc: 0.6493
45/94 [============>................] - ETA: 18s - loss: 0.6286 - acc: 0.6480
46/94 [============>................] - ETA: 18s - loss: 0.6267 - acc: 0.6482
47/94 [============>................] - ETA: 18s - loss: 0.6263 - acc: 0.6477
48/94 [=============>...............] - ETA: 17s - loss: 0.6227 - acc: 0.6505
49/94 [=============>...............] - ETA: 17s - loss: 0.6244 - acc: 0.6493
50/94 [=============>...............] - ETA: 17s - loss: 0.6257 - acc: 0.6470
51/94 [==============>..............] - ETA: 16s - loss: 0.6236 - acc: 0.6465
52/94 [==============>..............] - ETA: 16s - loss: 0.6248 - acc: 0.6461
53/94 [==============>..............] - ETA: 16s - loss: 0.6275 - acc: 0.6451
54/94 [==============>..............] - ETA: 16s - loss: 0.6256 - acc: 0.6471
55/94 [==============>..............] - ETA: 15s - loss: 0.6259 - acc: 0.6478
56/94 [==============>..............] - ETA: 15s - loss: 0.6255 - acc: 0.6474
57/94 [===============>.............] - ETA: 15s - loss: 0.6276 - acc: 0.6476
58/94 [===============>.............] - ETA: 14s - loss: 0.6267 - acc: 0.6483
59/94 [===============>.............] - ETA: 14s - loss: 0.6306 - acc: 0.6457
60/94 [===============>.............] - ETA: 14s - loss: 0.6277 - acc: 0.6470
61/94 [================>............] - ETA: 13s - loss: 0.6300 - acc: 0.6435
62/94 [================>............] - ETA: 13s - loss: 0.6292 - acc: 0.6447
63/94 [================>............] - ETA: 12s - loss: 0.6300 - acc: 0.6434
64/94 [=================>...........] - ETA: 12s - loss: 0.6325 - acc: 0.6422
65/94 [=================>...........] - ETA: 12s - loss: 0.6338 - acc: 0.6429
66/94 [=================>...........] - ETA: 11s - loss: 0.6350 - acc: 0.6426
67/94 [=================>...........] - ETA: 11s - loss: 0.6373 - acc: 0.6409
68/94 [=================>...........] - ETA: 11s - loss: 0.6408 - acc: 0.6407
69/94 [=================>...........] - ETA: 10s - loss: 0.6396 - acc: 0.6414
70/94 [==================>..........] - ETA: 10s - loss: 0.6397 - acc: 0.6407
71/94 [==================>..........] - ETA: 9s - loss: 0.6404 - acc: 0.6409
72/94 [==================>..........] - ETA: 9s - loss: 0.6397 - acc: 0.6398
73/94 [==================>..........] - ETA: 9s - loss: 0.6382 - acc: 0.6405
74/94 [==================>..........] - ETA: 8s - loss: 0.6384 - acc: 0.6415
75/94 [==================>..........] - ETA: 8s - loss: 0.6394 - acc: 0.6401
76/94 [==================>..........] - ETA: 7s - loss: 0.6397 - acc: 0.6390
77/94 [==================>..........] - ETA: 7s - loss: 0.6388 - acc: 0.6385
78/94 [==================>..........] - ETA: 7s - loss: 0.6409 - acc: 0.6351
79/94 [==================>..........] - ETA: 6s - loss: 0.6406 - acc: 0.6357
80/94 [==================>..........] - ETA: 6s - loss: 0.6398 - acc: 0.6360
81/94 [==================>..........] - ETA: 5s - loss: 0.6395 - acc: 0.6370
82/94 [==================>..........] - ETA: 5s - loss: 0.6376 - acc: 0.6392
83/94 [==================>..........] - ETA: 5s - loss: 0.6374 - acc: 0.6394
84/94 [==================>..........] - ETA: 4s - loss: 0.6365 - acc: 0.6385
85/94 [==================>..........] - ETA: 4s - loss: 0.6370 - acc: 0.6390
86/94 [==================>..........] - ETA: 3s - loss: 0.6391 - acc: 0.6374
87/94 [==================>..........] - ETA: 3s - loss: 0.6415 - acc: 0.6355
88/94 [==================>..........] - ETA: 2s - loss: 0.6413 - acc: 0.6354
89/94 [==================>..........] - ETA: 2s - loss: 0.6407 - acc: 0.6363
90/94 [==================>..........] - ETA: 2s - loss: 0.6389 - acc: 0.6386
91/94 [==================>..........] - ETA: 1s - loss: 0.6385 - acc: 0.6395
92/94 [==================>..........] - ETA: 1s - loss: 0.6373 - acc: 0.6407
93/94 [==================>..........] - ETA: 0s - loss: 0.6371 - acc: 0.6412
94/94 [==================>..........] - ETA: 0s - loss: 0.6372 - acc: 0.6407
95/94 [==============================] - 186s 2s/step - loss: 0.6370 - acc: 0.6405 - val_loss: 0.5923 - val_acc:
0.6561
Epoch 14/20
 1/94 [.............................] - ETA: 16s - loss: 0.4381 - acc: 0.7500
 2/94 [.............................] - ETA: 15s - loss: 0.4878 - acc: 0.6562
 3/94 [.............................] - ETA: 14s - loss: 0.5752 - acc: 0.6875
 4/94 [>............................] - ETA: 14s - loss: 0.6128 - acc: 0.6641
 5/94 [>............................] - ETA: 13s - loss: 0.5686 - acc: 0.7000
 6/94 [>............................] - ETA: 13s - loss: 0.5699 - acc: 0.6979
 7/94 [=>...........................] - ETA: 12s - loss: 0.5729 - acc: 0.6875
 8/94 [=>...........................] - ETA: 12s - loss: 0.5742 - acc: 0.6797
 9/94 [=>...........................] - ETA: 12s - loss: 0.5650 - acc: 0.6806
10/94 [==>..........................] - ETA: 11s - loss: 0.5618 - acc: 0.6781
11/94 [==>..........................] - ETA: 11s - loss: 0.5620 - acc: 0.6705
12/94 [==>..........................] - ETA: 11s - loss: 0.5618 - acc: 0.6771
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13/94 [===>.....] - ETA: 11s - loss: 0.5630 - acc: 0.6755
14/94 [===>.....] - ETA: 11s - loss: 0.5708 - acc: 0.6719
15/94 [===>.....] - ETA: 11s - loss: 0.5636 - acc: 0.6708
16/94 [====>.....] - ETA: 13s - loss: 0.5683 - acc: 0.6758
17/94 [====>.....] - ETA: 14s - loss: 0.5763 - acc: 0.6765
18/94 [====>.....] - ETA: 15s - loss: 0.5770 - acc: 0.6771
19/94 [=====>.....] - ETA: 16s - loss: 0.5730 - acc: 0.6809
20/94 [=====>.....] - ETA: 17s - loss: 0.5780 - acc: 0.6703
21/94 [=====>.....] - ETA: 18s - loss: 0.5740 - acc: 0.6771
22/94 [=====>.....] - ETA: 18s - loss: 0.5732 - acc: 0.6804
23/94 [======>.....] - ETA: 19s - loss: 0.5776 - acc: 0.6753
24/94 [======>.....] - ETA: 19s - loss: 0.5808 - acc: 0.6760
25/94 [======>.....] - ETA: 19s - loss: 0.5781 - acc: 0.6777
26/94 [=======>.....] - ETA: 19s - loss: 0.5749 - acc: 0.6781
27/94 [=======>.....] - ETA: 20s - loss: 0.5749 - acc: 0.6773
28/94 [=======>.....] - ETA: 20s - loss: 0.5754 - acc: 0.6799
29/94 [========>.....] - ETA: 20s - loss: 0.5765 - acc: 0.6780
30/94 [========>.....] - ETA: 20s - loss: 0.5775 - acc: 0.6731
31/94 [========>.....] - ETA: 20s - loss: 0.5827 - acc: 0.6695
32/94 [=========>.....] - ETA: 20s - loss: 0.6007 - acc: 0.6632
33/94 [=========>.....] - ETA: 20s - loss: 0.6045 - acc: 0.6592
34/94 [=========>.....] - ETA: 20s - loss: 0.6021 - acc: 0.6582
35/94 [==========>.....] - ETA: 20s - loss: 0.6028 - acc: 0.6537
36/94 [==========>.....] - ETA: 20s - loss: 0.6041 - acc: 0.6555
37/94 [==========>.....] - ETA: 20s - loss: 0.6088 - acc: 0.6547
38/94 [==========>.....] - ETA: 19s - loss: 0.6098 - acc: 0.6506
39/94 [==========>.....] - ETA: 19s - loss: 0.6139 - acc: 0.6516
40/94 [==========>.....] - ETA: 19s - loss: 0.6155 - acc: 0.6486
41/94 [==========>.....] - ETA: 19s - loss: 0.6143 - acc: 0.6487
42/94 [===========>.....] - ETA: 19s - loss: 0.6151 - acc: 0.6504
43/94 [===========>.....] - ETA: 19s - loss: 0.6129 - acc: 0.6513
44/94 [===========>.....] - ETA: 18s - loss: 0.6166 - acc: 0.6507
45/94 [===========>.....] - ETA: 18s - loss: 0.6192 - acc: 0.6487
46/94 [===========>.....] - ETA: 18s - loss: 0.6201 - acc: 0.6468
47/94 [===========>.....] - ETA: 18s - loss: 0.6212 - acc: 0.6450
48/94 [============>.....] - ETA: 17s - loss: 0.6180 - acc: 0.6505
49/94 [============>.....] - ETA: 17s - loss: 0.6178 - acc: 0.6500
50/94 [============>.....] - ETA: 17s - loss: 0.6170 - acc: 0.6513
51/94 [============>.....] - ETA: 16s - loss: 0.6166 - acc: 0.6508
52/94 [============>.....] - ETA: 16s - loss: 0.6151 - acc: 0.6533
53/94 [============>.....] - ETA: 16s - loss: 0.6158 - acc: 0.6528
54/94 [=============>.....] - ETA: 16s - loss: 0.6143 - acc: 0.6534
55/94 [=============>.....] - ETA: 15s - loss: 0.6138 - acc: 0.6529
56/94 [=============>.....] - ETA: 15s - loss: 0.6126 - acc: 0.6535
57/94 [=============>.....] - ETA: 15s - loss: 0.6141 - acc: 0.6498
58/94 [=============>.....] - ETA: 14s - loss: 0.6179 - acc: 0.6499
59/94 [=============>.....] - ETA: 14s - loss: 0.6255 - acc: 0.6489
60/94 [=============>.....] - ETA: 14s - loss: 0.6236 - acc: 0.6506
61/94 [==============>.....] - ETA: 13s - loss: 0.6235 - acc: 0.6507
62/94 [==============>.....] - ETA: 13s - loss: 0.6241 - acc: 0.6508
63/94 [==============>.....] - ETA: 12s - loss: 0.6243 - acc: 0.6514
64/94 [==============>.....] - ETA: 12s - loss: 0.6235 - acc: 0.6510
65/94 [==============>.....] - ETA: 12s - loss: 0.6241 - acc: 0.6491
66/94 [==============>.....] - ETA: 11s - loss: 0.6220 - acc: 0.6506
67/94 [===============>.....] - ETA: 11s - loss: 0.6236 - acc: 0.6498
68/94 [===============>.....] - ETA: 11s - loss: 0.6265 - acc: 0.6499
69/94 [===============>.....] - ETA: 10s - loss: 0.6286 - acc: 0.6495
70/94 [===============>.....] - ETA: 10s - loss: 0.6368 - acc: 0.6483
71/94 [===============>.....] - ETA: 9s - loss: 0.6351 - acc: 0.6497
72/94 [===============>.....] - ETA: 9s - loss: 0.6365 - acc: 0.6494
73/94 [===============>.....] - ETA: 9s - loss: 0.6353 - acc: 0.6490
74/94 [===============>.....] - ETA: 8s - loss: 0.6360 - acc: 0.6496
75/94 [===============>.....] - ETA: 8s - loss: 0.6347 - acc: 0.6509
76/94 [================>.....] - ETA: 7s - loss: 0.6322 - acc: 0.6538
77/94 [================>.....] - ETA: 7s - loss: 0.6298 - acc: 0.6547
78/94 [================>.....] - ETA: 7s - loss: 0.6291 - acc: 0.6551
79/94 [================>.....] - ETA: 6s - loss: 0.6301 - acc: 0.6535
80/94 [================>.....] - ETA: 6s - loss: 0.6303 - acc: 0.6528
81/94 [================>.....] - ETA: 5s - loss: 0.6300 - acc: 0.6532
82/94 [================>.....] - ETA: 5s - loss: 0.6301 - acc: 0.6521
83/94 [================>.....] - ETA: 5s - loss: 0.6291 - acc: 0.6522
84/94 [================>.....] - ETA: 4s - loss: 0.6304 - acc: 0.6518
85/94 [================>.....] - ETA: 4s - loss: 0.6308 - acc: 0.6504
86/94 [================>.....] - ETA: 3s - loss: 0.6317 - acc: 0.6494
87/94 [================>.....] - ETA: 3s - loss: 0.6301 - acc: 0.6506
88/94 [================>.....] - ETA: 2s - loss: 0.6304 - acc: 0.6492
89/94 [================>.....] - ETA: 2s - loss: 0.6310 - acc: 0.6489
90/94 [================>.....] - ETA: 2s - loss: 0.6304 - acc: 0.6487
91/94 [================>.....] - ETA: 1s - loss: 0.6280 - acc: 0.6505
92/94 [================>.....] - ETA: 1s - loss: 0.6268 - acc: 0.6512
93/94 [================>.....] - ETA: 0s - loss: 0.6266 - acc: 0.6513
94/94 [================>.....] - ETA: 0s - loss: 0.6268 - acc: 0.6516
95/94 [==============================] - 186s 2s/step - loss: 0.6250 - acc: 0.6527 - val_loss: 0.6110 - val_acc: 0.6447
Epoch 15/20
 1/94 [.....] - ETA: 15s - loss: 0.4758 - acc: 0.6875
 2/94 [.....] - ETA: 15s - loss: 0.4924 - acc: 0.7031
 3/94 [.....] - ETA: 14s - loss: 0.5832 - acc: 0.6354
 4/94 [>.....] - ETA: 14s - loss: 0.6564 - acc: 0.6094
 5/94 [>.....] - ETA: 13s - loss: 0.6530 - acc: 0.6375
 6/94 [>.....] - ETA: 13s - loss: 0.6490 - acc: 0.6406
 7/94 [=>.....] - ETA: 12s - loss: 0.6686 - acc: 0.6518
 8/94 [=>.....] - ETA: 12s - loss: 0.6710 - acc: 0.6484
 9/94 [=>.....] - ETA: 12s - loss: 0.6636 - acc: 0.6424
10/94 [==>.....] - ETA: 11s - loss: 0.6440 - acc: 0.6531
11/94 [==>.....] - ETA: 11s - loss: 0.6314 - acc: 0.6562
12/94 [==>.....] - ETA: 11s - loss: 0.6263 - acc: 0.6641
13/94 [===>.....] - ETA: 11s - loss: 0.6180 - acc: 0.6611
14/94 [===>.....] - ETA: 11s - loss: 0.6103 - acc: 0.6652
15/94 [===>.....] - ETA: 12s - loss: 0.6065 - acc: 0.6667
16/94 [====>.....] - ETA: 13s - loss: 0.5967 - acc: 0.6680
17/94 [====>.....] - ETA: 14s - loss: 0.5941 - acc: 0.6691
18/94 [====>.....] - ETA: 15s - loss: 0.6087 - acc: 0.6684
19/94 [=====>.....] - ETA: 16s - loss: 0.6103 - acc: 0.6628
20/94 [=====>.....] - ETA: 17s - loss: 0.6101 - acc: 0.6656
21/94 [=====>.....] - ETA: 18s - loss: 0.6036 - acc: 0.6682
22/94 [=====>.....] - ETA: 18s - loss: 0.6012 - acc: 0.6719
23/94 [======>.....] - ETA: 19s - loss: 0.5950 - acc: 0.6793
24/94 [======>.....] - ETA: 19s - loss: 0.5970 - acc: 0.6719
25/94 [======>.....] - ETA: 19s - loss: 0.5958 - acc: 0.6700
26/94 [=======>.....] - ETA: 20s - loss: 0.5944 - acc: 0.6695
27/94 [=======>.....] - ETA: 20s - loss: 0.6003 - acc: 0.6678
28/94 [=======>.....] - ETA: 20s - loss: 0.5981 - acc: 0.6730
29/94 [========>.....] - ETA: 20s - loss: 0.5959 - acc: 0.6724
30/94 [========>.....] - ETA: 20s - loss: 0.5919 - acc: 0.6760
31/94 [========>.....] - ETA: 20s - loss: 0.5917 - acc: 0.6744
32/94 [=========>.....] - ETA: 20s - loss: 0.5885 - acc: 0.6768
33/94 [=========>.....] - ETA: 20s - loss: 0.5871 - acc: 0.6761

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34/94 [=========>....................] - ETA: 20s - loss: 0.5809 - acc: 0.6792
35/94 [==========>...................] - ETA: 20s - loss: 0.5837 - acc: 0.6750
36/94 [==========>...................] - ETA: 20s - loss: 0.5843 - acc: 0.6701
37/94 [==========>...................] - ETA: 20s - loss: 0.5821 - acc: 0.6706
38/94 [==========>...................] - ETA: 19s - loss: 0.5822 - acc: 0.6732
39/94 [==========>...................] - ETA: 19s - loss: 0.5802 - acc: 0.6744
40/94 [==========>...................] - ETA: 19s - loss: 0.5794 - acc: 0.6731
41/94 [==========>...................] - ETA: 19s - loss: 0.5810 - acc: 0.6689
42/94 [===========>..................] - ETA: 19s - loss: 0.5808 - acc: 0.6679
43/94 [===========>..................] - ETA: 18s - loss: 0.5813 - acc: 0.6676
44/94 [===========>..................] - ETA: 18s - loss: 0.5820 - acc: 0.6659
45/94 [===========>..................] - ETA: 18s - loss: 0.5815 - acc: 0.6699
46/94 [===========>..................] - ETA: 18s - loss: 0.5787 - acc: 0.6709
47/94 [===========>..................] - ETA: 17s - loss: 0.5812 - acc: 0.6713
48/94 [============>.................] - ETA: 17s - loss: 0.5794 - acc: 0.6716
49/94 [============>.................] - ETA: 17s - loss: 0.5840 - acc: 0.6707
50/94 [============>.................] - ETA: 17s - loss: 0.5858 - acc: 0.6685
51/94 [============>.................] - ETA: 16s - loss: 0.5849 - acc: 0.6658
52/94 [============>.................] - ETA: 16s - loss: 0.5888 - acc: 0.6626
53/94 [============>.................] - ETA: 16s - loss: 0.5905 - acc: 0.6607
54/94 [=============>................] - ETA: 15s - loss: 0.5885 - acc: 0.6601
55/94 [=============>................] - ETA: 15s - loss: 0.5912 - acc: 0.6583
56/94 [=============>................] - ETA: 15s - loss: 0.5898 - acc: 0.6566
57/94 [=============>................] - ETA: 14s - loss: 0.5957 - acc: 0.6533
58/94 [=============>................] - ETA: 14s - loss: 0.6022 - acc: 0.6496
59/94 [=============>................] - ETA: 14s - loss: 0.6101 - acc: 0.6492
60/94 [=============>................] - ETA: 13s - loss: 0.6105 - acc: 0.6498
61/94 [==============>...............] - ETA: 13s - loss: 0.6080 - acc: 0.6514
62/94 [==============>...............] - ETA: 13s - loss: 0.6095 - acc: 0.6515
63/94 [==============>...............] - ETA: 12s - loss: 0.6077 - acc: 0.6521
64/94 [==============>...............] - ETA: 12s - loss: 0.6072 - acc: 0.6517
65/94 [==============>...............] - ETA: 12s - loss: 0.6046 - acc: 0.6541
66/94 [==============>...............] - ETA: 11s - loss: 0.6023 - acc: 0.6546
67/94 [===============>..............] - ETA: 11s - loss: 0.6030 - acc: 0.6542
68/94 [===============>..............] - ETA: 11s - loss: 0.6031 - acc: 0.6533
69/94 [===============>..............] - ETA: 10s - loss: 0.6036 - acc: 0.6534
70/94 [================>.............] - ETA: 10s - loss: 0.6026 - acc: 0.6552
71/94 [================>.............] - ETA: 9s - loss: 0.6058 - acc: 0.6526
72/94 [================>.............] - ETA: 9s - loss: 0.6065 - acc: 0.6522
73/94 [================>.............] - ETA: 9s - loss: 0.6087 - acc: 0.6514
74/94 [================>.............] - ETA: 8s - loss: 0.6087 - acc: 0.6506
75/94 [================>.............] - ETA: 8s - loss: 0.6098 - acc: 0.6511
76/94 [=================>............] - ETA: 7s - loss: 0.6091 - acc: 0.6520
77/94 [=================>............] - ETA: 7s - loss: 0.6065 - acc: 0.6528
78/94 [=================>............] - ETA: 7s - loss: 0.6092 - acc: 0.6517
79/94 [=================>............] - ETA: 6s - loss: 0.6088 - acc: 0.6514
80/94 [=================>............] - ETA: 6s - loss: 0.6092 - acc: 0.6491
81/94 [=================>............] - ETA: 5s - loss: 0.6074 - acc: 0.6495
82/94 [=================>............] - ETA: 5s - loss: 0.6066 - acc: 0.6504
83/94 [==================>...........] - ETA: 5s - loss: 0.6065 - acc: 0.6490
84/94 [==================>...........] - ETA: 4s - loss: 0.6091 - acc: 0.6487
85/94 [==================>...........] - ETA: 4s - loss: 0.6091 - acc: 0.6477
86/94 [==================>...........] - ETA: 3s - loss: 0.6083 - acc: 0.6478
87/94 [==================>...........] - ETA: 3s - loss: 0.6067 - acc: 0.6486
88/94 [==================>...........] - ETA: 2s - loss: 0.6062 - acc: 0.6501
89/94 [===================>..........] - ETA: 2s - loss: 0.6072 - acc: 0.6498
90/94 [===================>..........] - ETA: 2s - loss: 0.6073 - acc: 0.6502
91/94 [===================>..........] - ETA: 1s - loss: 0.6073 - acc: 0.6517
92/94 [===================>..........] - ETA: 1s - loss: 0.6116 - acc: 0.6524
93/94 [===================>..........] - ETA: 0s - loss: 0.6124 - acc: 0.6524
94/94 [===================>..........] - ETA: 0s - loss: 0.6125 - acc: 0.6525
95/94 [==============================] - 188s 2s/step - loss: 0.6126 - acc: 0.6515 - val_loss: 0.6138 - val_acc: 0.6541
Epoch 16/20
 1/94 [..............................] - ETA: 16s - loss: 0.4797 - acc: 0.8438
 2/94 [..............................] - ETA: 15s - loss: 0.5854 - acc: 0.7031
 3/94 [..............................] - ETA: 14s - loss: 0.5684 - acc: 0.7083
 4/94 [>.............................] - ETA: 14s - loss: 0.5637 - acc: 0.6953
 5/94 [>.............................] - ETA: 13s - loss: 0.6158 - acc: 0.6687
 6/94 [>.............................] - ETA: 13s - loss: 0.6152 - acc: 0.6615
 7/94 [=>............................] - ETA: 12s - loss: 0.6262 - acc: 0.6562
 8/94 [=>............................] - ETA: 12s - loss: 0.6247 - acc: 0.6523
 9/94 [=>............................] - ETA: 12s - loss: 0.6230 - acc: 0.6528
10/94 [==>...........................] - ETA: 12s - loss: 0.6120 - acc: 0.6531
11/94 [==>...........................] - ETA: 11s - loss: 0.6145 - acc: 0.6477
12/94 [==>...........................] - ETA: 11s - loss: 0.6042 - acc: 0.6589
13/94 [===>..........................] - ETA: 11s - loss: 0.6206 - acc: 0.6538
14/94 [===>..........................] - ETA: 11s - loss: 0.6296 - acc: 0.6473
15/94 [===>..........................] - ETA: 11s - loss: 0.6269 - acc: 0.6396
16/94 [====>.........................] - ETA: 13s - loss: 0.6258 - acc: 0.6367
17/94 [====>.........................] - ETA: 14s - loss: 0.6279 - acc: 0.6379
18/94 [====>.........................] - ETA: 15s - loss: 0.6179 - acc: 0.6441
19/94 [=====>........................] - ETA: 16s - loss: 0.6137 - acc: 0.6447
20/94 [=====>........................] - ETA: 17s - loss: 0.6120 - acc: 0.6500
21/94 [=====>........................] - ETA: 18s - loss: 0.6133 - acc: 0.6443
22/94 [=====>........................] - ETA: 18s - loss: 0.6195 - acc: 0.6435
23/94 [======>.......................] - ETA: 19s - loss: 0.6216 - acc: 0.6508
24/94 [======>.......................] - ETA: 19s - loss: 0.6265 - acc: 0.6484
25/94 [======>.......................] - ETA: 20s - loss: 0.6261 - acc: 0.6425
26/94 [=======>......................] - ETA: 20s - loss: 0.6289 - acc: 0.6406
27/94 [=======>......................] - ETA: 20s - loss: 0.6274 - acc: 0.6435
28/94 [=======>......................] - ETA: 20s - loss: 0.6243 - acc: 0.6484
29/94 [========>.....................] - ETA: 20s - loss: 0.6212 - acc: 0.6519
30/94 [========>.....................] - ETA: 20s - loss: 0.6248 - acc: 0.6490
31/94 [========>.....................] - ETA: 20s - loss: 0.6224 - acc: 0.6512
32/94 [=========>....................] - ETA: 20s - loss: 0.6195 - acc: 0.6514
33/94 [=========>....................] - ETA: 20s - loss: 0.6195 - acc: 0.6515
34/94 [=========>....................] - ETA: 20s - loss: 0.6185 - acc: 0.6498
35/94 [==========>...................] - ETA: 20s - loss: 0.6160 - acc: 0.6518
36/94 [==========>...................] - ETA: 20s - loss: 0.6117 - acc: 0.6554
37/94 [==========>...................] - ETA: 20s - loss: 0.6122 - acc: 0.6537
38/94 [===========>..................] - ETA: 20s - loss: 0.6159 - acc: 0.6521
39/94 [===========>..................] - ETA: 20s - loss: 0.6155 - acc: 0.6506
40/94 [===========>..................] - ETA: 19s - loss: 0.6135 - acc: 0.6523
41/94 [===========>..................] - ETA: 19s - loss: 0.6102 - acc: 0.6540
42/94 [===========>..................] - ETA: 19s - loss: 0.6067 - acc: 0.6548
43/94 [===========>..................] - ETA: 19s - loss: 0.6036 - acc: 0.6570
44/94 [===========>..................] - ETA: 19s - loss: 0.6020 - acc: 0.6577
45/94 [============>.................] - ETA: 18s - loss: 0.5986 - acc: 0.6590
46/94 [============>.................] - ETA: 18s - loss: 0.6025 - acc: 0.6576
47/94 [============>.................] - ETA: 18s - loss: 0.6031 - acc: 0.6562
48/94 [=============>................] - ETA: 18s - loss: 0.5996 - acc: 0.6602
49/94 [=============>................] - ETA: 17s - loss: 0.5979 - acc: 0.6607
50/94 [=============>................] - ETA: 17s - loss: 0.5951 - acc: 0.6613
51/94 [==============>...............] - ETA: 17s - loss: 0.5935 - acc: 0.6630
52/94 [==============>...............] - ETA: 16s - loss: 0.5930 - acc: 0.6653
53/94 [==============>...............] - ETA: 16s - loss: 0.5950 - acc: 0.6651
54/94 [==============>...............] - ETA: 16s - loss: 0.5939 - acc: 0.6667
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55/94 [================>.............] - ETA: 15s - loss: 0.5955 - acc: 0.6648
56/94 [================>.............] - ETA: 15s - loss: 0.5968 - acc: 0.6635
57/94 [================>.............] - ETA: 15s - loss: 0.5962 - acc: 0.6650
58/94 [================>.............] - ETA: 14s - loss: 0.5956 - acc: 0.6659
59/94 [================>.............] - ETA: 14s - loss: 0.5938 - acc: 0.6668
60/94 [================>.............] - ETA: 14s - loss: 0.5914 - acc: 0.6687
61/94 [=================>............] - ETA: 13s - loss: 0.5885 - acc: 0.6701
62/94 [=================>............] - ETA: 13s - loss: 0.5888 - acc: 0.6694
63/94 [=================>............] - ETA: 13s - loss: 0.5907 - acc: 0.6672
64/94 [=================>............] - ETA: 12s - loss: 0.5937 - acc: 0.6665
65/94 [=================>............] - ETA: 12s - loss: 0.5929 - acc: 0.6668
66/94 [=================>............] - ETA: 11s - loss: 0.5932 - acc: 0.6643
67/94 [==================>...........] - ETA: 11s - loss: 0.5922 - acc: 0.6628
68/94 [==================>...........] - ETA: 11s - loss: 0.5937 - acc: 0.6622
69/94 [==================>...........] - ETA: 10s - loss: 0.5925 - acc: 0.6626
70/94 [==================>...........] - ETA: 10s - loss: 0.5902 - acc: 0.6634
71/94 [==================>...........] - ETA: 9s - loss: 0.5891 - acc: 0.6633
72/94 [==================>...........] - ETA: 9s - loss: 0.5881 - acc: 0.6654
73/94 [==================>...........] - ETA: 9s - loss: 0.5889 - acc: 0.6644
74/94 [==================>...........] - ETA: 8s - loss: 0.5898 - acc: 0.6647
75/94 [==================>...........] - ETA: 8s - loss: 0.5871 - acc: 0.6663
76/94 [==================>...........] - ETA: 7s - loss: 0.5859 - acc: 0.6674
77/94 [==================>...........] - ETA: 7s - loss: 0.5871 - acc: 0.6664
78/94 [==================>...........] - ETA: 7s - loss: 0.5861 - acc: 0.6675
79/94 [==================>...........] - ETA: 6s - loss: 0.5849 - acc: 0.6685
80/94 [==================>...........] - ETA: 6s - loss: 0.5855 - acc: 0.6687
81/94 [==================>...........] - ETA: 5s - loss: 0.5845 - acc: 0.6701
82/94 [==================>...........] - ETA: 5s - loss: 0.5826 - acc: 0.6726
83/94 [==================>...........] - ETA: 5s - loss: 0.5830 - acc: 0.6736
84/94 [==================>...........] - ETA: 4s - loss: 0.5835 - acc: 0.6741
85/94 [==================>...........] - ETA: 4s - loss: 0.5818 - acc: 0.6757
86/94 [==================>...........] - ETA: 3s - loss: 0.5811 - acc: 0.6758
87/94 [==================>...........] - ETA: 3s - loss: 0.5787 - acc: 0.6770
88/94 [==================>...........] - ETA: 2s - loss: 0.5788 - acc: 0.6775
89/94 [==================>...........] - ETA: 2s - loss: 0.5786 - acc: 0.6773
90/94 [==================>...........] - ETA: 2s - loss: 0.5775 - acc: 0.6781
91/94 [==================>...........] - ETA: 1s - loss: 0.5793 - acc: 0.6758
92/94 [==================>...........] - ETA: 1s - loss: 0.5816 - acc: 0.6756
93/94 [==================>...........] - ETA: 0s - loss: 0.5814 - acc: 0.6757
94/94 [==================>...........] - ETA: 0s - loss: 0.5800 - acc: 0.6755
95/94 [==============================] - 190s 2s/step - loss: 0.5811 - acc: 0.6746 - val_loss: 0.8016 - val_acc:
0.5994
Epoch 17/20
 1/94 [..............................] - ETA: 15s - loss: 0.5968 - acc: 0.7188
 2/94 [..............................] - ETA: 15s - loss: 0.7291 - acc: 0.7031
 3/94 [..............................] - ETA: 14s - loss: 0.7061 - acc: 0.6875
 4/94 [>.............................] - ETA: 13s - loss: 0.6867 - acc: 0.6484
 5/94 [>.............................] - ETA: 13s - loss: 0.6399 - acc: 0.6625
 6/94 [>.............................] - ETA: 12s - loss: 0.6494 - acc: 0.6510
 7/94 [=>............................] - ETA: 12s - loss: 0.6482 - acc: 0.6429
 8/94 [=>............................] - ETA: 12s - loss: 0.6403 - acc: 0.6328
 9/94 [=>............................] - ETA: 12s - loss: 0.6389 - acc: 0.6250
10/94 [==>...........................] - ETA: 11s - loss: 0.6539 - acc: 0.6375
11/94 [==>...........................] - ETA: 11s - loss: 0.6458 - acc: 0.6420
12/94 [==>...........................] - ETA: 11s - loss: 0.6343 - acc: 0.6484
13/94 [===>..........................] - ETA: 11s - loss: 0.6330 - acc: 0.6514
14/94 [===>..........................] - ETA: 10s - loss: 0.6373 - acc: 0.6473
15/94 [===>..........................] - ETA: 12s - loss: 0.6272 - acc: 0.6562
16/94 [====>.........................] - ETA: 13s - loss: 0.6220 - acc: 0.6641
17/94 [====>.........................] - ETA: 14s - loss: 0.6215 - acc: 0.6673
18/94 [====>.........................] - ETA: 15s - loss: 0.6135 - acc: 0.6684
19/94 [=====>........................] - ETA: 16s - loss: 0.6127 - acc: 0.6711
20/94 [=====>........................] - ETA: 17s - loss: 0.6149 - acc: 0.6672
21/94 [=====>........................] - ETA: 18s - loss: 0.6068 - acc: 0.6667
22/94 [=====>........................] - ETA: 18s - loss: 0.5977 - acc: 0.6747
23/94 [======>.......................] - ETA: 19s - loss: 0.5963 - acc: 0.6753
24/94 [======>.......................] - ETA: 19s - loss: 0.5967 - acc: 0.6745
25/94 [======>.......................] - ETA: 19s - loss: 0.6006 - acc: 0.6787
26/94 [=======>......................] - ETA: 20s - loss: 0.6004 - acc: 0.6779
27/94 [=======>......................] - ETA: 20s - loss: 0.6056 - acc: 0.6748
28/94 [=======>......................] - ETA: 20s - loss: 0.6052 - acc: 0.6730
29/94 [========>.....................] - ETA: 20s - loss: 0.6063 - acc: 0.6724
30/94 [========>.....................] - ETA: 20s - loss: 0.6079 - acc: 0.6679
31/94 [========>.....................] - ETA: 20s - loss: 0.5998 - acc: 0.6756
32/94 [=========>....................] - ETA: 20s - loss: 0.5944 - acc: 0.6799
33/94 [=========>....................] - ETA: 20s - loss: 0.5936 - acc: 0.6782
34/94 [=========>....................] - ETA: 20s - loss: 0.5914 - acc: 0.6785
35/94 [==========>...................] - ETA: 20s - loss: 0.5963 - acc: 0.6770
36/94 [==========>...................] - ETA: 20s - loss: 0.5976 - acc: 0.6782
37/94 [==========>...................] - ETA: 20s - loss: 0.5972 - acc: 0.6767
38/94 [===========>..................] - ETA: 19s - loss: 0.5961 - acc: 0.6762
39/94 [===========>..................] - ETA: 19s - loss: 0.5992 - acc: 0.6741
40/94 [===========>..................] - ETA: 19s - loss: 0.5946 - acc: 0.6767
41/94 [===========>..................] - ETA: 19s - loss: 0.5943 - acc: 0.6770
42/94 [===========>..................] - ETA: 19s - loss: 0.5937 - acc: 0.6750
43/94 [===========>..................] - ETA: 18s - loss: 0.5976 - acc: 0.6717
44/94 [============>.................] - ETA: 18s - loss: 0.6042 - acc: 0.6706
45/94 [============>.................] - ETA: 18s - loss: 0.6048 - acc: 0.6675
46/94 [============>.................] - ETA: 18s - loss: 0.6021 - acc: 0.6693
47/94 [============>.................] - ETA: 17s - loss: 0.5978 - acc: 0.6704
48/94 [==============>...............] - ETA: 17s - loss: 0.5965 - acc: 0.6720
49/94 [==============>...............] - ETA: 17s - loss: 0.5956 - acc: 0.6736
50/94 [==============>...............] - ETA: 17s - loss: 0.5939 - acc: 0.6739
51/94 [===============>..............] - ETA: 16s - loss: 0.5941 - acc: 0.6735
52/94 [===============>..............] - ETA: 16s - loss: 0.5941 - acc: 0.6708
53/94 [===============>..............] - ETA: 16s - loss: 0.5917 - acc: 0.6711
54/94 [================>.............] - ETA: 15s - loss: 0.5942 - acc: 0.6691
55/94 [================>.............] - ETA: 15s - loss: 0.5958 - acc: 0.6689
56/94 [================>.............] - ETA: 15s - loss: 0.5969 - acc: 0.6698
57/94 [=================>............] - ETA: 14s - loss: 0.5965 - acc: 0.6695
58/94 [=================>............] - ETA: 14s - loss: 0.5936 - acc: 0.6725
59/94 [=================>............] - ETA: 14s - loss: 0.5925 - acc: 0.6739
60/94 [=================>............] - ETA: 13s - loss: 0.5901 - acc: 0.6746
61/94 [==================>...........] - ETA: 13s - loss: 0.5898 - acc: 0.6748
62/94 [==================>...........] - ETA: 13s - loss: 0.5900 - acc: 0.6745
63/94 [==================>...........] - ETA: 12s - loss: 0.5902 - acc: 0.6747
64/94 [===================>..........] - ETA: 12s - loss: 0.5900 - acc: 0.6754
65/94 [===================>..........] - ETA: 12s - loss: 0.5875 - acc: 0.6770
66/94 [===================>..........] - ETA: 11s - loss: 0.5894 - acc: 0.6777
67/94 [====================>.........] - ETA: 11s - loss: 0.5907 - acc: 0.6755
68/94 [====================>.........] - ETA: 10s - loss: 0.5895 - acc: 0.6757
69/94 [====================>.........] - ETA: 10s - loss: 0.5929 - acc: 0.6731
70/94 [====================>.........] - ETA: 10s - loss: 0.5924 - acc: 0.6720
71/94 [====================>.........] - ETA: 9s - loss: 0.5930 - acc: 0.6718
72/94 [====================>.........] - ETA: 9s - loss: 0.5950 - acc: 0.6724
73/94 [====================>.........] - ETA: 9s - loss: 0.5950 - acc: 0.6722
74/94 [=====================>........] - ETA: 8s - loss: 0.5966 - acc: 0.6703
75/94 [=====================>........] - ETA: 8s - loss: 0.5983 - acc: 0.6718
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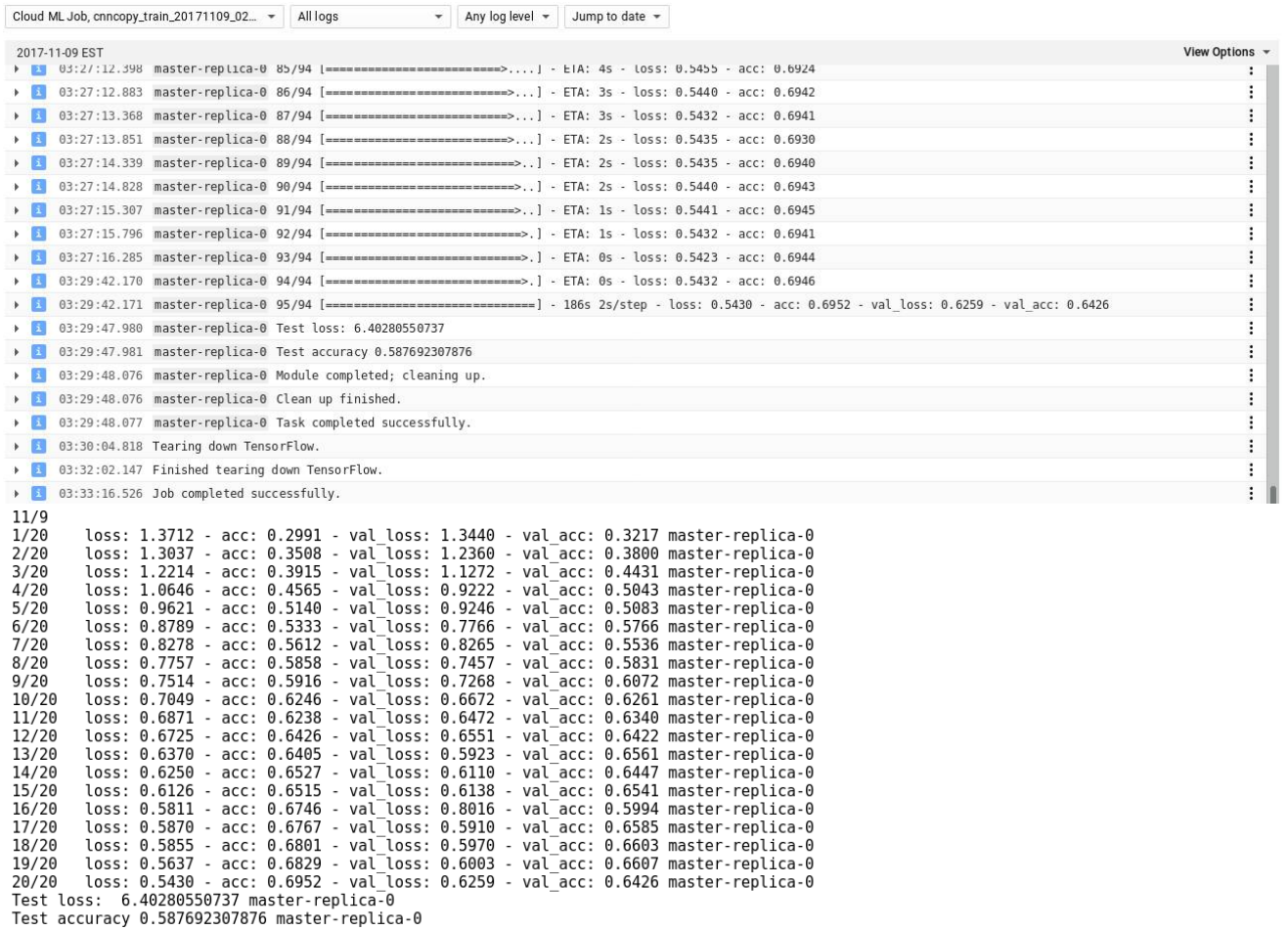
76/94 [=======================>.....] - ETA: 7s - loss: 0.5999 - acc: 0.6703
77/94 [=======================>.....] - ETA: 7s - loss: 0.6007 - acc: 0.6701
78/94 [=======================>.....] - ETA: 7s - loss: 0.6010 - acc: 0.6692
79/94 [=======================>.....] - ETA: 6s - loss: 0.5995 - acc: 0.6710
80/94 [=======================>.....] - ETA: 6s - loss: 0.5984 - acc: 0.6712
81/94 [=======================>.....] - ETA: 5s - loss: 0.5967 - acc: 0.6722
82/94 [=======================>.....] - ETA: 5s - loss: 0.5964 - acc: 0.6720
83/94 [========================>....] - ETA: 4s - loss: 0.5953 - acc: 0.6722
84/94 [========================>....] - ETA: 4s - loss: 0.5953 - acc: 0.6723
85/94 [========================>....] - ETA: 4s - loss: 0.5949 - acc: 0.6721
86/94 [========================>...] - ETA: 3s - loss: 0.5948 - acc: 0.6720
87/94 [========================>...] - ETA: 3s - loss: 0.5945 - acc: 0.6714
88/94 [========================>...] - ETA: 2s - loss: 0.5951 - acc: 0.6720
89/94 [=========================>..] - ETA: 2s - loss: 0.5944 - acc: 0.6725
90/94 [=========================>..] - ETA: 2s - loss: 0.5934 - acc: 0.6723
91/94 [=========================>..] - ETA: 1s - loss: 0.5910 - acc: 0.6752
92/94 [=========================>.] - ETA: 1s - loss: 0.5895 - acc: 0.6760
93/94 [=========================>.] - ETA: 0s - loss: 0.5880 - acc: 0.6772
94/94 [=========================>.] - ETA: 0s - loss: 0.5883 - acc: 0.6766
95/94 [==============================] - 186s 2s/step - loss: 0.5870 - acc: 0.6767 - val_loss: 0.5910 - val_acc:
0.6585
Epoch 18/20
 1/94 [.............................] - ETA: 16s - loss: 0.6439 - acc: 0.5625
 2/94 [.............................] - ETA: 15s - loss: 0.5770 - acc: 0.7031
 3/94 [.............................] - ETA: 14s - loss: 0.5729 - acc: 0.6875
 4/94 [>............................] - ETA: 14s - loss: 0.5875 - acc: 0.6797
 5/94 [>............................] - ETA: 13s - loss: 0.5640 - acc: 0.6750
 6/94 [>............................] - ETA: 12s - loss: 0.5771 - acc: 0.6587
 7/94 [=>...........................] - ETA: 12s - loss: 0.5764 - acc: 0.6628
 8/94 [=>...........................] - ETA: 12s - loss: 0.5583 - acc: 0.6776
 9/94 [=>...........................] - ETA: 11s - loss: 0.5605 - acc: 0.6856
10/94 [==>..........................] - ETA: 11s - loss: 0.5774 - acc: 0.6671
11/94 [==>..........................] - ETA: 11s - loss: 0.5912 - acc: 0.6576
12/94 [==>..........................] - ETA: 11s - loss: 0.5803 - acc: 0.6679
13/94 [===>.........................] - ETA: 11s - loss: 0.5794 - acc: 0.6766
14/94 [===>.........................] - ETA: 11s - loss: 0.5848 - acc: 0.6863
15/94 [===>.........................] - ETA: 11s - loss: 0.5811 - acc: 0.6864
16/94 [====>........................] - ETA: 13s - loss: 0.5789 - acc: 0.6864
17/94 [====>........................] - ETA: 14s - loss: 0.5874 - acc: 0.6902
18/94 [====>........................] - ETA: 15s - loss: 0.5845 - acc: 0.6900
19/94 [=====>.......................] - ETA: 16s - loss: 0.5850 - acc: 0.6899
20/94 [=====>.......................] - ETA: 17s - loss: 0.5811 - acc: 0.6898
21/94 [=====>.......................] - ETA: 18s - loss: 0.5829 - acc: 0.6837
22/94 [=====>.......................] - ETA: 18s - loss: 0.5880 - acc: 0.6754
23/94 [======>......................] - ETA: 19s - loss: 0.5832 - acc: 0.6786
24/94 [======>......................] - ETA: 19s - loss: 0.5789 - acc: 0.6829
25/94 [======>......................] - ETA: 19s - loss: 0.5760 - acc: 0.6868
26/94 [=======>.....................] - ETA: 20s - loss: 0.5714 - acc: 0.6857
27/94 [=======>.....................] - ETA: 20s - loss: 0.5767 - acc: 0.6788
28/94 [=======>.....................] - ETA: 20s - loss: 0.5800 - acc: 0.6824
29/94 [========>....................] - ETA: 20s - loss: 0.5769 - acc: 0.6837
30/94 [========>....................] - ETA: 20s - loss: 0.5761 - acc: 0.6828
31/94 [========>....................] - ETA: 20s - loss: 0.5868 - acc: 0.6829
32/94 [=========>...................] - ETA: 20s - loss: 0.5862 - acc: 0.6821
33/94 [=========>...................] - ETA: 20s - loss: 0.5817 - acc: 0.6823
34/94 [=========>...................] - ETA: 20s - loss: 0.5823 - acc: 0.6824
35/94 [==========>..................] - ETA: 20s - loss: 0.5809 - acc: 0.6826
36/94 [==========>..................] - ETA: 20s - loss: 0.5833 - acc: 0.6818
37/94 [==========>..................] - ETA: 20s - loss: 0.5792 - acc: 0.6870
38/94 [==========>..................] - ETA: 20s - loss: 0.5769 - acc: 0.6871
39/94 [==========>..................] - ETA: 20s - loss: 0.5744 - acc: 0.6863
40/94 [==========>..................] - ETA: 19s - loss: 0.5733 - acc: 0.6879
41/94 [==========>..................] - ETA: 19s - loss: 0.5699 - acc: 0.6924
42/94 [==========>..................] - ETA: 19s - loss: 0.5677 - acc: 0.6960
43/94 [==========>..................] - ETA: 19s - loss: 0.5691 - acc: 0.6951
44/94 [==========>..................] - ETA: 19s - loss: 0.5662 - acc: 0.6956
45/94 [===========>.................] - ETA: 18s - loss: 0.5653 - acc: 0.6962
46/94 [===========>.................] - ETA: 18s - loss: 0.5698 - acc: 0.6946
47/94 [===========>.................] - ETA: 18s - loss: 0.5710 - acc: 0.6945
48/94 [===========>.................] - ETA: 17s - loss: 0.5737 - acc: 0.6937
49/94 [===========>.................] - ETA: 17s - loss: 0.5771 - acc: 0.6897
50/94 [===========>.................] - ETA: 17s - loss: 0.5744 - acc: 0.6915
51/94 [============>................] - ETA: 17s - loss: 0.5779 - acc: 0.6902
52/94 [============>................] - ETA: 16s - loss: 0.5809 - acc: 0.6878
53/94 [============>................] - ETA: 16s - loss: 0.5834 - acc: 0.6866
54/94 [============>................] - ETA: 16s - loss: 0.5841 - acc: 0.6883
55/94 [============>................] - ETA: 15s - loss: 0.5851 - acc: 0.6844
56/94 [============>................] - ETA: 15s - loss: 0.5840 - acc: 0.6861
57/94 [=============>...............] - ETA: 15s - loss: 0.5853 - acc: 0.6861
58/94 [=============>...............] - ETA: 14s - loss: 0.5838 - acc: 0.6856
59/94 [=============>...............] - ETA: 14s - loss: 0.5843 - acc: 0.6840
60/94 [=============>...............] - ETA: 14s - loss: 0.5847 - acc: 0.6846
61/94 [==============>..............] - ETA: 13s - loss: 0.5835 - acc: 0.6847
62/94 [==============>..............] - ETA: 13s - loss: 0.5828 - acc: 0.6847
63/94 [==============>..............] - ETA: 13s - loss: 0.5860 - acc: 0.6818
64/94 [==============>..............] - ETA: 12s - loss: 0.5831 - acc: 0.6824
65/94 [==============>..............] - ETA: 12s - loss: 0.5842 - acc: 0.6815
66/94 [==============>..............] - ETA: 11s - loss: 0.5818 - acc: 0.6835
67/94 [==============>..............] - ETA: 11s - loss: 0.5810 - acc: 0.6831
68/94 [==============>..............] - ETA: 11s - loss: 0.5791 - acc: 0.6840
69/94 [==============>..............] - ETA: 10s - loss: 0.5797 - acc: 0.6832
70/94 [==============>..............] - ETA: 10s - loss: 0.5775 - acc: 0.6855
71/94 [==============>..............] - ETA: 9s - loss: 0.5788 - acc: 0.6837
72/94 [==============>..............] - ETA: 9s - loss: 0.5794 - acc: 0.6834
73/94 [===============>.............] - ETA: 9s - loss: 0.5799 - acc: 0.6821
74/94 [===============>.............] - ETA: 8s - loss: 0.5833 - acc: 0.6797
75/94 [===============>.............] - ETA: 8s - loss: 0.5818 - acc: 0.6819
76/94 [===============>.............] - ETA: 7s - loss: 0.5869 - acc: 0.6807
77/94 [===============>.............] - ETA: 7s - loss: 0.5878 - acc: 0.6816
78/94 [===============>.............] - ETA: 7s - loss: 0.5867 - acc: 0.6813
79/94 [===============>.............] - ETA: 6s - loss: 0.5854 - acc: 0.6817
80/94 [================>............] - ETA: 6s - loss: 0.5848 - acc: 0.6810
81/94 [================>............] - ETA: 5s - loss: 0.5835 - acc: 0.6815
82/94 [================>............] - ETA: 5s - loss: 0.5823 - acc: 0.6812
83/94 [================>............] - ETA: 5s - loss: 0.5804 - acc: 0.6820
84/94 [================>............] - ETA: 4s - loss: 0.5822 - acc: 0.6821
85/94 [================>............] - ETA: 4s - loss: 0.5849 - acc: 0.6796
86/94 [================>............] - ETA: 3s - loss: 0.5854 - acc: 0.6797
87/94 [================>............] - ETA: 3s - loss: 0.5857 - acc: 0.6787
88/94 [================>............] - ETA: 2s - loss: 0.5849 - acc: 0.6806
89/94 [=================>...........] - ETA: 2s - loss: 0.5868 - acc: 0.6792
90/94 [=================>...........] - ETA: 2s - loss: 0.5860 - acc: 0.6790
91/94 [=================>...........] - ETA: 1s - loss: 0.5853 - acc: 0.6794
92/94 [=================>...........] - ETA: 1s - loss: 0.5882 - acc: 0.6781
93/94 [=================>...........] - ETA: 0s - loss: 0.5874 - acc: 0.6789
94/94 [=================>...........] - ETA: 0s - loss: 0.5865 - acc: 0.6797
95/94 [==============================] - 187s 2s/step - loss: 0.5855 - acc: 0.6801 - val_loss: 0.5970 - val_acc:
0.6603
```

```
Epoch 19/20
 1/94 [..............................] - ETA: 16s - loss: 0.5151 - acc: 0.5625
 2/94 [..............................] - ETA: 15s - loss: 0.5331 - acc: 0.6406
 3/94 [..............................] - ETA: 14s - loss: 0.5549 - acc: 0.6562
 4/94 [>.............................] - ETA: 14s - loss: 0.5694 - acc: 0.6562
 5/94 [>.............................] - ETA: 13s - loss: 0.6004 - acc: 0.6562
 6/94 [>.............................] - ETA: 13s - loss: 0.6056 - acc: 0.6510
 7/94 [=>............................] - ETA: 12s - loss: 0.6060 - acc: 0.6518
 8/94 [=>............................] - ETA: 12s - loss: 0.5884 - acc: 0.6680
 9/94 [=>............................] - ETA: 12s - loss: 0.5743 - acc: 0.6806
10/94 [==>...........................] - ETA: 12s - loss: 0.5763 - acc: 0.6844
11/94 [==>...........................] - ETA: 11s - loss: 0.5702 - acc: 0.6903
12/94 [==>...........................] - ETA: 11s - loss: 0.5585 - acc: 0.6875
13/94 [===>..........................] - ETA: 11s - loss: 0.5477 - acc: 0.6899
14/94 [===>..........................] - ETA: 11s - loss: 0.5571 - acc: 0.6808
15/94 [===>..........................] - ETA: 12s - loss: 0.5533 - acc: 0.6896
16/94 [====>.........................] - ETA: 13s - loss: 0.5564 - acc: 0.6855
17/94 [====>.........................] - ETA: 14s - loss: 0.5578 - acc: 0.6837
18/94 [====>.........................] - ETA: 15s - loss: 0.5685 - acc: 0.6735
19/94 [=====>........................] - ETA: 16s - loss: 0.5722 - acc: 0.6759
20/94 [=====>........................] - ETA: 17s - loss: 0.5666 - acc: 0.6733
21/94 [=====>........................] - ETA: 17s - loss: 0.5686 - acc: 0.6695
22/94 [=====>........................] - ETA: 18s - loss: 0.5702 - acc: 0.6689
23/94 [======>.......................] - ETA: 19s - loss: 0.5688 - acc: 0.6724
24/94 [======>.......................] - ETA: 19s - loss: 0.5697 - acc: 0.6757
25/94 [======>.......................] - ETA: 19s - loss: 0.5676 - acc: 0.6774
26/94 [=======>......................] - ETA: 20s - loss: 0.5711 - acc: 0.6802
27/94 [=======>......................] - ETA: 20s - loss: 0.5696 - acc: 0.6816
28/94 [=======>......................] - ETA: 20s - loss: 0.5665 - acc: 0.6863
29/94 [========>.....................] - ETA: 20s - loss: 0.5652 - acc: 0.6885
30/94 [========>.....................] - ETA: 20s - loss: 0.5631 - acc: 0.6895
31/94 [========>.....................] - ETA: 20s - loss: 0.5657 - acc: 0.6884
32/94 [=========>....................] - ETA: 20s - loss: 0.5670 - acc: 0.6874
33/94 [=========>....................] - ETA: 20s - loss: 0.5605 - acc: 0.6903
34/94 [=========>....................] - ETA: 20s - loss: 0.5625 - acc: 0.6893
35/94 [==========>...................] - ETA: 20s - loss: 0.5605 - acc: 0.6901
36/94 [==========>...................] - ETA: 20s - loss: 0.5584 - acc: 0.6892
37/94 [==========>...................] - ETA: 20s - loss: 0.5576 - acc: 0.6891
38/94 [==========>...................] - ETA: 20s - loss: 0.5596 - acc: 0.6891
39/94 [==========>...................] - ETA: 19s - loss: 0.5589 - acc: 0.6898
40/94 [==========>...................] - ETA: 19s - loss: 0.5567 - acc: 0.6898
41/94 [==========>...................] - ETA: 19s - loss: 0.5548 - acc: 0.6935
42/94 [===========>..................] - ETA: 19s - loss: 0.5580 - acc: 0.6927
43/94 [===========>..................] - ETA: 19s - loss: 0.5604 - acc: 0.6940
44/94 [===========>..................] - ETA: 18s - loss: 0.5616 - acc: 0.6938
45/94 [============>.................] - ETA: 18s - loss: 0.5601 - acc: 0.6930
46/94 [============>.................] - ETA: 18s - loss: 0.5582 - acc: 0.6956
47/94 [============>.................] - ETA: 18s - loss: 0.5613 - acc: 0.6948
48/94 [=============>................] - ETA: 17s - loss: 0.5596 - acc: 0.6966
49/94 [=============>................] - ETA: 17s - loss: 0.5589 - acc: 0.6951
50/94 [=============>................] - ETA: 17s - loss: 0.5599 - acc: 0.6925
51/94 [==============>...............] - ETA: 16s - loss: 0.5611 - acc: 0.6917
52/94 [==============>...............] - ETA: 16s - loss: 0.5599 - acc: 0.6923
53/94 [==============>...............] - ETA: 16s - loss: 0.5592 - acc: 0.6945
54/94 [===============>..............] - ETA: 15s - loss: 0.5558 - acc: 0.6956
55/94 [===============>..............] - ETA: 15s - loss: 0.5556 - acc: 0.6937
56/94 [===============>..............] - ETA: 15s - loss: 0.5572 - acc: 0.6925
57/94 [================>.............] - ETA: 14s - loss: 0.5582 - acc: 0.6929
58/94 [================>.............] - ETA: 14s - loss: 0.5575 - acc: 0.6928
59/94 [================>.............] - ETA: 14s - loss: 0.5577 - acc: 0.6917
60/94 [================>.............] - ETA: 13s - loss: 0.5573 - acc: 0.6906
61/94 [=================>............] - ETA: 13s - loss: 0.5606 - acc: 0.6890
62/94 [=================>............] - ETA: 13s - loss: 0.5584 - acc: 0.6900
63/94 [=================>............] - ETA: 12s - loss: 0.5599 - acc: 0.6880
64/94 [==================>...........] - ETA: 12s - loss: 0.5587 - acc: 0.6880
65/94 [==================>...........] - ETA: 12s - loss: 0.5578 - acc: 0.6889
66/94 [==================>...........] - ETA: 11s - loss: 0.5582 - acc: 0.6875
67/94 [===================>..........] - ETA: 11s - loss: 0.5569 - acc: 0.6879
68/94 [===================>..........] - ETA: 11s - loss: 0.5574 - acc: 0.6875
69/94 [===================>..........] - ETA: 10s - loss: 0.5560 - acc: 0.6870
70/94 [====================>.........] - ETA: 10s - loss: 0.5575 - acc: 0.6861
71/94 [====================>.........] - ETA: 9s - loss: 0.5564 - acc: 0.6879
72/94 [====================>.........] - ETA: 9s - loss: 0.5551 - acc: 0.6901
73/94 [=====================>........] - ETA: 9s - loss: 0.5584 - acc: 0.6883
74/94 [=====================>........] - ETA: 8s - loss: 0.5589 - acc: 0.6887
75/94 [=====================>........] - ETA: 8s - loss: 0.5592 - acc: 0.6887
76/94 [======================>.......] - ETA: 7s - loss: 0.5593 - acc: 0.6908
77/94 [======================>.......] - ETA: 7s - loss: 0.5577 - acc: 0.6907
78/94 [======================>.......] - ETA: 7s - loss: 0.5564 - acc: 0.6911
79/94 [======================>.......] - ETA: 6s - loss: 0.5570 - acc: 0.6906
80/94 [=======================>......] - ETA: 6s - loss: 0.5562 - acc: 0.6906
81/94 [=======================>......] - ETA: 5s - loss: 0.5563 - acc: 0.6906
82/94 [=======================>......] - ETA: 5s - loss: 0.5606 - acc: 0.6890
83/94 [========================>.....] - ETA: 5s - loss: 0.5586 - acc: 0.6901
84/94 [========================>.....] - ETA: 4s - loss: 0.5588 - acc: 0.6886
85/94 [========================>.....] - ETA: 4s - loss: 0.5590 - acc: 0.6886
86/94 [=========================>....] - ETA: 3s - loss: 0.5578 - acc: 0.6882
87/94 [=========================>....] - ETA: 3s - loss: 0.5572 - acc: 0.6882
88/94 [=========================>....] - ETA: 2s - loss: 0.5579 - acc: 0.6878
89/94 [==========================>...] - ETA: 2s - loss: 0.5572 - acc: 0.6878
90/94 [==========================>...] - ETA: 2s - loss: 0.5559 - acc: 0.6885
91/94 [==========================>...] - ETA: 1s - loss: 0.5592 - acc: 0.6875
92/94 [==========================>...] - ETA: 1s - loss: 0.5607 - acc: 0.6858
93/94 [===========================>..] - ETA: 0s - loss: 0.5605 - acc: 0.6855
94/94 [===========================>..] - ETA: 0s - loss: 0.5865 - acc: 0.6797
95/94 [==============================] - 187s 2s/step - loss: 0.5855 - acc: 0.6801 - val_loss: 0.5970 - val_acc:
0.6603
Epoch 19/20
 1/94 [..............................] - ETA: 16s - loss: 0.5151 - acc: 0.5625
 2/94 [..............................] - ETA: 15s - loss: 0.5331 - acc: 0.6406
 3/94 [..............................] - ETA: 14s - loss: 0.5549 - acc: 0.6562
 4/94 [>.............................] - ETA: 14s - loss: 0.5694 - acc: 0.6562
 5/94 [>.............................] - ETA: 13s - loss: 0.6004 - acc: 0.6562
 6/94 [>.............................] - ETA: 13s - loss: 0.6056 - acc: 0.6510
 7/94 [=>............................] - ETA: 12s - loss: 0.6060 - acc: 0.6518
 8/94 [=>............................] - ETA: 12s - loss: 0.5884 - acc: 0.6680
 9/94 [=>............................] - ETA: 12s - loss: 0.5743 - acc: 0.6806
10/94 [==>...........................] - ETA: 12s - loss: 0.5763 - acc: 0.6844
11/94 [==>...........................] - ETA: 11s - loss: 0.5702 - acc: 0.6903
12/94 [==>...........................] - ETA: 11s - loss: 0.5585 - acc: 0.6875
13/94 [===>..........................] - ETA: 11s - loss: 0.5477 - acc: 0.6899
14/94 [===>..........................] - ETA: 11s - loss: 0.5571 - acc: 0.6808
15/94 [===>..........................] - ETA: 12s - loss: 0.5533 - acc: 0.6896
16/94 [====>.........................] - ETA: 13s - loss: 0.5564 - acc: 0.6855
17/94 [====>.........................] - ETA: 14s - loss: 0.5578 - acc: 0.6837
18/94 [====>.........................] - ETA: 15s - loss: 0.5685 - acc: 0.6735
19/94 [=====>........................] - ETA: 16s - loss: 0.5722 - acc: 0.6759
20/94 [=====>........................] - ETA: 17s - loss: 0.5666 - acc: 0.6733
```

```
21/94 [=====>.....] - ETA: 17s - loss: 0.5686 - acc: 0.6695
22/94 [=====>.....] - ETA: 18s - loss: 0.5702 - acc: 0.6689
23/94 [======>.....] - ETA: 19s - loss: 0.5688 - acc: 0.6724
24/94 [======>.....] - ETA: 19s - loss: 0.5697 - acc: 0.6757
25/94 [======>.....] - ETA: 19s - loss: 0.5676 - acc: 0.6774
26/94 [=======>.....] - ETA: 20s - loss: 0.5711 - acc: 0.6802
27/94 [=======>.....] - ETA: 20s - loss: 0.5696 - acc: 0.6816
28/94 [=======>.....] - ETA: 20s - loss: 0.5665 - acc: 0.6863
29/94 [========>.....] - ETA: 20s - loss: 0.5652 - acc: 0.6885
30/94 [========>.....] - ETA: 20s - loss: 0.5631 - acc: 0.6895
31/94 [========>.....] - ETA: 20s - loss: 0.5657 - acc: 0.6884
32/94 [========>.....] - ETA: 20s - loss: 0.5670 - acc: 0.6874
33/94 [========>.....] - ETA: 20s - loss: 0.5605 - acc: 0.6903
34/94 [========>.....] - ETA: 20s - loss: 0.5625 - acc: 0.6893
35/94 [=========>.....] - ETA: 20s - loss: 0.5605 - acc: 0.6901
36/94 [=========>.....] - ETA: 20s - loss: 0.5584 - acc: 0.6892
37/94 [=========>.....] - ETA: 20s - loss: 0.5576 - acc: 0.6891
38/94 [==========>.....] - ETA: 20s - loss: 0.5596 - acc: 0.6891
39/94 [==========>.....] - ETA: 19s - loss: 0.5589 - acc: 0.6898
40/94 [==========>.....] - ETA: 19s - loss: 0.5567 - acc: 0.6898
41/94 [==========>.....] - ETA: 19s - loss: 0.5548 - acc: 0.6935
42/94 [===========>.....] - ETA: 19s - loss: 0.5580 - acc: 0.6927
43/94 [===========>.....] - ETA: 19s - loss: 0.5604 - acc: 0.6940
44/94 [===========>.....] - ETA: 18s - loss: 0.5616 - acc: 0.6938
45/94 [===========>.....] - ETA: 18s - loss: 0.5601 - acc: 0.6930
46/94 [===========>.....] - ETA: 18s - loss: 0.5582 - acc: 0.6956
47/94 [===========>.....] - ETA: 18s - loss: 0.5613 - acc: 0.6948
48/94 [============>.....] - ETA: 17s - loss: 0.5596 - acc: 0.6966
49/94 [============>.....] - ETA: 17s - loss: 0.5589 - acc: 0.6951
50/94 [============>.....] - ETA: 17s - loss: 0.5599 - acc: 0.6925
51/94 [=============>.....] - ETA: 16s - loss: 0.5611 - acc: 0.6917
52/94 [=============>.....] - ETA: 16s - loss: 0.5599 - acc: 0.6923
53/94 [=============>.....] - ETA: 16s - loss: 0.5592 - acc: 0.6945
54/94 [==============>.....] - ETA: 15s - loss: 0.5558 - acc: 0.6956
55/94 [==============>.....] - ETA: 15s - loss: 0.5556 - acc: 0.6937
56/94 [==============>.....] - ETA: 15s - loss: 0.5572 - acc: 0.6925
57/94 [===============>.....] - ETA: 14s - loss: 0.5582 - acc: 0.6929
58/94 [===============>.....] - ETA: 14s - loss: 0.5575 - acc: 0.6928
59/94 [===============>.....] - ETA: 14s - loss: 0.5577 - acc: 0.6917
60/94 [===============>.....] - ETA: 13s - loss: 0.5573 - acc: 0.6906
61/94 [================>.....] - ETA: 13s - loss: 0.5606 - acc: 0.6890
62/94 [================>.....] - ETA: 13s - loss: 0.5584 - acc: 0.6900
63/94 [================>.....] - ETA: 12s - loss: 0.5599 - acc: 0.6880
64/94 [=================>.....] - ETA: 12s - loss: 0.5587 - acc: 0.6880
65/94 [=================>.....] - ETA: 12s - loss: 0.5578 - acc: 0.6889
66/94 [=================>.....] - ETA: 11s - loss: 0.5582 - acc: 0.6875
67/94 [=================>.....] - ETA: 11s - loss: 0.5569 - acc: 0.6879
68/94 [=================>.....] - ETA: 11s - loss: 0.5574 - acc: 0.6875
69/94 [=================>.....] - ETA: 10s - loss: 0.5560 - acc: 0.6870
70/94 [==================>.....] - ETA: 10s - loss: 0.5575 - acc: 0.6861
71/94 [==================>.....] - ETA: 9s - loss: 0.5564 - acc: 0.6879
72/94 [==================>.....] - ETA: 9s - loss: 0.5551 - acc: 0.6901
73/94 [==================>.....] - ETA: 9s - loss: 0.5584 - acc: 0.6883
74/94 [==================>.....] - ETA: 8s - loss: 0.5589 - acc: 0.6887
75/94 [==================>.....] - ETA: 8s - loss: 0.5592 - acc: 0.6887
76/94 [===================>.....] - ETA: 7s - loss: 0.5593 - acc: 0.6908
77/94 [===================>.....] - ETA: 7s - loss: 0.5577 - acc: 0.6907
78/94 [===================>.....] - ETA: 7s - loss: 0.5564 - acc: 0.6911
79/94 [===================>.....] - ETA: 6s - loss: 0.5570 - acc: 0.6906
80/94 [===================>.....] - ETA: 6s - loss: 0.5562 - acc: 0.6906
81/94 [===================>.....] - ETA: 5s - loss: 0.5563 - acc: 0.6906
82/94 [===================>.....] - ETA: 5s - loss: 0.5606 - acc: 0.6890
83/94 [====================>....] - ETA: 5s - loss: 0.5586 - acc: 0.6901
84/94 [====================>....] - ETA: 4s - loss: 0.5588 - acc: 0.6886
85/94 [====================>....] - ETA: 4s - loss: 0.5590 - acc: 0.6886
86/94 [=====================>...] - ETA: 3s - loss: 0.5578 - acc: 0.6882
87/94 [=====================>...] - ETA: 3s - loss: 0.5572 - acc: 0.6882
88/94 [=====================>...] - ETA: 2s - loss: 0.5579 - acc: 0.6878
89/94 [======================>..] - ETA: 2s - loss: 0.5572 - acc: 0.6878
90/94 [======================>..] - ETA: 2s - loss: 0.5559 - acc: 0.6885
91/94 [======================>..] - ETA: 1s - loss: 0.5592 - acc: 0.6875
92/94 [=======================>.] - ETA: 1s - loss: 0.5607 - acc: 0.6858
93/94 [=======================>.] - ETA: 0s - loss: 0.5605 - acc: 0.6855
94/94 [=======================>.] - ETA: 0s - loss: 0.5608 - acc: 0.6845
95/94 [==============================] - 187s 2s/step - loss: 0.5637 - acc: 0.6829 - val_loss: 0.6003 - val_acc:
0.6607
Epoch 20/20
 1/94 [.....] - ETA: 16s - loss: 0.7178 - acc: 0.5625
 2/94 [.....] - ETA: 15s - loss: 0.6425 - acc: 0.6250
 3/94 [.....] - ETA: 14s - loss: 0.5904 - acc: 0.6979
 4/94 [>.....] - ETA: 13s - loss: 0.5649 - acc: 0.6953
 5/94 [>.....] - ETA: 13s - loss: 0.5892 - acc: 0.6625
 6/94 [>.....] - ETA: 13s - loss: 0.5499 - acc: 0.6979
 7/94 [=>.....] - ETA: 12s - loss: 0.5410 - acc: 0.6875
 8/94 [=>.....] - ETA: 12s - loss: 0.5341 - acc: 0.6953
 9/94 [=>.....] - ETA: 12s - loss: 0.5382 - acc: 0.6875
10/94 [==>.....] - ETA: 11s - loss: 0.5272 - acc: 0.6969
11/94 [==>.....] - ETA: 11s - loss: 0.5180 - acc: 0.7017
12/94 [==>.....] - ETA: 11s - loss: 0.5188 - acc: 0.7005
13/94 [===>.....] - ETA: 11s - loss: 0.5159 - acc: 0.7043
14/94 [===>.....] - ETA: 11s - loss: 0.5153 - acc: 0.7054
15/94 [===>.....] - ETA: 12s - loss: 0.5248 - acc: 0.7000
16/94 [====>.....] - ETA: 13s - loss: 0.5330 - acc: 0.6992
17/94 [====>.....] - ETA: 14s - loss: 0.5397 - acc: 0.6967
18/94 [====>.....] - ETA: 15s - loss: 0.5417 - acc: 0.6979
19/94 [=====>.....] - ETA: 16s - loss: 0.5453 - acc: 0.6875
20/94 [=====>.....] - ETA: 17s - loss: 0.5471 - acc: 0.6859
21/94 [=====>.....] - ETA: 18s - loss: 0.5429 - acc: 0.6845
22/94 [=====>.....] - ETA: 18s - loss: 0.5350 - acc: 0.6889
23/94 [======>.....] - ETA: 19s - loss: 0.5345 - acc: 0.6889
24/94 [======>.....] - ETA: 19s - loss: 0.5396 - acc: 0.6888
25/94 [======>.....] - ETA: 19s - loss: 0.5384 - acc: 0.6925
26/94 [=======>.....] - ETA: 20s - loss: 0.5372 - acc: 0.6935
27/94 [=======>.....] - ETA: 20s - loss: 0.5325 - acc: 0.6991
28/94 [=======>.....] - ETA: 20s - loss: 0.5269 - acc: 0.7042
29/94 [========>.....] - ETA: 20s - loss: 0.5231 - acc: 0.7047
30/94 [========>.....] - ETA: 20s - loss: 0.5314 - acc: 0.7063
31/94 [========>.....] - ETA: 20s - loss: 0.5329 - acc: 0.7046
32/94 [=========>.....] - ETA: 20s - loss: 0.5332 - acc: 0.7012
33/94 [=========>.....] - ETA: 20s - loss: 0.5321 - acc: 0.7008
34/94 [=========>.....] - ETA: 20s - loss: 0.5283 - acc: 0.7013
35/94 [==========>.....] - ETA: 20s - loss: 0.5254 - acc: 0.7018
36/94 [==========>.....] - ETA: 20s - loss: 0.5219 - acc: 0.7040
37/94 [==========>.....] - ETA: 20s - loss: 0.5225 - acc: 0.7052
38/94 [===========>.....] - ETA: 19s - loss: 0.5245 - acc: 0.7031
39/94 [===========>.....] - ETA: 19s - loss: 0.5278 - acc: 0.7003
40/94 [===========>.....] - ETA: 19s - loss: 0.5321 - acc: 0.6977
41/94 [===========>.....] - ETA: 19s - loss: 0.5315 - acc: 0.7005
```

```
42/94 [============>.................] - ETA: 19s - loss: 0.5315 - acc: 0.7024
43/94 [============>.................] - ETA: 18s - loss: 0.5317 - acc: 0.7028
44/94 [============>.................] - ETA: 18s - loss: 0.5338 - acc: 0.7003
45/94 [============>.................] - ETA: 18s - loss: 0.5349 - acc: 0.6993
46/94 [============>.................] - ETA: 18s - loss: 0.5364 - acc: 0.6990
47/94 [============>.................] - ETA: 18s - loss: 0.5397 - acc: 0.6968
48/94 [=============>................] - ETA: 17s - loss: 0.5406 - acc: 0.6947
49/94 [=============>................] - ETA: 17s - loss: 0.5384 - acc: 0.6977
50/94 [=============>................] - ETA: 17s - loss: 0.5392 - acc: 0.6953
51/94 [==============>...............] - ETA: 16s - loss: 0.5401 - acc: 0.6970
52/94 [==============>...............] - ETA: 16s - loss: 0.5385 - acc: 0.6980
53/94 [==============>...............] - ETA: 16s - loss: 0.5365 - acc: 0.6990
54/94 [===============>..............] - ETA: 15s - loss: 0.5391 - acc: 0.6964
55/94 [===============>..............] - ETA: 15s - loss: 0.5408 - acc: 0.6946
56/94 [===============>..............] - ETA: 15s - loss: 0.5394 - acc: 0.6956
57/94 [================>.............] - ETA: 14s - loss: 0.5377 - acc: 0.6965
58/94 [================>.............] - ETA: 14s - loss: 0.5379 - acc: 0.6958
59/94 [================>.............] - ETA: 14s - loss: 0.5377 - acc: 0.6952
60/94 [================>.............] - ETA: 13s - loss: 0.5397 - acc: 0.6961
61/94 [=================>............] - ETA: 13s - loss: 0.5385 - acc: 0.6970
62/94 [=================>............] - ETA: 13s - loss: 0.5380 - acc: 0.6963
63/94 [=================>............] - ETA: 12s - loss: 0.5365 - acc: 0.6962
64/94 [==================>...........] - ETA: 12s - loss: 0.5357 - acc: 0.6946
65/94 [==================>...........] - ETA: 12s - loss: 0.5366 - acc: 0.6945
66/94 [==================>...........] - ETA: 11s - loss: 0.5352 - acc: 0.6962
67/94 [===================>..........] - ETA: 11s - loss: 0.5400 - acc: 0.6956
68/94 [===================>..........] - ETA: 10s - loss: 0.5431 - acc: 0.6941
69/94 [===================>..........] - ETA: 10s - loss: 0.5428 - acc: 0.6940
70/94 [====================>.........] - ETA: 10s - loss: 0.5444 - acc: 0.6931
71/94 [====================>.........] - ETA: 9s - loss: 0.5438 - acc: 0.6925
72/94 [====================>.........] - ETA: 9s - loss: 0.5427 - acc: 0.6920
73/94 [=====================>........] - ETA: 9s - loss: 0.5422 - acc: 0.6933
74/94 [=====================>........] - ETA: 8s - loss: 0.5425 - acc: 0.6928
75/94 [=====================>........] - ETA: 8s - loss: 0.5417 - acc: 0.6923
76/94 [======================>.......] - ETA: 7s - loss: 0.5402 - acc: 0.6934
77/94 [======================>.......] - ETA: 7s - loss: 0.5426 - acc: 0.6909
78/94 [======================>.......] - ETA: 7s - loss: 0.5436 - acc: 0.6913
79/94 [======================>.......] - ETA: 6s - loss: 0.5416 - acc: 0.6916
80/94 [=======================>......] - ETA: 6s - loss: 0.5421 - acc: 0.6912
81/94 [=======================>......] - ETA: 5s - loss: 0.5430 - acc: 0.6923
82/94 [=======================>......] - ETA: 5s - loss: 0.5435 - acc: 0.6934
83/94 [=======================>......] - ETA: 5s - loss: 0.5441 - acc: 0.6941
84/94 [========================>.....] - ETA: 4s - loss: 0.5443 - acc: 0.6933
85/94 [========================>.....] - ETA: 4s - loss: 0.5455 - acc: 0.6924
86/94 [========================>.....] - ETA: 3s - loss: 0.5440 - acc: 0.6942
87/94 [========================>.....] - ETA: 3s - loss: 0.5432 - acc: 0.6941
88/94 [========================>.....] - ETA: 2s - loss: 0.5435 - acc: 0.6930
89/94 [=========================>....] - ETA: 2s - loss: 0.5435 - acc: 0.6940
90/94 [=========================>....] - ETA: 2s - loss: 0.5440 - acc: 0.6943
91/94 [=========================>....] - ETA: 1s - loss: 0.5441 - acc: 0.6945
92/94 [==========================>...] - ETA: 1s - loss: 0.5432 - acc: 0.6941
93/94 [==========================>...] - ETA: 0s - loss: 0.5423 - acc: 0.6944
94/94 [==========================>...] - ETA: 0s - loss: 0.5432 - acc: 0.6946
95/94 [==============================] - 186s 2s/step - loss: 0.5430 - acc: 0.6952 - val_loss: 0.6259 - val_acc:
0.6426
Test loss:  6.40280550737
Test accuracy 0.587692307876
Module completed; cleaning up.
Clean up finished.
Task completed successfully.
I  Tearing down TensorFlow.
I  Finished tearing down TensorFlow.
03:33:16.526 Job completed successfully.
```




```
11/9
1/20    loss: 1.3712 - acc: 0.2991 - val_loss: 1.3440 - val_acc: 0.3217 master-replica-0
2/20    loss: 1.3037 - acc: 0.3508 - val_loss: 1.2360 - val_acc: 0.3800 master-replica-0
3/20    loss: 1.2214 - acc: 0.3915 - val_loss: 1.1272 - val_acc: 0.4431 master-replica-0
4/20    loss: 1.0646 - acc: 0.4565 - val_loss: 0.9222 - val_acc: 0.5043 master-replica-0
5/20    loss: 0.9621 - acc: 0.5140 - val_loss: 0.9246 - val_acc: 0.5083 master-replica-0
6/20    loss: 0.8789 - acc: 0.5333 - val_loss: 0.7766 - val_acc: 0.5766 master-replica-0
7/20    loss: 0.8278 - acc: 0.5612 - val_loss: 0.8265 - val_acc: 0.5536 master-replica-0
8/20    loss: 0.7757 - acc: 0.5858 - val_loss: 0.7457 - val_acc: 0.5831 master-replica-0
9/20    loss: 0.7514 - acc: 0.5916 - val_loss: 0.7268 - val_acc: 0.6072 master-replica-0
10/20   loss: 0.7049 - acc: 0.6246 - val_loss: 0.6672 - val_acc: 0.6261 master-replica-0
11/20   loss: 0.6871 - acc: 0.6238 - val_loss: 0.6472 - val_acc: 0.6340 master-replica-0
12/20   loss: 0.6725 - acc: 0.6426 - val_loss: 0.6551 - val_acc: 0.6422 master-replica-0
13/20   loss: 0.6370 - acc: 0.6405 - val_loss: 0.5923 - val_acc: 0.6561 master-replica-0
14/20   loss: 0.6250 - acc: 0.6527 - val_loss: 0.6110 - val_acc: 0.6447 master-replica-0
15/20   loss: 0.6126 - acc: 0.6515 - val_loss: 0.6138 - val_acc: 0.6541 master-replica-0
16/20   loss: 0.5811 - acc: 0.6746 - val_loss: 0.8016 - val_acc: 0.5994 master-replica-0
17/20   loss: 0.5870 - acc: 0.6767 - val_loss: 0.5910 - val_acc: 0.6585 master-replica-0
18/20   loss: 0.5855 - acc: 0.6801 - val_loss: 0.5970 - val_acc: 0.6603 master-replica-0
19/20   loss: 0.5637 - acc: 0.6829 - val_loss: 0.6003 - val_acc: 0.6607 master-replica-0
20/20   loss: 0.5430 - acc: 0.6952 - val_loss: 0.6259 - val_acc: 0.6426 master-replica-0
Test loss:  6.40280550737 master-replica-0
Test accuracy 0.587692307876 master-replica-0
```