

# Deep Learning on Azure

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# Chapter 1

## Preface

This repository contains materials to help you learn about Deep Learning with the Microsoft Cognitive Toolkit (CNTK) and Microsoft Azure. Students can find slides, tutorial notebooks, and scripts covering a variety of deep learning fundamentals and applications. These course assets will teach you how to implement convolutional networks, recurrent networks, and generative models and apply them to problems in computer vision, natural language processing, and reinforcement learning. The course materials will pay particular attention on how to implement these algorithms most effectively using the resources provided by the Azure infrastructure, and best practices when working with CNTK.

### 1.1 Part I - Fundamentals and Azure for Machine Learning

1. Pretensions to Thinking and Learning - Overview of Machine Learning
2. A Minimal Introduction to AI, Representation Learning, and Deep Learning
3. Deploying and Accessing the Linux Data Science Virtual Machine
4. Computational Graphs, Symbolic Differentiation, and Auto-Differentiation
5. Overview of the Microsoft Cognitive Toolkit (CNTK) and Other Deep Learning Frameworks
6. Activation Functions and Network Architectures
7. Representational Power and Capacity

### 1.2 Part II - Optimization

1. Backpropagation and Stochastic Optimization for Training Neural Networks
2. Momentum and Acceleration Methods
3. Regularization, Normalization, and Dropout
4. Distributed Training and Evaluation with Azure Batch AI
5. Practical Bayesian Optimization for Hyperparameter Search
6. Evolutionary Strategies for Parameter Search

### 1.3 Part III - Convolutional Neural Networks

1. Scaling Networks to Images
2. Receptive Fields, Spatial Arrangements, Strides and Filters
3. Dilated Convolutions and Pooling
4. Skip Connections and Residual Networks

## 1.4 Part IV - Recurrent Networks

1. Dense Word Vector Representations
2. Comparison of word2Vec, GloVe, and fasttext
3. Recurrent Neural Networks and Language Models
4. GRUs, LSTMs, and Recursive Architectures
5. Vanishing and Exploding Gradients
6. Memory and Attention

## 1.5 Part V - Reinforcement Learning

1. Optimal Control and Planning
2. Policy Gradients
3. Q-learning
4. Actor-Critic Methods
5. Evolutionary Strategies as an Alternative to Policy Methods

## 1.6 Part VI - Generative Models

1. Visualizing and Understanding Neural Networks with Saliency Maps
2. Adversarial Attacks on Neural Networks
3. Metrics on Distributions for Implicit Generative Models
4. Generative Adversarial Networks
5. Belief Nets and Change of Variable Models
6. Approximate Methods using the Variational Autoencoder

## 1.7 Part VII - Operationalization Methods

1. HDInsight, pyspark and mmlspark
2. Azure Batch Shipyard / Azure Batch Training
3. Azure container services
4. SQL Server 2017
5. The embedding learning library and web applications

## 1.8 Useful Resources

### 1.8.1 Online Courses

- Deep Learning Explained, edX 2017
  - Online MOOC that covers the fundamentals of Deep Learning with the Microsoft Cognitive Toolkit
  - Consists of 7 modules
  - Released in June 2017
- deeplearning.ai - Coursera Specialization Taught by Andrew Ng
  - Specialization consisting of 5 MOOCs on Deep Learning taught by Andrew Ng
  - Taught using TensorFlow
- fastAI

- 2 Deep Learning courses taught by Jeremy Howard and Rachel Thomas at USF
- CS231n - Convolutional Networks for Visual Recognition
- CS224n - Natural Language Processing with Deep Learning

### 1.8.2 Online Books and Blogs

- Neural Networks and Deep Learning - Michael Nielsen
- Deep Learning - Ian Goodfellow, Yoshua Bengio & Aaron Courville
- Chris Olah's Blog
- Distill Publications
- Andrej Karpathy's Blog
- Denny Britz's Blog
- Edwin Chen's Blog
- Off the Convex Path - Join blog with Sanjeev Arora, Moritz Hardt & Nisheeth Vishnoi
- BAIR - Berkeley AI Research Blog



# Chapter 2

## Provisioning Linux DSVMs with Azure CLI 2.0

### What You'll Need

- An Azure Subscription
- Bash
- Azure Cloud Shell
  - The Azure cloud shell provides a complete bash (and powershell) environment. The shell is automatically authenticated with Azure CLI 2.0 so you can provision and run all the scripts listed below using this shell.
- Windows Subsystem for Linux
  - In addition to WSL, you'll need to install Azure CLI 2.0. See the instructions below or refer to the Azure CLI 2.0.

In this lab you will provision your own **Linux Data Science Virtual Machine (DSVM)**. The DSVM is a virtual machine that contains a large number of data science and machine learning tools preinstalled, including deep learning libraries like CNTK, Tensorflow, Caffe2, PyTorch, Keras, MXNet, and a lot more.

In this course, we will specifically use the Ubuntu version of the DSVM, since it is the most common distribution for machine learning and data science. Other operating system variants of the DSVM are available in CentOS and Windows (2012 and 2016 Server Editions).

You can provision, start, and stop the Linux DSVM from the Azure portal itself. You are recommended to take a look at the Azure portal and learn the interface. However, in this course we will introduce you to the Azure CLI 2.0, which is a command-line interface built in Python and available on macOS, Linux, and Windows. Learning a bit about the CLI can greatly improve your productivity with Azure resources, and will allow you to configuration and management scripts into your daily workflow. For Windows 10 users, I highly recommend you install the Windows Subsystem for Linux to get a complete `bash` environment on your system. In addition, I use conemu as my main console, which has a number of nice features including tabbed support for multiple consoles, including Ubuntu Bash, PowerShell and Git Bash.

### 2.1 Installing and Testing the Azure CLI

Follow the instructions on the Azure CLI 2.0 webpage for the latest information on how to install the CLI. Once you have installed the Azure CLI, and added it to your `$PATH`, you should be able to call it from your terminal.

**\*NOTE** If you're using the Azure Cloud Shell, you don't need to install Azure CLI 2.0 or authenticate. All that is already done for you. Skip to section Deploying Via a Custom Script.

```
alizaidi@MININT-C510VH5:~$ which az
/home/alizaidi/anaconda3/bin/az
```

## 2.2 Login to Your Azure Account

In order to use the Azure CLI 2.0 to manage and create resources in Azure, you'll need to login to your Azure account:

```
alizaidi@MININT-C510VH5:~$ az login
```

This will prompt you to open a browser and activate your session:

```
alizaidi@MININT-C510VH5:~$ az login
```

```
To sign in, use a web browser to open the page https://aka.ms/devicelogin and enter the code FA5JZBPGA ...
```

Once you're logged into your account, you can list all the Azure subscriptions associated with your account by running `az account list`, and the one you're currently defaulting to using `az account show`:

```
alizaidi@MININT-C510VH5:~$ az account show
```

```
{
  "environmentName": "AzureCloud",
  "id": "please-dont-steal-my-acount",
  "isDefault": true,
  "name": "Not for you",
  "state": "Enabled",
  "tenantId": "nah",
  "user": {
    "name": "alizaidi@microsoft.com",
    "type": "user"
  }
}
```

```
alizaidi@MININT-C510VH5:~$ az account list
```

```
[
  {
    "cloudName": "AzureCloud",
    "id": "please-dont-steal-my-acount",
    "isDefault": true,
    "name": "Not for you",
    "state": "Enabled",
    "tenantId": "nah",
    "user": {
      "name": "alizaidi@microsoft.com",
      "type": "user"
    }
  }
]
```

You can use the option `--output table` to print the output in a tabular format.

# Device Login

Enter the code that you received from the application on your device

## Microsoft Azure Cross-platform Command Line Interface

Application publisher:

Click Cancel if this isn't the application you were trying to sign in to on your device.

ContinueCancel

Figure 2.1:

## 2.3 Deploying with a Custom Script

Rather than doing this manually, I have created a custom script that will create the DSVM for you, and also run some configuration settings on your VM's network to allow for easier access.

You can simply deploy the DSVM by navigating to the `labs/0-dsvm-deploy-script` directory and running

```
alizaidi:$ ./deploydsvm.sh
```

The default parameters will use your bash username as your username for the VM, and a simple password. Feel free to change these by specThis will create your virtual machine, open up all the necessary ports on your VM's network security group, and save the credentials in a text file `creds.txt`.

## 2.4 Updating DSVM OS Disk Size

By default, your primary partition on the DSVM is only 50 GBs. Fortunately, expanding it is pretty easy. Let's again use two helper scripts I created to make this process trivially easy. Using the `$VMNAME` and `$RG` values saved in the file `creds.txt`, fill in the following command:

```
expand-osdisk.sh "os-size-in-GB" "RG" "VMNAME"
```

For example, I'd run

```
expand-disk.sh 200 azaididlclass azaididsvm
```

Now you're ready to log into your VM and have some fun!

## 2.5 Deploying Manually (Only Proceed if You Didn't Use the Script Above!)

If you didn't use the scripts above, I've written out the instructions manually below.

### 2.5.1 Create a New Resource Group

Resource groups are a convenient way of consolidating related resources together. This is particularly handy when you have a project that will require a variety of Azure resources and you'd like to see them all in one place.

Please make sure your resource group is in “East US” region (you could potentially use South Central US).

In this example, I'll create a resource group called `azteachdl` in `eastus`

```
alizaidi:$ az group create -n azteachdl -l eastus
{
  "id": "/subscriptions/stay-away-from me/resourceGroups/azteachdl",
  "location": "eastus",
  "#managedBy": null,
  "name": "azteachdl",
  "properties": {
    "provisioningState": "Succeeded"
  },
  "tags": null
}
```

## 2.5.2 Create Your DSVM

Now let's create the Linux DSVM. Edit the parameters below with your configurations. In particular, you'll need to specify your own `resource-group` name, a name for the data science virtual machine, and your username.

```
az vm create \
    --resource-group azteachdl \
    --name azdsvmclass \
    --admin-username alizaidi \
    --public-ip-address-dns-name algoclass \
    --image microsoft-ads:linux-data-science-vm-ubuntu:linuxdsvmbuntu:latest \
    --size Standard_NC6 \
    --generate-ssh-keys
```

While the resources are being deployed, you will see a "*Running*" message displayed in your terminal. Upon completion, you should see an output JSON table with information about your resources:

```
{
  "fqdns": "",
  "id": "/subscriptions/keep-away/resourceGroups/azaaididlclass/providers/Microsoft.Compute/virtualMachines/azdsvmclass",
  "location": "eastus",
  "macAddress": "00-0D-3A-1B-59-48",
  "powerState": "VM running",
  "privateIpAddress": "10.0.0.4",
  "publicIpAddress": "13.00.000.000",
  "resourceGroup": "azaaididlclass"
}
```

## 2.5.3 Create a Password for the User

In the scripted solution, the authentication is done through a password.

In the manual setup we showed how you could create a virtual machine using the `generate-ssh-keys` option, which authenticates using SSH keys, which by default are saved as a pair of private and public keys in `~/.ssh/id_rsa` and `~/.ssh/id_rsa.pub`. In order to access certain web applications like Jupyter, we'll need a password for our user.

To create a password for the user, run the following:

```
sudo passwd $USERNAME
```

where `$USERNAME` is the username you used to create the VM.

You can now navigate to the portal and check for your resources.



# Chapter 3

## Upgrading CNTK and CUDNN

In this lab, we'll upgrade from CNTK version 2.0 to CNTK 2.2.

### 3.1 Updating CNTK

CNTK is available in a variety of precompiled binaries, which you can install using the `pip` installer.

### 3.2 Updating CNTK With a Single Script

I've created a single script to make the upgrade process a lot simper:

```
./cntk-install.sh
```

This will create a new `conda` environment called `cntk-py35` with your new CNTK installation.

#### 3.2.1 Launch JupyterLab

JupyterLab is an updated environment based on Jupyter. In addition to the notebooks popularized by Jupyter, JupyterLab has an inspector for viewing help files quickly, a terminal, and a file browser. This makes for a more complete interactive development experience!

To launch JupyterLab and keep it running, I recommend first creating a password you can use to log into your server without having to use special tokens (see the documentation here). Moreover, since we want to keep JupyterLab running in the background even after we close out our terminal session, I'd recommend using tmux to launch your Jupyter session.

```
tmux new -s jupyterlab
jupyter notebook --generate-config
jupyter notebook password
jupyter lab --ip="*"
tmux detach
jupyter notebook list
```

Now navigate to your :8888 to interact with JupyterLab!

### 3.3 Manually Updating CNTK and Launching Jupyter (No Need to Do This if You Use the Script)

Only follow the steps below if the script above didn't work or if you like doing this manually...

#### 3.3.1 Create Conda Virtual Environment

For this tutorial, we'll use the `conda` virtual environment manager to create and modify Python virtual environments. You can create a Python 3.5 environment with `conda` by using the `conda create` command:

```
conda create -n cntk-py35 python=3.5 anaconda
```

The environment will be named `cntk-py35` and the additional flag `anaconda` ensures that the distribution will install over a 100 prebuilt Python packages for scientific computing (list here).

#### 3.3.2 Install CNTK Using pip Binary Wheels

We can activate that environment by running

```
source activate cntk-py35
```

Now that we are in our virutla environment for CNTK, let's install the appropriate Python binary using a Python "wheel". For example, here are the installation instructions for CNTK on a Python 3.5 environment with Ubuntu 16.04 system with GPU support:

```
pip install https://cntk.ai/PythonWheel/GPU/cntk-2.1-cp35-cp35m-linux_x86_64.whl
```

#### 3.3.3 Temporary Fixes

Let's take complete ownership of our `home` and `anaconda` directories:

```
sudo chown alizaidi:alizaidi -R /home/alizaidi
source deactivate
sudo chown alizaidi:alizaidi -R /anaconda/
pip install -U pip
```

**IMPORTANT** replace `alizaidi` with the username you used to create the DSVM.

Update `ipython` and related packages:

```
pip install --upgrade --force-reinstall jupyter
```

Remove `az_ml_magic` from `ipython` startup:

```
rm ~/.ipython/profile_default/startup/az_ml_magic.py
```

#### 3.3.4 Conda Extensions

Since we created a new environment, let's also install some extensions that will make it easier to find that environment from JupyterHub.

```
conda install nb_conda
conda install ipykernel
```

### 3.3. MANUALLY UPDATING CNTK AND LAUNCHING JUPYTER (NO NEED TO DO THIS IF YOU USE THE S

```
python -m ipykernel install --user --name cntk-py35 --display-name "cntk-py35"  
jupyter kernelspec list
```

#### 3.3.5 Install Keras

Let's also install Keras in this specific Python environment

```
source activate cntk-py35  
pip install keras
```



# Chapter 4

## Transfer Learning with CNTK

### 4.1 Classifying Dogs and Cats Using a Pre-Trained Network

This notebook provides a walkthrough of how to use an existing model, trained on a large corpus of images, and retrain it on a narrower class of images for a specific domain. In particular, we will be looking at the famous Kaggle competition, Cats vs. Dogs.

Let's import our core scientific python modules, `numpy`, `matplotlib` and `pandas`. In addition, we import CNTK. If you have trouble getting CNTK to run on a GPU (and you're sure you have one properly installed), you can manually request CNTK use the `gpu` device by commenting out the line after the import.

We have some helper functions in the `utils.py` script that we'll use to download our pre-trained network from a repository.

```
import os, cv2, random
import numpy as np
import os, shutil
import random
from glob import glob
np.random.seed(123)
import matplotlib.pyplot as plt
from matplotlib import ticker
import matplotlib.image as mpimg
import seaborn as sns
import itertools
import pandas as pd
sns.set(style="white")
%matplotlib inline

import cntk as C
# C.device.try_set_default_device(C.device.gpu(0))
import cntk.io.transforms as xforms

from __future__ import print_function
from utils.download_model import models, download_model_by_name, list_available_models
from PIL import Image
from IPython.display import display, SVG
```

```
%load_ext autoreload
```

### 4.1.1 Download Data

One of the easiest ways to download data from Kaggle competitions is using the kaggle-cli.

```
kg download -u <username> -p <password> -c dogs-vs-cats-redux-kernels-edition
```

For now, you can download the data just by running the bash commands below, which will download the data from my public blob storage account. Note, the data set is ~815 MB in size, and is in a storage container in *Central US*.

```
%%bash
wget -q https://alizaidi.blob.core.windows.net/training/catsdogs/data.zip
unzip data.zip
cd data
unzip *.zip
rm ../data.zip
```

## 4.2 Create Train, Test and Validate Sets

Our data arrives in a rather simple structure:

```
train/
    cat.****.jpg
    dog.****.jpg
test/
    *****.jpg
```

In order to evaluate our model (especially if we are tinkering with hyperparameters), it is important we separate a portion of our train set and use that for evaluation/validation. You shouldn't use your test set to guide your choice of hyperparameters, as this will likely lead to overfitted networks.

The function below takes a 20% sample from the `train` directory and puts it in a new directory called `val`. It leaves the `data/train` directory completely untouched, and instead makes a fully copy to `./train` from where it takes the sample and moves it to `./val`.

```
def train_val_split(train_path, split_train_path, split_val_path):

    if(os.path.exists(split_train_path)): shutil.rmtree(split_train_path)

    os.mkdir(split_val_path)

    # Next copy everything in the combined training directory to the split training directory
    shutil.copytree(train_path, split_train_path)

    num_folds = 5 # One of the folds to be val, the rest for train...

    for subdir in glob(split_train_path + '*'):
        g = glob(subdir + '/*.jpg')
        shuf = np.random.permutation(g)
        for i in range(int(round(len(shuf)/num_folds))):
            print("Transferring ", shuf[i], " to ",
```

```

        split_val_path + "/" + shuf[i].split('/')[2])
os.rename(shuf[i], split_val_path + "/" + shuf[i].split('/')[2])

train_val_split(train_path = "data/train", split_train_path=".train", split_val_path=".val")

Transferring ./train/cat.6109.jpg to ./val/cat.6109.jpg
Transferring ./train/dog.5873.jpg to ./val/dog.5873.jpg
Transferring ./train/dog.9468.jpg to ./val/dog.9468.jpg
Transferring ./train/cat.9550.jpg to ./val/cat.9550.jpg
Transferring ./train/dog.111.jpg to ./val/dog.111.jpg
Transferring ./train/cat.2628.jpg to ./val/cat.2628.jpg
Transferring ./train/dog.6430.jpg to ./val/dog.6430.jpg
Transferring ./train/dog.642.jpg to ./val/dog.642.jpg
Transferring ./train/dog.9465.jpg to ./val/dog.9465.jpg
Transferring ./train/dog.10947.jpg to ./val/dog.10947.jpg
Transferring ./train/cat.10475.jpg to ./val/cat.10475.jpg
Transferring ./train/dog.6433.jpg to ./val/dog.6433.jpg
Transferring ./train/cat.5853.jpg to ./val/cat.5853.jpg
Transferring ./train/cat.10527.jpg to ./val/cat.10527.jpg
Transferring ./train/cat.11977.jpg to ./val/cat.11977.jpg
Transferring ./train/dog.5173.jpg to ./val/dog.5173.jpg
Transferring ./train/cat.9391.jpg to ./val/cat.9391.jpg
Transferring ./train/cat.3189.jpg to ./val/cat.3189.jpg
Transferring ./train/dog.4299.jpg to ./val/dog.4299.jpg
Transferring ./train/dog.11492.jpg to ./val/dog.11492.jpg
Transferring ./train/dog.10894.jpg to ./val/dog.10894.jpg
Transferring ./train/cat.2177.jpg to ./val/cat.2177.jpg
Transferring ./train/cat.9712.jpg to ./val/cat.9712.jpg
Transferring ./train/cat.5060.jpg to ./val/cat.5060.jpg
Transferring ./train/cat.8942.jpg to ./val/cat.8942.jpg
Transferring ./train/cat.3977.jpg to ./val/cat.3977.jpg
Transferring ./train/cat.6462.jpg to ./val/cat.6462.jpg
Transferring ./train/dog.8681.jpg to ./val/dog.8681.jpg
Transferring ./train/dog.6768.jpg to ./val/dog.6768.jpg
Transferring ./train/dog.11025.jpg to ./val/dog.11025.jpg
Transferring ./train/cat.895.jpg to ./val/cat.895.jpg
Transferring ./train/dog.5775.jpg to ./val/dog.5775.jpg
Transferring ./train/cat.5206.jpg to ./val/cat.5206.jpg
Transferring ./train/cat.7135.jpg to ./val/cat.7135.jpg
Transferring ./train/cat.5365.jpg to ./val/cat.5365.jpg
Transferring ./train/cat.5888.jpg to ./val/cat.5888.jpg
Transferring ./train/cat.11863.jpg to ./val/cat.11863.jpg
Transferring ./train/cat.44.jpg to ./val/cat.44.jpg
Transferring ./train/dog.8802.jpg to ./val/dog.8802.jpg
Transferring ./train/cat.5389.jpg to ./val/cat.5389.jpg
Transferring ./train/cat.1922.jpg to ./val/cat.1922.jpg
Transferring ./train/cat.11303.jpg to ./val/cat.11303.jpg
Transferring ./train/dog.7221.jpg to ./val/dog.7221.jpg
Transferring ./train/dog.10890.jpg to ./val/dog.10890.jpg
Transferring ./train/cat.12050.jpg to ./val/cat.12050.jpg
Transferring ./train/dog.1726.jpg to ./val/dog.1726.jpg
Transferring ./train/dog.1230.jpg to ./val/dog.1230.jpg
Transferring ./train/dog.10810.jpg to ./val/dog.10810.jpg
Transferring ./train/cat.11925.jpg to ./val/cat.11925.jpg

```

```
Transferring ./train/dog.4675.jpg to ./val/dog.4675.jpg
Transferring ./train/cat.7273.jpg to ./val/cat.7273.jpg
Transferring ./train/cat.4016.jpg to ./val/cat.4016.jpg
Transferring ./train/cat.10264.jpg to ./val/cat.10264.jpg
Transferring ./train/dog.2864.jpg to ./val/dog.2864.jpg
Transferring ./train/cat.8417.jpg to ./val/cat.8417.jpg
Transferring ./train/dog.11487.jpg to ./val/dog.11487.jpg
Transferring ./train/cat.3400.jpg to ./val/cat.3400.jpg
Transferring ./train/dog.7898.jpg to ./val/dog.7898.jpg
Transferring ./train/dog.53.jpg to ./val/dog.53.jpg
Transferring ./train/dog.3764.jpg to ./val/dog.3764.jpg
Transferring ./train/dog.466.jpg to ./val/dog.466.jpg
Transferring ./train/dog.3664.jpg to ./val/dog.3664.jpg
Transferring ./train/dog.4542.jpg to ./val/dog.4542.jpg
Transferring ./train/cat.40.jpg to ./val/cat.40.jpg
Transferring ./train/dog.828.jpg to ./val/dog.828.jpg
Transferring ./train/cat.4011.jpg to ./val/cat.4011.jpg
Transferring ./train/dog.4882.jpg to ./val/dog.4882.jpg
Transferring ./train/dog.10431.jpg to ./val/dog.10431.jpg
Transferring ./train/cat.11108.jpg to ./val/cat.11108.jpg
Transferring ./train/dog.9434.jpg to ./val/dog.9434.jpg
Transferring ./train/cat.10261.jpg to ./val/cat.10261.jpg
Transferring ./train/dog.5239.jpg to ./val/dog.5239.jpg
Transferring ./train/dog.10800.jpg to ./val/dog.10800.jpg
Transferring ./train/dog.6166.jpg to ./val/dog.6166.jpg
Transferring ./train/cat.3282.jpg to ./val/cat.3282.jpg
Transferring ./train/dog.5340.jpg to ./val/dog.5340.jpg
Transferring ./train/dog.381.jpg to ./val/dog.381.jpg
Transferring ./train/cat.7004.jpg to ./val/cat.7004.jpg
Transferring ./train/cat.916.jpg to ./val/cat.916.jpg
Transferring ./train/cat.897.jpg to ./val/cat.897.jpg
Transferring ./train/dog.11691.jpg to ./val/dog.11691.jpg
Transferring ./train/dog.7296.jpg to ./val/dog.7296.jpg
Transferring ./train/dog.10832.jpg to ./val/dog.10832.jpg
Transferring ./train/dog.8954.jpg to ./val/dog.8954.jpg
Transferring ./train/dog.3381.jpg to ./val/dog.3381.jpg
Transferring ./train/cat.6213.jpg to ./val/cat.6213.jpg
Transferring ./train/dog.398.jpg to ./val/dog.398.jpg
Transferring ./train/dog.10766.jpg to ./val/dog.10766.jpg
Transferring ./train/cat.2180.jpg to ./val/cat.2180.jpg
Transferring ./train/dog.1537.jpg to ./val/dog.1537.jpg
Transferring ./train/dog.1839.jpg to ./val/dog.1839.jpg
Transferring ./train/cat.11616.jpg to ./val/cat.11616.jpg
Transferring ./train/dog.8059.jpg to ./val/dog.8059.jpg
Transferring ./train/cat.3159.jpg to ./val/cat.3159.jpg
Transferring ./train/cat.4862.jpg to ./val/cat.4862.jpg
Transferring ./train/cat.5172.jpg to ./val/cat.5172.jpg
Transferring ./train/dog.8022.jpg to ./val/dog.8022.jpg
Transferring ./train/cat.1158.jpg to ./val/cat.1158.jpg
Transferring ./train/cat.8352.jpg to ./val/cat.8352.jpg
Transferring ./train/cat.11530.jpg to ./val/cat.11530.jpg
Transferring ./train/cat.3688.jpg to ./val/cat.3688.jpg
Transferring ./train/cat.10355.jpg to ./val/cat.10355.jpg
Transferring ./train/cat.9971.jpg to ./val/cat.9971.jpg
```

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Transferring ./train/dog.9724.jpg to ./val/dog.9724.jpg
Transferring ./train/dog.2813.jpg to ./val/dog.2813.jpg
Transferring ./train/dog.2437.jpg to ./val/dog.2437.jpg
Transferring ./train/dog.10684.jpg to ./val/dog.10684.jpg
Transferring ./train/cat.12494.jpg to ./val/cat.12494.jpg
Transferring ./train/dog.10339.jpg to ./val/dog.10339.jpg
Transferring ./train/cat.1893.jpg to ./val/cat.1893.jpg
Transferring ./train/cat.10846.jpg to ./val/cat.10846.jpg
Transferring ./train/cat.2889.jpg to ./val/cat.2889.jpg
Transferring ./train/cat.4383.jpg to ./val/cat.4383.jpg
Transferring ./train/dog.1421.jpg to ./val/dog.1421.jpg
Transferring ./train/dog.3127.jpg to ./val/dog.3127.jpg
Transferring ./train/cat.11644.jpg to ./val/cat.11644.jpg
Transferring ./train/dog.10964.jpg to ./val/dog.10964.jpg
Transferring ./train/dog.11113.jpg to ./val/dog.11113.jpg
Transferring ./train/dog.2329.jpg to ./val/dog.2329.jpg
Transferring ./train/dog.2564.jpg to ./val/dog.2564.jpg
Transferring ./train/cat.4963.jpg to ./val/cat.4963.jpg
Transferring ./train/cat.11001.jpg to ./val/cat.11001.jpg
Transferring ./train/dog.10935.jpg to ./val/dog.10935.jpg
Transferring ./train/cat.7498.jpg to ./val/cat.7498.jpg
Transferring ./train/dog.9226.jpg to ./val/dog.9226.jpg
Transferring ./train/cat.3944.jpg to ./val/cat.3944.jpg
Transferring ./train/cat.7497.jpg to ./val/cat.7497.jpg
Transferring ./train/cat.7279.jpg to ./val/cat.7279.jpg
Transferring ./train/cat.2195.jpg to ./val/cat.2195.jpg
Transferring ./train/cat.3879.jpg to ./val/cat.3879.jpg
Transferring ./train/cat.10792.jpg to ./val/cat.10792.jpg
Transferring ./train/dog.8830.jpg to ./val/dog.8830.jpg
Transferring ./train/cat.8696.jpg to ./val/cat.8696.jpg
Transferring ./train/cat.5368.jpg to ./val/cat.5368.jpg
Transferring ./train/cat.11236.jpg to ./val/cat.11236.jpg
Transferring ./train/cat.11912.jpg to ./val/cat.11912.jpg
Transferring ./train/dog.7700.jpg to ./val/dog.7700.jpg
Transferring ./train/cat.5559.jpg to ./val/cat.5559.jpg
Transferring ./train/dog.7368.jpg to ./val/dog.7368.jpg
Transferring ./train/cat.431.jpg to ./val/cat.431.jpg
Transferring ./train/cat.3290.jpg to ./val/cat.3290.jpg
Transferring ./train/cat.48.jpg to ./val/cat.48.jpg
Transferring ./train/cat.11127.jpg to ./val/cat.11127.jpg
Transferring ./train/cat.10196.jpg to ./val/cat.10196.jpg
Transferring ./train/dog.7490.jpg to ./val/dog.7490.jpg
Transferring ./train/cat.5385.jpg to ./val/cat.5385.jpg
Transferring ./train/cat.1743.jpg to ./val/cat.1743.jpg
Transferring ./train/cat.318.jpg to ./val/cat.318.jpg
Transferring ./train/dog.9052.jpg to ./val/dog.9052.jpg
Transferring ./train/cat.9702.jpg to ./val/cat.9702.jpg
Transferring ./train/dog.10308.jpg to ./val/dog.10308.jpg
Transferring ./train/cat.10796.jpg to ./val/cat.10796.jpg
Transferring ./train/dog.8611.jpg to ./val/dog.8611.jpg
Transferring ./train/dog.11436.jpg to ./val/dog.11436.jpg
Transferring ./train/dog.6472.jpg to ./val/dog.6472.jpg
Transferring ./train/dog.3.jpg to ./val/dog.3.jpg
Transferring ./train/cat.3435.jpg to ./val/cat.3435.jpg
```

```
Transferring ./train/cat.9510.jpg to ./val/cat.9510.jpg
Transferring ./train/dog.1089.jpg to ./val/dog.1089.jpg
Transferring ./train/cat.3774.jpg to ./val/cat.3774.jpg
Transferring ./train/cat.7718.jpg to ./val/cat.7718.jpg
Transferring ./train/dog.8241.jpg to ./val/dog.8241.jpg
Transferring ./train/cat.176.jpg to ./val/cat.176.jpg
Transferring ./train/cat.9290.jpg to ./val/cat.9290.jpg
Transferring ./train/cat.1413.jpg to ./val/cat.1413.jpg
Transferring ./train/cat.4561.jpg to ./val/cat.4561.jpg
Transferring ./train/cat.7831.jpg to ./val/cat.7831.jpg
Transferring ./train/cat.11532.jpg to ./val/cat.11532.jpg
Transferring ./train/dog.11504.jpg to ./val/dog.11504.jpg
Transferring ./train/dog.8288.jpg to ./val/dog.8288.jpg
Transferring ./train/cat.4578.jpg to ./val/cat.4578.jpg
Transferring ./train/cat.1411.jpg to ./val/cat.1411.jpg
Transferring ./train/cat.6766.jpg to ./val/cat.6766.jpg
Transferring ./train/cat.9179.jpg to ./val/cat.9179.jpg
Transferring ./train/dog.451.jpg to ./val/dog.451.jpg
Transferring ./train/dog.9791.jpg to ./val/dog.9791.jpg
Transferring ./train/cat.3905.jpg to ./val/cat.3905.jpg
Transferring ./train/cat.942.jpg to ./val/cat.942.jpg
Transferring ./train/dog.6976.jpg to ./val/dog.6976.jpg
Transferring ./train/dog.7236.jpg to ./val/dog.7236.jpg
Transferring ./train/dog.11624.jpg to ./val/dog.11624.jpg
Transferring ./train/cat.3512.jpg to ./val/cat.3512.jpg
Transferring ./train/cat.2220.jpg to ./val/cat.2220.jpg
Transferring ./train/dog.6570.jpg to ./val/dog.6570.jpg
Transferring ./train/cat.4014.jpg to ./val/cat.4014.jpg
Transferring ./train/cat.2115.jpg to ./val/cat.2115.jpg
Transferring ./train/dog.10415.jpg to ./val/dog.10415.jpg
Transferring ./train/cat.11755.jpg to ./val/cat.11755.jpg
Transferring ./train/dog.457.jpg to ./val/dog.457.jpg
Transferring ./train/cat.4713.jpg to ./val/cat.4713.jpg
Transferring ./train/dog.1975.jpg to ./val/dog.1975.jpg
Transferring ./train/cat.10494.jpg to ./val/cat.10494.jpg
Transferring ./train/dog.9105.jpg to ./val/dog.9105.jpg
Transferring ./train/dog.10218.jpg to ./val/dog.10218.jpg
Transferring ./train/dog.6414.jpg to ./val/dog.6414.jpg
Transferring ./train/cat.10545.jpg to ./val/cat.10545.jpg
Transferring ./train/dog.12302.jpg to ./val/dog.12302.jpg
Transferring ./train/dog.5343.jpg to ./val/dog.5343.jpg
Transferring ./train/dog.7211.jpg to ./val/dog.7211.jpg
Transferring ./train/cat.4286.jpg to ./val/cat.4286.jpg
Transferring ./train/dog.557.jpg to ./val/dog.557.jpg
Transferring ./train/dog.9013.jpg to ./val/dog.9013.jpg
Transferring ./train/dog.3813.jpg to ./val/dog.3813.jpg
Transferring ./train/cat.3246.jpg to ./val/cat.3246.jpg
Transferring ./train/cat.11881.jpg to ./val/cat.11881.jpg
Transferring ./train/dog.4653.jpg to ./val/dog.4653.jpg
Transferring ./train/cat.2715.jpg to ./val/cat.2715.jpg
Transferring ./train/cat.12233.jpg to ./val/cat.12233.jpg
Transferring ./train/dog.4135.jpg to ./val/dog.4135.jpg
Transferring ./train/cat.5835.jpg to ./val/cat.5835.jpg
Transferring ./train/cat.5269.jpg to ./val/cat.5269.jpg
```

```
Transferring ./train/cat.10502.jpg to ./val/cat.10502.jpg
Transferring ./train/cat.899.jpg to ./val/cat.899.jpg
Transferring ./train/cat.7836.jpg to ./val/cat.7836.jpg
Transferring ./train/cat.10832.jpg to ./val/cat.10832.jpg
Transferring ./train/cat.8283.jpg to ./val/cat.8283.jpg
Transferring ./train/cat.523.jpg to ./val/cat.523.jpg
Transferring ./train/cat.9794.jpg to ./val/cat.9794.jpg
Transferring ./train/cat.4199.jpg to ./val/cat.4199.jpg
Transferring ./train/dog.11449.jpg to ./val/dog.11449.jpg
Transferring ./train/dog.10089.jpg to ./val/dog.10089.jpg
Transferring ./train/cat.11357.jpg to ./val/cat.11357.jpg
Transferring ./train/dog.11004.jpg to ./val/dog.11004.jpg
Transferring ./train/cat.10761.jpg to ./val/cat.10761.jpg
Transferring ./train/dog.8943.jpg to ./val/dog.8943.jpg
Transferring ./train/cat.2578.jpg to ./val/cat.2578.jpg
Transferring ./train/cat.4612.jpg to ./val/cat.4612.jpg
Transferring ./train/cat.5747.jpg to ./val/cat.5747.jpg
Transferring ./train/cat.4061.jpg to ./val/cat.4061.jpg
Transferring ./train/dog.4870.jpg to ./val/dog.4870.jpg
Transferring ./train/dog.9980.jpg to ./val/dog.9980.jpg
Transferring ./train/dog.9308.jpg to ./val/dog.9308.jpg
Transferring ./train/dog.11065.jpg to ./val/dog.11065.jpg
Transferring ./train/dog.7899.jpg to ./val/dog.7899.jpg
Transferring ./train/cat.2830.jpg to ./val/cat.2830.jpg
Transferring ./train/cat.9828.jpg to ./val/cat.9828.jpg
Transferring ./train/cat.8384.jpg to ./val/cat.8384.jpg
Transferring ./train/cat.1926.jpg to ./val/cat.1926.jpg
Transferring ./train/cat.11724.jpg to ./val/cat.11724.jpg
Transferring ./train/cat.2630.jpg to ./val/cat.2630.jpg
Transferring ./train/dog.1228.jpg to ./val/dog.1228.jpg
Transferring ./train/cat.5504.jpg to ./val/cat.5504.jpg
Transferring ./train/cat.11025.jpg to ./val/cat.11025.jpg
Transferring ./train/cat.1710.jpg to ./val/cat.1710.jpg
Transferring ./train/cat.8272.jpg to ./val/cat.8272.jpg
Transferring ./train/cat.4157.jpg to ./val/cat.4157.jpg
Transferring ./train/cat.7869.jpg to ./val/cat.7869.jpg
Transferring ./train/dog.6671.jpg to ./val/dog.6671.jpg
Transferring ./train/dog.229.jpg to ./val/dog.229.jpg
Transferring ./train/dog.7978.jpg to ./val/dog.7978.jpg
Transferring ./train/cat.2217.jpg to ./val/cat.2217.jpg
Transferring ./train/cat.10809.jpg to ./val/cat.10809.jpg
Transferring ./train/dog.5391.jpg to ./val/dog.5391.jpg
Transferring ./train/dog.386.jpg to ./val/dog.386.jpg
Transferring ./train/dog.12318.jpg to ./val/dog.12318.jpg
Transferring ./train/cat.5586.jpg to ./val/cat.5586.jpg
Transferring ./train/cat.11033.jpg to ./val/cat.11033.jpg
Transferring ./train/dog.4617.jpg to ./val/dog.4617.jpg
Transferring ./train/dog.10416.jpg to ./val/dog.10416.jpg
Transferring ./train/cat.2950.jpg to ./val/cat.2950.jpg
Transferring ./train/cat.7226.jpg to ./val/cat.7226.jpg
Transferring ./train/cat.4658.jpg to ./val/cat.4658.jpg
Transferring ./train/dog.4516.jpg to ./val/dog.4516.jpg
Transferring ./train/cat.5340.jpg to ./val/cat.5340.jpg
Transferring ./train/cat.223.jpg to ./val/cat.223.jpg
```

```
Transferring ./train/dog.5236.jpg to ./val/dog.5236.jpg
Transferring ./train/dog.12331.jpg to ./val/dog.12331.jpg
Transferring ./train/cat.3717.jpg to ./val/cat.3717.jpg
Transferring ./train/cat.6466.jpg to ./val/cat.6466.jpg
Transferring ./train/cat.11389.jpg to ./val/cat.11389.jpg
Transferring ./train/cat.4385.jpg to ./val/cat.4385.jpg
Transferring ./train/cat.4401.jpg to ./val/cat.4401.jpg
Transferring ./train/cat.9617.jpg to ./val/cat.9617.jpg
Transferring ./train/dog.8394.jpg to ./val/dog.8394.jpg
Transferring ./train/cat.5937.jpg to ./val/cat.5937.jpg
Transferring ./train/cat.10160.jpg to ./val/cat.10160.jpg
Transferring ./train/dog.5240.jpg to ./val/dog.5240.jpg
Transferring ./train/cat.8182.jpg to ./val/cat.8182.jpg
Transferring ./train/cat.424.jpg to ./val/cat.424.jpg
Transferring ./train/cat.280.jpg to ./val/cat.280.jpg
Transferring ./train/cat.3887.jpg to ./val/cat.3887.jpg
Transferring ./train/dog.560.jpg to ./val/dog.560.jpg
Transferring ./train/cat.11150.jpg to ./val/cat.11150.jpg
Transferring ./train/dog.2599.jpg to ./val/dog.2599.jpg
Transferring ./train/dog.10120.jpg to ./val/dog.10120.jpg
Transferring ./train/cat.8910.jpg to ./val/cat.8910.jpg
Transferring ./train/cat.3897.jpg to ./val/cat.3897.jpg
Transferring ./train/dog.8832.jpg to ./val/dog.8832.jpg
Transferring ./train/dog.876.jpg to ./val/dog.876.jpg
Transferring ./train/cat.3713.jpg to ./val/cat.3713.jpg
Transferring ./train/cat.3886.jpg to ./val/cat.3886.jpg
Transferring ./train/cat.1798.jpg to ./val/cat.1798.jpg
Transferring ./train/cat.12188.jpg to ./val/cat.12188.jpg
Transferring ./train/dog.5916.jpg to ./val/dog.5916.jpg
Transferring ./train/dog.4410.jpg to ./val/dog.4410.jpg
Transferring ./train/dog.6049.jpg to ./val/dog.6049.jpg
Transferring ./train/cat.1120.jpg to ./val/cat.1120.jpg
Transferring ./train/dog.4390.jpg to ./val/dog.4390.jpg
Transferring ./train/dog.10984.jpg to ./val/dog.10984.jpg
Transferring ./train/cat.1745.jpg to ./val/cat.1745.jpg
Transferring ./train/dog.5522.jpg to ./val/dog.5522.jpg
Transferring ./train/cat.3694.jpg to ./val/cat.3694.jpg
Transferring ./train/cat.3815.jpg to ./val/cat.3815.jpg
Transferring ./train/cat.6480.jpg to ./val/cat.6480.jpg
Transferring ./train/cat.6246.jpg to ./val/cat.6246.jpg
Transferring ./train/dog.9695.jpg to ./val/dog.9695.jpg
Transferring ./train/cat.11462.jpg to ./val/cat.11462.jpg
Transferring ./train/cat.11732.jpg to ./val/cat.11732.jpg
Transferring ./train/dog.7739.jpg to ./val/dog.7739.jpg
Transferring ./train/dog.6614.jpg to ./val/dog.6614.jpg
Transferring ./train/cat.5010.jpg to ./val/cat.5010.jpg
Transferring ./train/dog.8109.jpg to ./val/dog.8109.jpg
Transferring ./train/dog.3804.jpg to ./val/dog.3804.jpg
Transferring ./train/cat.11499.jpg to ./val/cat.11499.jpg
Transferring ./train/dog.4204.jpg to ./val/dog.4204.jpg
Transferring ./train/cat.1253.jpg to ./val/cat.1253.jpg
Transferring ./train/dog.5992.jpg to ./val/dog.5992.jpg
Transferring ./train/cat.334.jpg to ./val/cat.334.jpg
Transferring ./train/cat.9512.jpg to ./val/cat.9512.jpg
```

```
Transferring ./train/dog.4917.jpg to ./val/dog.4917.jpg
Transferring ./train/cat.9007.jpg to ./val/cat.9007.jpg
Transferring ./train/dog.7098.jpg to ./val/dog.7098.jpg
Transferring ./train/cat.4074.jpg to ./val/cat.4074.jpg
Transferring ./train/dog.2834.jpg to ./val/dog.2834.jpg
Transferring ./train/dog.10356.jpg to ./val/dog.10356.jpg
Transferring ./train/cat.9461.jpg to ./val/cat.9461.jpg
Transferring ./train/cat.10913.jpg to ./val/cat.10913.jpg
Transferring ./train/dog.3611.jpg to ./val/dog.3611.jpg
Transferring ./train/cat.7445.jpg to ./val/cat.7445.jpg
Transferring ./train/cat.6952.jpg to ./val/cat.6952.jpg
Transferring ./train/cat.4522.jpg to ./val/cat.4522.jpg
Transferring ./train/cat.1138.jpg to ./val/cat.1138.jpg
Transferring ./train/dog.6232.jpg to ./val/dog.6232.jpg
Transferring ./train/dog.3248.jpg to ./val/dog.3248.jpg
Transferring ./train/dog.10061.jpg to ./val/dog.10061.jpg
Transferring ./train/dog.1687.jpg to ./val/dog.1687.jpg
Transferring ./train/dog.2749.jpg to ./val/dog.2749.jpg
Transferring ./train/cat.9058.jpg to ./val/cat.9058.jpg
Transferring ./train/dog.10062.jpg to ./val/dog.10062.jpg
Transferring ./train/cat.765.jpg to ./val/cat.765.jpg
Transferring ./train/dog.808.jpg to ./val/dog.808.jpg
Transferring ./train/cat.3388.jpg to ./val/cat.3388.jpg
Transferring ./train/dog.5996.jpg to ./val/dog.5996.jpg
Transferring ./train/dog.2773.jpg to ./val/dog.2773.jpg
Transferring ./train/cat.1511.jpg to ./val/cat.1511.jpg
Transferring ./train/cat.6126.jpg to ./val/cat.6126.jpg
Transferring ./train/cat.1387.jpg to ./val/cat.1387.jpg
Transferring ./train/cat.8927.jpg to ./val/cat.8927.jpg
Transferring ./train/dog.2635.jpg to ./val/dog.2635.jpg
Transferring ./train/cat.7373.jpg to ./val/cat.7373.jpg
Transferring ./train/cat.461.jpg to ./val/cat.461.jpg
Transferring ./train/cat.3995.jpg to ./val/cat.3995.jpg
Transferring ./train/cat.3068.jpg to ./val/cat.3068.jpg
Transferring ./train/dog.10679.jpg to ./val/dog.10679.jpg
Transferring ./train/cat.8485.jpg to ./val/cat.8485.jpg
Transferring ./train/cat.1974.jpg to ./val/cat.1974.jpg
Transferring ./train/cat.12416.jpg to ./val/cat.12416.jpg
Transferring ./train/cat.5776.jpg to ./val/cat.5776.jpg
Transferring ./train/dog.8645.jpg to ./val/dog.8645.jpg
Transferring ./train/dog.1067.jpg to ./val/dog.1067.jpg
Transferring ./train/cat.6059.jpg to ./val/cat.6059.jpg
Transferring ./train/dog.10619.jpg to ./val/dog.10619.jpg
Transferring ./train/dog.410.jpg to ./val/dog.410.jpg
Transferring ./train/cat.2614.jpg to ./val/cat.2614.jpg
Transferring ./train/cat.10269.jpg to ./val/cat.10269.jpg
Transferring ./train/dog.7361.jpg to ./val/dog.7361.jpg
Transferring ./train/dog.11099.jpg to ./val/dog.11099.jpg
Transferring ./train/cat.11962.jpg to ./val/cat.11962.jpg
Transferring ./train/cat.4622.jpg to ./val/cat.4622.jpg
Transferring ./train/cat.9176.jpg to ./val/cat.9176.jpg
Transferring ./train/dog.9640.jpg to ./val/dog.9640.jpg
Transferring ./train/dog.2351.jpg to ./val/dog.2351.jpg
Transferring ./train/dog.6170.jpg to ./val/dog.6170.jpg
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```
Transferring ./train/dog.2414.jpg to ./val/dog.2414.jpg
Transferring ./train/cat.715.jpg to ./val/cat.715.jpg
Transferring ./train/dog.9570.jpg to ./val/dog.9570.jpg
Transferring ./train/dog.11362.jpg to ./val/dog.11362.jpg
Transferring ./train/dog.10674.jpg to ./val/dog.10674.jpg
Transferring ./train/dog.9070.jpg to ./val/dog.9070.jpg
Transferring ./train/dog.5941.jpg to ./val/dog.5941.jpg
Transferring ./train/dog.1198.jpg to ./val/dog.1198.jpg
Transferring ./train/cat.585.jpg to ./val/cat.585.jpg
Transferring ./train/cat.5190.jpg to ./val/cat.5190.jpg
Transferring ./train/dog.12222.jpg to ./val/dog.12222.jpg
Transferring ./train/cat.10954.jpg to ./val/cat.10954.jpg
Transferring ./train/cat.3468.jpg to ./val/cat.3468.jpg
Transferring ./train/cat.9445.jpg to ./val/cat.9445.jpg
Transferring ./train/dog.5798.jpg to ./val/dog.5798.jpg
Transferring ./train/dog.9222.jpg to ./val/dog.9222.jpg
Transferring ./train/cat.7917.jpg to ./val/cat.7917.jpg
Transferring ./train/dog.588.jpg to ./val/dog.588.jpg
Transferring ./train/dog.2048.jpg to ./val/dog.2048.jpg
Transferring ./train/cat.11295.jpg to ./val/cat.11295.jpg
Transferring ./train/dog.9446.jpg to ./val/dog.9446.jpg
Transferring ./train/cat.2550.jpg to ./val/cat.2550.jpg
Transferring ./train/dog.6326.jpg to ./val/dog.6326.jpg
Transferring ./train/dog.8889.jpg to ./val/dog.8889.jpg
Transferring ./train/dog.5827.jpg to ./val/dog.5827.jpg
Transferring ./train/dog.8822.jpg to ./val/dog.8822.jpg
Transferring ./train/cat.6851.jpg to ./val/cat.6851.jpg
Transferring ./train/dog.12453.jpg to ./val/dog.12453.jpg
Transferring ./train/cat.2544.jpg to ./val/cat.2544.jpg
Transferring ./train/cat.9366.jpg to ./val/cat.9366.jpg
Transferring ./train/dog.11255.jpg to ./val/dog.11255.jpg
Transferring ./train/cat.616.jpg to ./val/cat.616.jpg
Transferring ./train/cat.4928.jpg to ./val/cat.4928.jpg
Transferring ./train/cat.2687.jpg to ./val/cat.2687.jpg
Transferring ./train/dog.7562.jpg to ./val/dog.7562.jpg
Transferring ./train/cat.508.jpg to ./val/cat.508.jpg
Transferring ./train/dog.5780.jpg to ./val/dog.5780.jpg
Transferring ./train/dog.9825.jpg to ./val/dog.9825.jpg
Transferring ./train/cat.8543.jpg to ./val/cat.8543.jpg
Transferring ./train/dog.6098.jpg to ./val/dog.6098.jpg
Transferring ./train/dog.5120.jpg to ./val/dog.5120.jpg
Transferring ./train/cat.3239.jpg to ./val/cat.3239.jpg
Transferring ./train/cat.12187.jpg to ./val/cat.12187.jpg
Transferring ./train/cat.11412.jpg to ./val/cat.11412.jpg
Transferring ./train/cat.10338.jpg to ./val/cat.10338.jpg
Transferring ./train/dog.2224.jpg to ./val/dog.2224.jpg
Transferring ./train/dog.8074.jpg to ./val/dog.8074.jpg
Transferring ./train/dog.6862.jpg to ./val/dog.6862.jpg
Transferring ./train/cat.6160.jpg to ./val/cat.6160.jpg
Transferring ./train/dog.8807.jpg to ./val/dog.8807.jpg
Transferring ./train/cat.6702.jpg to ./val/cat.6702.jpg
Transferring ./train/cat.10278.jpg to ./val/cat.10278.jpg
Transferring ./train/dog.7758.jpg to ./val/dog.7758.jpg
Transferring ./train/cat.8006.jpg to ./val/cat.8006.jpg
```

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Transferring ./train/cat.3081.jpg to ./val/cat.3081.jpg
Transferring ./train/dog.6552.jpg to ./val/dog.6552.jpg
Transferring ./train/cat.8435.jpg to ./val/cat.8435.jpg
Transferring ./train/dog.7985.jpg to ./val/dog.7985.jpg
Transferring ./train/cat.1006.jpg to ./val/cat.1006.jpg
Transferring ./train/cat.12304.jpg to ./val/cat.12304.jpg
Transferring ./train/cat.3683.jpg to ./val/cat.3683.jpg
Transferring ./train/cat.171.jpg to ./val/cat.171.jpg
Transferring ./train/cat.3093.jpg to ./val/cat.3093.jpg
Transferring ./train/cat.11898.jpg to ./val/cat.11898.jpg
Transferring ./train/cat.5170.jpg to ./val/cat.5170.jpg
Transferring ./train/dog.1043.jpg to ./val/dog.1043.jpg
Transferring ./train/dog.6476.jpg to ./val/dog.6476.jpg
Transferring ./train/dog.4481.jpg to ./val/dog.4481.jpg
Transferring ./train/cat.4623.jpg to ./val/cat.4623.jpg
Transferring ./train/dog.12035.jpg to ./val/dog.12035.jpg
Transferring ./train/cat.3050.jpg to ./val/cat.3050.jpg
Transferring ./train/cat.7161.jpg to ./val/cat.7161.jpg
Transferring ./train/cat.80.jpg to ./val/cat.80.jpg
Transferring ./train/dog.11732.jpg to ./val/dog.11732.jpg
Transferring ./train/cat.2966.jpg to ./val/cat.2966.jpg
Transferring ./train/dog.10864.jpg to ./val/dog.10864.jpg
Transferring ./train/cat.7541.jpg to ./val/cat.7541.jpg
Transferring ./train/dog.9747.jpg to ./val/dog.9747.jpg
Transferring ./train/cat.3192.jpg to ./val/cat.3192.jpg
Transferring ./train/dog.2015.jpg to ./val/dog.2015.jpg
Transferring ./train/cat.2059.jpg to ./val/cat.2059.jpg
Transferring ./train/cat.1164.jpg to ./val/cat.1164.jpg
Transferring ./train/cat.6371.jpg to ./val/cat.6371.jpg
Transferring ./train/cat.3893.jpg to ./val/cat.3893.jpg
Transferring ./train/cat.5007.jpg to ./val/cat.5007.jpg
Transferring ./train/dog.9201.jpg to ./val/dog.9201.jpg
Transferring ./train/dog.6982.jpg to ./val/dog.6982.jpg
Transferring ./train/dog.8823.jpg to ./val/dog.8823.jpg
Transferring ./train/dog.3460.jpg to ./val/dog.3460.jpg
Transferring ./train/cat.8327.jpg to ./val/cat.8327.jpg
Transferring ./train/cat.9191.jpg to ./val/cat.9191.jpg
Transferring ./train/cat.6594.jpg to ./val/cat.6594.jpg
Transferring ./train/cat.11014.jpg to ./val/cat.11014.jpg
Transferring ./train/dog.8965.jpg to ./val/dog.8965.jpg
Transferring ./train/dog.5486.jpg to ./val/dog.5486.jpg
Transferring ./train/cat.7565.jpg to ./val/cat.7565.jpg
Transferring ./train/dog.6054.jpg to ./val/dog.6054.jpg
Transferring ./train/dog.10406.jpg to ./val/dog.10406.jpg
Transferring ./train/dog.11907.jpg to ./val/dog.11907.jpg
Transferring ./train/cat.6804.jpg to ./val/cat.6804.jpg
Transferring ./train/cat.2409.jpg to ./val/cat.2409.jpg
Transferring ./train/dog.6724.jpg to ./val/dog.6724.jpg
Transferring ./train/dog.11320.jpg to ./val/dog.11320.jpg
Transferring ./train/cat.3854.jpg to ./val/cat.3854.jpg
Transferring ./train/cat.3584.jpg to ./val/cat.3584.jpg
Transferring ./train/dog.8412.jpg to ./val/dog.8412.jpg
Transferring ./train/dog.2911.jpg to ./val/dog.2911.jpg
Transferring ./train/dog.4109.jpg to ./val/dog.4109.jpg
```

```
Transferring ./train/dog.8308.jpg to ./val/dog.8308.jpg
Transferring ./train/dog.6539.jpg to ./val/dog.6539.jpg
Transferring ./train/cat.3750.jpg to ./val/cat.3750.jpg
Transferring ./train/dog.1521.jpg to ./val/dog.1521.jpg
Transferring ./train/dog.12229.jpg to ./val/dog.12229.jpg
Transferring ./train/cat.5238.jpg to ./val/cat.5238.jpg
Transferring ./train/dog.9319.jpg to ./val/dog.9319.jpg
Transferring ./train/dog.10734.jpg to ./val/dog.10734.jpg
Transferring ./train/cat.10501.jpg to ./val/cat.10501.jpg
Transferring ./train/dog.8112.jpg to ./val/dog.8112.jpg
Transferring ./train/dog.6992.jpg to ./val/dog.6992.jpg
Transferring ./train/cat.9855.jpg to ./val/cat.9855.jpg
Transferring ./train/cat.1241.jpg to ./val/cat.1241.jpg
Transferring ./train/dog.3647.jpg to ./val/dog.3647.jpg
Transferring ./train/dog.7263.jpg to ./val/dog.7263.jpg
Transferring ./train/dog.1824.jpg to ./val/dog.1824.jpg
Transferring ./train/dog.8883.jpg to ./val/dog.8883.jpg
Transferring ./train/cat.7092.jpg to ./val/cat.7092.jpg
Transferring ./train/cat.8617.jpg to ./val/cat.8617.jpg
Transferring ./train/dog.8246.jpg to ./val/dog.8246.jpg
Transferring ./train/cat.4213.jpg to ./val/cat.4213.jpg
Transferring ./train/cat.7600.jpg to ./val/cat.7600.jpg
Transferring ./train/dog.6943.jpg to ./val/dog.6943.jpg
Transferring ./train/cat.8266.jpg to ./val/cat.8266.jpg
Transferring ./train/dog.4940.jpg to ./val/dog.4940.jpg
Transferring ./train/dog.7184.jpg to ./val/dog.7184.jpg
Transferring ./train/dog.10004.jpg to ./val/dog.10004.jpg
Transferring ./train/dog.1973.jpg to ./val/dog.1973.jpg
Transferring ./train/cat.5744.jpg to ./val/cat.5744.jpg
Transferring ./train/dog.6221.jpg to ./val/dog.6221.jpg
Transferring ./train/dog.3026.jpg to ./val/dog.3026.jpg
Transferring ./train/cat.6057.jpg to ./val/cat.6057.jpg
Transferring ./train/cat.557.jpg to ./val/cat.557.jpg
Transferring ./train/cat.11417.jpg to ./val/cat.11417.jpg
Transferring ./train/dog.10002.jpg to ./val/dog.10002.jpg
Transferring ./train/cat.148.jpg to ./val/cat.148.jpg
Transferring ./train/cat.7602.jpg to ./val/cat.7602.jpg
Transferring ./train/cat.12396.jpg to ./val/cat.12396.jpg
Transferring ./train/cat.4345.jpg to ./val/cat.4345.jpg
Transferring ./train/cat.11963.jpg to ./val/cat.11963.jpg
Transferring ./train/cat.3059.jpg to ./val/cat.3059.jpg
Transferring ./train/cat.3801.jpg to ./val/cat.3801.jpg
Transferring ./train/cat.11095.jpg to ./val/cat.11095.jpg
Transferring ./train/cat.9332.jpg to ./val/cat.9332.jpg
Transferring ./train/dog.12062.jpg to ./val/dog.12062.jpg
Transferring ./train/dog.1383.jpg to ./val/dog.1383.jpg
Transferring ./train/cat.12203.jpg to ./val/cat.12203.jpg
Transferring ./train/dog.10985.jpg to ./val/dog.10985.jpg
Transferring ./train/dog.11139.jpg to ./val/dog.11139.jpg
Transferring ./train/dog.6851.jpg to ./val/dog.6851.jpg
Transferring ./train/dog.8042.jpg to ./val/dog.8042.jpg
Transferring ./train/dog.4522.jpg to ./val/dog.4522.jpg
Transferring ./train/dog.7377.jpg to ./val/dog.7377.jpg
Transferring ./train/dog.1567.jpg to ./val/dog.1567.jpg
```

```
Transferring ./train/cat.8616.jpg to ./val/cat.8616.jpg
Transferring ./train/dog.1410.jpg to ./val/dog.1410.jpg
Transferring ./train/cat.10655.jpg to ./val/cat.10655.jpg
Transferring ./train/dog.9313.jpg to ./val/dog.9313.jpg
Transferring ./train/cat.4348.jpg to ./val/cat.4348.jpg
Transferring ./train/dog.1031.jpg to ./val/dog.1031.jpg
Transferring ./train/cat.615.jpg to ./val/cat.615.jpg
Transferring ./train/cat.6964.jpg to ./val/cat.6964.jpg
Transferring ./train/dog.2005.jpg to ./val/dog.2005.jpg
Transferring ./train/cat.5999.jpg to ./val/cat.5999.jpg
Transferring ./train/cat.213.jpg to ./val/cat.213.jpg
Transferring ./train/cat.11256.jpg to ./val/cat.11256.jpg
Transferring ./train/cat.43.jpg to ./val/cat.43.jpg
Transferring ./train/cat.6781.jpg to ./val/cat.6781.jpg
Transferring ./train/cat.10111.jpg to ./val/cat.10111.jpg
Transferring ./train/cat.8311.jpg to ./val/cat.8311.jpg
Transferring ./train/dog.3283.jpg to ./val/dog.3283.jpg
Transferring ./train/cat.6139.jpg to ./val/cat.6139.jpg
Transferring ./train/cat.6891.jpg to ./val/cat.6891.jpg
Transferring ./train/dog.7880.jpg to ./val/dog.7880.jpg
Transferring ./train/dog.5949.jpg to ./val/dog.5949.jpg
Transferring ./train/cat.3547.jpg to ./val/cat.3547.jpg
Transferring ./train/cat.5223.jpg to ./val/cat.5223.jpg
Transferring ./train/cat.7613.jpg to ./val/cat.7613.jpg
Transferring ./train/dog.9426.jpg to ./val/dog.9426.jpg
Transferring ./train/cat.2003.jpg to ./val/cat.2003.jpg
Transferring ./train/dog.10524.jpg to ./val/dog.10524.jpg
Transferring ./train/dog.8343.jpg to ./val/dog.8343.jpg
Transferring ./train/cat.4638.jpg to ./val/cat.4638.jpg
Transferring ./train/dog.1892.jpg to ./val/dog.1892.jpg
Transferring ./train/cat.8812.jpg to ./val/cat.8812.jpg
Transferring ./train/dog.10223.jpg to ./val/dog.10223.jpg
Transferring ./train/dog.7447.jpg to ./val/dog.7447.jpg
Transferring ./train/cat.7663.jpg to ./val/cat.7663.jpg
Transferring ./train/cat.9214.jpg to ./val/cat.9214.jpg
Transferring ./train/cat.11549.jpg to ./val/cat.11549.jpg
Transferring ./train/cat.11035.jpg to ./val/cat.11035.jpg
Transferring ./train/cat.11378.jpg to ./val/cat.11378.jpg
Transferring ./train/cat.9280.jpg to ./val/cat.9280.jpg
Transferring ./train/cat.1009.jpg to ./val/cat.1009.jpg
Transferring ./train/cat.7295.jpg to ./val/cat.7295.jpg
Transferring ./train/cat.7988.jpg to ./val/cat.7988.jpg
Transferring ./train/cat.8235.jpg to ./val/cat.8235.jpg
Transferring ./train/dog.3803.jpg to ./val/dog.3803.jpg
Transferring ./train/dog.6077.jpg to ./val/dog.6077.jpg
Transferring ./train/dog.9016.jpg to ./val/dog.9016.jpg
Transferring ./train/cat.6444.jpg to ./val/cat.6444.jpg
Transferring ./train/dog.6963.jpg to ./val/dog.6963.jpg
Transferring ./train/dog.8520.jpg to ./val/dog.8520.jpg
Transferring ./train/cat.10394.jpg to ./val/cat.10394.jpg
Transferring ./train/cat.5603.jpg to ./val/cat.5603.jpg
Transferring ./train/dog.9364.jpg to ./val/dog.9364.jpg
Transferring ./train/dog.10200.jpg to ./val/dog.10200.jpg
Transferring ./train/cat.5040.jpg to ./val/cat.5040.jpg
```

```
Transferring ./train/cat.4896.jpg to ./val/cat.4896.jpg
Transferring ./train/dog.6419.jpg to ./val/dog.6419.jpg
Transferring ./train/dog.2850.jpg to ./val/dog.2850.jpg
Transferring ./train/cat.8510.jpg to ./val/cat.8510.jpg
Transferring ./train/cat.9392.jpg to ./val/cat.9392.jpg
Transferring ./train/dog.8153.jpg to ./val/dog.8153.jpg
Transferring ./train/dog.8756.jpg to ./val/dog.8756.jpg
Transferring ./train/cat.6270.jpg to ./val/cat.6270.jpg
Transferring ./train/cat.7005.jpg to ./val/cat.7005.jpg
Transferring ./train/dog.12022.jpg to ./val/dog.12022.jpg
Transferring ./train/cat.8793.jpg to ./val/cat.8793.jpg
Transferring ./train/cat.1440.jpg to ./val/cat.1440.jpg
Transferring ./train/dog.793.jpg to ./val/dog.793.jpg
Transferring ./train/cat.7578.jpg to ./val/cat.7578.jpg
Transferring ./train/cat.420.jpg to ./val/cat.420.jpg
Transferring ./train/dog.3304.jpg to ./val/dog.3304.jpg
Transferring ./train/dog.3250.jpg to ./val/dog.3250.jpg
Transferring ./train/dog.12182.jpg to ./val/dog.12182.jpg
Transferring ./train/dog.1449.jpg to ./val/dog.1449.jpg
Transferring ./train/dog.394.jpg to ./val/dog.394.jpg
Transferring ./train/dog.7339.jpg to ./val/dog.7339.jpg
Transferring ./train/dog.787.jpg to ./val/dog.787.jpg
Transferring ./train/cat.1447.jpg to ./val/cat.1447.jpg
Transferring ./train/dog.4830.jpg to ./val/dog.4830.jpg
Transferring ./train/cat.5879.jpg to ./val/cat.5879.jpg
Transferring ./train/dog.12403.jpg to ./val/dog.12403.jpg
Transferring ./train/dog.11402.jpg to ./val/dog.11402.jpg
Transferring ./train/dog.11070.jpg to ./val/dog.11070.jpg
Transferring ./train/cat.3913.jpg to ./val/cat.3913.jpg
Transferring ./train/cat.5889.jpg to ./val/cat.5889.jpg
Transferring ./train/dog.6226.jpg to ./val/dog.6226.jpg
Transferring ./train/cat.10598.jpg to ./val/cat.10598.jpg
Transferring ./train/dog.4912.jpg to ./val/dog.4912.jpg
Transferring ./train/dog.4937.jpg to ./val/dog.4937.jpg
Transferring ./train/dog.9797.jpg to ./val/dog.9797.jpg
Transferring ./train/dog.4944.jpg to ./val/dog.4944.jpg
Transferring ./train/dog.2757.jpg to ./val/dog.2757.jpg
Transferring ./train/cat.12290.jpg to ./val/cat.12290.jpg
Transferring ./train/cat.6506.jpg to ./val/cat.6506.jpg
Transferring ./train/cat.7870.jpg to ./val/cat.7870.jpg
Transferring ./train/cat.11469.jpg to ./val/cat.11469.jpg
Transferring ./train/cat.402.jpg to ./val/cat.402.jpg
Transferring ./train/dog.2100.jpg to ./val/dog.2100.jpg
Transferring ./train/dog.8620.jpg to ./val/dog.8620.jpg
Transferring ./train/cat.8084.jpg to ./val/cat.8084.jpg
Transferring ./train/cat.4962.jpg to ./val/cat.4962.jpg
Transferring ./train/cat.10243.jpg to ./val/cat.10243.jpg
Transferring ./train/cat.8433.jpg to ./val/cat.8433.jpg
Transferring ./train/cat.296.jpg to ./val/cat.296.jpg
Transferring ./train/dog.3701.jpg to ./val/dog.3701.jpg
Transferring ./train/dog.2254.jpg to ./val/dog.2254.jpg
Transferring ./train/cat.5910.jpg to ./val/cat.5910.jpg
Transferring ./train/dog.6050.jpg to ./val/dog.6050.jpg
Transferring ./train/cat.9116.jpg to ./val/cat.9116.jpg
```

```
Transferring ./train/cat.11428.jpg to ./val/cat.11428.jpg
Transferring ./train/dog.9066.jpg to ./val/dog.9066.jpg
Transferring ./train/dog.11078.jpg to ./val/dog.11078.jpg
Transferring ./train/dog.9363.jpg to ./val/dog.9363.jpg
Transferring ./train/dog.12158.jpg to ./val/dog.12158.jpg
Transferring ./train/dog.10946.jpg to ./val/dog.10946.jpg
Transferring ./train/dog.8636.jpg to ./val/dog.8636.jpg
Transferring ./train/dog.72.jpg to ./val/dog.72.jpg
Transferring ./train/dog.9107.jpg to ./val/dog.9107.jpg
Transferring ./train/cat.10807.jpg to ./val/cat.10807.jpg
Transferring ./train/cat.5908.jpg to ./val/cat.5908.jpg
Transferring ./train/cat.11302.jpg to ./val/cat.11302.jpg
Transferring ./train/dog.1064.jpg to ./val/dog.1064.jpg
Transferring ./train/cat.9189.jpg to ./val/cat.9189.jpg
Transferring ./train/dog.7588.jpg to ./val/dog.7588.jpg
Transferring ./train/dog.3524.jpg to ./val/dog.3524.jpg
Transferring ./train/cat.12178.jpg to ./val/cat.12178.jpg
Transferring ./train/cat.11329.jpg to ./val/cat.11329.jpg
Transferring ./train/dog.5879.jpg to ./val/dog.5879.jpg
Transferring ./train/cat.5855.jpg to ./val/cat.5855.jpg
Transferring ./train/cat.9693.jpg to ./val/cat.9693.jpg
Transferring ./train/dog.9006.jpg to ./val/dog.9006.jpg
Transferring ./train/cat.369.jpg to ./val/cat.369.jpg
Transferring ./train/dog.6156.jpg to ./val/dog.6156.jpg
Transferring ./train/cat.8521.jpg to ./val/cat.8521.jpg
Transferring ./train/cat.6289.jpg to ./val/cat.6289.jpg
Transferring ./train/cat.5453.jpg to ./val/cat.5453.jpg
Transferring ./train/cat.11398.jpg to ./val/cat.11398.jpg
Transferring ./train/dog.2877.jpg to ./val/dog.2877.jpg
Transferring ./train/cat.7380.jpg to ./val/cat.7380.jpg
Transferring ./train/dog.865.jpg to ./val/dog.865.jpg
Transferring ./train/dog.10588.jpg to ./val/dog.10588.jpg
Transferring ./train/dog.7805.jpg to ./val/dog.7805.jpg
Transferring ./train/cat.9919.jpg to ./val/cat.9919.jpg
Transferring ./train/cat.1165.jpg to ./val/cat.1165.jpg
Transferring ./train/dog.5349.jpg to ./val/dog.5349.jpg
Transferring ./train/dog.9792.jpg to ./val/dog.9792.jpg
Transferring ./train/dog.10749.jpg to ./val/dog.10749.jpg
Transferring ./train/cat.8895.jpg to ./val/cat.8895.jpg
Transferring ./train/dog.8637.jpg to ./val/dog.8637.jpg
Transferring ./train/cat.633.jpg to ./val/cat.633.jpg
Transferring ./train/dog.6996.jpg to ./val/dog.6996.jpg
Transferring ./train/cat.9688.jpg to ./val/cat.9688.jpg
Transferring ./train/dog.3193.jpg to ./val/dog.3193.jpg
Transferring ./train/dog.1712.jpg to ./val/dog.1712.jpg
Transferring ./train/cat.4559.jpg to ./val/cat.4559.jpg
Transferring ./train/dog.2533.jpg to ./val/dog.2533.jpg
Transferring ./train/dog.6898.jpg to ./val/dog.6898.jpg
Transferring ./train/dog.10456.jpg to ./val/dog.10456.jpg
Transferring ./train/cat.1499.jpg to ./val/cat.1499.jpg
Transferring ./train/dog.5588.jpg to ./val/dog.5588.jpg
Transferring ./train/dog.4497.jpg to ./val/dog.4497.jpg
Transferring ./train/dog.9038.jpg to ./val/dog.9038.jpg
Transferring ./train/dog.951.jpg to ./val/dog.951.jpg
```

```
Transferring ./train/cat.686.jpg to ./val/cat.686.jpg
Transferring ./train/cat.5483.jpg to ./val/cat.5483.jpg
Transferring ./train/dog.244.jpg to ./val/dog.244.jpg
Transferring ./train/dog.5274.jpg to ./val/dog.5274.jpg
Transferring ./train/dog.12457.jpg to ./val/dog.12457.jpg
Transferring ./train/dog.12393.jpg to ./val/dog.12393.jpg
Transferring ./train/cat.2089.jpg to ./val/cat.2089.jpg
Transferring ./train/dog.7199.jpg to ./val/dog.7199.jpg
Transferring ./train/cat.2831.jpg to ./val/cat.2831.jpg
Transferring ./train/dog.2431.jpg to ./val/dog.2431.jpg
Transferring ./train/cat.30.jpg to ./val/cat.30.jpg
Transferring ./train/cat.7594.jpg to ./val/cat.7594.jpg
Transferring ./train/dog.7566.jpg to ./val/dog.7566.jpg
Transferring ./train/cat.7142.jpg to ./val/cat.7142.jpg
Transferring ./train/dog.11644.jpg to ./val/dog.11644.jpg
Transferring ./train/cat.12113.jpg to ./val/cat.12113.jpg
Transferring ./train/dog.3045.jpg to ./val/dog.3045.jpg
Transferring ./train/cat.11984.jpg to ./val/cat.11984.jpg
Transferring ./train/dog.735.jpg to ./val/dog.735.jpg
Transferring ./train/dog.10477.jpg to ./val/dog.10477.jpg
Transferring ./train/cat.2079.jpg to ./val/cat.2079.jpg
Transferring ./train/cat.1986.jpg to ./val/cat.1986.jpg
Transferring ./train/dog.7194.jpg to ./val/dog.7194.jpg
Transferring ./train/cat.4432.jpg to ./val/cat.4432.jpg
Transferring ./train/dog.3294.jpg to ./val/dog.3294.jpg
Transferring ./train/dog.8732.jpg to ./val/dog.8732.jpg
Transferring ./train/cat.3061.jpg to ./val/cat.3061.jpg
Transferring ./train/dog.2192.jpg to ./val/dog.2192.jpg
Transferring ./train/dog.4379.jpg to ./val/dog.4379.jpg
Transferring ./train/dog.3648.jpg to ./val/dog.3648.jpg
Transferring ./train/cat.8103.jpg to ./val/cat.8103.jpg
Transferring ./train/dog.4179.jpg to ./val/dog.4179.jpg
Transferring ./train/dog.4055.jpg to ./val/dog.4055.jpg
Transferring ./train/dog.9727.jpg to ./val/dog.9727.jpg
Transferring ./train/cat.7932.jpg to ./val/cat.7932.jpg
Transferring ./train/dog.7893.jpg to ./val/dog.7893.jpg
Transferring ./train/cat.376.jpg to ./val/cat.376.jpg
Transferring ./train/cat.6550.jpg to ./val/cat.6550.jpg
Transferring ./train/cat.7799.jpg to ./val/cat.7799.jpg
Transferring ./train/cat.11560.jpg to ./val/cat.11560.jpg
Transferring ./train/dog.3209.jpg to ./val/dog.3209.jpg
Transferring ./train/dog.4939.jpg to ./val/dog.4939.jpg
Transferring ./train/dog.7016.jpg to ./val/dog.7016.jpg
Transferring ./train/dog.8878.jpg to ./val/dog.8878.jpg
Transferring ./train/cat.10464.jpg to ./val/cat.10464.jpg
Transferring ./train/cat.8278.jpg to ./val/cat.8278.jpg
Transferring ./train/dog.11217.jpg to ./val/dog.11217.jpg
Transferring ./train/dog.3454.jpg to ./val/dog.3454.jpg
Transferring ./train/dog.5209.jpg to ./val/dog.5209.jpg
Transferring ./train/cat.6805.jpg to ./val/cat.6805.jpg
Transferring ./train/cat.6740.jpg to ./val/cat.6740.jpg
Transferring ./train/cat.9597.jpg to ./val/cat.9597.jpg
Transferring ./train/cat.4996.jpg to ./val/cat.4996.jpg
Transferring ./train/dog.3931.jpg to ./val/dog.3931.jpg
```

```
Transferring ./train/cat.10217.jpg to ./val/cat.10217.jpg
Transferring ./train/cat.7993.jpg to ./val/cat.7993.jpg
Transferring ./train/cat.6274.jpg to ./val/cat.6274.jpg
Transferring ./train/dog.2057.jpg to ./val/dog.2057.jpg
Transferring ./train/dog.5381.jpg to ./val/dog.5381.jpg
Transferring ./train/dog.4890.jpg to ./val/dog.4890.jpg
Transferring ./train/dog.6229.jpg to ./val/dog.6229.jpg
Transferring ./train/dog.8403.jpg to ./val/dog.8403.jpg
Transferring ./train/cat.7233.jpg to ./val/cat.7233.jpg
Transferring ./train/cat.8415.jpg to ./val/cat.8415.jpg
Transferring ./train/dog.6922.jpg to ./val/dog.6922.jpg
Transferring ./train/cat.11353.jpg to ./val/cat.11353.jpg
Transferring ./train/dog.810.jpg to ./val/dog.810.jpg
Transferring ./train/cat.7419.jpg to ./val/cat.7419.jpg
Transferring ./train/cat.2638.jpg to ./val/cat.2638.jpg
Transferring ./train/cat.5491.jpg to ./val/cat.5491.jpg
Transferring ./train/cat.10862.jpg to ./val/cat.10862.jpg
Transferring ./train/dog.11719.jpg to ./val/dog.11719.jpg
Transferring ./train/cat.9076.jpg to ./val/cat.9076.jpg
Transferring ./train/cat.7462.jpg to ./val/cat.7462.jpg
Transferring ./train/cat.4494.jpg to ./val/cat.4494.jpg
Transferring ./train/dog.5289.jpg to ./val/dog.5289.jpg
Transferring ./train/cat.6872.jpg to ./val/cat.6872.jpg
Transferring ./train/dog.6234.jpg to ./val/dog.6234.jpg
Transferring ./train/cat.5830.jpg to ./val/cat.5830.jpg
Transferring ./train/dog.10269.jpg to ./val/dog.10269.jpg
Transferring ./train/cat.4275.jpg to ./val/cat.4275.jpg
Transferring ./train/cat.7473.jpg to ./val/cat.7473.jpg
Transferring ./train/cat.998.jpg to ./val/cat.998.jpg
Transferring ./train/cat.10587.jpg to ./val/cat.10587.jpg
Transferring ./train/dog.5275.jpg to ./val/dog.5275.jpg
Transferring ./train/cat.9850.jpg to ./val/cat.9850.jpg
Transferring ./train/cat.3514.jpg to ./val/cat.3514.jpg
Transferring ./train/cat.10284.jpg to ./val/cat.10284.jpg
Transferring ./train/dog.3923.jpg to ./val/dog.3923.jpg
Transferring ./train/dog.11480.jpg to ./val/dog.11480.jpg
Transferring ./train/cat.3545.jpg to ./val/cat.3545.jpg
Transferring ./train/dog.7781.jpg to ./val/dog.7781.jpg
Transferring ./train/cat.3089.jpg to ./val/cat.3089.jpg
Transferring ./train/cat.4106.jpg to ./val/cat.4106.jpg
Transferring ./train/cat.7998.jpg to ./val/cat.7998.jpg
Transferring ./train/dog.115.jpg to ./val/dog.115.jpg
Transferring ./train/dog.9396.jpg to ./val/dog.9396.jpg
Transferring ./train/cat.6567.jpg to ./val/cat.6567.jpg
Transferring ./train/cat.6962.jpg to ./val/cat.6962.jpg
Transferring ./train/dog.6805.jpg to ./val/dog.6805.jpg
Transferring ./train/cat.629.jpg to ./val/cat.629.jpg
Transferring ./train/dog.2023.jpg to ./val/dog.2023.jpg
Transferring ./train/cat.12444.jpg to ./val/cat.12444.jpg
Transferring ./train/dog.1837.jpg to ./val/dog.1837.jpg
Transferring ./train/cat.6774.jpg to ./val/cat.6774.jpg
Transferring ./train/cat.7191.jpg to ./val/cat.7191.jpg
Transferring ./train/cat.11181.jpg to ./val/cat.11181.jpg
Transferring ./train/cat.5330.jpg to ./val/cat.5330.jpg
```

```
Transferring ./train/dog.6775.jpg to ./val/dog.6775.jpg
Transferring ./train/dog.11260.jpg to ./val/dog.11260.jpg
Transferring ./train/cat.1730.jpg to ./val/cat.1730.jpg
Transferring ./train/dog.3967.jpg to ./val/dog.3967.jpg
Transferring ./train/cat.10869.jpg to ./val/cat.10869.jpg
Transferring ./train/cat.7038.jpg to ./val/cat.7038.jpg
Transferring ./train/cat.10092.jpg to ./val/cat.10092.jpg
Transferring ./train/cat.7293.jpg to ./val/cat.7293.jpg
Transferring ./train/cat.9426.jpg to ./val/cat.9426.jpg
Transferring ./train/cat.2388.jpg to ./val/cat.2388.jpg
Transferring ./train/dog.4707.jpg to ./val/dog.4707.jpg
Transferring ./train/cat.4498.jpg to ./val/cat.4498.jpg
Transferring ./train/cat.10551.jpg to ./val/cat.10551.jpg
Transferring ./train/dog.10228.jpg to ./val/dog.10228.jpg
Transferring ./train/dog.5712.jpg to ./val/dog.5712.jpg
Transferring ./train/cat.6820.jpg to ./val/cat.6820.jpg
Transferring ./train/cat.6530.jpg to ./val/cat.6530.jpg
Transferring ./train/dog.11921.jpg to ./val/dog.11921.jpg
Transferring ./train/dog.1139.jpg to ./val/dog.1139.jpg
Transferring ./train/cat.3256.jpg to ./val/cat.3256.jpg
Transferring ./train/cat.592.jpg to ./val/cat.592.jpg
Transferring ./train/dog.10444.jpg to ./val/dog.10444.jpg
Transferring ./train/dog.8993.jpg to ./val/dog.8993.jpg
Transferring ./train/dog.1631.jpg to ./val/dog.1631.jpg
Transferring ./train/cat.7379.jpg to ./val/cat.7379.jpg
Transferring ./train/dog.2634.jpg to ./val/dog.2634.jpg
Transferring ./train/dog.6014.jpg to ./val/dog.6014.jpg
Transferring ./train/dog.8217.jpg to ./val/dog.8217.jpg
Transferring ./train/dog.10928.jpg to ./val/dog.10928.jpg
Transferring ./train/dog.2830.jpg to ./val/dog.2830.jpg
Transferring ./train/cat.3934.jpg to ./val/cat.3934.jpg
Transferring ./train/cat.10363.jpg to ./val/cat.10363.jpg
Transferring ./train/cat.8309.jpg to ./val/cat.8309.jpg
Transferring ./train/dog.6373.jpg to ./val/dog.6373.jpg
Transferring ./train/dog.4832.jpg to ./val/dog.4832.jpg
Transferring ./train/dog.2482.jpg to ./val/dog.2482.jpg
Transferring ./train/dog.2779.jpg to ./val/dog.2779.jpg
Transferring ./train/dog.11875.jpg to ./val/dog.11875.jpg
Transferring ./train/dog.6350.jpg to ./val/dog.6350.jpg
Transferring ./train/dog.2416.jpg to ./val/dog.2416.jpg
Transferring ./train/cat.8646.jpg to ./val/cat.8646.jpg
Transferring ./train/cat.11470.jpg to ./val/cat.11470.jpg
Transferring ./train/dog.7638.jpg to ./val/dog.7638.jpg
Transferring ./train/cat.4682.jpg to ./val/cat.4682.jpg
Transferring ./train/cat.12025.jpg to ./val/cat.12025.jpg
Transferring ./train/dog.1132.jpg to ./val/dog.1132.jpg
Transferring ./train/dog.9389.jpg to ./val/dog.9389.jpg
Transferring ./train/dog.3380.jpg to ./val/dog.3380.jpg
Transferring ./train/dog.3031.jpg to ./val/dog.3031.jpg
Transferring ./train/cat.3404.jpg to ./val/cat.3404.jpg
Transferring ./train/dog.3684.jpg to ./val/dog.3684.jpg
Transferring ./train/dog.3439.jpg to ./val/dog.3439.jpg
Transferring ./train/cat.3890.jpg to ./val/cat.3890.jpg
Transferring ./train/dog.6301.jpg to ./val/dog.6301.jpg
```

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Transferring ./train/dog.7440.jpg to ./val/dog.7440.jpg
Transferring ./train/cat.9451.jpg to ./val/cat.9451.jpg
Transferring ./train/cat.3588.jpg to ./val/cat.3588.jpg
Transferring ./train/dog.11502.jpg to ./val/dog.11502.jpg
Transferring ./train/cat.2567.jpg to ./val/cat.2567.jpg
Transferring ./train/dog.8452.jpg to ./val/dog.8452.jpg
Transferring ./train/dog.11850.jpg to ./val/dog.11850.jpg
Transferring ./train/dog.6643.jpg to ./val/dog.6643.jpg
Transferring ./train/dog.4662.jpg to ./val/dog.4662.jpg
Transferring ./train/dog.7663.jpg to ./val/dog.7663.jpg
Transferring ./train/dog.4116.jpg to ./val/dog.4116.jpg
Transferring ./train/dog.7865.jpg to ./val/dog.7865.jpg
Transferring ./train/dog.10271.jpg to ./val/dog.10271.jpg
Transferring ./train/dog.5929.jpg to ./val/dog.5929.jpg
Transferring ./train/dog.4366.jpg to ./val/dog.4366.jpg
Transferring ./train/dog.619.jpg to ./val/dog.619.jpg
Transferring ./train/cat.5955.jpg to ./val/cat.5955.jpg
Transferring ./train/dog.5261.jpg to ./val/dog.5261.jpg
Transferring ./train/cat.6129.jpg to ./val/cat.6129.jpg
Transferring ./train/cat.1541.jpg to ./val/cat.1541.jpg
Transferring ./train/dog.25.jpg to ./val/dog.25.jpg
Transferring ./train/dog.7485.jpg to ./val/dog.7485.jpg
Transferring ./train/dog.10944.jpg to ./val/dog.10944.jpg
Transferring ./train/cat.9970.jpg to ./val/cat.9970.jpg
Transferring ./train/cat.4253.jpg to ./val/cat.4253.jpg
Transferring ./train/cat.7796.jpg to ./val/cat.7796.jpg
Transferring ./train/cat.12288.jpg to ./val/cat.12288.jpg
Transferring ./train/cat.5318.jpg to ./val/cat.5318.jpg
Transferring ./train/dog.1179.jpg to ./val/dog.1179.jpg
Transferring ./train/cat.8224.jpg to ./val/cat.8224.jpg
Transferring ./train/dog.8952.jpg to ./val/dog.8952.jpg
Transferring ./train/dog.6407.jpg to ./val/dog.6407.jpg
Transferring ./train/cat.11951.jpg to ./val/cat.11951.jpg
Transferring ./train/cat.7403.jpg to ./val/cat.7403.jpg
Transferring ./train/dog.4349.jpg to ./val/dog.4349.jpg
Transferring ./train/cat.321.jpg to ./val/cat.321.jpg
Transferring ./train/dog.6131.jpg to ./val/dog.6131.jpg
Transferring ./train/dog.7163.jpg to ./val/dog.7163.jpg
Transferring ./train/dog.10934.jpg to ./val/dog.10934.jpg
Transferring ./train/cat.4966.jpg to ./val/cat.4966.jpg
Transferring ./train/cat.330.jpg to ./val/cat.330.jpg
Transferring ./train/cat.6507.jpg to ./val/cat.6507.jpg
Transferring ./train/dog.3117.jpg to ./val/dog.3117.jpg
Transferring ./train/dog.12090.jpg to ./val/dog.12090.jpg
Transferring ./train/dog.5891.jpg to ./val/dog.5891.jpg
Transferring ./train/dog.5695.jpg to ./val/dog.5695.jpg
Transferring ./train/dog.3489.jpg to ./val/dog.3489.jpg
Transferring ./train/cat.9174.jpg to ./val/cat.9174.jpg
Transferring ./train/dog.5979.jpg to ./val/dog.5979.jpg
Transferring ./train/cat.3542.jpg to ./val/cat.3542.jpg
Transferring ./train/cat.7898.jpg to ./val/cat.7898.jpg
Transferring ./train/dog.3734.jpg to ./val/dog.3734.jpg
Transferring ./train/cat.9376.jpg to ./val/cat.9376.jpg
Transferring ./train/dog.6009.jpg to ./val/dog.6009.jpg
```

```
Transferring ./train/cat.4305.jpg to ./val/cat.4305.jpg
Transferring ./train/dog.1080.jpg to ./val/dog.1080.jpg
Transferring ./train/cat.9526.jpg to ./val/cat.9526.jpg
Transferring ./train/dog.669.jpg to ./val/dog.669.jpg
Transferring ./train/dog.2310.jpg to ./val/dog.2310.jpg
Transferring ./train/cat.9142.jpg to ./val/cat.9142.jpg
Transferring ./train/dog.3145.jpg to ./val/dog.3145.jpg
Transferring ./train/cat.5473.jpg to ./val/cat.5473.jpg
Transferring ./train/cat.9208.jpg to ./val/cat.9208.jpg
Transferring ./train/dog.2537.jpg to ./val/dog.2537.jpg
Transferring ./train/cat.4735.jpg to ./val/cat.4735.jpg
Transferring ./train/dog.8368.jpg to ./val/dog.8368.jpg
Transferring ./train/cat.2420.jpg to ./val/cat.2420.jpg
Transferring ./train/cat.235.jpg to ./val/cat.235.jpg
Transferring ./train/dog.4727.jpg to ./val/dog.4727.jpg
Transferring ./train/dog.11200.jpg to ./val/dog.11200.jpg
Transferring ./train/dog.8046.jpg to ./val/dog.8046.jpg
Transferring ./train/cat.4751.jpg to ./val/cat.4751.jpg
Transferring ./train/dog.1756.jpg to ./val/dog.1756.jpg
Transferring ./train/dog.1713.jpg to ./val/dog.1713.jpg
Transferring ./train/dog.693.jpg to ./val/dog.693.jpg
Transferring ./train/cat.9708.jpg to ./val/cat.9708.jpg
Transferring ./train/cat.11283.jpg to ./val/cat.11283.jpg
Transferring ./train/dog.4320.jpg to ./val/dog.4320.jpg
Transferring ./train/cat.12169.jpg to ./val/cat.12169.jpg
Transferring ./train/cat.8959.jpg to ./val/cat.8959.jpg
Transferring ./train/dog.6927.jpg to ./val/dog.6927.jpg
Transferring ./train/dog.231.jpg to ./val/dog.231.jpg
Transferring ./train/cat.2528.jpg to ./val/cat.2528.jpg
Transferring ./train/dog.5748.jpg to ./val/dog.5748.jpg
Transferring ./train/cat.8101.jpg to ./val/cat.8101.jpg
Transferring ./train/dog.11277.jpg to ./val/dog.11277.jpg
Transferring ./train/dog.2198.jpg to ./val/dog.2198.jpg
Transferring ./train/cat.3126.jpg to ./val/cat.3126.jpg
Transferring ./train/dog.12324.jpg to ./val/dog.12324.jpg
Transferring ./train/dog.2808.jpg to ./val/dog.2808.jpg
Transferring ./train/dog.10831.jpg to ./val/dog.10831.jpg
Transferring ./train/cat.6173.jpg to ./val/cat.6173.jpg
Transferring ./train/cat.516.jpg to ./val/cat.516.jpg
Transferring ./train/cat.6468.jpg to ./val/cat.6468.jpg
Transferring ./train/cat.3167.jpg to ./val/cat.3167.jpg
Transferring ./train/cat.5592.jpg to ./val/cat.5592.jpg
Transferring ./train/dog.3673.jpg to ./val/dog.3673.jpg
Transferring ./train/dog.2619.jpg to ./val/dog.2619.jpg
Transferring ./train/dog.4455.jpg to ./val/dog.4455.jpg
Transferring ./train/cat.9935.jpg to ./val/cat.9935.jpg
Transferring ./train/dog.5739.jpg to ./val/dog.5739.jpg
Transferring ./train/dog.227.jpg to ./val/dog.227.jpg
Transferring ./train/dog.3202.jpg to ./val/dog.3202.jpg
Transferring ./train/cat.2552.jpg to ./val/cat.2552.jpg
Transferring ./train/cat.9543.jpg to ./val/cat.9543.jpg
Transferring ./train/cat.5109.jpg to ./val/cat.5109.jpg
Transferring ./train/dog.7645.jpg to ./val/dog.7645.jpg
Transferring ./train/dog.10521.jpg to ./val/dog.10521.jpg
```

```
Transferring ./train/dog.1131.jpg to ./val/dog.1131.jpg
Transferring ./train/dog.2177.jpg to ./val/dog.2177.jpg
Transferring ./train/dog.10941.jpg to ./val/dog.10941.jpg
Transferring ./train/dog.3842.jpg to ./val/dog.3842.jpg
Transferring ./train/cat.9148.jpg to ./val/cat.9148.jpg
Transferring ./train/dog.3292.jpg to ./val/dog.3292.jpg
Transferring ./train/dog.11966.jpg to ./val/dog.11966.jpg
Transferring ./train/cat.7962.jpg to ./val/cat.7962.jpg
Transferring ./train/cat.11161.jpg to ./val/cat.11161.jpg
Transferring ./train/dog.2962.jpg to ./val/dog.2962.jpg
Transferring ./train/cat.2360.jpg to ./val/cat.2360.jpg
Transferring ./train/dog.3464.jpg to ./val/dog.3464.jpg
Transferring ./train/cat.10017.jpg to ./val/cat.10017.jpg
Transferring ./train/dog.5026.jpg to ./val/dog.5026.jpg
Transferring ./train/cat.10419.jpg to ./val/cat.10419.jpg
Transferring ./train/cat.2919.jpg to ./val/cat.2919.jpg
Transferring ./train/cat.437.jpg to ./val/cat.437.jpg
Transferring ./train/dog.9400.jpg to ./val/dog.9400.jpg
Transferring ./train/dog.2311.jpg to ./val/dog.2311.jpg
Transferring ./train/cat.10535.jpg to ./val/cat.10535.jpg
Transferring ./train/cat.130.jpg to ./val/cat.130.jpg
Transferring ./train/dog.762.jpg to ./val/dog.762.jpg
Transferring ./train/dog.785.jpg to ./val/dog.785.jpg
Transferring ./train/dog.8719.jpg to ./val/dog.8719.jpg
Transferring ./train/dog.1854.jpg to ./val/dog.1854.jpg
Transferring ./train/cat.2478.jpg to ./val/cat.2478.jpg
Transferring ./train/cat.845.jpg to ./val/cat.845.jpg
Transferring ./train/dog.2383.jpg to ./val/dog.2383.jpg
Transferring ./train/dog.1388.jpg to ./val/dog.1388.jpg
Transferring ./train/cat.11943.jpg to ./val/cat.11943.jpg
Transferring ./train/dog.7674.jpg to ./val/dog.7674.jpg
Transferring ./train/dog.10261.jpg to ./val/dog.10261.jpg
Transferring ./train/dog.5264.jpg to ./val/dog.5264.jpg
Transferring ./train/dog.437.jpg to ./val/dog.437.jpg
Transferring ./train/cat.4891.jpg to ./val/cat.4891.jpg
Transferring ./train/dog.881.jpg to ./val/dog.881.jpg
Transferring ./train/dog.5494.jpg to ./val/dog.5494.jpg
Transferring ./train/dog.3725.jpg to ./val/dog.3725.jpg
Transferring ./train/cat.9292.jpg to ./val/cat.9292.jpg
Transferring ./train/dog.5464.jpg to ./val/dog.5464.jpg
Transferring ./train/dog.11291.jpg to ./val/dog.11291.jpg
Transferring ./train/cat.11332.jpg to ./val/cat.11332.jpg
Transferring ./train/cat.1162.jpg to ./val/cat.1162.jpg
Transferring ./train/cat.2698.jpg to ./val/cat.2698.jpg
Transferring ./train/cat.821.jpg to ./val/cat.821.jpg
Transferring ./train/cat.5472.jpg to ./val/cat.5472.jpg
Transferring ./train/dog.7334.jpg to ./val/dog.7334.jpg
Transferring ./train/cat.8095.jpg to ./val/cat.8095.jpg
Transferring ./train/cat.6068.jpg to ./val/cat.6068.jpg
Transferring ./train/dog.6654.jpg to ./val/dog.6654.jpg
Transferring ./train/cat.8201.jpg to ./val/cat.8201.jpg
Transferring ./train/cat.6252.jpg to ./val/cat.6252.jpg
Transferring ./train/cat.11651.jpg to ./val/cat.11651.jpg
Transferring ./train/dog.6129.jpg to ./val/dog.6129.jpg
```

```
Transferring ./train/cat.7807.jpg to ./val/cat.7807.jpg
Transferring ./train/cat.1002.jpg to ./val/cat.1002.jpg
Transferring ./train/dog.11724.jpg to ./val/dog.11724.jpg
Transferring ./train/cat.2548.jpg to ./val/cat.2548.jpg
Transferring ./train/dog.9137.jpg to ./val/dog.9137.jpg
Transferring ./train/cat.3433.jpg to ./val/cat.3433.jpg
Transferring ./train/cat.5945.jpg to ./val/cat.5945.jpg
Transferring ./train/dog.1577.jpg to ./val/dog.1577.jpg
Transferring ./train/cat.2748.jpg to ./val/cat.2748.jpg
Transferring ./train/dog.3617.jpg to ./val/dog.3617.jpg
Transferring ./train/dog.2442.jpg to ./val/dog.2442.jpg
Transferring ./train/cat.8612.jpg to ./val/cat.8612.jpg
Transferring ./train/dog.12089.jpg to ./val/dog.12089.jpg
Transferring ./train/dog.1010.jpg to ./val/dog.1010.jpg
Transferring ./train/dog.11321.jpg to ./val/dog.11321.jpg
Transferring ./train/dog.8189.jpg to ./val/dog.8189.jpg
Transferring ./train/dog.4322.jpg to ./val/dog.4322.jpg
Transferring ./train/cat.8678.jpg to ./val/cat.8678.jpg
Transferring ./train/dog.2585.jpg to ./val/dog.2585.jpg
Transferring ./train/dog.6952.jpg to ./val/dog.6952.jpg
Transferring ./train/dog.1947.jpg to ./val/dog.1947.jpg
Transferring ./train/cat.10289.jpg to ./val/cat.10289.jpg
Transferring ./train/cat.5090.jpg to ./val/cat.5090.jpg
Transferring ./train/dog.12315.jpg to ./val/dog.12315.jpg
Transferring ./train/dog.8975.jpg to ./val/dog.8975.jpg
Transferring ./train/cat.11148.jpg to ./val/cat.11148.jpg
Transferring ./train/cat.5691.jpg to ./val/cat.5691.jpg
Transferring ./train/dog.6020.jpg to ./val/dog.6020.jpg
Transferring ./train/dog.10632.jpg to ./val/dog.10632.jpg
Transferring ./train/cat.9320.jpg to ./val/cat.9320.jpg
Transferring ./train/cat.4220.jpg to ./val/cat.4220.jpg
Transferring ./train/dog.7644.jpg to ./val/dog.7644.jpg
Transferring ./train/dog.10121.jpg to ./val/dog.10121.jpg
Transferring ./train/dog.428.jpg to ./val/dog.428.jpg
Transferring ./train/cat.8294.jpg to ./val/cat.8294.jpg
Transferring ./train/dog.11109.jpg to ./val/dog.11109.jpg
Transferring ./train/cat.10387.jpg to ./val/cat.10387.jpg
Transferring ./train/dog.6271.jpg to ./val/dog.6271.jpg
Transferring ./train/dog.7974.jpg to ./val/dog.7974.jpg
Transferring ./train/cat.4923.jpg to ./val/cat.4923.jpg
Transferring ./train/cat.162.jpg to ./val/cat.162.jpg
Transferring ./train/cat.10133.jpg to ./val/cat.10133.jpg
Transferring ./train/cat.1086.jpg to ./val/cat.1086.jpg
Transferring ./train/cat.9083.jpg to ./val/cat.9083.jpg
Transferring ./train/dog.12038.jpg to ./val/dog.12038.jpg
Transferring ./train/cat.3208.jpg to ./val/cat.3208.jpg
Transferring ./train/dog.11093.jpg to ./val/dog.11093.jpg
Transferring ./train/cat.2611.jpg to ./val/cat.2611.jpg
Transferring ./train/dog.6594.jpg to ./val/dog.6594.jpg
Transferring ./train/cat.10075.jpg to ./val/cat.10075.jpg
Transferring ./train/dog.5696.jpg to ./val/dog.5696.jpg
Transferring ./train/dog.6107.jpg to ./val/dog.6107.jpg
Transferring ./train/cat.12467.jpg to ./val/cat.12467.jpg
Transferring ./train/cat.8287.jpg to ./val/cat.8287.jpg
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```
Transferring ./train/dog.9283.jpg to ./val/dog.9283.jpg
Transferring ./train/cat.6359.jpg to ./val/cat.6359.jpg
Transferring ./train/cat.3153.jpg to ./val/cat.3153.jpg
Transferring ./train/cat.12473.jpg to ./val/cat.12473.jpg
Transferring ./train/dog.3406.jpg to ./val/dog.3406.jpg
Transferring ./train/dog.4118.jpg to ./val/dog.4118.jpg
Transferring ./train/cat.1641.jpg to ./val/cat.1641.jpg
Transferring ./train/cat.3758.jpg to ./val/cat.3758.jpg
Transferring ./train/cat.5361.jpg to ./val/cat.5361.jpg
Transferring ./train/dog.6394.jpg to ./val/dog.6394.jpg
Transferring ./train/dog.3110.jpg to ./val/dog.3110.jpg
Transferring ./train/cat.9267.jpg to ./val/cat.9267.jpg
Transferring ./train/cat.157.jpg to ./val/cat.157.jpg
Transferring ./train/cat.7044.jpg to ./val/cat.7044.jpg
Transferring ./train/cat.1869.jpg to ./val/cat.1869.jpg
Transferring ./train/cat.10892.jpg to ./val/cat.10892.jpg
Transferring ./train/dog.5022.jpg to ./val/dog.5022.jpg
Transferring ./train/cat.11622.jpg to ./val/cat.11622.jpg
Transferring ./train/cat.10484.jpg to ./val/cat.10484.jpg
Transferring ./train/cat.9905.jpg to ./val/cat.9905.jpg
Transferring ./train/cat.370.jpg to ./val/cat.370.jpg
Transferring ./train/cat.105.jpg to ./val/cat.105.jpg
Transferring ./train/cat.2497.jpg to ./val/cat.2497.jpg
Transferring ./train/dog.6896.jpg to ./val/dog.6896.jpg
Transferring ./train/cat.2901.jpg to ./val/cat.2901.jpg
Transferring ./train/cat.1053.jpg to ./val/cat.1053.jpg
Transferring ./train/cat.9422.jpg to ./val/cat.9422.jpg
Transferring ./train/cat.4970.jpg to ./val/cat.4970.jpg
Transferring ./train/dog.11552.jpg to ./val/dog.11552.jpg
Transferring ./train/dog.10634.jpg to ./val/dog.10634.jpg
Transferring ./train/dog.6683.jpg to ./val/dog.6683.jpg
Transferring ./train/dog.5920.jpg to ./val/dog.5920.jpg
Transferring ./train/dog.2801.jpg to ./val/dog.2801.jpg
Transferring ./train/dog.11326.jpg to ./val/dog.11326.jpg
Transferring ./train/cat.8172.jpg to ./val/cat.8172.jpg
Transferring ./train/cat.7501.jpg to ./val/cat.7501.jpg
Transferring ./train/dog.11281.jpg to ./val/dog.11281.jpg
Transferring ./train/dog.11743.jpg to ./val/dog.11743.jpg
Transferring ./train/dog.3955.jpg to ./val/dog.3955.jpg
Transferring ./train/cat.2282.jpg to ./val/cat.2282.jpg
Transferring ./train/cat.8075.jpg to ./val/cat.8075.jpg
Transferring ./train/dog.471.jpg to ./val/dog.471.jpg
Transferring ./train/dog.1147.jpg to ./val/dog.1147.jpg
Transferring ./train/dog.8772.jpg to ./val/dog.8772.jpg
Transferring ./train/dog.2250.jpg to ./val/dog.2250.jpg
Transferring ./train/dog.3386.jpg to ./val/dog.3386.jpg
Transferring ./train/dog.10806.jpg to ./val/dog.10806.jpg
Transferring ./train/cat.349.jpg to ./val/cat.349.jpg
Transferring ./train/dog.2230.jpg to ./val/dog.2230.jpg
Transferring ./train/dog.4144.jpg to ./val/dog.4144.jpg
Transferring ./train/dog.3001.jpg to ./val/dog.3001.jpg
Transferring ./train/dog.10312.jpg to ./val/dog.10312.jpg
Transferring ./train/dog.2172.jpg to ./val/dog.2172.jpg
Transferring ./train/cat.3142.jpg to ./val/cat.3142.jpg
```

```
Transferring ./train/cat.6280.jpg to ./val/cat.6280.jpg
Transferring ./train/cat.11609.jpg to ./val/cat.11609.jpg
Transferring ./train/cat.4358.jpg to ./val/cat.4358.jpg
Transferring ./train/dog.11682.jpg to ./val/dog.11682.jpg
Transferring ./train/dog.9660.jpg to ./val/dog.9660.jpg
Transferring ./train/dog.9938.jpg to ./val/dog.9938.jpg
Transferring ./train/dog.7106.jpg to ./val/dog.7106.jpg
Transferring ./train/dog.2944.jpg to ./val/dog.2944.jpg
Transferring ./train/cat.1259.jpg to ./val/cat.1259.jpg
Transferring ./train/dog.5449.jpg to ./val/dog.5449.jpg
Transferring ./train/dog.10244.jpg to ./val/dog.10244.jpg
Transferring ./train/dog.1245.jpg to ./val/dog.1245.jpg
Transferring ./train/cat.12244.jpg to ./val/cat.12244.jpg
Transferring ./train/cat.10707.jpg to ./val/cat.10707.jpg
Transferring ./train/cat.2435.jpg to ./val/cat.2435.jpg
Transferring ./train/cat.9681.jpg to ./val/cat.9681.jpg
Transferring ./train/dog.688.jpg to ./val/dog.688.jpg
Transferring ./train/cat.2957.jpg to ./val/cat.2957.jpg
Transferring ./train/cat.7765.jpg to ./val/cat.7765.jpg
Transferring ./train/dog.12024.jpg to ./val/dog.12024.jpg
Transferring ./train/dog.8980.jpg to ./val/dog.8980.jpg
Transferring ./train/dog.953.jpg to ./val/dog.953.jpg
Transferring ./train/cat.4208.jpg to ./val/cat.4208.jpg
Transferring ./train/cat.12038.jpg to ./val/cat.12038.jpg
Transferring ./train/dog.11636.jpg to ./val/dog.11636.jpg
Transferring ./train/cat.10010.jpg to ./val/cat.10010.jpg
Transferring ./train/dog.12142.jpg to ./val/dog.12142.jpg
Transferring ./train/cat.8824.jpg to ./val/cat.8824.jpg
Transferring ./train/dog.139.jpg to ./val/dog.139.jpg
Transferring ./train/cat.2972.jpg to ./val/cat.2972.jpg
Transferring ./train/dog.9914.jpg to ./val/dog.9914.jpg
Transferring ./train/cat.9573.jpg to ./val/cat.9573.jpg
Transferring ./train/dog.10331.jpg to ./val/dog.10331.jpg
Transferring ./train/cat.6554.jpg to ./val/cat.6554.jpg
Transferring ./train/dog.11873.jpg to ./val/dog.11873.jpg
Transferring ./train/dog.10886.jpg to ./val/dog.10886.jpg
Transferring ./train/cat.4700.jpg to ./val/cat.4700.jpg
Transferring ./train/cat.4315.jpg to ./val/cat.4315.jpg
Transferring ./train/cat.6010.jpg to ./val/cat.6010.jpg
Transferring ./train/cat.11089.jpg to ./val/cat.11089.jpg
Transferring ./train/dog.8431.jpg to ./val/dog.8431.jpg
Transferring ./train/dog.2643.jpg to ./val/dog.2643.jpg
Transferring ./train/cat.10330.jpg to ./val/cat.10330.jpg
Transferring ./train/dog.10330.jpg to ./val/dog.10330.jpg
Transferring ./train/cat.12332.jpg to ./val/cat.12332.jpg
Transferring ./train/dog.2253.jpg to ./val/dog.2253.jpg
Transferring ./train/cat.11438.jpg to ./val/cat.11438.jpg
Transferring ./train/dog.765.jpg to ./val/dog.765.jpg
Transferring ./train/cat.2125.jpg to ./val/cat.2125.jpg
Transferring ./train/cat.7425.jpg to ./val/cat.7425.jpg
Transferring ./train/dog.12480.jpg to ./val/dog.12480.jpg
Transferring ./train/cat.4544.jpg to ./val/cat.4544.jpg
Transferring ./train/dog.1798.jpg to ./val/dog.1798.jpg
Transferring ./train/cat.7068.jpg to ./val/cat.7068.jpg
```

```
Transferring ./train/cat.5402.jpg to ./val/cat.5402.jpg
Transferring ./train/cat.6632.jpg to ./val/cat.6632.jpg
Transferring ./train/dog.4992.jpg to ./val/dog.4992.jpg
Transferring ./train/dog.2977.jpg to ./val/dog.2977.jpg
Transferring ./train/cat.906.jpg to ./val/cat.906.jpg
Transferring ./train/cat.9797.jpg to ./val/cat.9797.jpg
Transferring ./train/cat.327.jpg to ./val/cat.327.jpg
Transferring ./train/dog.6090.jpg to ./val/dog.6090.jpg
Transferring ./train/dog.4131.jpg to ./val/dog.4131.jpg
Transferring ./train/dog.7870.jpg to ./val/dog.7870.jpg
Transferring ./train/cat.1071.jpg to ./val/cat.1071.jpg
Transferring ./train/cat.2540.jpg to ./val/cat.2540.jpg
Transferring ./train/cat.712.jpg to ./val/cat.712.jpg
Transferring ./train/cat.4514.jpg to ./val/cat.4514.jpg
Transferring ./train/cat.3946.jpg to ./val/cat.3946.jpg
Transferring ./train/cat.5777.jpg to ./val/cat.5777.jpg
Transferring ./train/cat.463.jpg to ./val/cat.463.jpg
Transferring ./train/dog.6650.jpg to ./val/dog.6650.jpg
Transferring ./train/dog.12482.jpg to ./val/dog.12482.jpg
Transferring ./train/dog.11772.jpg to ./val/dog.11772.jpg
Transferring ./train/dog.10378.jpg to ./val/dog.10378.jpg
Transferring ./train/dog.3028.jpg to ./val/dog.3028.jpg
Transferring ./train/dog.2297.jpg to ./val/dog.2297.jpg
Transferring ./train/dog.1451.jpg to ./val/dog.1451.jpg
Transferring ./train/cat.3776.jpg to ./val/cat.3776.jpg
Transferring ./train/dog.7546.jpg to ./val/dog.7546.jpg
Transferring ./train/cat.4861.jpg to ./val/cat.4861.jpg
Transferring ./train/dog.6029.jpg to ./val/dog.6029.jpg
Transferring ./train/dog.4017.jpg to ./val/dog.4017.jpg
Transferring ./train/cat.4820.jpg to ./val/cat.4820.jpg
Transferring ./train/cat.2281.jpg to ./val/cat.2281.jpg
Transferring ./train/cat.9956.jpg to ./val/cat.9956.jpg
Transferring ./train/dog.1776.jpg to ./val/dog.1776.jpg
Transferring ./train/cat.2111.jpg to ./val/cat.2111.jpg
Transferring ./train/cat.4486.jpg to ./val/cat.4486.jpg
Transferring ./train/cat.2049.jpg to ./val/cat.2049.jpg
Transferring ./train/dog.1867.jpg to ./val/dog.1867.jpg
Transferring ./train/dog.3365.jpg to ./val/dog.3365.jpg
Transferring ./train/dog.3035.jpg to ./val/dog.3035.jpg
Transferring ./train/dog.7209.jpg to ./val/dog.7209.jpg
Transferring ./train/cat.9974.jpg to ./val/cat.9974.jpg
Transferring ./train/dog.6072.jpg to ./val/dog.6072.jpg
Transferring ./train/cat.1344.jpg to ./val/cat.1344.jpg
Transferring ./train/dog.11512.jpg to ./val/dog.11512.jpg
Transferring ./train/cat.3727.jpg to ./val/cat.3727.jpg
Transferring ./train/dog.8675.jpg to ./val/dog.8675.jpg
Transferring ./train/cat.10948.jpg to ./val/cat.10948.jpg
Transferring ./train/dog.9927.jpg to ./val/dog.9927.jpg
Transferring ./train/dog.8928.jpg to ./val/dog.8928.jpg
Transferring ./train/dog.2711.jpg to ./val/dog.2711.jpg
Transferring ./train/cat.94.jpg to ./val/cat.94.jpg
Transferring ./train/cat.4314.jpg to ./val/cat.4314.jpg
Transferring ./train/dog.7054.jpg to ./val/dog.7054.jpg
Transferring ./train/dog.5883.jpg to ./val/dog.5883.jpg
```

```
Transferring ./train/dog.6447.jpg to ./val/dog.6447.jpg
Transferring ./train/cat.6209.jpg to ./val/cat.6209.jpg
Transferring ./train/cat.8387.jpg to ./val/cat.8387.jpg
Transferring ./train/cat.8377.jpg to ./val/cat.8377.jpg
Transferring ./train/cat.10213.jpg to ./val/cat.10213.jpg
Transferring ./train/dog.5779.jpg to ./val/dog.5779.jpg
Transferring ./train/cat.4438.jpg to ./val/cat.4438.jpg
Transferring ./train/cat.1842.jpg to ./val/cat.1842.jpg
Transferring ./train/dog.2455.jpg to ./val/dog.2455.jpg
Transferring ./train/cat.9316.jpg to ./val/cat.9316.jpg
Transferring ./train/dog.6024.jpg to ./val/dog.6024.jpg
Transferring ./train/cat.3307.jpg to ./val/cat.3307.jpg
Transferring ./train/cat.12183.jpg to ./val/cat.12183.jpg
Transferring ./train/dog.6052.jpg to ./val/dog.6052.jpg
Transferring ./train/dog.5146.jpg to ./val/dog.5146.jpg
Transferring ./train/dog.9399.jpg to ./val/dog.9399.jpg
Transferring ./train/dog.6595.jpg to ./val/dog.6595.jpg
Transferring ./train/dog.9382.jpg to ./val/dog.9382.jpg
Transferring ./train/cat.2251.jpg to ./val/cat.2251.jpg
Transferring ./train/cat.1962.jpg to ./val/cat.1962.jpg
Transferring ./train/cat.1556.jpg to ./val/cat.1556.jpg
Transferring ./train/dog.5804.jpg to ./val/dog.5804.jpg
Transferring ./train/cat.3526.jpg to ./val/cat.3526.jpg
Transferring ./train/cat.9446.jpg to ./val/cat.9446.jpg
Transferring ./train/dog.10975.jpg to ./val/dog.10975.jpg
Transferring ./train/cat.732.jpg to ./val/cat.732.jpg
Transferring ./train/dog.5679.jpg to ./val/dog.5679.jpg
Transferring ./train/cat.534.jpg to ./val/cat.534.jpg
Transferring ./train/dog.8286.jpg to ./val/dog.8286.jpg
Transferring ./train/cat.476.jpg to ./val/cat.476.jpg
Transferring ./train/cat.7972.jpg to ./val/cat.7972.jpg
Transferring ./train/cat.11054.jpg to ./val/cat.11054.jpg
Transferring ./train/cat.951.jpg to ./val/cat.951.jpg
Transferring ./train/cat.3693.jpg to ./val/cat.3693.jpg
Transferring ./train/cat.3335.jpg to ./val/cat.3335.jpg
Transferring ./train/cat.8180.jpg to ./val/cat.8180.jpg
Transferring ./train/dog.6269.jpg to ./val/dog.6269.jpg
Transferring ./train/cat.7362.jpg to ./val/cat.7362.jpg
Transferring ./train/dog.5796.jpg to ./val/dog.5796.jpg
Transferring ./train/cat.3441.jpg to ./val/cat.3441.jpg
Transferring ./train/dog.10905.jpg to ./val/dog.10905.jpg
Transferring ./train/dog.4267.jpg to ./val/dog.4267.jpg
Transferring ./train/cat.8286.jpg to ./val/cat.8286.jpg
Transferring ./train/cat.6694.jpg to ./val/cat.6694.jpg
Transferring ./train/cat.3302.jpg to ./val/cat.3302.jpg
Transferring ./train/dog.5662.jpg to ./val/dog.5662.jpg
Transferring ./train/dog.4793.jpg to ./val/dog.4793.jpg
Transferring ./train/dog.6258.jpg to ./val/dog.6258.jpg
Transferring ./train/dog.1347.jpg to ./val/dog.1347.jpg
Transferring ./train/cat.1867.jpg to ./val/cat.1867.jpg
Transferring ./train/dog.8064.jpg to ./val/dog.8064.jpg
Transferring ./train/cat.8741.jpg to ./val/cat.8741.jpg
Transferring ./train/cat.9038.jpg to ./val/cat.9038.jpg
Transferring ./train/dog.7924.jpg to ./val/dog.7924.jpg
```

```
Transferring ./train/dog.2162.jpg to ./val/dog.2162.jpg
Transferring ./train/dog.11005.jpg to ./val/dog.11005.jpg
Transferring ./train/cat.10641.jpg to ./val/cat.10641.jpg
Transferring ./train/cat.10510.jpg to ./val/cat.10510.jpg
Transferring ./train/dog.8614.jpg to ./val/dog.8614.jpg
Transferring ./train/dog.9889.jpg to ./val/dog.9889.jpg
Transferring ./train/dog.1296.jpg to ./val/dog.1296.jpg
Transferring ./train/cat.12260.jpg to ./val/cat.12260.jpg
Transferring ./train/dog.4619.jpg to ./val/dog.4619.jpg
Transferring ./train/dog.5164.jpg to ./val/dog.5164.jpg
Transferring ./train/dog.7487.jpg to ./val/dog.7487.jpg
Transferring ./train/dog.5070.jpg to ./val/dog.5070.jpg
Transferring ./train/cat.2796.jpg to ./val/cat.2796.jpg
Transferring ./train/dog.8938.jpg to ./val/dog.8938.jpg
Transferring ./train/cat.12021.jpg to ./val/cat.12021.jpg
Transferring ./train/dog.3119.jpg to ./val/dog.3119.jpg
Transferring ./train/dog.9865.jpg to ./val/dog.9865.jpg
Transferring ./train/dog.2418.jpg to ./val/dog.2418.jpg
Transferring ./train/dog.8424.jpg to ./val/dog.8424.jpg
Transferring ./train/dog.6338.jpg to ./val/dog.6338.jpg
Transferring ./train/cat.4720.jpg to ./val/cat.4720.jpg
Transferring ./train/cat.8418.jpg to ./val/cat.8418.jpg
Transferring ./train/cat.5560.jpg to ./val/cat.5560.jpg
Transferring ./train/dog.4066.jpg to ./val/dog.4066.jpg
Transferring ./train/dog.11201.jpg to ./val/dog.11201.jpg
Transferring ./train/dog.4678.jpg to ./val/dog.4678.jpg
Transferring ./train/dog.12265.jpg to ./val/dog.12265.jpg
Transferring ./train/dog.899.jpg to ./val/dog.899.jpg
Transferring ./train/dog.4629.jpg to ./val/dog.4629.jpg
Transferring ./train/cat.7097.jpg to ./val/cat.7097.jpg
Transferring ./train/cat.9763.jpg to ./val/cat.9763.jpg
Transferring ./train/dog.3582.jpg to ./val/dog.3582.jpg
Transferring ./train/dog.10720.jpg to ./val/dog.10720.jpg
Transferring ./train/cat.1717.jpg to ./val/cat.1717.jpg
Transferring ./train/cat.5814.jpg to ./val/cat.5814.jpg
Transferring ./train/cat.3371.jpg to ./val/cat.3371.jpg
Transferring ./train/dog.6493.jpg to ./val/dog.6493.jpg
Transferring ./train/dog.4889.jpg to ./val/dog.4889.jpg
Transferring ./train/cat.7046.jpg to ./val/cat.7046.jpg
Transferring ./train/dog.900.jpg to ./val/dog.900.jpg
Transferring ./train/cat.9555.jpg to ./val/cat.9555.jpg
Transferring ./train/cat.451.jpg to ./val/cat.451.jpg
Transferring ./train/dog.8291.jpg to ./val/dog.8291.jpg
Transferring ./train/dog.10786.jpg to ./val/dog.10786.jpg
Transferring ./train/dog.4638.jpg to ./val/dog.4638.jpg
Transferring ./train/dog.9116.jpg to ./val/dog.9116.jpg
Transferring ./train/cat.3322.jpg to ./val/cat.3322.jpg
Transferring ./train/dog.7952.jpg to ./val/dog.7952.jpg
Transferring ./train/dog.11564.jpg to ./val/dog.11564.jpg
Transferring ./train/cat.9595.jpg to ./val/cat.9595.jpg
Transferring ./train/dog.2605.jpg to ./val/dog.2605.jpg
Transferring ./train/dog.1791.jpg to ./val/dog.1791.jpg
Transferring ./train/dog.4836.jpg to ./val/dog.4836.jpg
Transferring ./train/dog.11752.jpg to ./val/dog.11752.jpg
```

```
Transferring ./train/cat.3882.jpg to ./val/cat.3882.jpg
Transferring ./train/dog.4576.jpg to ./val/dog.4576.jpg
Transferring ./train/cat.2404.jpg to ./val/cat.2404.jpg
Transferring ./train/dog.7749.jpg to ./val/dog.7749.jpg
Transferring ./train/cat.2137.jpg to ./val/cat.2137.jpg
Transferring ./train/cat.860.jpg to ./val/cat.860.jpg
Transferring ./train/dog.5956.jpg to ./val/dog.5956.jpg
Transferring ./train/cat.3311.jpg to ./val/cat.3311.jpg
Transferring ./train/dog.2159.jpg to ./val/dog.2159.jpg
Transferring ./train/cat.8484.jpg to ./val/cat.8484.jpg
Transferring ./train/dog.6656.jpg to ./val/dog.6656.jpg
Transferring ./train/cat.8860.jpg to ./val/cat.8860.jpg
Transferring ./train/cat.8917.jpg to ./val/cat.8917.jpg
Transferring ./train/cat.6691.jpg to ./val/cat.6691.jpg
Transferring ./train/cat.10623.jpg to ./val/cat.10623.jpg
Transferring ./train/cat.10600.jpg to ./val/cat.10600.jpg
Transferring ./train/cat.511.jpg to ./val/cat.511.jpg
Transferring ./train/cat.9408.jpg to ./val/cat.9408.jpg
Transferring ./train/cat.4905.jpg to ./val/cat.4905.jpg
Transferring ./train/cat.10607.jpg to ./val/cat.10607.jpg
Transferring ./train/cat.4206.jpg to ./val/cat.4206.jpg
Transferring ./train/cat.8420.jpg to ./val/cat.8420.jpg
Transferring ./train/dog.8164.jpg to ./val/dog.8164.jpg
Transferring ./train/cat.5343.jpg to ./val/cat.5343.jpg
Transferring ./train/cat.2577.jpg to ./val/cat.2577.jpg
Transferring ./train/dog.1167.jpg to ./val/dog.1167.jpg
Transferring ./train/cat.1800.jpg to ./val/cat.1800.jpg
Transferring ./train/cat.8877.jpg to ./val/cat.8877.jpg
Transferring ./train/dog.10532.jpg to ./val/dog.10532.jpg
Transferring ./train/dog.1146.jpg to ./val/dog.1146.jpg
Transferring ./train/cat.4582.jpg to ./val/cat.4582.jpg
Transferring ./train/cat.8636.jpg to ./val/cat.8636.jpg
Transferring ./train/cat.7281.jpg to ./val/cat.7281.jpg
Transferring ./train/cat.10016.jpg to ./val/cat.10016.jpg
Transferring ./train/dog.9320.jpg to ./val/dog.9320.jpg
Transferring ./train/cat.2503.jpg to ./val/cat.2503.jpg
Transferring ./train/dog.7605.jpg to ./val/dog.7605.jpg
Transferring ./train/dog.5605.jpg to ./val/dog.5605.jpg
Transferring ./train/dog.3751.jpg to ./val/dog.3751.jpg
Transferring ./train/dog.2842.jpg to ./val/dog.2842.jpg
Transferring ./train/cat.6287.jpg to ./val/cat.6287.jpg
Transferring ./train/cat.5938.jpg to ./val/cat.5938.jpg
Transferring ./train/dog.2803.jpg to ./val/dog.2803.jpg
Transferring ./train/dog.10750.jpg to ./val/dog.10750.jpg
Transferring ./train/cat.5191.jpg to ./val/cat.5191.jpg
Transferring ./train/cat.4485.jpg to ./val/cat.4485.jpg
Transferring ./train/cat.10633.jpg to ./val/cat.10633.jpg
Transferring ./train/dog.6589.jpg to ./val/dog.6589.jpg
Transferring ./train/dog.725.jpg to ./val/dog.725.jpg
Transferring ./train/cat.11476.jpg to ./val/cat.11476.jpg
Transferring ./train/cat.11709.jpg to ./val/cat.11709.jpg
Transferring ./train/cat.163.jpg to ./val/cat.163.jpg
Transferring ./train/cat.2737.jpg to ./val/cat.2737.jpg
Transferring ./train/dog.2083.jpg to ./val/dog.2083.jpg
```

```
Transferring ./train/dog.4717.jpg to ./val/dog.4717.jpg
Transferring ./train/cat.6562.jpg to ./val/cat.6562.jpg
Transferring ./train/cat.9185.jpg to ./val/cat.9185.jpg
Transferring ./train/dog.6908.jpg to ./val/dog.6908.jpg
Transferring ./train/dog.38.jpg to ./val/dog.38.jpg
Transferring ./train/dog.4986.jpg to ./val/dog.4986.jpg
Transferring ./train/dog.4869.jpg to ./val/dog.4869.jpg
Transferring ./train/cat.9145.jpg to ./val/cat.9145.jpg
Transferring ./train/cat.309.jpg to ./val/cat.309.jpg
Transferring ./train/dog.9496.jpg to ./val/dog.9496.jpg
Transferring ./train/cat.6866.jpg to ./val/cat.6866.jpg
Transferring ./train/cat.5713.jpg to ./val/cat.5713.jpg
Transferring ./train/dog.7839.jpg to ./val/dog.7839.jpg
Transferring ./train/dog.5481.jpg to ./val/dog.5481.jpg
Transferring ./train/dog.12190.jpg to ./val/dog.12190.jpg
Transferring ./train/dog.5924.jpg to ./val/dog.5924.jpg
Transferring ./train/cat.6893.jpg to ./val/cat.6893.jpg
Transferring ./train/dog.12128.jpg to ./val/dog.12128.jpg
Transferring ./train/dog.9959.jpg to ./val/dog.9959.jpg
Transferring ./train/cat.10856.jpg to ./val/cat.10856.jpg
Transferring ./train/dog.681.jpg to ./val/dog.681.jpg
Transferring ./train/dog.364.jpg to ./val/dog.364.jpg
Transferring ./train/dog.11327.jpg to ./val/dog.11327.jpg
Transferring ./train/dog.6302.jpg to ./val/dog.6302.jpg
Transferring ./train/cat.11232.jpg to ./val/cat.11232.jpg
Transferring ./train/dog.869.jpg to ./val/dog.869.jpg
Transferring ./train/cat.408.jpg to ./val/cat.408.jpg
Transferring ./train/dog.9391.jpg to ./val/dog.9391.jpg
Transferring ./train/cat.2637.jpg to ./val/cat.2637.jpg
Transferring ./train/cat.10119.jpg to ./val/cat.10119.jpg
Transferring ./train/dog.3890.jpg to ./val/dog.3890.jpg
Transferring ./train/dog.5055.jpg to ./val/dog.5055.jpg
Transferring ./train/dog.10888.jpg to ./val/dog.10888.jpg
Transferring ./train/cat.7323.jpg to ./val/cat.7323.jpg
Transferring ./train/cat.12234.jpg to ./val/cat.12234.jpg
Transferring ./train/dog.10354.jpg to ./val/dog.10354.jpg
Transferring ./train/cat.6762.jpg to ./val/cat.6762.jpg
Transferring ./train/dog.6840.jpg to ./val/dog.6840.jpg
Transferring ./train/cat.5254.jpg to ./val/cat.5254.jpg
Transferring ./train/dog.10100.jpg to ./val/dog.10100.jpg
Transferring ./train/dog.5440.jpg to ./val/dog.5440.jpg
Transferring ./train/cat.8509.jpg to ./val/cat.8509.jpg
Transferring ./train/dog.2323.jpg to ./val/dog.2323.jpg
Transferring ./train/cat.9692.jpg to ./val/cat.9692.jpg
Transferring ./train/dog.10221.jpg to ./val/dog.10221.jpg
Transferring ./train/dog.2408.jpg to ./val/dog.2408.jpg
Transferring ./train/dog.2964.jpg to ./val/dog.2964.jpg
Transferring ./train/cat.10108.jpg to ./val/cat.10108.jpg
Transferring ./train/cat.3829.jpg to ./val/cat.3829.jpg
Transferring ./train/cat.70.jpg to ./val/cat.70.jpg
Transferring ./train/cat.9719.jpg to ./val/cat.9719.jpg
Transferring ./train/dog.8385.jpg to ./val/dog.8385.jpg
Transferring ./train/dog.12170.jpg to ./val/dog.12170.jpg
Transferring ./train/cat.835.jpg to ./val/cat.835.jpg
```

```
Transferring ./train/cat.12168.jpg to ./val/cat.12168.jpg
Transferring ./train/cat.4459.jpg to ./val/cat.4459.jpg
Transferring ./train/dog.8870.jpg to ./val/dog.8870.jpg
Transferring ./train/dog.7026.jpg to ./val/dog.7026.jpg
Transferring ./train/cat.9380.jpg to ./val/cat.9380.jpg
Transferring ./train/dog.8589.jpg to ./val/dog.8589.jpg
Transferring ./train/cat.7217.jpg to ./val/cat.7217.jpg
Transferring ./train/dog.9996.jpg to ./val/dog.9996.jpg
Transferring ./train/cat.10173.jpg to ./val/cat.10173.jpg
Transferring ./train/cat.7629.jpg to ./val/cat.7629.jpg
Transferring ./train/cat.1681.jpg to ./val/cat.1681.jpg
Transferring ./train/cat.2780.jpg to ./val/cat.2780.jpg
Transferring ./train/cat.12381.jpg to ./val/cat.12381.jpg
Transferring ./train/dog.5599.jpg to ./val/dog.5599.jpg
Transferring ./train/dog.3363.jpg to ./val/dog.3363.jpg
Transferring ./train/cat.8693.jpg to ./val/cat.8693.jpg
Transferring ./train/dog.2772.jpg to ./val/dog.2772.jpg
Transferring ./train/dog.2368.jpg to ./val/dog.2368.jpg
Transferring ./train/cat.3391.jpg to ./val/cat.3391.jpg
Transferring ./train/cat.6660.jpg to ./val/cat.6660.jpg
Transferring ./train/cat.5232.jpg to ./val/cat.5232.jpg
Transferring ./train/cat.11486.jpg to ./val/cat.11486.jpg
Transferring ./train/dog.4968.jpg to ./val/dog.4968.jpg
Transferring ./train/dog.3547.jpg to ./val/dog.3547.jpg
Transferring ./train/dog.1022.jpg to ./val/dog.1022.jpg
Transferring ./train/dog.6026.jpg to ./val/dog.6026.jpg
Transferring ./train/cat.10772.jpg to ./val/cat.10772.jpg
Transferring ./train/cat.9858.jpg to ./val/cat.9858.jpg
Transferring ./train/dog.295.jpg to ./val/dog.295.jpg
Transferring ./train/dog.699.jpg to ./val/dog.699.jpg
Transferring ./train/cat.3842.jpg to ./val/cat.3842.jpg
Transferring ./train/dog.3766.jpg to ./val/dog.3766.jpg
Transferring ./train/dog.9808.jpg to ./val/dog.9808.jpg
Transferring ./train/cat.156.jpg to ./val/cat.156.jpg
Transferring ./train/cat.7095.jpg to ./val/cat.7095.jpg
Transferring ./train/cat.6344.jpg to ./val/cat.6344.jpg
Transferring ./train/dog.2924.jpg to ./val/dog.2924.jpg
Transferring ./train/dog.5290.jpg to ./val/dog.5290.jpg
Transferring ./train/dog.11193.jpg to ./val/dog.11193.jpg
Transferring ./train/cat.3160.jpg to ./val/cat.3160.jpg
Transferring ./train/dog.7989.jpg to ./val/dog.7989.jpg
Transferring ./train/cat.7250.jpg to ./val/cat.7250.jpg
Transferring ./train/dog.12332.jpg to ./val/dog.12332.jpg
Transferring ./train/dog.3442.jpg to ./val/dog.3442.jpg
Transferring ./train/cat.9499.jpg to ./val/cat.9499.jpg
Transferring ./train/dog.11717.jpg to ./val/dog.11717.jpg
Transferring ./train/dog.8662.jpg to ./val/dog.8662.jpg
Transferring ./train/dog.331.jpg to ./val/dog.331.jpg
Transferring ./train/dog.8948.jpg to ./val/dog.8948.jpg
Transferring ./train/dog.5851.jpg to ./val/dog.5851.jpg
Transferring ./train/cat.8353.jpg to ./val/cat.8353.jpg
Transferring ./train/cat.10804.jpg to ./val/cat.10804.jpg
Transferring ./train/cat.1740.jpg to ./val/cat.1740.jpg
Transferring ./train/dog.4709.jpg to ./val/dog.4709.jpg
```

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Transferring ./train/dog.4464.jpg to ./val/dog.4464.jpg
Transferring ./train/dog.6751.jpg to ./val/dog.6751.jpg
Transferring ./train/cat.5532.jpg to ./val/cat.5532.jpg
Transferring ./train/cat.7398.jpg to ./val/cat.7398.jpg
Transferring ./train/cat.9921.jpg to ./val/cat.9921.jpg
Transferring ./train/dog.1085.jpg to ./val/dog.1085.jpg
Transferring ./train/dog.5221.jpg to ./val/dog.5221.jpg
Transferring ./train/dog.4690.jpg to ./val/dog.4690.jpg
Transferring ./train/cat.4195.jpg to ./val/cat.4195.jpg
Transferring ./train/cat.72.jpg to ./val/cat.72.jpg
Transferring ./train/dog.7104.jpg to ./val/dog.7104.jpg
Transferring ./train/cat.10386.jpg to ./val/cat.10386.jpg
Transferring ./train/cat.8787.jpg to ./val/cat.8787.jpg
Transferring ./train/dog.5936.jpg to ./val/dog.5936.jpg
Transferring ./train/dog.7305.jpg to ./val/dog.7305.jpg
Transferring ./train/dog.7333.jpg to ./val/dog.7333.jpg
Transferring ./train/cat.11328.jpg to ./val/cat.11328.jpg
Transferring ./train/cat.5648.jpg to ./val/cat.5648.jpg
Transferring ./train/cat.7817.jpg to ./val/cat.7817.jpg
Transferring ./train/cat.11157.jpg to ./val/cat.11157.jpg
Transferring ./train/dog.10337.jpg to ./val/dog.10337.jpg
Transferring ./train/cat.2124.jpg to ./val/cat.2124.jpg
Transferring ./train/cat.1807.jpg to ./val/cat.1807.jpg
Transferring ./train/cat.6635.jpg to ./val/cat.6635.jpg
Transferring ./train/dog.3679.jpg to ./val/dog.3679.jpg
Transferring ./train/cat.3532.jpg to ./val/cat.3532.jpg
Transferring ./train/dog.567.jpg to ./val/dog.567.jpg
Transferring ./train/cat.11774.jpg to ./val/cat.11774.jpg
Transferring ./train/dog.1289.jpg to ./val/dog.1289.jpg
Transferring ./train/dog.4783.jpg to ./val/dog.4783.jpg
Transferring ./train/cat.10745.jpg to ./val/cat.10745.jpg
Transferring ./train/cat.5529.jpg to ./val/cat.5529.jpg
Transferring ./train/cat.4783.jpg to ./val/cat.4783.jpg
Transferring ./train/cat.9476.jpg to ./val/cat.9476.jpg
Transferring ./train/cat.8165.jpg to ./val/cat.8165.jpg
Transferring ./train/cat.11344.jpg to ./val/cat.11344.jpg
Transferring ./train/dog.214.jpg to ./val/dog.214.jpg
Transferring ./train/dog.9585.jpg to ./val/dog.9585.jpg
Transferring ./train/dog.10409.jpg to ./val/dog.10409.jpg
Transferring ./train/cat.4880.jpg to ./val/cat.4880.jpg
Transferring ./train/dog.7919.jpg to ./val/dog.7919.jpg
Transferring ./train/dog.9357.jpg to ./val/dog.9357.jpg
Transferring ./train/dog.341.jpg to ./val/dog.341.jpg
Transferring ./train/dog.4546.jpg to ./val/dog.4546.jpg
Transferring ./train/dog.3349.jpg to ./val/dog.3349.jpg
Transferring ./train/dog.8528.jpg to ./val/dog.8528.jpg
Transferring ./train/dog.717.jpg to ./val/dog.717.jpg
Transferring ./train/dog.9416.jpg to ./val/dog.9416.jpg
Transferring ./train/cat.4732.jpg to ./val/cat.4732.jpg
Transferring ./train/dog.9949.jpg to ./val/dog.9949.jpg
Transferring ./train/dog.10743.jpg to ./val/dog.10743.jpg
Transferring ./train/cat.2187.jpg to ./val/cat.2187.jpg
Transferring ./train/dog.4807.jpg to ./val/dog.4807.jpg
Transferring ./train/cat.12190.jpg to ./val/cat.12190.jpg
```

```
Transferring ./train/cat.2960.jpg to ./val/cat.2960.jpg
Transferring ./train/dog.3915.jpg to ./val/dog.3915.jpg
Transferring ./train/dog.6700.jpg to ./val/dog.6700.jpg
Transferring ./train/dog.7220.jpg to ./val/dog.7220.jpg
Transferring ./train/dog.7814.jpg to ./val/dog.7814.jpg
Transferring ./train/dog.9238.jpg to ./val/dog.9238.jpg
Transferring ./train/cat.3731.jpg to ./val/cat.3731.jpg
Transferring ./train/dog.661.jpg to ./val/dog.661.jpg
Transferring ./train/dog.2691.jpg to ./val/dog.2691.jpg
Transferring ./train/dog.3281.jpg to ./val/dog.3281.jpg
Transferring ./train/dog.8672.jpg to ./val/dog.8672.jpg
Transferring ./train/cat.8980.jpg to ./val/cat.8980.jpg
Transferring ./train/cat.9816.jpg to ./val/cat.9816.jpg
Transferring ./train/cat.10058.jpg to ./val/cat.10058.jpg
Transferring ./train/dog.1178.jpg to ./val/dog.1178.jpg
Transferring ./train/dog.3241.jpg to ./val/dog.3241.jpg
Transferring ./train/dog.6608.jpg to ./val/dog.6608.jpg
Transferring ./train/cat.1351.jpg to ./val/cat.1351.jpg
Transferring ./train/cat.9158.jpg to ./val/cat.9158.jpg
Transferring ./train/cat.8501.jpg to ./val/cat.8501.jpg
Transferring ./train/cat.11446.jpg to ./val/cat.11446.jpg
Transferring ./train/dog.5420.jpg to ./val/dog.5420.jpg
Transferring ./train/cat.10315.jpg to ./val/cat.10315.jpg
Transferring ./train/cat.7407.jpg to ./val/cat.7407.jpg
Transferring ./train/cat.5585.jpg to ./val/cat.5585.jpg
Transferring ./train/cat.5050.jpg to ./val/cat.5050.jpg
Transferring ./train/cat.9040.jpg to ./val/cat.9040.jpg
Transferring ./train/cat.8226.jpg to ./val/cat.8226.jpg
Transferring ./train/cat.6718.jpg to ./val/cat.6718.jpg
Transferring ./train/cat.12421.jpg to ./val/cat.12421.jpg
Transferring ./train/cat.10971.jpg to ./val/cat.10971.jpg
Transferring ./train/dog.5036.jpg to ./val/dog.5036.jpg
Transferring ./train/cat.5357.jpg to ./val/cat.5357.jpg
Transferring ./train/cat.5574.jpg to ./val/cat.5574.jpg
Transferring ./train/cat.7209.jpg to ./val/cat.7209.jpg
Transferring ./train/cat.9125.jpg to ./val/cat.9125.jpg
Transferring ./train/cat.9480.jpg to ./val/cat.9480.jpg
Transferring ./train/cat.12014.jpg to ./val/cat.12014.jpg
Transferring ./train/cat.8831.jpg to ./val/cat.8831.jpg
Transferring ./train/cat.131.jpg to ./val/cat.131.jpg
Transferring ./train/cat.3888.jpg to ./val/cat.3888.jpg
Transferring ./train/cat.10998.jpg to ./val/cat.10998.jpg
Transferring ./train/dog.1349.jpg to ./val/dog.1349.jpg
Transferring ./train/cat.8280.jpg to ./val/cat.8280.jpg
Transferring ./train/cat.3170.jpg to ./val/cat.3170.jpg
Transferring ./train/cat.3831.jpg to ./val/cat.3831.jpg
Transferring ./train/cat.11917.jpg to ./val/cat.11917.jpg
Transferring ./train/cat.9138.jpg to ./val/cat.9138.jpg
Transferring ./train/cat.5839.jpg to ./val/cat.5839.jpg
Transferring ./train/cat.840.jpg to ./val/cat.840.jpg
Transferring ./train/cat.6863.jpg to ./val/cat.6863.jpg
Transferring ./train/cat.8208.jpg to ./val/cat.8208.jpg
Transferring ./train/cat.11736.jpg to ./val/cat.11736.jpg
Transferring ./train/dog.10407.jpg to ./val/dog.10407.jpg
```

```
Transferring ./train/cat.10586.jpg to ./val/cat.10586.jpg
Transferring ./train/cat.11552.jpg to ./val/cat.11552.jpg
Transferring ./train/cat.12418.jpg to ./val/cat.12418.jpg
Transferring ./train/dog.1960.jpg to ./val/dog.1960.jpg
Transferring ./train/cat.6360.jpg to ./val/cat.6360.jpg
Transferring ./train/dog.336.jpg to ./val/dog.336.jpg
Transferring ./train/dog.6057.jpg to ./val/dog.6057.jpg
Transferring ./train/cat.10775.jpg to ./val/cat.10775.jpg
Transferring ./train/cat.8652.jpg to ./val/cat.8652.jpg
Transferring ./train/dog.1658.jpg to ./val/dog.1658.jpg
Transferring ./train/dog.10895.jpg to ./val/dog.10895.jpg
Transferring ./train/dog.4487.jpg to ./val/dog.4487.jpg
Transferring ./train/dog.11694.jpg to ./val/dog.11694.jpg
Transferring ./train/dog.1367.jpg to ./val/dog.1367.jpg
Transferring ./train/cat.8010.jpg to ./val/cat.8010.jpg
Transferring ./train/dog.8008.jpg to ./val/dog.8008.jpg
Transferring ./train/cat.5916.jpg to ./val/cat.5916.jpg
Transferring ./train/cat.4770.jpg to ./val/cat.4770.jpg
Transferring ./train/dog.7278.jpg to ./val/dog.7278.jpg
Transferring ./train/dog.8849.jpg to ./val/dog.8849.jpg
Transferring ./train/cat.5458.jpg to ./val/cat.5458.jpg
Transferring ./train/cat.9862.jpg to ./val/cat.9862.jpg
Transferring ./train/dog.8011.jpg to ./val/dog.8011.jpg
Transferring ./train/dog.10413.jpg to ./val/dog.10413.jpg
Transferring ./train/dog.6099.jpg to ./val/dog.6099.jpg
Transferring ./train/cat.10032.jpg to ./val/cat.10032.jpg
Transferring ./train/dog.3768.jpg to ./val/dog.3768.jpg
Transferring ./train/cat.12069.jpg to ./val/cat.12069.jpg
Transferring ./train/dog.2799.jpg to ./val/dog.2799.jpg
Transferring ./train/cat.9298.jpg to ./val/cat.9298.jpg
Transferring ./train/dog.6122.jpg to ./val/dog.6122.jpg
Transferring ./train/cat.10801.jpg to ./val/cat.10801.jpg
Transferring ./train/dog.10641.jpg to ./val/dog.10641.jpg
Transferring ./train/dog.9347.jpg to ./val/dog.9347.jpg
Transferring ./train/dog.2381.jpg to ./val/dog.2381.jpg
Transferring ./train/dog.8340.jpg to ./val/dog.8340.jpg
Transferring ./train/cat.12338.jpg to ./val/cat.12338.jpg
Transferring ./train/cat.11847.jpg to ./val/cat.11847.jpg
Transferring ./train/cat.6140.jpg to ./val/cat.6140.jpg
Transferring ./train/cat.7203.jpg to ./val/cat.7203.jpg
Transferring ./train/dog.2640.jpg to ./val/dog.2640.jpg
Transferring ./train/dog.2504.jpg to ./val/dog.2504.jpg
Transferring ./train/dog.8949.jpg to ./val/dog.8949.jpg
Transferring ./train/cat.4961.jpg to ./val/cat.4961.jpg
Transferring ./train/cat.6183.jpg to ./val/cat.6183.jpg
Transferring ./train/dog.1907.jpg to ./val/dog.1907.jpg
Transferring ./train/cat.3745.jpg to ./val/cat.3745.jpg
Transferring ./train/cat.5284.jpg to ./val/cat.5284.jpg
Transferring ./train/cat.10390.jpg to ./val/cat.10390.jpg
Transferring ./train/cat.11477.jpg to ./val/cat.11477.jpg
Transferring ./train/dog.11829.jpg to ./val/dog.11829.jpg
Transferring ./train/cat.11650.jpg to ./val/cat.11650.jpg
Transferring ./train/cat.3008.jpg to ./val/cat.3008.jpg
Transferring ./train/cat.11807.jpg to ./val/cat.11807.jpg
```

```
Transferring ./train/dog.10048.jpg to ./val/dog.10048.jpg
Transferring ./train/dog.12305.jpg to ./val/dog.12305.jpg
Transferring ./train/cat.5018.jpg to ./val/cat.5018.jpg
Transferring ./train/cat.10070.jpg to ./val/cat.10070.jpg
Transferring ./train/dog.4699.jpg to ./val/dog.4699.jpg
Transferring ./train/dog.11584.jpg to ./val/dog.11584.jpg
Transferring ./train/cat.8123.jpg to ./val/cat.8123.jpg
Transferring ./train/cat.7563.jpg to ./val/cat.7563.jpg
Transferring ./train/dog.4851.jpg to ./val/dog.4851.jpg
Transferring ./train/dog.10340.jpg to ./val/dog.10340.jpg
Transferring ./train/cat.2505.jpg to ./val/cat.2505.jpg
Transferring ./train/cat.5241.jpg to ./val/cat.5241.jpg
Transferring ./train/dog.6115.jpg to ./val/dog.6115.jpg
Transferring ./train/cat.4172.jpg to ./val/cat.4172.jpg
Transferring ./train/dog.467.jpg to ./val/dog.467.jpg
Transferring ./train/cat.6271.jpg to ./val/cat.6271.jpg
Transferring ./train/cat.8641.jpg to ./val/cat.8641.jpg
Transferring ./train/dog.8691.jpg to ./val/dog.8691.jpg
Transferring ./train/cat.7449.jpg to ./val/cat.7449.jpg
Transferring ./train/cat.7991.jpg to ./val/cat.7991.jpg
Transferring ./train/cat.1870.jpg to ./val/cat.1870.jpg
Transferring ./train/dog.10093.jpg to ./val/dog.10093.jpg
Transferring ./train/dog.6048.jpg to ./val/dog.6048.jpg
Transferring ./train/dog.1995.jpg to ./val/dog.1995.jpg
Transferring ./train/cat.12052.jpg to ./val/cat.12052.jpg
Transferring ./train/cat.11518.jpg to ./val/cat.11518.jpg
Transferring ./train/dog.8198.jpg to ./val/dog.8198.jpg
Transferring ./train/cat.11961.jpg to ./val/cat.11961.jpg
Transferring ./train/dog.9881.jpg to ./val/dog.9881.jpg
Transferring ./train/cat.9625.jpg to ./val/cat.9625.jpg
Transferring ./train/dog.7217.jpg to ./val/dog.7217.jpg
Transferring ./train/cat.10651.jpg to ./val/cat.10651.jpg
Transferring ./train/dog.4128.jpg to ./val/dog.4128.jpg
Transferring ./train/dog.5488.jpg to ./val/dog.5488.jpg
Transferring ./train/dog.3636.jpg to ./val/dog.3636.jpg
Transferring ./train/dog.7551.jpg to ./val/dog.7551.jpg
Transferring ./train/cat.183.jpg to ./val/cat.183.jpg
Transferring ./train/cat.3044.jpg to ./val/cat.3044.jpg
Transferring ./train/dog.6128.jpg to ./val/dog.6128.jpg
Transferring ./train/dog.11764.jpg to ./val/dog.11764.jpg
Transferring ./train/cat.8742.jpg to ./val/cat.8742.jpg
Transferring ./train/cat.1859.jpg to ./val/cat.1859.jpg
Transferring ./train/dog.7628.jpg to ./val/dog.7628.jpg
Transferring ./train/dog.1309.jpg to ./val/dog.1309.jpg
Transferring ./train/dog.11715.jpg to ./val/dog.11715.jpg
Transferring ./train/cat.4974.jpg to ./val/cat.4974.jpg
Transferring ./train/dog.8479.jpg to ./val/dog.8479.jpg
Transferring ./train/cat.11690.jpg to ./val/cat.11690.jpg
Transferring ./train/dog.3249.jpg to ./val/dog.3249.jpg
Transferring ./train/cat.4191.jpg to ./val/cat.4191.jpg
Transferring ./train/cat.11612.jpg to ./val/cat.11612.jpg
Transferring ./train/dog.1246.jpg to ./val/dog.1246.jpg
Transferring ./train/cat.3500.jpg to ./val/cat.3500.jpg
Transferring ./train/cat.11565.jpg to ./val/cat.11565.jpg
```

```
Transferring ./train/cat.7156.jpg to ./val/cat.7156.jpg
Transferring ./train/dog.3195.jpg to ./val/dog.3195.jpg
Transferring ./train/cat.10661.jpg to ./val/cat.10661.jpg
Transferring ./train/dog.5267.jpg to ./val/dog.5267.jpg
Transferring ./train/dog.1545.jpg to ./val/dog.1545.jpg
Transferring ./train/dog.8838.jpg to ./val/dog.8838.jpg
Transferring ./train/cat.7476.jpg to ./val/cat.7476.jpg
Transferring ./train/dog.12020.jpg to ./val/dog.12020.jpg
Transferring ./train/dog.506.jpg to ./val/dog.506.jpg
Transferring ./train/cat.3998.jpg to ./val/cat.3998.jpg
Transferring ./train/dog.7399.jpg to ./val/dog.7399.jpg
Transferring ./train/dog.11878.jpg to ./val/dog.11878.jpg
Transferring ./train/cat.9630.jpg to ./val/cat.9630.jpg
Transferring ./train/cat.10708.jpg to ./val/cat.10708.jpg
Transferring ./train/cat.1090.jpg to ./val/cat.1090.jpg
Transferring ./train/dog.9778.jpg to ./val/dog.9778.jpg
Transferring ./train/dog.9082.jpg to ./val/dog.9082.jpg
Transferring ./train/cat.6448.jpg to ./val/cat.6448.jpg
Transferring ./train/dog.7285.jpg to ./val/dog.7285.jpg
Transferring ./train/dog.5466.jpg to ./val/dog.5466.jpg
Transferring ./train/dog.4474.jpg to ./val/dog.4474.jpg
Transferring ./train/dog.6509.jpg to ./val/dog.6509.jpg
Transferring ./train/cat.11066.jpg to ./val/cat.11066.jpg
Transferring ./train/cat.6942.jpg to ./val/cat.6942.jpg
Transferring ./train/dog.8900.jpg to ./val/dog.8900.jpg
Transferring ./train/cat.8465.jpg to ./val/cat.8465.jpg
Transferring ./train/dog.12358.jpg to ./val/dog.12358.jpg
Transferring ./train/cat.6370.jpg to ./val/cat.6370.jpg
Transferring ./train/cat.9902.jpg to ./val/cat.9902.jpg
Transferring ./train/cat.8188.jpg to ./val/cat.8188.jpg
Transferring ./train/dog.2986.jpg to ./val/dog.2986.jpg
Transferring ./train/cat.12483.jpg to ./val/cat.12483.jpg
Transferring ./train/dog.3759.jpg to ./val/dog.3759.jpg
Transferring ./train/dog.3213.jpg to ./val/dog.3213.jpg
Transferring ./train/cat.10372.jpg to ./val/cat.10372.jpg
Transferring ./train/cat.12477.jpg to ./val/cat.12477.jpg
Transferring ./train/dog.10636.jpg to ./val/dog.10636.jpg
Transferring ./train/cat.11475.jpg to ./val/cat.11475.jpg
Transferring ./train/cat.6527.jpg to ./val/cat.6527.jpg
Transferring ./train/cat.2676.jpg to ./val/cat.2676.jpg
Transferring ./train/cat.3233.jpg to ./val/cat.3233.jpg
Transferring ./train/cat.2181.jpg to ./val/cat.2181.jpg
Transferring ./train/cat.1533.jpg to ./val/cat.1533.jpg
Transferring ./train/cat.12176.jpg to ./val/cat.12176.jpg
Transferring ./train/dog.218.jpg to ./val/dog.218.jpg
Transferring ./train/dog.5045.jpg to ./val/dog.5045.jpg
Transferring ./train/dog.5216.jpg to ./val/dog.5216.jpg
Transferring ./train/dog.6641.jpg to ./val/dog.6641.jpg
Transferring ./train/dog.2115.jpg to ./val/dog.2115.jpg
Transferring ./train/cat.1341.jpg to ./val/cat.1341.jpg
Transferring ./train/dog.7852.jpg to ./val/dog.7852.jpg
Transferring ./train/cat.6836.jpg to ./val/cat.6836.jpg
Transferring ./train/cat.3218.jpg to ./val/cat.3218.jpg
Transferring ./train/cat.11436.jpg to ./val/cat.11436.jpg
```

```
Transferring ./train/cat.6325.jpg to ./val/cat.6325.jpg
Transferring ./train/dog.9361.jpg to ./val/dog.9361.jpg
Transferring ./train/cat.9087.jpg to ./val/cat.9087.jpg
Transferring ./train/dog.883.jpg to ./val/dog.883.jpg
Transferring ./train/cat.2048.jpg to ./val/cat.2048.jpg
Transferring ./train/dog.861.jpg to ./val/dog.861.jpg
Transferring ./train/cat.8586.jpg to ./val/cat.8586.jpg
Transferring ./train/dog.9953.jpg to ./val/dog.9953.jpg
Transferring ./train/dog.8634.jpg to ./val/dog.8634.jpg
Transferring ./train/cat.4722.jpg to ./val/cat.4722.jpg
Transferring ./train/dog.8466.jpg to ./val/dog.8466.jpg
Transferring ./train/dog.7982.jpg to ./val/dog.7982.jpg
Transferring ./train/dog.5770.jpg to ./val/dog.5770.jpg
Transferring ./train/cat.1873.jpg to ./val/cat.1873.jpg
Transferring ./train/dog.3088.jpg to ./val/dog.3088.jpg
Transferring ./train/dog.6836.jpg to ./val/dog.6836.jpg
Transferring ./train/dog.7828.jpg to ./val/dog.7828.jpg
Transferring ./train/dog.11613.jpg to ./val/dog.11613.jpg
Transferring ./train/dog.11001.jpg to ./val/dog.11001.jpg
Transferring ./train/dog.12126.jpg to ./val/dog.12126.jpg
Transferring ./train/cat.7100.jpg to ./val/cat.7100.jpg
Transferring ./train/cat.12087.jpg to ./val/cat.12087.jpg
Transferring ./train/dog.8127.jpg to ./val/dog.8127.jpg
Transferring ./train/dog.10160.jpg to ./val/dog.10160.jpg
Transferring ./train/dog.9494.jpg to ./val/dog.9494.jpg
Transferring ./train/cat.526.jpg to ./val/cat.526.jpg
Transferring ./train/cat.10821.jpg to ./val/cat.10821.jpg
Transferring ./train/cat.2466.jpg to ./val/cat.2466.jpg
Transferring ./train/dog.10755.jpg to ./val/dog.10755.jpg
Transferring ./train/cat.7308.jpg to ./val/cat.7308.jpg
Transferring ./train/dog.4080.jpg to ./val/dog.4080.jpg
Transferring ./train/cat.155.jpg to ./val/cat.155.jpg
Transferring ./train/dog.12105.jpg to ./val/dog.12105.jpg
Transferring ./train/dog.9804.jpg to ./val/dog.9804.jpg
Transferring ./train/dog.5671.jpg to ./val/dog.5671.jpg
Transferring ./train/dog.8745.jpg to ./val/dog.8745.jpg
Transferring ./train/dog.752.jpg to ./val/dog.752.jpg
Transferring ./train/dog.3549.jpg to ./val/dog.3549.jpg
Transferring ./train/cat.11791.jpg to ./val/cat.11791.jpg
Transferring ./train/dog.4307.jpg to ./val/dog.4307.jpg
Transferring ./train/dog.2990.jpg to ./val/dog.2990.jpg
Transferring ./train/dog.1898.jpg to ./val/dog.1898.jpg
Transferring ./train/dog.9470.jpg to ./val/dog.9470.jpg
Transferring ./train/dog.12098.jpg to ./val/dog.12098.jpg
Transferring ./train/cat.4533.jpg to ./val/cat.4533.jpg
Transferring ./train/cat.1230.jpg to ./val/cat.1230.jpg
Transferring ./train/dog.4632.jpg to ./val/dog.4632.jpg
Transferring ./train/dog.3050.jpg to ./val/dog.3050.jpg
Transferring ./train/cat.3443.jpg to ./val/cat.3443.jpg
Transferring ./train/cat.6358.jpg to ./val/cat.6358.jpg
Transferring ./train/cat.11323.jpg to ./val/cat.11323.jpg
Transferring ./train/dog.4037.jpg to ./val/dog.4037.jpg
Transferring ./train/cat.10132.jpg to ./val/cat.10132.jpg
Transferring ./train/cat.6074.jpg to ./val/cat.6074.jpg
```

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Transferring ./train/dog.6036.jpg to ./val/dog.6036.jpg
Transferring ./train/cat.4758.jpg to ./val/cat.4758.jpg
Transferring ./train/cat.9172.jpg to ./val/cat.9172.jpg
Transferring ./train/dog.8448.jpg to ./val/dog.8448.jpg
Transferring ./train/dog.6173.jpg to ./val/dog.6173.jpg
Transferring ./train/cat.4654.jpg to ./val/cat.4654.jpg
Transferring ./train/dog.6534.jpg to ./val/dog.6534.jpg
Transferring ./train/cat.7106.jpg to ./val/cat.7106.jpg
Transferring ./train/dog.7609.jpg to ./val/dog.7609.jpg
Transferring ./train/dog.11622.jpg to ./val/dog.11622.jpg
Transferring ./train/cat.9684.jpg to ./val/cat.9684.jpg
Transferring ./train/dog.2118.jpg to ./val/dog.2118.jpg
Transferring ./train/dog.11523.jpg to ./val/dog.11523.jpg
Transferring ./train/dog.10324.jpg to ./val/dog.10324.jpg
Transferring ./train/dog.4981.jpg to ./val/dog.4981.jpg
Transferring ./train/dog.3832.jpg to ./val/dog.3832.jpg
Transferring ./train/cat.12333.jpg to ./val/cat.12333.jpg
Transferring ./train/dog.1231.jpg to ./val/dog.1231.jpg
Transferring ./train/cat.9700.jpg to ./val/cat.9700.jpg
Transferring ./train/cat.12129.jpg to ./val/cat.12129.jpg
Transferring ./train/cat.3487.jpg to ./val/cat.3487.jpg
Transferring ./train/dog.12387.jpg to ./val/dog.12387.jpg
Transferring ./train/dog.11928.jpg to ./val/dog.11928.jpg
Transferring ./train/dog.10769.jpg to ./val/dog.10769.jpg
Transferring ./train/dog.2752.jpg to ./val/dog.2752.jpg
Transferring ./train/dog.6814.jpg to ./val/dog.6814.jpg
Transferring ./train/dog.7972.jpg to ./val/dog.7972.jpg
Transferring ./train/cat.7355.jpg to ./val/cat.7355.jpg
Transferring ./train/dog.1634.jpg to ./val/dog.1634.jpg
Transferring ./train/dog.3746.jpg to ./val/dog.3746.jpg
Transferring ./train/cat.7418.jpg to ./val/cat.7418.jpg
Transferring ./train/cat.10783.jpg to ./val/cat.10783.jpg
Transferring ./train/dog.1416.jpg to ./val/dog.1416.jpg
Transferring ./train/cat.6022.jpg to ./val/cat.6022.jpg
Transferring ./train/cat.3789.jpg to ./val/cat.3789.jpg
Transferring ./train/dog.1910.jpg to ./val/dog.1910.jpg
Transferring ./train/cat.10670.jpg to ./val/cat.10670.jpg
Transferring ./train/dog.8690.jpg to ./val/dog.8690.jpg
Transferring ./train/dog.6011.jpg to ./val/dog.6011.jpg
Transferring ./train/cat.5503.jpg to ./val/cat.5503.jpg
Transferring ./train/dog.11055.jpg to ./val/dog.11055.jpg
Transferring ./train/cat.5260.jpg to ./val/cat.5260.jpg
Transferring ./train/dog.2424.jpg to ./val/dog.2424.jpg
Transferring ./train/cat.12237.jpg to ./val/cat.12237.jpg
Transferring ./train/dog.8947.jpg to ./val/dog.8947.jpg
Transferring ./train/cat.6944.jpg to ./val/cat.6944.jpg
Transferring ./train/cat.2257.jpg to ./val/cat.2257.jpg
Transferring ./train/cat.8611.jpg to ./val/cat.8611.jpg
Transferring ./train/dog.11813.jpg to ./val/dog.11813.jpg
Transferring ./train/dog.2006.jpg to ./val/dog.2006.jpg
Transferring ./train/dog.8596.jpg to ./val/dog.8596.jpg
Transferring ./train/dog.1201.jpg to ./val/dog.1201.jpg
Transferring ./train/cat.4499.jpg to ./val/cat.4499.jpg
Transferring ./train/cat.6294.jpg to ./val/cat.6294.jpg
```

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Transferring ./train/cat.6615.jpg to ./val/cat.6615.jpg
Transferring ./train/dog.7995.jpg to ./val/dog.7995.jpg
Transferring ./train/dog.12248.jpg to ./val/dog.12248.jpg
Transferring ./train/dog.6730.jpg to ./val/dog.6730.jpg
Transferring ./train/cat.11939.jpg to ./val/cat.11939.jpg
Transferring ./train/cat.3649.jpg to ./val/cat.3649.jpg
Transferring ./train/cat.6032.jpg to ./val/cat.6032.jpg
Transferring ./train/dog.11050.jpg to ./val/dog.11050.jpg
Transferring ./train/dog.6186.jpg to ./val/dog.6186.jpg
Transferring ./train/dog.4457.jpg to ./val/dog.4457.jpg
Transferring ./train/cat.1789.jpg to ./val/cat.1789.jpg
Transferring ./train/cat.3843.jpg to ./val/cat.3843.jpg
Transferring ./train/cat.4531.jpg to ./val/cat.4531.jpg
Transferring ./train/dog.10727.jpg to ./val/dog.10727.jpg
Transferring ./train/cat.7976.jpg to ./val/cat.7976.jpg
Transferring ./train/cat.6892.jpg to ./val/cat.6892.jpg
Transferring ./train/dog.12087.jpg to ./val/dog.12087.jpg
Transferring ./train/cat.5914.jpg to ./val/cat.5914.jpg
Transferring ./train/dog.1110.jpg to ./val/dog.1110.jpg
Transferring ./train/dog.10722.jpg to ./val/dog.10722.jpg
Transferring ./train/dog.2726.jpg to ./val/dog.2726.jpg
Transferring ./train/cat.3478.jpg to ./val/cat.3478.jpg
Transferring ./train/dog.12221.jpg to ./val/dog.12221.jpg
Transferring ./train/cat.10006.jpg to ./val/cat.10006.jpg
Transferring ./train/cat.1170.jpg to ./val/cat.1170.jpg
Transferring ./train/dog.1686.jpg to ./val/dog.1686.jpg
Transferring ./train/dog.384.jpg to ./val/dog.384.jpg
Transferring ./train/dog.10661.jpg to ./val/dog.10661.jpg
Transferring ./train/cat.656.jpg to ./val/cat.656.jpg
Transferring ./train/dog.6875.jpg to ./val/dog.6875.jpg
Transferring ./train/cat.485.jpg to ./val/cat.485.jpg
Transferring ./train/cat.4781.jpg to ./val/cat.4781.jpg
Transferring ./train/cat.9966.jpg to ./val/cat.9966.jpg
Transferring ./train/cat.8879.jpg to ./val/cat.8879.jpg
Transferring ./train/dog.8862.jpg to ./val/dog.8862.jpg
Transferring ./train/dog.6255.jpg to ./val/dog.6255.jpg
Transferring ./train/cat.1448.jpg to ./val/cat.1448.jpg
Transferring ./train/dog.10772.jpg to ./val/dog.10772.jpg
Transferring ./train/cat.7792.jpg to ./val/cat.7792.jpg
Transferring ./train/cat.1207.jpg to ./val/cat.1207.jpg
Transferring ./train/cat.11459.jpg to ./val/cat.11459.jpg
Transferring ./train/dog.1683.jpg to ./val/dog.1683.jpg
Transferring ./train/cat.5625.jpg to ./val/cat.5625.jpg
Transferring ./train/dog.8341.jpg to ./val/dog.8341.jpg
Transferring ./train/dog.6533.jpg to ./val/dog.6533.jpg
Transferring ./train/cat.2935.jpg to ./val/cat.2935.jpg
Transferring ./train/cat.3596.jpg to ./val/cat.3596.jpg
Transferring ./train/cat.6182.jpg to ./val/cat.6182.jpg
Transferring ./train/cat.2403.jpg to ./val/cat.2403.jpg
Transferring ./train/dog.10774.jpg to ./val/dog.10774.jpg
Transferring ./train/dog.10238.jpg to ./val/dog.10238.jpg
Transferring ./train/dog.4165.jpg to ./val/dog.4165.jpg
Transferring ./train/dog.1320.jpg to ./val/dog.1320.jpg
Transferring ./train/cat.10620.jpg to ./val/cat.10620.jpg
```

```
Transferring ./train/cat.10101.jpg to ./val/cat.10101.jpg
Transferring ./train/cat.8655.jpg to ./val/cat.8655.jpg
Transferring ./train/cat.7768.jpg to ./val/cat.7768.jpg
Transferring ./train/cat.7050.jpg to ./val/cat.7050.jpg
Transferring ./train/cat.8.jpg to ./val/cat.8.jpg
Transferring ./train/dog.3682.jpg to ./val/dog.3682.jpg
Transferring ./train/cat.3999.jpg to ./val/cat.3999.jpg
Transferring ./train/dog.104.jpg to ./val/dog.104.jpg
Transferring ./train/cat.5439.jpg to ./val/cat.5439.jpg
Transferring ./train/dog.11680.jpg to ./val/dog.11680.jpg
Transferring ./train/dog.10405.jpg to ./val/dog.10405.jpg
Transferring ./train/cat.7133.jpg to ./val/cat.7133.jpg
Transferring ./train/cat.7929.jpg to ./val/cat.7929.jpg
Transferring ./train/cat.4583.jpg to ./val/cat.4583.jpg
Transferring ./train/dog.7915.jpg to ./val/dog.7915.jpg
Transferring ./train/dog.10918.jpg to ./val/dog.10918.jpg
Transferring ./train/cat.9811.jpg to ./val/cat.9811.jpg
Transferring ./train/cat.3686.jpg to ./val/cat.3686.jpg
Transferring ./train/cat.3480.jpg to ./val/cat.3480.jpg
Transferring ./train/dog.3132.jpg to ./val/dog.3132.jpg
Transferring ./train/dog.3157.jpg to ./val/dog.3157.jpg
Transferring ./train/cat.7614.jpg to ./val/cat.7614.jpg
Transferring ./train/cat.5017.jpg to ./val/cat.5017.jpg
Transferring ./train/cat.1379.jpg to ./val/cat.1379.jpg
Transferring ./train/cat.9906.jpg to ./val/cat.9906.jpg
Transferring ./train/dog.9123.jpg to ./val/dog.9123.jpg
Transferring ./train/dog.1482.jpg to ./val/dog.1482.jpg
Transferring ./train/dog.8642.jpg to ./val/dog.8642.jpg
Transferring ./train/cat.847.jpg to ./val/cat.847.jpg
Transferring ./train/dog.4161.jpg to ./val/dog.4161.jpg
Transferring ./train/dog.7519.jpg to ./val/dog.7519.jpg
Transferring ./train/cat.7261.jpg to ./val/cat.7261.jpg
Transferring ./train/cat.4066.jpg to ./val/cat.4066.jpg
Transferring ./train/cat.8792.jpg to ./val/cat.8792.jpg
Transferring ./train/dog.2934.jpg to ./val/dog.2934.jpg
Transferring ./train/dog.8546.jpg to ./val/dog.8546.jpg
Transferring ./train/cat.11517.jpg to ./val/cat.11517.jpg
Transferring ./train/dog.1304.jpg to ./val/dog.1304.jpg
Transferring ./train/cat.4229.jpg to ./val/cat.4229.jpg
Transferring ./train/cat.3419.jpg to ./val/cat.3419.jpg
Transferring ./train/dog.5107.jpg to ./val/dog.5107.jpg
Transferring ./train/dog.57.jpg to ./val/dog.57.jpg
Transferring ./train/cat.613.jpg to ./val/cat.613.jpg
Transferring ./train/cat.5193.jpg to ./val/cat.5193.jpg
Transferring ./train/dog.737.jpg to ./val/dog.737.jpg
Transferring ./train/cat.7812.jpg to ./val/cat.7812.jpg
Transferring ./train/cat.11809.jpg to ./val/cat.11809.jpg
Transferring ./train/cat.6927.jpg to ./val/cat.6927.jpg
Transferring ./train/dog.2200.jpg to ./val/dog.2200.jpg
Transferring ./train/dog.8824.jpg to ./val/dog.8824.jpg
Transferring ./train/cat.5143.jpg to ./val/cat.5143.jpg
Transferring ./train/dog.10880.jpg to ./val/dog.10880.jpg
Transferring ./train/dog.4568.jpg to ./val/dog.4568.jpg
Transferring ./train/cat.3386.jpg to ./val/cat.3386.jpg
```

```
Transferring ./train/dog.4841.jpg to ./val/dog.4841.jpg
Transferring ./train/dog.9842.jpg to ./val/dog.9842.jpg
Transferring ./train/cat.2379.jpg to ./val/cat.2379.jpg
Transferring ./train/dog.11539.jpg to ./val/dog.11539.jpg
Transferring ./train/cat.1358.jpg to ./val/cat.1358.jpg
Transferring ./train/cat.9570.jpg to ./val/cat.9570.jpg
Transferring ./train/cat.7437.jpg to ./val/cat.7437.jpg
Transferring ./train/dog.333.jpg to ./val/dog.333.jpg
Transferring ./train/cat.6261.jpg to ./val/cat.6261.jpg
Transferring ./train/cat.6988.jpg to ./val/cat.6988.jpg
Transferring ./train/dog.838.jpg to ./val/dog.838.jpg
Transferring ./train/dog.8276.jpg to ./val/dog.8276.jpg
Transferring ./train/cat.11351.jpg to ./val/cat.11351.jpg
Transferring ./train/cat.11206.jpg to ./val/cat.11206.jpg
Transferring ./train/cat.5447.jpg to ./val/cat.5447.jpg
Transferring ./train/cat.3627.jpg to ./val/cat.3627.jpg
Transferring ./train/dog.11204.jpg to ./val/dog.11204.jpg
Transferring ./train/dog.1606.jpg to ./val/dog.1606.jpg
Transferring ./train/dog.5509.jpg to ./val/dog.5509.jpg
Transferring ./train/dog.1853.jpg to ./val/dog.1853.jpg
Transferring ./train/cat.9231.jpg to ./val/cat.9231.jpg
Transferring ./train/cat.4000.jpg to ./val/cat.4000.jpg
Transferring ./train/dog.6027.jpg to ./val/dog.6027.jpg
Transferring ./train/cat.5119.jpg to ./val/cat.5119.jpg
Transferring ./train/cat.7745.jpg to ./val/cat.7745.jpg
Transferring ./train/cat.10953.jpg to ./val/cat.10953.jpg
Transferring ./train/dog.9245.jpg to ./val/dog.9245.jpg
Transferring ./train/cat.9471.jpg to ./val/cat.9471.jpg
Transferring ./train/cat.5641.jpg to ./val/cat.5641.jpg
Transferring ./train/cat.8159.jpg to ./val/cat.8159.jpg
Transferring ./train/dog.3021.jpg to ./val/dog.3021.jpg
Transferring ./train/dog.42.jpg to ./val/dog.42.jpg
Transferring ./train/dog.3618.jpg to ./val/dog.3618.jpg
Transferring ./train/cat.2658.jpg to ./val/cat.2658.jpg
Transferring ./train/cat.6672.jpg to ./val/cat.6672.jpg
Transferring ./train/dog.10392.jpg to ./val/dog.10392.jpg
Transferring ./train/dog.9528.jpg to ./val/dog.9528.jpg
Transferring ./train/dog.1986.jpg to ./val/dog.1986.jpg
Transferring ./train/cat.8463.jpg to ./val/cat.8463.jpg
Transferring ./train/dog.12328.jpg to ./val/dog.12328.jpg
Transferring ./train/dog.731.jpg to ./val/dog.731.jpg
Transferring ./train/dog.7229.jpg to ./val/dog.7229.jpg
Transferring ./train/dog.4333.jpg to ./val/dog.4333.jpg
Transferring ./train/cat.9044.jpg to ./val/cat.9044.jpg
Transferring ./train/cat.10781.jpg to ./val/cat.10781.jpg
Transferring ./train/cat.11414.jpg to ./val/cat.11414.jpg
Transferring ./train/cat.9247.jpg to ./val/cat.9247.jpg
Transferring ./train/cat.1699.jpg to ./val/cat.1699.jpg
Transferring ./train/cat.11836.jpg to ./val/cat.11836.jpg
Transferring ./train/cat.4675.jpg to ./val/cat.4675.jpg
Transferring ./train/cat.11196.jpg to ./val/cat.11196.jpg
Transferring ./train/cat.8349.jpg to ./val/cat.8349.jpg
Transferring ./train/dog.6410.jpg to ./val/dog.6410.jpg
Transferring ./train/dog.1505.jpg to ./val/dog.1505.jpg
```

```
Transferring ./train/cat.519.jpg to ./val/cat.519.jpg
Transferring ./train/dog.9625.jpg to ./val/dog.9625.jpg
Transferring ./train/cat.8281.jpg to ./val/cat.8281.jpg
Transferring ./train/cat.12305.jpg to ./val/cat.12305.jpg
Transferring ./train/dog.3390.jpg to ./val/dog.3390.jpg
Transferring ./train/cat.11680.jpg to ./val/cat.11680.jpg
Transferring ./train/dog.5277.jpg to ./val/dog.5277.jpg
Transferring ./train/cat.12256.jpg to ./val/cat.12256.jpg
Transferring ./train/dog.4647.jpg to ./val/dog.4647.jpg
Transferring ./train/dog.7251.jpg to ./val/dog.7251.jpg
Transferring ./train/cat.2510.jpg to ./val/cat.2510.jpg
Transferring ./train/cat.5660.jpg to ./val/cat.5660.jpg
Transferring ./train/dog.5547.jpg to ./val/dog.5547.jpg
Transferring ./train/dog.68.jpg to ./val/dog.68.jpg
Transferring ./train/dog.11956.jpg to ./val/dog.11956.jpg
Transferring ./train/cat.8206.jpg to ./val/cat.8206.jpg
Transferring ./train/cat.3144.jpg to ./val/cat.3144.jpg
Transferring ./train/cat.248.jpg to ./val/cat.248.jpg
Transferring ./train/cat.1872.jpg to ./val/cat.1872.jpg
Transferring ./train/cat.2787.jpg to ./val/cat.2787.jpg
Transferring ./train/cat.5025.jpg to ./val/cat.5025.jpg
Transferring ./train/cat.6128.jpg to ./val/cat.6128.jpg
Transferring ./train/dog.9522.jpg to ./val/dog.9522.jpg
Transferring ./train/cat.1193.jpg to ./val/cat.1193.jpg
Transferring ./train/dog.12085.jpg to ./val/dog.12085.jpg
Transferring ./train/cat.8956.jpg to ./val/cat.8956.jpg
Transferring ./train/dog.4499.jpg to ./val/dog.4499.jpg
Transferring ./train/cat.11190.jpg to ./val/cat.11190.jpg
Transferring ./train/dog.12381.jpg to ./val/dog.12381.jpg
Transferring ./train/dog.3223.jpg to ./val/dog.3223.jpg
Transferring ./train/dog.7913.jpg to ./val/dog.7913.jpg
Transferring ./train/dog.5196.jpg to ./val/dog.5196.jpg
Transferring ./train/dog.6016.jpg to ./val/dog.6016.jpg
Transferring ./train/cat.11746.jpg to ./val/cat.11746.jpg
Transferring ./train/dog.6469.jpg to ./val/dog.6469.jpg
Transferring ./train/dog.10673.jpg to ./val/dog.10673.jpg
Transferring ./train/cat.9947.jpg to ./val/cat.9947.jpg
Transferring ./train/dog.10881.jpg to ./val/dog.10881.jpg
Transferring ./train/dog.8092.jpg to ./val/dog.8092.jpg
Transferring ./train/dog.3140.jpg to ./val/dog.3140.jpg
Transferring ./train/cat.7483.jpg to ./val/cat.7483.jpg
Transferring ./train/cat.12460.jpg to ./val/cat.12460.jpg
Transferring ./train/dog.1342.jpg to ./val/dog.1342.jpg
Transferring ./train/cat.3225.jpg to ./val/cat.3225.jpg
Transferring ./train/dog.968.jpg to ./val/dog.968.jpg
Transferring ./train/dog.3040.jpg to ./val/dog.3040.jpg
Transferring ./train/cat.1561.jpg to ./val/cat.1561.jpg
Transferring ./train/dog.5507.jpg to ./val/dog.5507.jpg
Transferring ./train/dog.492.jpg to ./val/dog.492.jpg
Transferring ./train/cat.5302.jpg to ./val/cat.5302.jpg
Transferring ./train/cat.9117.jpg to ./val/cat.9117.jpg
Transferring ./train/cat.12312.jpg to ./val/cat.12312.jpg
Transferring ./train/dog.7444.jpg to ./val/dog.7444.jpg
Transferring ./train/cat.8621.jpg to ./val/cat.8621.jpg
```

```
Transferring ./train/cat.4653.jpg to ./val/cat.4653.jpg
Transferring ./train/dog.5395.jpg to ./val/dog.5395.jpg
Transferring ./train/cat.7359.jpg to ./val/cat.7359.jpg
Transferring ./train/dog.7944.jpg to ./val/dog.7944.jpg
Transferring ./train/cat.4667.jpg to ./val/cat.4667.jpg
Transferring ./train/dog.5237.jpg to ./val/dog.5237.jpg
Transferring ./train/dog.5306.jpg to ./val/dog.5306.jpg
Transferring ./train/cat.3899.jpg to ./val/cat.3899.jpg
Transferring ./train/dog.1674.jpg to ./val/dog.1674.jpg
Transferring ./train/dog.1018.jpg to ./val/dog.1018.jpg
Transferring ./train/dog.1337.jpg to ./val/dog.1337.jpg
Transferring ./train/dog.257.jpg to ./val/dog.257.jpg
Transferring ./train/cat.6354.jpg to ./val/cat.6354.jpg
Transferring ./train/cat.7658.jpg to ./val/cat.7658.jpg
Transferring ./train/dog.5156.jpg to ./val/dog.5156.jpg
Transferring ./train/dog.2399.jpg to ./val/dog.2399.jpg
Transferring ./train/cat.10973.jpg to ./val/cat.10973.jpg
Transferring ./train/cat.5169.jpg to ./val/cat.5169.jpg
Transferring ./train/cat.1607.jpg to ./val/cat.1607.jpg
Transferring ./train/cat.3689.jpg to ./val/cat.3689.jpg
Transferring ./train/cat.11145.jpg to ./val/cat.11145.jpg
Transferring ./train/cat.6034.jpg to ./val/cat.6034.jpg
Transferring ./train/cat.4789.jpg to ./val/cat.4789.jpg
Transferring ./train/dog.12202.jpg to ./val/dog.12202.jpg
Transferring ./train/cat.6856.jpg to ./val/cat.6856.jpg
Transferring ./train/cat.11645.jpg to ./val/cat.11645.jpg
Transferring ./train/cat.4618.jpg to ./val/cat.4618.jpg
Transferring ./train/dog.9054.jpg to ./val/dog.9054.jpg
Transferring ./train/cat.401.jpg to ./val/cat.401.jpg
Transferring ./train/cat.2988.jpg to ./val/cat.2988.jpg
Transferring ./train/dog.3782.jpg to ./val/dog.3782.jpg
Transferring ./train/cat.1576.jpg to ./val/cat.1576.jpg
Transferring ./train/dog.1594.jpg to ./val/dog.1594.jpg
Transferring ./train/dog.1075.jpg to ./val/dog.1075.jpg
Transferring ./train/dog.4976.jpg to ./val/dog.4976.jpg
Transferring ./train/cat.12266.jpg to ./val/cat.12266.jpg
Transferring ./train/dog.4762.jpg to ./val/dog.4762.jpg
Transferring ./train/cat.2019.jpg to ./val/cat.2019.jpg
Transferring ./train/cat.3580.jpg to ./val/cat.3580.jpg
Transferring ./train/dog.8066.jpg to ./val/dog.8066.jpg
Transferring ./train/cat.10003.jpg to ./val/cat.10003.jpg
Transferring ./train/dog.5946.jpg to ./val/dog.5946.jpg
Transferring ./train/dog.7015.jpg to ./val/dog.7015.jpg
Transferring ./train/dog.10829.jpg to ./val/dog.10829.jpg
Transferring ./train/dog.5273.jpg to ./val/dog.5273.jpg
Transferring ./train/dog.11053.jpg to ./val/dog.11053.jpg
Transferring ./train/dog.7832.jpg to ./val/dog.7832.jpg
Transferring ./train/cat.8524.jpg to ./val/cat.8524.jpg
Transferring ./train/cat.1051.jpg to ./val/cat.1051.jpg
Transferring ./train/cat.2883.jpg to ./val/cat.2883.jpg
Transferring ./train/cat.11128.jpg to ./val/cat.11128.jpg
Transferring ./train/cat.10824.jpg to ./val/cat.10824.jpg
Transferring ./train/cat.113.jpg to ./val/cat.113.jpg
Transferring ./train/cat.6858.jpg to ./val/cat.6858.jpg
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```
Transferring ./train/cat.4406.jpg to ./val/cat.4406.jpg
Transferring ./train/cat.6222.jpg to ./val/cat.6222.jpg
Transferring ./train/cat.4778.jpg to ./val/cat.4778.jpg
Transferring ./train/cat.2920.jpg to ./val/cat.2920.jpg
Transferring ./train/dog.7793.jpg to ./val/dog.7793.jpg
Transferring ./train/cat.12351.jpg to ./val/cat.12351.jpg
Transferring ./train/cat.2502.jpg to ./val/cat.2502.jpg
Transferring ./train/cat.7588.jpg to ./val/cat.7588.jpg
Transferring ./train/cat.5679.jpg to ./val/cat.5679.jpg
Transferring ./train/dog.4438.jpg to ./val/dog.4438.jpg
Transferring ./train/cat.4794.jpg to ./val/cat.4794.jpg
Transferring ./train/cat.5316.jpg to ./val/cat.5316.jpg
Transferring ./train/cat.4428.jpg to ./val/cat.4428.jpg
Transferring ./train/dog.5864.jpg to ./val/dog.5864.jpg
Transferring ./train/cat.2549.jpg to ./val/cat.2549.jpg
Transferring ./train/dog.2852.jpg to ./val/dog.2852.jpg
Transferring ./train/cat.6200.jpg to ./val/cat.6200.jpg
Transferring ./train/cat.6366.jpg to ./val/cat.6366.jpg
Transferring ./train/dog.5763.jpg to ./val/dog.5763.jpg
Transferring ./train/dog.6741.jpg to ./val/dog.6741.jpg
Transferring ./train/dog.11329.jpg to ./val/dog.11329.jpg
Transferring ./train/cat.7835.jpg to ./val/cat.7835.jpg
Transferring ./train/cat.12359.jpg to ./val/cat.12359.jpg
Transferring ./train/dog.5861.jpg to ./val/dog.5861.jpg
Transferring ./train/cat.2551.jpg to ./val/cat.2551.jpg
Transferring ./train/cat.58.jpg to ./val/cat.58.jpg
Transferring ./train/cat.4697.jpg to ./val/cat.4697.jpg
Transferring ./train/dog.7526.jpg to ./val/dog.7526.jpg
Transferring ./train/dog.11737.jpg to ./val/dog.11737.jpg
Transferring ./train/dog.5179.jpg to ./val/dog.5179.jpg
Transferring ./train/cat.1831.jpg to ./val/cat.1831.jpg
Transferring ./train/cat.117.jpg to ./val/cat.117.jpg
Transferring ./train/cat.10409.jpg to ./val/cat.10409.jpg
Transferring ./train/dog.3593.jpg to ./val/dog.3593.jpg
Transferring ./train/dog.1377.jpg to ./val/dog.1377.jpg
Transferring ./train/cat.336.jpg to ./val/cat.336.jpg
Transferring ./train/dog.8922.jpg to ./val/dog.8922.jpg
Transferring ./train/dog.10305.jpg to ./val/dog.10305.jpg
Transferring ./train/cat.5511.jpg to ./val/cat.5511.jpg
Transferring ./train/cat.2077.jpg to ./val/cat.2077.jpg
Transferring ./train/dog.10498.jpg to ./val/dog.10498.jpg
Transferring ./train/dog.142.jpg to ./val/dog.142.jpg
Transferring ./train/dog.7009.jpg to ./val/dog.7009.jpg
Transferring ./train/dog.10272.jpg to ./val/dog.10272.jpg
Transferring ./train/cat.6832.jpg to ./val/cat.6832.jpg
Transferring ./train/dog.407.jpg to ./val/dog.407.jpg
Transferring ./train/cat.5444.jpg to ./val/cat.5444.jpg
Transferring ./train/dog.10550.jpg to ./val/dog.10550.jpg
Transferring ./train/dog.3190.jpg to ./val/dog.3190.jpg
Transferring ./train/cat.10060.jpg to ./val/cat.10060.jpg
Transferring ./train/dog.12493.jpg to ./val/dog.12493.jpg
Transferring ./train/dog.8312.jpg to ./val/dog.8312.jpg
Transferring ./train/dog.5841.jpg to ./val/dog.5841.jpg
Transferring ./train/cat.5308.jpg to ./val/cat.5308.jpg
```

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Transferring ./train/dog.3739.jpg to ./val/dog.3739.jpg
Transferring ./train/dog.2983.jpg to ./val/dog.2983.jpg
Transferring ./train/cat.5069.jpg to ./val/cat.5069.jpg
Transferring ./train/dog.10706.jpg to ./val/dog.10706.jpg
Transferring ./train/dog.4026.jpg to ./val/dog.4026.jpg
Transferring ./train/cat.484.jpg to ./val/cat.484.jpg
Transferring ./train/cat.5006.jpg to ./val/cat.5006.jpg
Transferring ./train/dog.529.jpg to ./val/dog.529.jpg
Transferring ./train/cat.2100.jpg to ./val/cat.2100.jpg
Transferring ./train/dog.5268.jpg to ./val/dog.5268.jpg
Transferring ./train/cat.3652.jpg to ./val/cat.3652.jpg
Transferring ./train/dog.720.jpg to ./val/dog.720.jpg
Transferring ./train/dog.1161.jpg to ./val/dog.1161.jpg
Transferring ./train/cat.4452.jpg to ./val/cat.4452.jpg
Transferring ./train/dog.3220.jpg to ./val/dog.3220.jpg
Transferring ./train/cat.11944.jpg to ./val/cat.11944.jpg
Transferring ./train/cat.10136.jpg to ./val/cat.10136.jpg
Transferring ./train/cat.9757.jpg to ./val/cat.9757.jpg
Transferring ./train/cat.12268.jpg to ./val/cat.12268.jpg
Transferring ./train/dog.7232.jpg to ./val/dog.7232.jpg
Transferring ./train/dog.9455.jpg to ./val/dog.9455.jpg
Transferring ./train/dog.6223.jpg to ./val/dog.6223.jpg
Transferring ./train/cat.2243.jpg to ./val/cat.2243.jpg
Transferring ./train/cat.6948.jpg to ./val/cat.6948.jpg
Transferring ./train/dog.6886.jpg to ./val/dog.6886.jpg
Transferring ./train/cat.4389.jpg to ./val/cat.4389.jpg
Transferring ./train/cat.3869.jpg to ./val/cat.3869.jpg
Transferring ./train/cat.11239.jpg to ./val/cat.11239.jpg
Transferring ./train/dog.1590.jpg to ./val/dog.1590.jpg
Transferring ./train/cat.2209.jpg to ./val/cat.2209.jpg
Transferring ./train/dog.3417.jpg to ./val/dog.3417.jpg
Transferring ./train/dog.284.jpg to ./val/dog.284.jpg
Transferring ./train/dog.109.jpg to ./val/dog.109.jpg
Transferring ./train/dog.4198.jpg to ./val/dog.4198.jpg
Transferring ./train/cat.2214.jpg to ./val/cat.2214.jpg
Transferring ./train/dog.3340.jpg to ./val/dog.3340.jpg
Transferring ./train/cat.1609.jpg to ./val/cat.1609.jpg
Transferring ./train/cat.6808.jpg to ./val/cat.6808.jpg
Transferring ./train/cat.5471.jpg to ./val/cat.5471.jpg
Transferring ./train/dog.8140.jpg to ./val/dog.8140.jpg
Transferring ./train/dog.3728.jpg to ./val/dog.3728.jpg
Transferring ./train/dog.3134.jpg to ./val/dog.3134.jpg
Transferring ./train/dog.5129.jpg to ./val/dog.5129.jpg
Transferring ./train/dog.6213.jpg to ./val/dog.6213.jpg
Transferring ./train/cat.10874.jpg to ./val/cat.10874.jpg
Transferring ./train/cat.8822.jpg to ./val/cat.8822.jpg
Transferring ./train/dog.608.jpg to ./val/dog.608.jpg
Transferring ./train/cat.3018.jpg to ./val/cat.3018.jpg
Transferring ./train/dog.4262.jpg to ./val/dog.4262.jpg
Transferring ./train/cat.3173.jpg to ./val/cat.3173.jpg
Transferring ./train/cat.9009.jpg to ./val/cat.9009.jpg
Transferring ./train/dog.2553.jpg to ./val/dog.2553.jpg
Transferring ./train/dog.8810.jpg to ./val/dog.8810.jpg
Transferring ./train/cat.1022.jpg to ./val/cat.1022.jpg
```

```
Transferring ./train/cat.3112.jpg to ./val/cat.3112.jpg
Transferring ./train/dog.37.jpg to ./val/dog.37.jpg
Transferring ./train/dog.1578.jpg to ./val/dog.1578.jpg
Transferring ./train/dog.10022.jpg to ./val/dog.10022.jpg
Transferring ./train/cat.7192.jpg to ./val/cat.7192.jpg
Transferring ./train/dog.6143.jpg to ./val/dog.6143.jpg
Transferring ./train/cat.1096.jpg to ./val/cat.1096.jpg
Transferring ./train/cat.8765.jpg to ./val/cat.8765.jpg
Transferring ./train/cat.5551.jpg to ./val/cat.5551.jpg
Transferring ./train/dog.6930.jpg to ./val/dog.6930.jpg
Transferring ./train/dog.4901.jpg to ./val/dog.4901.jpg
Transferring ./train/cat.1895.jpg to ./val/cat.1895.jpg
Transferring ./train/cat.4564.jpg to ./val/cat.4564.jpg
Transferring ./train/dog.9843.jpg to ./val/dog.9843.jpg
Transferring ./train/cat.5903.jpg to ./val/cat.5903.jpg
Transferring ./train/dog.5657.jpg to ./val/dog.5657.jpg
Transferring ./train/cat.4335.jpg to ./val/cat.4335.jpg
Transferring ./train/dog.11221.jpg to ./val/dog.11221.jpg
Transferring ./train/dog.10103.jpg to ./val/dog.10103.jpg
Transferring ./train/cat.4280.jpg to ./val/cat.4280.jpg
Transferring ./train/dog.8649.jpg to ./val/dog.8649.jpg
Transferring ./train/dog.3594.jpg to ./val/dog.3594.jpg
Transferring ./train/dog.10288.jpg to ./val/dog.10288.jpg
Transferring ./train/dog.1279.jpg to ./val/dog.1279.jpg
Transferring ./train/cat.5881.jpg to ./val/cat.5881.jpg
Transferring ./train/cat.10815.jpg to ./val/cat.10815.jpg
Transferring ./train/dog.2016.jpg to ./val/dog.2016.jpg
Transferring ./train/cat.10487.jpg to ./val/cat.10487.jpg
Transferring ./train/cat.9534.jpg to ./val/cat.9534.jpg
Transferring ./train/cat.7916.jpg to ./val/cat.7916.jpg
Transferring ./train/cat.829.jpg to ./val/cat.829.jpg
Transferring ./train/cat.1847.jpg to ./val/cat.1847.jpg
Transferring ./train/cat.240.jpg to ./val/cat.240.jpg
Transferring ./train/cat.7701.jpg to ./val/cat.7701.jpg
Transferring ./train/cat.1702.jpg to ./val/cat.1702.jpg
Transferring ./train/dog.4363.jpg to ./val/dog.4363.jpg
Transferring ./train/cat.9536.jpg to ./val/cat.9536.jpg
Transferring ./train/dog.11184.jpg to ./val/dog.11184.jpg
Transferring ./train/dog.1277.jpg to ./val/dog.1277.jpg
Transferring ./train/cat.11598.jpg to ./val/cat.11598.jpg
Transferring ./train/cat.2679.jpg to ./val/cat.2679.jpg
Transferring ./train/dog.4235.jpg to ./val/dog.4235.jpg
Transferring ./train/dog.7613.jpg to ./val/dog.7613.jpg
Transferring ./train/cat.5673.jpg to ./val/cat.5673.jpg
Transferring ./train/cat.1481.jpg to ./val/cat.1481.jpg
Transferring ./train/dog.5095.jpg to ./val/dog.5095.jpg
Transferring ./train/cat.1966.jpg to ./val/cat.1966.jpg
Transferring ./train/cat.4032.jpg to ./val/cat.4032.jpg
Transferring ./train/dog.3939.jpg to ./val/dog.3939.jpg
Transferring ./train/dog.2876.jpg to ./val/dog.2876.jpg
Transferring ./train/dog.6127.jpg to ./val/dog.6127.jpg
Transferring ./train/cat.4698.jpg to ./val/cat.4698.jpg
Transferring ./train/dog.3020.jpg to ./val/dog.3020.jpg
Transferring ./train/cat.2970.jpg to ./val/cat.2970.jpg
```

```
Transferring ./train/dog.4671.jpg to ./val/dog.4671.jpg
Transferring ./train/dog.5966.jpg to ./val/dog.5966.jpg
Transferring ./train/cat.9312.jpg to ./val/cat.9312.jpg
Transferring ./train/dog.1887.jpg to ./val/dog.1887.jpg
Transferring ./train/dog.4475.jpg to ./val/dog.4475.jpg
Transferring ./train/cat.5883.jpg to ./val/cat.5883.jpg
Transferring ./train/cat.10711.jpg to ./val/cat.10711.jpg
Transferring ./train/cat.3477.jpg to ./val/cat.3477.jpg
Transferring ./train/dog.10420.jpg to ./val/dog.10420.jpg
Transferring ./train/cat.251.jpg to ./val/cat.251.jpg
Transferring ./train/cat.4147.jpg to ./val/cat.4147.jpg
Transferring ./train/dog.11136.jpg to ./val/dog.11136.jpg
Transferring ./train/cat.10274.jpg to ./val/cat.10274.jpg
Transferring ./train/cat.10385.jpg to ./val/cat.10385.jpg
Transferring ./train/cat.10393.jpg to ./val/cat.10393.jpg
Transferring ./train/dog.6789.jpg to ./val/dog.6789.jpg
Transferring ./train/dog.6375.jpg to ./val/dog.6375.jpg
Transferring ./train/cat.5724.jpg to ./val/cat.5724.jpg
Transferring ./train/cat.4744.jpg to ./val/cat.4744.jpg
Transferring ./train/cat.5553.jpg to ./val/cat.5553.jpg
Transferring ./train/dog.149.jpg to ./val/dog.149.jpg
Transferring ./train/dog.10130.jpg to ./val/dog.10130.jpg
Transferring ./train/cat.3737.jpg to ./val/cat.3737.jpg
Transferring ./train/cat.7397.jpg to ./val/cat.7397.jpg
Transferring ./train/dog.2794.jpg to ./val/dog.2794.jpg
Transferring ./train/cat.2033.jpg to ./val/cat.2033.jpg
Transferring ./train/cat.2272.jpg to ./val/cat.2272.jpg
Transferring ./train/dog.10255.jpg to ./val/dog.10255.jpg
Transferring ./train/dog.9735.jpg to ./val/dog.9735.jpg
Transferring ./train/dog.9764.jpg to ./val/dog.9764.jpg
Transferring ./train/cat.12029.jpg to ./val/cat.12029.jpg
Transferring ./train/dog.5356.jpg to ./val/dog.5356.jpg
Transferring ./train/cat.3481.jpg to ./val/cat.3481.jpg
Transferring ./train/cat.11884.jpg to ./val/cat.11884.jpg
Transferring ./train/cat.5650.jpg to ./val/cat.5650.jpg
Transferring ./train/dog.5877.jpg to ./val/dog.5877.jpg
Transferring ./train/cat.5818.jpg to ./val/cat.5818.jpg
Transferring ./train/cat.12241.jpg to ./val/cat.12241.jpg
Transferring ./train/cat.1055.jpg to ./val/cat.1055.jpg
Transferring ./train/dog.11635.jpg to ./val/dog.11635.jpg
Transferring ./train/cat.8603.jpg to ./val/cat.8603.jpg
Transferring ./train/dog.5079.jpg to ./val/dog.5079.jpg
Transferring ./train/dog.3478.jpg to ./val/dog.3478.jpg
Transferring ./train/cat.4364.jpg to ./val/cat.4364.jpg
Transferring ./train/dog.3795.jpg to ./val/dog.3795.jpg
Transferring ./train/dog.8738.jpg to ./val/dog.8738.jpg
Transferring ./train/cat.2781.jpg to ./val/cat.2781.jpg
Transferring ./train/cat.10791.jpg to ./val/cat.10791.jpg
Transferring ./train/dog.10936.jpg to ./val/dog.10936.jpg
Transferring ./train/cat.2539.jpg to ./val/cat.2539.jpg
Transferring ./train/dog.5541.jpg to ./val/dog.5541.jpg
Transferring ./train/dog.2590.jpg to ./val/dog.2590.jpg
Transferring ./train/dog.8927.jpg to ./val/dog.8927.jpg
Transferring ./train/cat.8482.jpg to ./val/cat.8482.jpg
```

```
Transferring ./train/cat.9774.jpg to ./val/cat.9774.jpg
Transferring ./train/cat.10749.jpg to ./val/cat.10749.jpg
Transferring ./train/cat.2537.jpg to ./val/cat.2537.jpg
Transferring ./train/dog.10587.jpg to ./val/dog.10587.jpg
Transferring ./train/dog.1363.jpg to ./val/dog.1363.jpg
Transferring ./train/dog.3844.jpg to ./val/dog.3844.jpg
Transferring ./train/cat.11455.jpg to ./val/cat.11455.jpg
Transferring ./train/cat.6789.jpg to ./val/cat.6789.jpg
Transferring ./train/cat.10342.jpg to ./val/cat.10342.jpg
Transferring ./train/dog.5238.jpg to ./val/dog.5238.jpg
Transferring ./train/cat.5061.jpg to ./val/cat.5061.jpg
Transferring ./train/dog.11987.jpg to ./val/dog.11987.jpg
Transferring ./train/cat.5792.jpg to ./val/cat.5792.jpg
Transferring ./train/dog.3279.jpg to ./val/dog.3279.jpg
Transferring ./train/cat.11411.jpg to ./val/cat.11411.jpg
Transferring ./train/cat.6420.jpg to ./val/cat.6420.jpg
Transferring ./train/dog.11704.jpg to ./val/dog.11704.jpg
Transferring ./train/cat.6472.jpg to ./val/cat.6472.jpg
Transferring ./train/cat.9023.jpg to ./val/cat.9023.jpg
Transferring ./train/dog.12342.jpg to ./val/dog.12342.jpg
Transferring ./train/cat.2668.jpg to ./val/cat.2668.jpg
Transferring ./train/cat.3623.jpg to ./val/cat.3623.jpg
Transferring ./train/cat.1501.jpg to ./val/cat.1501.jpg
Transferring ./train/cat.125.jpg to ./val/cat.125.jpg
Transferring ./train/dog.1506.jpg to ./val/dog.1506.jpg
Transferring ./train/cat.7457.jpg to ./val/cat.7457.jpg
Transferring ./train/dog.124.jpg to ./val/dog.124.jpg
Transferring ./train/cat.5258.jpg to ./val/cat.5258.jpg
Transferring ./train/cat.11257.jpg to ./val/cat.11257.jpg
Transferring ./train/dog.507.jpg to ./val/dog.507.jpg
Transferring ./train/dog.2302.jpg to ./val/dog.2302.jpg
Transferring ./train/dog.3979.jpg to ./val/dog.3979.jpg
Transferring ./train/dog.9217.jpg to ./val/dog.9217.jpg
Transferring ./train/cat.5276.jpg to ./val/cat.5276.jpg
Transferring ./train/dog.2959.jpg to ./val/dog.2959.jpg
Transferring ./train/dog.9711.jpg to ./val/dog.9711.jpg
Transferring ./train/dog.11953.jpg to ./val/dog.11953.jpg
Transferring ./train/dog.10546.jpg to ./val/dog.10546.jpg
Transferring ./train/dog.6950.jpg to ./val/dog.6950.jpg
Transferring ./train/cat.2870.jpg to ./val/cat.2870.jpg
Transferring ./train/dog.10323.jpg to ./val/dog.10323.jpg
Transferring ./train/dog.1651.jpg to ./val/dog.1651.jpg
Transferring ./train/cat.3583.jpg to ./val/cat.3583.jpg
Transferring ./train/dog.3384.jpg to ./val/dog.3384.jpg
Transferring ./train/dog.3005.jpg to ./val/dog.3005.jpg
Transferring ./train/dog.324.jpg to ./val/dog.324.jpg
Transferring ./train/cat.6196.jpg to ./val/cat.6196.jpg
Transferring ./train/cat.4917.jpg to ./val/cat.4917.jpg
Transferring ./train/dog.11383.jpg to ./val/dog.11383.jpg
Transferring ./train/dog.11995.jpg to ./val/dog.11995.jpg
Transferring ./train/cat.2784.jpg to ./val/cat.2784.jpg
Transferring ./train/cat.2221.jpg to ./val/cat.2221.jpg
Transferring ./train/cat.12303.jpg to ./val/cat.12303.jpg
Transferring ./train/dog.7563.jpg to ./val/dog.7563.jpg
```

```
Transferring ./train/cat.6474.jpg to ./val/cat.6474.jpg
Transferring ./train/dog.848.jpg to ./val/dog.848.jpg
Transferring ./train/cat.3280.jpg to ./val/cat.3280.jpg
Transferring ./train/cat.7485.jpg to ./val/cat.7485.jpg
Transferring ./train/cat.2872.jpg to ./val/cat.2872.jpg
Transferring ./train/cat.2773.jpg to ./val/cat.2773.jpg
Transferring ./train/cat.10945.jpg to ./val/cat.10945.jpg
Transferring ./train/dog.10162.jpg to ./val/dog.10162.jpg
Transferring ./train/dog.9488.jpg to ./val/dog.9488.jpg
Transferring ./train/cat.8232.jpg to ./val/cat.8232.jpg
Transferring ./train/dog.9104.jpg to ./val/dog.9104.jpg
Transferring ./train/dog.6723.jpg to ./val/dog.6723.jpg
Transferring ./train/dog.3379.jpg to ./val/dog.3379.jpg
Transferring ./train/dog.9606.jpg to ./val/dog.9606.jpg
Transferring ./train/dog.12333.jpg to ./val/dog.12333.jpg
Transferring ./train/cat.12446.jpg to ./val/cat.12446.jpg
Transferring ./train/dog.5894.jpg to ./val/dog.5894.jpg
Transferring ./train/dog.8470.jpg to ./val/dog.8470.jpg
Transferring ./train/cat.5063.jpg to ./val/cat.5063.jpg
Transferring ./train/dog.11256.jpg to ./val/dog.11256.jpg
Transferring ./train/dog.9708.jpg to ./val/dog.9708.jpg
Transferring ./train/dog.1820.jpg to ./val/dog.1820.jpg
Transferring ./train/dog.2737.jpg to ./val/dog.2737.jpg
Transferring ./train/dog.10384.jpg to ./val/dog.10384.jpg
Transferring ./train/dog.2404.jpg to ./val/dog.2404.jpg
Transferring ./train/cat.4471.jpg to ./val/cat.4471.jpg
Transferring ./train/cat.1062.jpg to ./val/cat.1062.jpg
Transferring ./train/cat.9613.jpg to ./val/cat.9613.jpg
Transferring ./train/dog.12310.jpg to ./val/dog.12310.jpg
Transferring ./train/dog.9292.jpg to ./val/dog.9292.jpg
Transferring ./train/cat.199.jpg to ./val/cat.199.jpg
Transferring ./train/dog.3169.jpg to ./val/dog.3169.jpg
Transferring ./train/cat.11099.jpg to ./val/cat.11099.jpg
Transferring ./train/dog.7687.jpg to ./val/dog.7687.jpg
Transferring ./train/cat.5562.jpg to ./val/cat.5562.jpg
Transferring ./train/cat.9363.jpg to ./val/cat.9363.jpg
Transferring ./train/dog.4173.jpg to ./val/dog.4173.jpg
Transferring ./train/cat.8381.jpg to ./val/cat.8381.jpg
Transferring ./train/cat.5148.jpg to ./val/cat.5148.jpg
Transferring ./train/dog.5004.jpg to ./val/dog.5004.jpg
Transferring ./train/dog.8110.jpg to ./val/dog.8110.jpg
Transferring ./train/dog.8652.jpg to ./val/dog.8652.jpg
Transferring ./train/cat.6215.jpg to ./val/cat.6215.jpg
Transferring ./train/dog.6532.jpg to ./val/dog.6532.jpg
Transferring ./train/dog.10579.jpg to ./val/dog.10579.jpg
Transferring ./train/dog.9891.jpg to ./val/dog.9891.jpg
Transferring ./train/cat.755.jpg to ./val/cat.755.jpg
Transferring ./train/dog.2633.jpg to ./val/dog.2633.jpg
Transferring ./train/cat.2571.jpg to ./val/cat.2571.jpg
Transferring ./train/dog.4975.jpg to ./val/dog.4975.jpg
Transferring ./train/cat.3770.jpg to ./val/cat.3770.jpg
Transferring ./train/cat.3703.jpg to ./val/cat.3703.jpg
Transferring ./train/dog.9010.jpg to ./val/dog.9010.jpg
Transferring ./train/dog.8566.jpg to ./val/dog.8566.jpg
```

```
Transferring ./train/cat.3403.jpg to ./val/cat.3403.jpg
Transferring ./train/dog.10032.jpg to ./val/dog.10032.jpg
Transferring ./train/dog.11886.jpg to ./val/dog.11886.jpg
Transferring ./train/dog.9989.jpg to ./val/dog.9989.jpg
Transferring ./train/cat.11865.jpg to ./val/cat.11865.jpg
Transferring ./train/dog.3799.jpg to ./val/dog.3799.jpg
Transferring ./train/dog.6305.jpg to ./val/dog.6305.jpg
Transferring ./train/dog.10510.jpg to ./val/dog.10510.jpg
Transferring ./train/cat.11387.jpg to ./val/cat.11387.jpg
Transferring ./train/cat.12150.jpg to ./val/cat.12150.jpg
Transferring ./train/cat.7444.jpg to ./val/cat.7444.jpg
Transferring ./train/dog.1092.jpg to ./val/dog.1092.jpg
Transferring ./train/dog.9845.jpg to ./val/dog.9845.jpg
Transferring ./train/dog.4634.jpg to ./val/dog.4634.jpg
Transferring ./train/dog.12118.jpg to ./val/dog.12118.jpg
Transferring ./train/dog.24.jpg to ./val/dog.24.jpg
Transferring ./train/cat.11602.jpg to ./val/cat.11602.jpg
Transferring ./train/cat.1350.jpg to ./val/cat.1350.jpg
Transferring ./train/dog.1351.jpg to ./val/dog.1351.jpg
Transferring ./train/cat.10509.jpg to ./val/cat.10509.jpg
Transferring ./train/dog.1551.jpg to ./val/dog.1551.jpg
Transferring ./train/dog.2156.jpg to ./val/dog.2156.jpg
Transferring ./train/cat.320.jpg to ./val/cat.320.jpg
Transferring ./train/cat.1992.jpg to ./val/cat.1992.jpg
Transferring ./train/dog.6694.jpg to ./val/dog.6694.jpg
Transferring ./train/dog.11081.jpg to ./val/dog.11081.jpg
Transferring ./train/dog.3805.jpg to ./val/dog.3805.jpg
Transferring ./train/cat.3782.jpg to ./val/cat.3782.jpg
Transferring ./train/cat.7611.jpg to ./val/cat.7611.jpg
Transferring ./train/cat.12456.jpg to ./val/cat.12456.jpg
Transferring ./train/dog.1400.jpg to ./val/dog.1400.jpg
Transferring ./train/dog.11548.jpg to ./val/dog.11548.jpg
Transferring ./train/cat.1133.jpg to ./val/cat.1133.jpg
Transferring ./train/dog.6882.jpg to ./val/dog.6882.jpg
Transferring ./train/dog.9355.jpg to ./val/dog.9355.jpg
Transferring ./train/dog.11460.jpg to ./val/dog.11460.jpg
Transferring ./train/cat.11255.jpg to ./val/cat.11255.jpg
Transferring ./train/cat.6693.jpg to ./val/cat.6693.jpg
Transferring ./train/dog.3199.jpg to ./val/dog.3199.jpg
Transferring ./train/dog.10608.jpg to ./val/dog.10608.jpg
Transferring ./train/dog.11229.jpg to ./val/dog.11229.jpg
Transferring ./train/dog.5093.jpg to ./val/dog.5093.jpg
Transferring ./train/cat.9807.jpg to ./val/cat.9807.jpg
Transferring ./train/dog.512.jpg to ./val/dog.512.jpg
Transferring ./train/dog.6902.jpg to ./val/dog.6902.jpg
Transferring ./train/dog.4447.jpg to ./val/dog.4447.jpg
Transferring ./train/cat.4986.jpg to ./val/cat.4986.jpg
Transferring ./train/cat.6848.jpg to ./val/cat.6848.jpg
Transferring ./train/cat.10490.jpg to ./val/cat.10490.jpg
Transferring ./train/dog.8380.jpg to ./val/dog.8380.jpg
Transferring ./train/cat.371.jpg to ./val/cat.371.jpg
Transferring ./train/dog.9287.jpg to ./val/dog.9287.jpg
Transferring ./train/cat.5049.jpg to ./val/cat.5049.jpg
Transferring ./train/dog.5561.jpg to ./val/dog.5561.jpg
```

```
Transferring ./train/dog.1779.jpg to ./val/dog.1779.jpg
Transferring ./train/cat.11843.jpg to ./val/cat.11843.jpg
Transferring ./train/dog.5361.jpg to ./val/dog.5361.jpg
Transferring ./train/cat.2888.jpg to ./val/cat.2888.jpg
Transferring ./train/dog.11560.jpg to ./val/dog.11560.jpg
Transferring ./train/dog.3512.jpg to ./val/dog.3512.jpg
Transferring ./train/dog.11986.jpg to ./val/dog.11986.jpg
Transferring ./train/cat.9798.jpg to ./val/cat.9798.jpg
Transferring ./train/dog.11455.jpg to ./val/dog.11455.jpg
Transferring ./train/dog.10680.jpg to ./val/dog.10680.jpg
Transferring ./train/cat.12389.jpg to ./val/cat.12389.jpg
Transferring ./train/cat.7697.jpg to ./val/cat.7697.jpg
Transferring ./train/dog.6401.jpg to ./val/dog.6401.jpg
Transferring ./train/dog.12392.jpg to ./val/dog.12392.jpg
Transferring ./train/cat.6831.jpg to ./val/cat.6831.jpg
Transferring ./train/dog.2050.jpg to ./val/dog.2050.jpg
Transferring ./train/dog.1181.jpg to ./val/dog.1181.jpg
Transferring ./train/cat.8091.jpg to ./val/cat.8091.jpg
Transferring ./train/dog.6607.jpg to ./val/dog.6607.jpg
Transferring ./train/dog.11203.jpg to ./val/dog.11203.jpg
Transferring ./train/dog.3057.jpg to ./val/dog.3057.jpg
Transferring ./train/cat.8558.jpg to ./val/cat.8558.jpg
Transferring ./train/cat.3358.jpg to ./val/cat.3358.jpg
Transferring ./train/dog.12337.jpg to ./val/dog.12337.jpg
Transferring ./train/cat.5665.jpg to ./val/cat.5665.jpg
Transferring ./train/cat.10161.jpg to ./val/cat.10161.jpg
Transferring ./train/cat.5538.jpg to ./val/cat.5538.jpg
Transferring ./train/cat.1544.jpg to ./val/cat.1544.jpg
Transferring ./train/dog.2099.jpg to ./val/dog.2099.jpg
Transferring ./train/dog.7806.jpg to ./val/dog.7806.jpg
Transferring ./train/dog.2360.jpg to ./val/dog.2360.jpg
Transferring ./train/dog.10643.jpg to ./val/dog.10643.jpg
Transferring ./train/cat.12352.jpg to ./val/cat.12352.jpg
Transferring ./train/dog.4932.jpg to ./val/dog.4932.jpg
Transferring ./train/cat.777.jpg to ./val/cat.777.jpg
Transferring ./train/dog.1915.jpg to ./val/dog.1915.jpg
Transferring ./train/cat.3648.jpg to ./val/cat.3648.jpg
Transferring ./train/cat.8025.jpg to ./val/cat.8025.jpg
Transferring ./train/cat.1461.jpg to ./val/cat.1461.jpg
Transferring ./train/cat.10047.jpg to ./val/cat.10047.jpg
Transferring ./train/dog.1205.jpg to ./val/dog.1205.jpg
Transferring ./train/dog.1150.jpg to ./val/dog.1150.jpg
Transferring ./train/dog.6323.jpg to ./val/dog.6323.jpg
Transferring ./train/dog.2434.jpg to ./val/dog.2434.jpg
Transferring ./train/cat.9764.jpg to ./val/cat.9764.jpg
Transferring ./train/cat.4852.jpg to ./val/cat.4852.jpg
Transferring ./train/cat.5731.jpg to ./val/cat.5731.jpg
Transferring ./train/cat.3493.jpg to ./val/cat.3493.jpg
Transferring ./train/dog.12356.jpg to ./val/dog.12356.jpg
Transferring ./train/dog.5287.jpg to ./val/dog.5287.jpg
Transferring ./train/cat.4652.jpg to ./val/cat.4652.jpg
Transferring ./train/cat.3110.jpg to ./val/cat.3110.jpg
Transferring ./train/dog.10481.jpg to ./val/dog.10481.jpg
Transferring ./train/cat.11756.jpg to ./val/cat.11756.jpg
```

```
Transferring ./train/cat.12026.jpg to ./val/cat.12026.jpg
Transferring ./train/dog.2653.jpg to ./val/dog.2653.jpg
Transferring ./train/dog.11556.jpg to ./val/dog.11556.jpg
Transferring ./train/cat.7897.jpg to ./val/cat.7897.jpg
Transferring ./train/cat.9653.jpg to ./val/cat.9653.jpg
Transferring ./train/cat.2522.jpg to ./val/cat.2522.jpg
Transferring ./train/dog.7319.jpg to ./val/dog.7319.jpg
Transferring ./train/cat.7494.jpg to ./val/cat.7494.jpg
Transferring ./train/dog.9196.jpg to ./val/dog.9196.jpg
Transferring ./train/dog.6034.jpg to ./val/dog.6034.jpg
Transferring ./train/cat.9761.jpg to ./val/cat.9761.jpg
Transferring ./train/cat.9631.jpg to ./val/cat.9631.jpg
Transferring ./train/cat.3115.jpg to ./val/cat.3115.jpg
Transferring ./train/cat.4276.jpg to ./val/cat.4276.jpg
Transferring ./train/cat.2063.jpg to ./val/cat.2063.jpg
Transferring ./train/cat.2035.jpg to ./val/cat.2035.jpg
Transferring ./train/cat.4650.jpg to ./val/cat.4650.jpg
Transferring ./train/dog.9934.jpg to ./val/dog.9934.jpg
Transferring ./train/cat.2076.jpg to ./val/cat.2076.jpg
Transferring ./train/cat.11440.jpg to ./val/cat.11440.jpg
Transferring ./train/cat.8721.jpg to ./val/cat.8721.jpg
Transferring ./train/dog.6888.jpg to ./val/dog.6888.jpg
Transferring ./train/dog.2350.jpg to ./val/dog.2350.jpg
Transferring ./train/cat.10085.jpg to ./val/cat.10085.jpg
Transferring ./train/dog.2753.jpg to ./val/dog.2753.jpg
Transferring ./train/dog.6984.jpg to ./val/dog.6984.jpg
Transferring ./train/dog.4630.jpg to ./val/dog.4630.jpg
Transferring ./train/dog.7166.jpg to ./val/dog.7166.jpg
Transferring ./train/cat.8813.jpg to ./val/cat.8813.jpg
Transferring ./train/dog.10382.jpg to ./val/dog.10382.jpg
Transferring ./train/dog.3964.jpg to ./val/dog.3964.jpg
Transferring ./train/cat.11408.jpg to ./val/cat.11408.jpg
Transferring ./train/dog.5415.jpg to ./val/dog.5415.jpg
Transferring ./train/dog.58.jpg to ./val/dog.58.jpg
Transferring ./train/dog.10015.jpg to ./val/dog.10015.jpg
Transferring ./train/cat.4674.jpg to ./val/cat.4674.jpg
Transferring ./train/dog.4444.jpg to ./val/dog.4444.jpg
Transferring ./train/dog.10887.jpg to ./val/dog.10887.jpg
Transferring ./train/dog.4810.jpg to ./val/dog.4810.jpg
Transferring ./train/cat.5682.jpg to ./val/cat.5682.jpg
Transferring ./train/cat.2091.jpg to ./val/cat.2091.jpg
Transferring ./train/dog.9295.jpg to ./val/dog.9295.jpg
Transferring ./train/dog.8013.jpg to ./val/dog.8013.jpg
Transferring ./train/cat.12287.jpg to ./val/cat.12287.jpg
Transferring ./train/dog.6404.jpg to ./val/dog.6404.jpg
Transferring ./train/dog.12396.jpg to ./val/dog.12396.jpg
Transferring ./train/dog.7966.jpg to ./val/dog.7966.jpg
Transferring ./train/cat.1973.jpg to ./val/cat.1973.jpg
Transferring ./train/cat.8406.jpg to ./val/cat.8406.jpg
Transferring ./train/dog.7994.jpg to ./val/dog.7994.jpg
Transferring ./train/dog.4282.jpg to ./val/dog.4282.jpg
Transferring ./train/cat.12167.jpg to ./val/cat.12167.jpg
Transferring ./train/cat.9701.jpg to ./val/cat.9701.jpg
Transferring ./train/dog.8371.jpg to ./val/dog.8371.jpg
```

```
Transferring ./train/cat.12348.jpg to ./val/cat.12348.jpg
Transferring ./train/cat.12296.jpg to ./val/cat.12296.jpg
Transferring ./train/cat.2771.jpg to ./val/cat.2771.jpg
Transferring ./train/cat.5981.jpg to ./val/cat.5981.jpg
Transferring ./train/dog.7227.jpg to ./val/dog.7227.jpg
Transferring ./train/dog.11269.jpg to ./val/dog.11269.jpg
Transferring ./train/dog.7791.jpg to ./val/dog.7791.jpg
Transferring ./train/dog.7167.jpg to ./val/dog.7167.jpg
Transferring ./train/cat.8618.jpg to ./val/cat.8618.jpg
Transferring ./train/cat.2390.jpg to ./val/cat.2390.jpg
Transferring ./train/cat.7580.jpg to ./val/cat.7580.jpg
Transferring ./train/dog.11759.jpg to ./val/dog.11759.jpg
Transferring ./train/cat.9135.jpg to ./val/cat.9135.jpg
Transferring ./train/cat.8965.jpg to ./val/cat.8965.jpg
Transferring ./train/cat.7867.jpg to ./val/cat.7867.jpg
Transferring ./train/dog.4755.jpg to ./val/dog.4755.jpg
Transferring ./train/cat.11972.jpg to ./val/cat.11972.jpg
Transferring ./train/cat.8191.jpg to ./val/cat.8191.jpg
Transferring ./train/cat.1678.jpg to ./val/cat.1678.jpg
Transferring ./train/cat.3558.jpg to ./val/cat.3558.jpg
Transferring ./train/cat.623.jpg to ./val/cat.623.jpg
Transferring ./train/dog.9371.jpg to ./val/dog.9371.jpg
Transferring ./train/dog.11069.jpg to ./val/dog.11069.jpg
Transferring ./train/cat.5092.jpg to ./val/cat.5092.jpg
Transferring ./train/dog.9610.jpg to ./val/dog.9610.jpg
Transferring ./train/dog.11296.jpg to ./val/dog.11296.jpg
Transferring ./train/cat.7741.jpg to ./val/cat.7741.jpg
Transferring ./train/dog.10132.jpg to ./val/dog.10132.jpg
Transferring ./train/dog.5984.jpg to ./val/dog.5984.jpg
Transferring ./train/dog.11605.jpg to ./val/dog.11605.jpg
Transferring ./train/cat.9703.jpg to ./val/cat.9703.jpg
Transferring ./train/dog.9213.jpg to ./val/dog.9213.jpg
Transferring ./train/dog.5052.jpg to ./val/dog.5052.jpg
Transferring ./train/dog.9685.jpg to ./val/dog.9685.jpg
Transferring ./train/cat.10664.jpg to ./val/cat.10664.jpg
Transferring ./train/cat.4932.jpg to ./val/cat.4932.jpg
Transferring ./train/dog.1880.jpg to ./val/dog.1880.jpg
Transferring ./train/dog.4303.jpg to ./val/dog.4303.jpg
Transferring ./train/cat.6190.jpg to ./val/cat.6190.jpg
Transferring ./train/dog.2824.jpg to ./val/dog.2824.jpg
Transferring ./train/dog.1301.jpg to ./val/dog.1301.jpg
Transferring ./train/dog.11392.jpg to ./val/dog.11392.jpg
Transferring ./train/cat.339.jpg to ./val/cat.339.jpg
Transferring ./train/cat.688.jpg to ./val/cat.688.jpg
Transferring ./train/cat.4071.jpg to ./val/cat.4071.jpg
Transferring ./train/cat.9640.jpg to ./val/cat.9640.jpg
Transferring ./train/dog.977.jpg to ./val/dog.977.jpg
Transferring ./train/dog.9710.jpg to ./val/dog.9710.jpg
Transferring ./train/dog.3855.jpg to ./val/dog.3855.jpg
Transferring ./train/cat.11402.jpg to ./val/cat.11402.jpg
Transferring ./train/dog.12225.jpg to ./val/dog.12225.jpg
Transferring ./train/dog.4086.jpg to ./val/dog.4086.jpg
Transferring ./train/cat.4473.jpg to ./val/cat.4473.jpg
Transferring ./train/cat.1644.jpg to ./val/cat.1644.jpg
```

```
Transferring ./train/cat.383.jpg to ./val/cat.383.jpg
Transferring ./train/dog.12244.jpg to ./val/dog.12244.jpg
Transferring ./train/cat.2642.jpg to ./val/cat.2642.jpg
Transferring ./train/dog.12223.jpg to ./val/dog.12223.jpg
Transferring ./train/cat.10873.jpg to ./val/cat.10873.jpg
Transferring ./train/cat.2250.jpg to ./val/cat.2250.jpg
Transferring ./train/cat.10660.jpg to ./val/cat.10660.jpg
Transferring ./train/dog.4136.jpg to ./val/dog.4136.jpg
Transferring ./train/cat.4004.jpg to ./val/cat.4004.jpg
Transferring ./train/cat.11819.jpg to ./val/cat.11819.jpg
Transferring ./train/dog.3613.jpg to ./val/dog.3613.jpg
Transferring ./train/cat.5353.jpg to ./val/cat.5353.jpg
Transferring ./train/cat.7889.jpg to ./val/cat.7889.jpg
Transferring ./train/cat.9638.jpg to ./val/cat.9638.jpg
Transferring ./train/cat.8875.jpg to ./val/cat.8875.jpg
Transferring ./train/dog.11833.jpg to ./val/dog.11833.jpg
Transferring ./train/dog.7057.jpg to ./val/dog.7057.jpg
Transferring ./train/cat.5545.jpg to ./val/cat.5545.jpg
Transferring ./train/dog.8234.jpg to ./val/dog.8234.jpg
Transferring ./train/dog.3275.jpg to ./val/dog.3275.jpg
Transferring ./train/cat.7830.jpg to ./val/cat.7830.jpg
Transferring ./train/dog.441.jpg to ./val/dog.441.jpg
Transferring ./train/cat.261.jpg to ./val/cat.261.jpg
Transferring ./train/cat.6159.jpg to ./val/cat.6159.jpg
Transferring ./train/dog.9788.jpg to ./val/dog.9788.jpg
Transferring ./train/dog.6593.jpg to ./val/dog.6593.jpg
Transferring ./train/dog.582.jpg to ./val/dog.582.jpg
Transferring ./train/cat.10980.jpg to ./val/cat.10980.jpg
Transferring ./train/dog.9761.jpg to ./val/dog.9761.jpg
Transferring ./train/dog.10560.jpg to ./val/dog.10560.jpg
Transferring ./train/cat.1653.jpg to ./val/cat.1653.jpg
Transferring ./train/dog.10745.jpg to ./val/dog.10745.jpg
Transferring ./train/dog.2060.jpg to ./val/dog.2060.jpg
Transferring ./train/cat.3628.jpg to ./val/cat.3628.jpg
Transferring ./train/dog.3085.jpg to ./val/dog.3085.jpg
Transferring ./train/cat.1355.jpg to ./val/cat.1355.jpg
Transferring ./train/cat.5763.jpg to ./val/cat.5763.jpg
Transferring ./train/dog.1335.jpg to ./val/dog.1335.jpg
Transferring ./train/dog.2712.jpg to ./val/dog.2712.jpg
Transferring ./train/cat.4087.jpg to ./val/cat.4087.jpg
Transferring ./train/cat.513.jpg to ./val/cat.513.jpg
Transferring ./train/dog.4112.jpg to ./val/dog.4112.jpg
Transferring ./train/dog.1703.jpg to ./val/dog.1703.jpg
Transferring ./train/dog.12475.jpg to ./val/dog.12475.jpg
Transferring ./train/cat.2339.jpg to ./val/cat.2339.jpg
Transferring ./train/dog.3516.jpg to ./val/dog.3516.jpg
Transferring ./train/dog.12489.jpg to ./val/dog.12489.jpg
Transferring ./train/cat.8565.jpg to ./val/cat.8565.jpg
Transferring ./train/dog.2630.jpg to ./val/dog.2630.jpg
Transferring ./train/dog.8365.jpg to ./val/dog.8365.jpg
Transferring ./train/cat.8258.jpg to ./val/cat.8258.jpg
Transferring ./train/cat.7134.jpg to ./val/cat.7134.jpg
Transferring ./train/cat.8810.jpg to ./val/cat.8810.jpg
Transferring ./train/cat.10909.jpg to ./val/cat.10909.jpg
```

```
Transferring ./train/cat.4065.jpg to ./val/cat.4065.jpg
Transferring ./train/cat.3255.jpg to ./val/cat.3255.jpg
Transferring ./train/cat.842.jpg to ./val/cat.842.jpg
Transferring ./train/cat.10241.jpg to ./val/cat.10241.jpg
Transferring ./train/dog.5056.jpg to ./val/dog.5056.jpg
Transferring ./train/cat.7436.jpg to ./val/cat.7436.jpg
Transferring ./train/cat.8234.jpg to ./val/cat.8234.jpg
Transferring ./train/dog.6631.jpg to ./val/dog.6631.jpg
Transferring ./train/dog.6130.jpg to ./val/dog.6130.jpg
Transferring ./train/dog.1128.jpg to ./val/dog.1128.jpg
Transferring ./train/dog.859.jpg to ./val/dog.859.jpg
Transferring ./train/cat.6938.jpg to ./val/cat.6938.jpg
Transferring ./train/cat.11049.jpg to ./val/cat.11049.jpg
Transferring ./train/dog.3217.jpg to ./val/dog.3217.jpg
Transferring ./train/dog.8786.jpg to ./val/dog.8786.jpg
Transferring ./train/cat.10538.jpg to ./val/cat.10538.jpg
Transferring ./train/dog.2724.jpg to ./val/dog.2724.jpg
Transferring ./train/dog.4847.jpg to ./val/dog.4847.jpg
Transferring ./train/cat.403.jpg to ./val/cat.403.jpg
Transferring ./train/dog.1154.jpg to ./val/dog.1154.jpg
Transferring ./train/dog.1431.jpg to ./val/dog.1431.jpg
Transferring ./train/cat.7222.jpg to ./val/cat.7222.jpg
Transferring ./train/dog.7887.jpg to ./val/dog.7887.jpg
Transferring ./train/dog.10235.jpg to ./val/dog.10235.jpg
Transferring ./train/dog.11557.jpg to ./val/dog.11557.jpg
Transferring ./train/dog.4364.jpg to ./val/dog.4364.jpg
Transferring ./train/dog.8537.jpg to ./val/dog.8537.jpg
Transferring ./train/dog.1916.jpg to ./val/dog.1916.jpg
Transferring ./train/dog.9192.jpg to ./val/dog.9192.jpg
Transferring ./train/dog.11791.jpg to ./val/dog.11791.jpg
Transferring ./train/dog.5230.jpg to ./val/dog.5230.jpg
Transferring ./train/dog.4030.jpg to ./val/dog.4030.jpg
Transferring ./train/dog.4815.jpg to ./val/dog.4815.jpg
Transferring ./train/cat.7340.jpg to ./val/cat.7340.jpg
Transferring ./train/dog.11189.jpg to ./val/dog.11189.jpg
Transferring ./train/dog.1562.jpg to ./val/dog.1562.jpg
Transferring ./train/cat.5255.jpg to ./val/cat.5255.jpg
Transferring ./train/dog.3615.jpg to ./val/dog.3615.jpg
Transferring ./train/dog.11663.jpg to ./val/dog.11663.jpg
Transferring ./train/dog.801.jpg to ./val/dog.801.jpg
Transferring ./train/cat.1125.jpg to ./val/cat.1125.jpg
Transferring ./train/cat.12206.jpg to ./val/cat.12206.jpg
Transferring ./train/cat.3505.jpg to ./val/cat.3505.jpg
Transferring ./train/cat.8324.jpg to ./val/cat.8324.jpg
Transferring ./train/cat.7973.jpg to ./val/cat.7973.jpg
Transferring ./train/dog.11098.jpg to ./val/dog.11098.jpg
Transferring ./train/cat.3513.jpg to ./val/cat.3513.jpg
Transferring ./train/cat.3553.jpg to ./val/cat.3553.jpg
Transferring ./train/cat.936.jpg to ./val/cat.936.jpg
Transferring ./train/dog.3970.jpg to ./val/dog.3970.jpg
Transferring ./train/dog.8509.jpg to ./val/dog.8509.jpg
Transferring ./train/dog.5648.jpg to ./val/dog.5648.jpg
Transferring ./train/cat.677.jpg to ./val/cat.677.jpg
Transferring ./train/dog.1329.jpg to ./val/dog.1329.jpg
```

```
Transferring ./train/cat.10503.jpg to ./val/cat.10503.jpg
Transferring ./train/cat.7542.jpg to ./val/cat.7542.jpg
Transferring ./train/dog.1900.jpg to ./val/dog.1900.jpg
Transferring ./train/cat.8802.jpg to ./val/cat.8802.jpg
Transferring ./train/cat.11981.jpg to ./val/cat.11981.jpg
Transferring ./train/cat.8445.jpg to ./val/cat.8445.jpg
Transferring ./train/dog.5366.jpg to ./val/dog.5366.jpg
Transferring ./train/dog.4210.jpg to ./val/dog.4210.jpg
Transferring ./train/dog.4412.jpg to ./val/dog.4412.jpg
Transferring ./train/dog.8915.jpg to ./val/dog.8915.jpg
Transferring ./train/dog.6883.jpg to ./val/dog.6883.jpg
Transferring ./train/cat.8747.jpg to ./val/cat.8747.jpg
Transferring ./train/cat.11626.jpg to ./val/cat.11626.jpg
Transferring ./train/cat.4516.jpg to ./val/cat.4516.jpg
Transferring ./train/cat.4604.jpg to ./val/cat.4604.jpg
Transferring ./train/dog.406.jpg to ./val/dog.406.jpg
Transferring ./train/dog.10898.jpg to ./val/dog.10898.jpg
Transferring ./train/cat.10139.jpg to ./val/cat.10139.jpg
Transferring ./train/cat.1488.jpg to ./val/cat.1488.jpg
Transferring ./train/dog.1550.jpg to ./val/dog.1550.jpg
Transferring ./train/cat.12324.jpg to ./val/cat.12324.jpg
Transferring ./train/cat.11141.jpg to ./val/cat.11141.jpg
Transferring ./train/dog.2102.jpg to ./val/dog.2102.jpg
Transferring ./train/cat.4252.jpg to ./val/cat.4252.jpg
Transferring ./train/dog.10788.jpg to ./val/dog.10788.jpg
Transferring ./train/dog.995.jpg to ./val/dog.995.jpg
Transferring ./train/dog.9923.jpg to ./val/dog.9923.jpg
Transferring ./train/cat.879.jpg to ./val/cat.879.jpg
Transferring ./train/cat.1811.jpg to ./val/cat.1811.jpg
Transferring ./train/dog.11699.jpg to ./val/dog.11699.jpg
Transferring ./train/cat.191.jpg to ./val/cat.191.jpg
Transferring ./train/cat.7551.jpg to ./val/cat.7551.jpg
Transferring ./train/cat.496.jpg to ./val/cat.496.jpg
Transferring ./train/dog.11827.jpg to ./val/dog.11827.jpg
Transferring ./train/dog.6219.jpg to ./val/dog.6219.jpg
Transferring ./train/cat.9319.jpg to ./val/cat.9319.jpg
Transferring ./train/dog.283.jpg to ./val/dog.283.jpg
Transferring ./train/cat.5975.jpg to ./val/cat.5975.jpg
Transferring ./train/cat.8070.jpg to ./val/cat.8070.jpg
Transferring ./train/dog.10996.jpg to ./val/dog.10996.jpg
Transferring ./train/dog.592.jpg to ./val/dog.592.jpg
Transferring ./train/cat.4085.jpg to ./val/cat.4085.jpg
Transferring ./train/cat.1318.jpg to ./val/cat.1318.jpg
Transferring ./train/dog.3902.jpg to ./val/dog.3902.jpg
Transferring ./train/dog.3597.jpg to ./val/dog.3597.jpg
Transferring ./train/dog.2596.jpg to ./val/dog.2596.jpg
Transferring ./train/cat.5788.jpg to ./val/cat.5788.jpg
Transferring ./train/dog.637.jpg to ./val/dog.637.jpg
Transferring ./train/dog.2064.jpg to ./val/dog.2064.jpg
Transferring ./train/dog.3290.jpg to ./val/dog.3290.jpg
Transferring ./train/dog.6564.jpg to ./val/dog.6564.jpg
Transferring ./train/cat.5407.jpg to ./val/cat.5407.jpg
Transferring ./train/cat.10500.jpg to ./val/cat.10500.jpg
Transferring ./train/cat.12091.jpg to ./val/cat.12091.jpg
```

```
Transferring ./train/dog.10203.jpg to ./val/dog.10203.jpg
Transferring ./train/cat.923.jpg to ./val/cat.923.jpg
Transferring ./train/dog.783.jpg to ./val/dog.783.jpg
Transferring ./train/dog.8265.jpg to ./val/dog.8265.jpg
Transferring ./train/dog.3781.jpg to ./val/dog.3781.jpg
Transferring ./train/dog.1580.jpg to ./val/dog.1580.jpg
Transferring ./train/cat.5263.jpg to ./val/cat.5263.jpg
Transferring ./train/cat.4950.jpg to ./val/cat.4950.jpg
Transferring ./train/dog.9042.jpg to ./val/dog.9042.jpg
Transferring ./train/dog.3901.jpg to ./val/dog.3901.jpg
Transferring ./train/dog.2298.jpg to ./val/dog.2298.jpg
Transferring ./train/dog.6523.jpg to ./val/dog.6523.jpg
Transferring ./train/dog.11170.jpg to ./val/dog.11170.jpg
Transferring ./train/dog.4187.jpg to ./val/dog.4187.jpg
Transferring ./train/dog.11810.jpg to ./val/dog.11810.jpg
Transferring ./train/dog.6405.jpg to ./val/dog.6405.jpg
Transferring ./train/dog.9194.jpg to ./val/dog.9194.jpg
Transferring ./train/cat.2713.jpg to ./val/cat.2713.jpg
Transferring ./train/dog.10049.jpg to ./val/dog.10049.jpg
Transferring ./train/cat.7306.jpg to ./val/cat.7306.jpg
Transferring ./train/cat.10554.jpg to ./val/cat.10554.jpg
Transferring ./train/dog.7162.jpg to ./val/dog.7162.jpg
Transferring ./train/dog.6962.jpg to ./val/dog.6962.jpg
Transferring ./train/cat.3040.jpg to ./val/cat.3040.jpg
Transferring ./train/cat.3286.jpg to ./val/cat.3286.jpg
Transferring ./train/dog.1501.jpg to ./val/dog.1501.jpg
Transferring ./train/cat.5526.jpg to ./val/cat.5526.jpg
Transferring ./train/dog.7837.jpg to ./val/dog.7837.jpg
Transferring ./train/dog.6151.jpg to ./val/dog.6151.jpg
Transferring ./train/dog.9814.jpg to ./val/dog.9814.jpg
Transferring ./train/cat.1639.jpg to ./val/cat.1639.jpg
Transferring ./train/dog.4334.jpg to ./val/dog.4334.jpg
Transferring ./train/cat.10986.jpg to ./val/cat.10986.jpg
Transferring ./train/cat.4460.jpg to ./val/cat.4460.jpg
Transferring ./train/cat.11022.jpg to ./val/cat.11022.jpg
Transferring ./train/dog.6513.jpg to ./val/dog.6513.jpg
Transferring ./train/dog.7552.jpg to ./val/dog.7552.jpg
Transferring ./train/dog.2394.jpg to ./val/dog.2394.jpg
Transferring ./train/dog.8640.jpg to ./val/dog.8640.jpg
Transferring ./train/dog.8717.jpg to ./val/dog.8717.jpg
Transferring ./train/dog.4586.jpg to ./val/dog.4586.jpg
Transferring ./train/dog.3431.jpg to ./val/dog.3431.jpg
Transferring ./train/dog.11118.jpg to ./val/dog.11118.jpg
Transferring ./train/cat.11510.jpg to ./val/cat.11510.jpg
Transferring ./train/cat.10341.jpg to ./val/cat.10341.jpg
Transferring ./train/cat.1204.jpg to ./val/cat.1204.jpg
Transferring ./train/cat.11537.jpg to ./val/cat.11537.jpg
Transferring ./train/cat.2589.jpg to ./val/cat.2589.jpg
Transferring ./train/cat.7181.jpg to ./val/cat.7181.jpg
Transferring ./train/dog.2720.jpg to ./val/dog.2720.jpg
Transferring ./train/dog.6088.jpg to ./val/dog.6088.jpg
Transferring ./train/dog.10251.jpg to ./val/dog.10251.jpg
Transferring ./train/cat.2310.jpg to ./val/cat.2310.jpg
Transferring ./train/dog.5933.jpg to ./val/dog.5933.jpg
```

```
Transferring ./train/dog.1941.jpg to ./val/dog.1941.jpg
Transferring ./train/cat.6175.jpg to ./val/cat.6175.jpg
Transferring ./train/cat.934.jpg to ./val/cat.934.jpg
Transferring ./train/cat.3569.jpg to ./val/cat.3569.jpg
Transferring ./train/dog.7842.jpg to ./val/dog.7842.jpg
Transferring ./train/cat.6826.jpg to ./val/cat.6826.jpg
Transferring ./train/cat.4685.jpg to ./val/cat.4685.jpg
Transferring ./train/dog.3533.jpg to ./val/dog.3533.jpg
Transferring ./train/cat.278.jpg to ./val/cat.278.jpg
Transferring ./train/cat.9622.jpg to ./val/cat.9622.jpg
Transferring ./train/cat.4322.jpg to ./val/cat.4322.jpg
Transferring ./train/dog.6677.jpg to ./val/dog.6677.jpg
Transferring ./train/dog.8916.jpg to ./val/dog.8916.jpg
Transferring ./train/dog.6706.jpg to ./val/dog.6706.jpg
Transferring ./train/dog.6782.jpg to ./val/dog.6782.jpg
Transferring ./train/cat.9754.jpg to ./val/cat.9754.jpg
Transferring ./train/cat.5806.jpg to ./val/cat.5806.jpg
Transferring ./train/cat.4231.jpg to ./val/cat.4231.jpg
Transferring ./train/cat.8048.jpg to ./val/cat.8048.jpg
Transferring ./train/cat.6877.jpg to ./val/cat.6877.jpg
Transferring ./train/dog.2660.jpg to ./val/dog.2660.jpg
Transferring ./train/dog.4668.jpg to ./val/dog.4668.jpg
Transferring ./train/dog.12264.jpg to ./val/dog.12264.jpg
Transferring ./train/cat.3990.jpg to ./val/cat.3990.jpg
Transferring ./train/cat.6961.jpg to ./val/cat.6961.jpg
Transferring ./train/dog.11797.jpg to ./val/dog.11797.jpg
Transferring ./train/cat.5823.jpg to ./val/cat.5823.jpg
Transferring ./train/cat.610.jpg to ./val/cat.610.jpg
Transferring ./train/cat.6868.jpg to ./val/cat.6868.jpg
Transferring ./train/cat.7021.jpg to ./val/cat.7021.jpg
Transferring ./train/cat.5621.jpg to ./val/cat.5621.jpg
Transferring ./train/dog.5800.jpg to ./val/dog.5800.jpg
Transferring ./train/cat.6715.jpg to ./val/cat.6715.jpg
Transferring ./train/cat.9357.jpg to ./val/cat.9357.jpg
Transferring ./train/dog.2429.jpg to ./val/dog.2429.jpg
Transferring ./train/dog.2262.jpg to ./val/dog.2262.jpg
Transferring ./train/cat.7213.jpg to ./val/cat.7213.jpg
Transferring ./train/dog.4218.jpg to ./val/dog.4218.jpg
Transferring ./train/cat.10709.jpg to ./val/cat.10709.jpg
Transferring ./train/cat.7959.jpg to ./val/cat.7959.jpg
Transferring ./train/cat.4197.jpg to ./val/cat.4197.jpg
Transferring ./train/dog.8663.jpg to ./val/dog.8663.jpg
Transferring ./train/cat.5328.jpg to ./val/cat.5328.jpg
Transferring ./train/dog.1090.jpg to ./val/dog.1090.jpg
Transferring ./train/dog.1637.jpg to ./val/dog.1637.jpg
Transferring ./train/dog.7597.jpg to ./val/dog.7597.jpg
Transferring ./train/cat.4601.jpg to ./val/cat.4601.jpg
Transferring ./train/cat.967.jpg to ./val/cat.967.jpg
Transferring ./train/cat.12159.jpg to ./val/cat.12159.jpg
Transferring ./train/cat.7059.jpg to ./val/cat.7059.jpg
Transferring ./train/dog.4427.jpg to ./val/dog.4427.jpg
Transferring ./train/dog.9653.jpg to ./val/dog.9653.jpg
Transferring ./train/cat.1076.jpg to ./val/cat.1076.jpg
Transferring ./train/dog.2627.jpg to ./val/dog.2627.jpg
```

```
Transferring ./train/dog.12148.jpg to ./val/dog.12148.jpg
Transferring ./train/dog.7354.jpg to ./val/dog.7354.jpg
Transferring ./train/dog.6303.jpg to ./val/dog.6303.jpg
Transferring ./train/dog.10663.jpg to ./val/dog.10663.jpg
Transferring ./train/dog.2228.jpg to ./val/dog.2228.jpg
Transferring ./train/dog.4227.jpg to ./val/dog.4227.jpg
Transferring ./train/dog.8141.jpg to ./val/dog.8141.jpg
Transferring ./train/dog.186.jpg to ./val/dog.186.jpg
Transferring ./train/cat.1487.jpg to ./val/cat.1487.jpg
Transferring ./train/cat.7421.jpg to ./val/cat.7421.jpg
Transferring ./train/dog.2234.jpg to ./val/dog.2234.jpg
Transferring ./train/dog.10172.jpg to ./val/dog.10172.jpg
Transferring ./train/dog.11918.jpg to ./val/dog.11918.jpg
Transferring ./train/dog.7812.jpg to ./val/dog.7812.jpg
Transferring ./train/cat.6787.jpg to ./val/cat.6787.jpg
Transferring ./train/dog.2594.jpg to ./val/dog.2594.jpg
Transferring ./train/dog.8505.jpg to ./val/dog.8505.jpg
Transferring ./train/dog.8116.jpg to ./val/dog.8116.jpg
Transferring ./train/cat.6845.jpg to ./val/cat.6845.jpg
Transferring ./train/cat.1229.jpg to ./val/cat.1229.jpg
Transferring ./train/cat.9436.jpg to ./val/cat.9436.jpg
Transferring ./train/cat.5810.jpg to ./val/cat.5810.jpg
Transferring ./train/cat.4320.jpg to ./val/cat.4320.jpg
Transferring ./train/dog.640.jpg to ./val/dog.640.jpg
Transferring ./train/dog.10659.jpg to ./val/dog.10659.jpg
Transferring ./train/dog.8065.jpg to ./val/dog.8065.jpg
Transferring ./train/dog.4141.jpg to ./val/dog.4141.jpg
Transferring ./train/cat.6460.jpg to ./val/cat.6460.jpg
Transferring ./train/cat.5509.jpg to ./val/cat.5509.jpg
Transferring ./train/dog.5842.jpg to ./val/dog.5842.jpg
Transferring ./train/cat.1575.jpg to ./val/cat.1575.jpg
Transferring ./train/cat.5599.jpg to ./val/cat.5599.jpg
Transferring ./train/cat.9167.jpg to ./val/cat.9167.jpg
Transferring ./train/dog.6857.jpg to ./val/dog.6857.jpg
Transferring ./train/dog.9475.jpg to ./val/dog.9475.jpg
Transferring ./train/dog.4195.jpg to ./val/dog.4195.jpg
Transferring ./train/dog.10551.jpg to ./val/dog.10551.jpg
Transferring ./train/cat.7992.jpg to ./val/cat.7992.jpg
Transferring ./train/cat.2113.jpg to ./val/cat.2113.jpg
Transferring ./train/dog.6663.jpg to ./val/dog.6663.jpg
Transferring ./train/dog.12343.jpg to ./val/dog.12343.jpg
Transferring ./train/cat.7824.jpg to ./val/cat.7824.jpg
Transferring ./train/cat.819.jpg to ./val/cat.819.jpg
Transferring ./train/cat.7099.jpg to ./val/cat.7099.jpg
Transferring ./train/dog.9480.jpg to ./val/dog.9480.jpg
Transferring ./train/dog.4562.jpg to ./val/dog.4562.jpg
Transferring ./train/cat.9737.jpg to ./val/cat.9737.jpg
Transferring ./train/dog.9146.jpg to ./val/dog.9146.jpg
Transferring ./train/cat.7247.jpg to ./val/cat.7247.jpg
Transferring ./train/dog.4863.jpg to ./val/dog.4863.jpg
Transferring ./train/dog.11457.jpg to ./val/dog.11457.jpg
Transferring ./train/cat.3341.jpg to ./val/cat.3341.jpg
Transferring ./train/cat.11941.jpg to ./val/cat.11941.jpg
Transferring ./train/dog.8921.jpg to ./val/dog.8921.jpg
```

```
Transferring ./train/cat.10121.jpg to ./val/cat.10121.jpg
Transferring ./train/cat.5236.jpg to ./val/cat.5236.jpg
Transferring ./train/cat.2507.jpg to ./val/cat.2507.jpg
Transferring ./train/dog.11577.jpg to ./val/dog.11577.jpg
Transferring ./train/cat.1995.jpg to ./val/cat.1995.jpg
Transferring ./train/cat.7738.jpg to ./val/cat.7738.jpg
Transferring ./train/cat.5445.jpg to ./val/cat.5445.jpg
Transferring ./train/dog.2241.jpg to ./val/dog.2241.jpg
Transferring ./train/cat.8549.jpg to ./val/cat.8549.jpg
Transferring ./train/dog.1774.jpg to ./val/dog.1774.jpg
Transferring ./train/cat.11437.jpg to ./val/cat.11437.jpg
Transferring ./train/dog.8977.jpg to ./val/dog.8977.jpg
Transferring ./train/dog.6064.jpg to ./val/dog.6064.jpg
Transferring ./train/dog.9639.jpg to ./val/dog.9639.jpg
Transferring ./train/cat.5014.jpg to ./val/cat.5014.jpg
Transferring ./train/dog.4034.jpg to ./val/dog.4034.jpg
Transferring ./train/cat.2120.jpg to ./val/cat.2120.jpg
Transferring ./train/dog.639.jpg to ./val/dog.639.jpg
Transferring ./train/dog.4520.jpg to ./val/dog.4520.jpg
Transferring ./train/dog.6764.jpg to ./val/dog.6764.jpg
Transferring ./train/dog.7801.jpg to ./val/dog.7801.jpg
Transferring ./train/dog.7225.jpg to ./val/dog.7225.jpg
Transferring ./train/cat.1467.jpg to ./val/cat.1467.jpg
Transferring ./train/cat.2444.jpg to ./val/cat.2444.jpg
Transferring ./train/dog.5960.jpg to ./val/dog.5960.jpg
Transferring ./train/cat.5220.jpg to ./val/cat.5220.jpg
Transferring ./train/cat.3052.jpg to ./val/cat.3052.jpg
Transferring ./train/cat.3912.jpg to ./val/cat.3912.jpg
Transferring ./train/cat.11139.jpg to ./val/cat.11139.jpg
Transferring ./train/dog.6770.jpg to ./val/dog.6770.jpg
Transferring ./train/cat.11762.jpg to ./val/cat.11762.jpg
Transferring ./train/cat.1059.jpg to ./val/cat.1059.jpg
Transferring ./train/dog.3566.jpg to ./val/dog.3566.jpg
Transferring ./train/cat.9846.jpg to ./val/cat.9846.jpg
Transferring ./train/dog.4575.jpg to ./val/dog.4575.jpg
Transferring ./train/cat.4545.jpg to ./val/cat.4545.jpg
Transferring ./train/dog.9499.jpg to ./val/dog.9499.jpg
Transferring ./train/cat.2415.jpg to ./val/cat.2415.jpg
Transferring ./train/cat.5359.jpg to ./val/cat.5359.jpg
Transferring ./train/dog.4521.jpg to ./val/dog.4521.jpg
Transferring ./train/dog.3669.jpg to ./val/dog.3669.jpg
Transferring ./train/cat.8843.jpg to ./val/cat.8843.jpg
Transferring ./train/dog.3463.jpg to ./val/dog.3463.jpg
Transferring ./train/cat.3908.jpg to ./val/cat.3908.jpg
Transferring ./train/cat.6729.jpg to ./val/cat.6729.jpg
Transferring ./train/cat.2008.jpg to ./val/cat.2008.jpg
Transferring ./train/dog.7936.jpg to ./val/dog.7936.jpg
Transferring ./train/cat.3656.jpg to ./val/cat.3656.jpg
Transferring ./train/dog.74.jpg to ./val/dog.74.jpg
Transferring ./train/cat.5113.jpg to ./val/cat.5113.jpg
Transferring ./train/cat.4566.jpg to ./val/cat.4566.jpg
Transferring ./train/dog.4547.jpg to ./val/dog.4547.jpg
Transferring ./train/dog.8683.jpg to ./val/dog.8683.jpg
Transferring ./train/dog.2186.jpg to ./val/dog.2186.jpg
```

```
Transferring ./train/dog.5461.jpg to ./val/dog.5461.jpg
Transferring ./train/dog.3753.jpg to ./val/dog.3753.jpg
Transferring ./train/cat.1337.jpg to ./val/cat.1337.jpg
Transferring ./train/cat.5748.jpg to ./val/cat.5748.jpg
Transferring ./train/dog.11847.jpg to ./val/dog.11847.jpg
Transferring ./train/dog.11134.jpg to ./val/dog.11134.jpg
Transferring ./train/cat.11279.jpg to ./val/cat.11279.jpg
Transferring ./train/cat.9606.jpg to ./val/cat.9606.jpg
Transferring ./train/cat.1799.jpg to ./val/cat.1799.jpg
Transferring ./train/dog.12209.jpg to ./val/dog.12209.jpg
Transferring ./train/cat.11782.jpg to ./val/cat.11782.jpg
Transferring ./train/cat.7727.jpg to ./val/cat.7727.jpg
Transferring ./train/dog.3278.jpg to ./val/dog.3278.jpg
Transferring ./train/cat.3705.jpg to ./val/cat.3705.jpg
Transferring ./train/dog.6744.jpg to ./val/dog.6744.jpg
Transferring ./train/dog.5578.jpg to ./val/dog.5578.jpg
Transferring ./train/dog.2330.jpg to ./val/dog.2330.jpg
Transferring ./train/cat.1063.jpg to ./val/cat.1063.jpg
Transferring ./train/dog.7148.jpg to ./val/dog.7148.jpg
Transferring ./train/dog.6687.jpg to ./val/dog.6687.jpg
Transferring ./train/cat.2657.jpg to ./val/cat.2657.jpg
Transferring ./train/dog.2543.jpg to ./val/dog.2543.jpg
Transferring ./train/cat.11535.jpg to ./val/cat.11535.jpg
Transferring ./train/cat.8839.jpg to ./val/cat.8839.jpg
Transferring ./train/cat.10525.jpg to ./val/cat.10525.jpg
Transferring ./train/dog.10752.jpg to ./val/dog.10752.jpg
Transferring ./train/cat.8139.jpg to ./val/cat.8139.jpg
Transferring ./train/dog.9298.jpg to ./val/dog.9298.jpg
Transferring ./train/dog.11561.jpg to ./val/dog.11561.jpg
Transferring ./train/dog.1027.jpg to ./val/dog.1027.jpg
Transferring ./train/dog.11387.jpg to ./val/dog.11387.jpg
Transferring ./train/cat.3231.jpg to ./val/cat.3231.jpg
Transferring ./train/cat.4515.jpg to ./val/cat.4515.jpg
Transferring ./train/dog.1052.jpg to ./val/dog.1052.jpg
Transferring ./train/cat.3571.jpg to ./val/cat.3571.jpg
Transferring ./train/dog.6397.jpg to ./val/dog.6397.jpg
Transferring ./train/dog.9175.jpg to ./val/dog.9175.jpg
Transferring ./train/dog.10453.jpg to ./val/dog.10453.jpg
Transferring ./train/cat.12466.jpg to ./val/cat.12466.jpg
Transferring ./train/cat.3660.jpg to ./val/cat.3660.jpg
Transferring ./train/dog.3787.jpg to ./val/dog.3787.jpg
Transferring ./train/dog.2771.jpg to ./val/dog.2771.jpg
Transferring ./train/cat.1868.jpg to ./val/cat.1868.jpg
Transferring ./train/dog.3239.jpg to ./val/dog.3239.jpg
Transferring ./train/dog.2663.jpg to ./val/dog.2663.jpg
Transferring ./train/dog.12352.jpg to ./val/dog.12352.jpg
Transferring ./train/cat.221.jpg to ./val/cat.221.jpg
Transferring ./train/cat.1879.jpg to ./val/cat.1879.jpg
Transferring ./train/dog.9493.jpg to ./val/dog.9493.jpg
Transferring ./train/dog.7300.jpg to ./val/dog.7300.jpg
Transferring ./train/cat.1504.jpg to ./val/cat.1504.jpg
Transferring ./train/cat.10244.jpg to ./val/cat.10244.jpg
Transferring ./train/dog.3358.jpg to ./val/dog.3358.jpg
Transferring ./train/dog.3755.jpg to ./val/dog.3755.jpg
```

```
Transferring ./train/dog.5807.jpg to ./val/dog.5807.jpg
Transferring ./train/cat.834.jpg to ./val/cat.834.jpg
Transferring ./train/cat.11950.jpg to ./val/cat.11950.jpg
Transferring ./train/dog.9511.jpg to ./val/dog.9511.jpg
Transferring ./train/cat.9113.jpg to ./val/cat.9113.jpg
Transferring ./train/dog.10104.jpg to ./val/dog.10104.jpg
Transferring ./train/dog.277.jpg to ./val/dog.277.jpg
Transferring ./train/cat.1835.jpg to ./val/cat.1835.jpg
Transferring ./train/cat.706.jpg to ./val/cat.706.jpg
Transferring ./train/dog.8210.jpg to ./val/dog.8210.jpg
Transferring ./train/cat.7977.jpg to ./val/cat.7977.jpg
Transferring ./train/cat.11831.jpg to ./val/cat.11831.jpg
Transferring ./train/dog.7012.jpg to ./val/dog.7012.jpg
Transferring ./train/dog.10824.jpg to ./val/dog.10824.jpg
Transferring ./train/dog.5831.jpg to ./val/dog.5831.jpg
Transferring ./train/cat.9860.jpg to ./val/cat.9860.jpg
Transferring ./train/dog.6521.jpg to ./val/dog.6521.jpg
Transferring ./train/dog.8346.jpg to ./val/dog.8346.jpg
Transferring ./train/dog.5245.jpg to ./val/dog.5245.jpg
Transferring ./train/dog.10073.jpg to ./val/dog.10073.jpg
Transferring ./train/dog.6150.jpg to ./val/dog.6150.jpg
Transferring ./train/dog.745.jpg to ./val/dog.745.jpg
Transferring ./train/dog.11301.jpg to ./val/dog.11301.jpg
Transferring ./train/dog.8616.jpg to ./val/dog.8616.jpg
Transferring ./train/cat.7871.jpg to ./val/cat.7871.jpg
Transferring ./train/cat.3027.jpg to ./val/cat.3027.jpg
Transferring ./train/dog.7346.jpg to ./val/dog.7346.jpg
Transferring ./train/cat.10270.jpg to ./val/cat.10270.jpg
Transferring ./train/dog.9982.jpg to ./val/dog.9982.jpg
Transferring ./train/dog.9562.jpg to ./val/dog.9562.jpg
Transferring ./train/dog.8071.jpg to ./val/dog.8071.jpg
Transferring ./train/dog.3297.jpg to ./val/dog.3297.jpg
Transferring ./train/cat.12027.jpg to ./val/cat.12027.jpg
Transferring ./train/cat.2979.jpg to ./val/cat.2979.jpg
Transferring ./train/cat.4399.jpg to ./val/cat.4399.jpg
Transferring ./train/dog.11893.jpg to ./val/dog.11893.jpg
Transferring ./train/cat.4736.jpg to ./val/cat.4736.jpg
Transferring ./train/dog.6431.jpg to ./val/dog.6431.jpg
Transferring ./train/cat.8321.jpg to ./val/cat.8321.jpg
Transferring ./train/dog.1549.jpg to ./val/dog.1549.jpg
Transferring ./train/cat.3241.jpg to ./val/cat.3241.jpg
Transferring ./train/cat.11571.jpg to ./val/cat.11571.jpg
Transferring ./train/dog.1822.jpg to ./val/dog.1822.jpg
Transferring ./train/cat.11968.jpg to ./val/cat.11968.jpg
Transferring ./train/dog.3128.jpg to ./val/dog.3128.jpg
Transferring ./train/dog.4493.jpg to ./val/dog.4493.jpg
Transferring ./train/cat.1855.jpg to ./val/cat.1855.jpg
Transferring ./train/dog.11249.jpg to ./val/dog.11249.jpg
Transferring ./train/cat.1860.jpg to ./val/cat.1860.jpg
Transferring ./train/cat.348.jpg to ./val/cat.348.jpg
Transferring ./train/cat.9349.jpg to ./val/cat.9349.jpg
Transferring ./train/cat.10188.jpg to ./val/cat.10188.jpg
Transferring ./train/dog.946.jpg to ./val/dog.946.jpg
Transferring ./train/dog.3833.jpg to ./val/dog.3833.jpg
```

```
Transferring ./train/dog.3710.jpg to ./val/dog.3710.jpg
Transferring ./train/cat.5165.jpg to ./val/cat.5165.jpg
Transferring ./train/cat.2330.jpg to ./val/cat.2330.jpg
Transferring ./train/dog.7531.jpg to ./val/dog.7531.jpg
Transferring ./train/dog.8145.jpg to ./val/dog.8145.jpg
Transferring ./train/cat.2520.jpg to ./val/cat.2520.jpg
Transferring ./train/dog.5330.jpg to ./val/dog.5330.jpg
Transferring ./train/dog.4502.jpg to ./val/dog.4502.jpg
Transferring ./train/cat.9766.jpg to ./val/cat.9766.jpg
Transferring ./train/cat.501.jpg to ./val/cat.501.jpg
Transferring ./train/cat.3194.jpg to ./val/cat.3194.jpg
Transferring ./train/cat.9361.jpg to ./val/cat.9361.jpg
Transferring ./train/cat.11131.jpg to ./val/cat.11131.jpg
Transferring ./train/dog.8238.jpg to ./val/dog.8238.jpg
Transferring ./train/dog.4595.jpg to ./val/dog.4595.jpg
Transferring ./train/cat.3303.jpg to ./val/cat.3303.jpg
Transferring ./train/cat.4939.jpg to ./val/cat.4939.jpg
Transferring ./train/dog.3177.jpg to ./val/dog.3177.jpg
Transferring ./train/cat.8171.jpg to ./val/cat.8171.jpg
Transferring ./train/dog.5235.jpg to ./val/dog.5235.jpg
Transferring ./train/cat.2504.jpg to ./val/cat.2504.jpg
Transferring ./train/cat.8662.jpg to ./val/cat.8662.jpg
Transferring ./train/cat.2352.jpg to ./val/cat.2352.jpg
Transferring ./train/cat.2793.jpg to ./val/cat.2793.jpg
Transferring ./train/dog.2954.jpg to ./val/dog.2954.jpg
Transferring ./train/dog.2866.jpg to ./val/dog.2866.jpg
Transferring ./train/cat.10528.jpg to ./val/cat.10528.jpg
Transferring ./train/cat.8532.jpg to ./val/cat.8532.jpg
Transferring ./train/cat.7030.jpg to ./val/cat.7030.jpg
Transferring ./train/cat.8579.jpg to ./val/cat.8579.jpg
Transferring ./train/cat.7496.jpg to ./val/cat.7496.jpg
Transferring ./train/cat.6619.jpg to ./val/cat.6619.jpg
Transferring ./train/cat.435.jpg to ./val/cat.435.jpg
Transferring ./train/dog.10264.jpg to ./val/dog.10264.jpg
Transferring ./train/dog.8188.jpg to ./val/dog.8188.jpg
Transferring ./train/cat.11625.jpg to ./val/cat.11625.jpg
Transferring ./train/cat.11242.jpg to ./val/cat.11242.jpg
Transferring ./train/cat.4022.jpg to ./val/cat.4022.jpg
Transferring ./train/dog.5035.jpg to ./val/dog.5035.jpg
Transferring ./train/cat.12127.jpg to ./val/cat.12127.jpg
Transferring ./train/dog.10762.jpg to ./val/dog.10762.jpg
Transferring ./train/dog.9005.jpg to ./val/dog.9005.jpg
Transferring ./train/cat.3447.jpg to ./val/cat.3447.jpg
Transferring ./train/dog.9629.jpg to ./val/dog.9629.jpg
Transferring ./train/dog.2870.jpg to ./val/dog.2870.jpg
Transferring ./train/dog.4167.jpg to ./val/dog.4167.jpg
Transferring ./train/dog.12379.jpg to ./val/dog.12379.jpg
Transferring ./train/dog.2248.jpg to ./val/dog.2248.jpg
Transferring ./train/dog.2651.jpg to ./val/dog.2651.jpg
Transferring ./train/dog.9929.jpg to ./val/dog.9929.jpg
Transferring ./train/dog.1340.jpg to ./val/dog.1340.jpg
Transferring ./train/dog.7970.jpg to ./val/dog.7970.jpg
Transferring ./train/dog.8315.jpg to ./val/dog.8315.jpg
Transferring ./train/cat.208.jpg to ./val/cat.208.jpg
```

```
Transferring ./train/dog.2171.jpg to ./val/dog.2171.jpg
Transferring ./train/cat.4526.jpg to ./val/cat.4526.jpg
Transferring ./train/dog.3258.jpg to ./val/dog.3258.jpg
Transferring ./train/dog.4585.jpg to ./val/dog.4585.jpg
Transferring ./train/cat.9560.jpg to ./val/cat.9560.jpg
Transferring ./train/dog.4577.jpg to ./val/dog.4577.jpg
Transferring ./train/cat.9303.jpg to ./val/cat.9303.jpg
Transferring ./train/dog.11246.jpg to ./val/dog.11246.jpg
Transferring ./train/dog.7360.jpg to ./val/dog.7360.jpg
Transferring ./train/dog.7918.jpg to ./val/dog.7918.jpg
Transferring ./train/dog.4809.jpg to ./val/dog.4809.jpg
Transferring ./train/cat.11212.jpg to ./val/cat.11212.jpg
Transferring ./train/dog.7274.jpg to ./val/dog.7274.jpg
Transferring ./train/cat.193.jpg to ./val/cat.193.jpg
Transferring ./train/cat.4441.jpg to ./val/cat.4441.jpg
Transferring ./train/dog.10642.jpg to ./val/dog.10642.jpg
Transferring ./train/cat.477.jpg to ./val/cat.477.jpg
Transferring ./train/dog.1825.jpg to ./val/dog.1825.jpg
Transferring ./train/dog.727.jpg to ./val/dog.727.jpg
Transferring ./train/cat.2083.jpg to ./val/cat.2083.jpg
Transferring ./train/dog.5692.jpg to ./val/dog.5692.jpg
Transferring ./train/cat.1782.jpg to ./val/cat.1782.jpg
Transferring ./train/dog.8829.jpg to ./val/dog.8829.jpg
Transferring ./train/cat.7325.jpg to ./val/cat.7325.jpg
Transferring ./train/cat.762.jpg to ./val/cat.762.jpg
Transferring ./train/dog.9008.jpg to ./val/dog.9008.jpg
Transferring ./train/cat.2740.jpg to ./val/cat.2740.jpg
Transferring ./train/cat.9851.jpg to ./val/cat.9851.jpg
Transferring ./train/cat.1614.jpg to ./val/cat.1614.jpg
Transferring ./train/cat.8974.jpg to ./val/cat.8974.jpg
Transferring ./train/dog.12144.jpg to ./val/dog.12144.jpg
Transferring ./train/cat.9982.jpg to ./val/cat.9982.jpg
Transferring ./train/dog.8433.jpg to ./val/dog.8433.jpg
Transferring ./train/dog.8390.jpg to ./val/dog.8390.jpg
Transferring ./train/dog.4867.jpg to ./val/dog.4867.jpg
Transferring ./train/dog.3226.jpg to ./val/dog.3226.jpg
Transferring ./train/dog.9777.jpg to ./val/dog.9777.jpg
Transferring ./train/dog.2456.jpg to ./val/dog.2456.jpg
Transferring ./train/cat.1384.jpg to ./val/cat.1384.jpg
Transferring ./train/cat.1539.jpg to ./val/cat.1539.jpg
Transferring ./train/cat.10934.jpg to ./val/cat.10934.jpg
Transferring ./train/dog.1243.jpg to ./val/dog.1243.jpg
Transferring ./train/dog.2676.jpg to ./val/dog.2676.jpg
Transferring ./train/cat.488.jpg to ./val/cat.488.jpg
Transferring ./train/dog.2902.jpg to ./val/dog.2902.jpg
Transferring ./train/cat.9324.jpg to ./val/cat.9324.jpg
Transferring ./train/dog.7514.jpg to ./val/dog.7514.jpg
Transferring ./train/dog.11744.jpg to ./val/dog.11744.jpg
Transferring ./train/dog.3738.jpg to ./val/dog.3738.jpg
Transferring ./train/cat.4571.jpg to ./val/cat.4571.jpg
Transferring ./train/cat.6107.jpg to ./val/cat.6107.jpg
Transferring ./train/dog.9046.jpg to ./val/dog.9046.jpg
Transferring ./train/cat.11405.jpg to ./val/cat.11405.jpg
Transferring ./train/cat.12047.jpg to ./val/cat.12047.jpg
```

```
Transferring ./train/cat.4894.jpg to ./val/cat.4894.jpg
Transferring ./train/cat.7388.jpg to ./val/cat.7388.jpg
Transferring ./train/cat.2840.jpg to ./val/cat.2840.jpg
Transferring ./train/dog.5309.jpg to ./val/dog.5309.jpg
Transferring ./train/dog.4396.jpg to ./val/dog.4396.jpg
Transferring ./train/dog.267.jpg to ./val/dog.267.jpg
Transferring ./train/dog.4260.jpg to ./val/dog.4260.jpg
Transferring ./train/dog.6686.jpg to ./val/dog.6686.jpg
Transferring ./train/cat.8121.jpg to ./val/cat.8121.jpg
Transferring ./train/dog.8252.jpg to ./val/dog.8252.jpg
Transferring ./train/cat.4481.jpg to ./val/cat.4481.jpg
Transferring ./train/dog.6078.jpg to ./val/dog.6078.jpg
Transferring ./train/cat.8038.jpg to ./val/cat.8038.jpg
Transferring ./train/dog.4228.jpg to ./val/dog.4228.jpg
Transferring ./train/dog.513.jpg to ./val/dog.513.jpg
Transferring ./train/dog.3459.jpg to ./val/dog.3459.jpg
Transferring ./train/cat.2316.jpg to ./val/cat.2316.jpg
Transferring ./train/cat.3629.jpg to ./val/cat.3629.jpg
Transferring ./train/dog.9654.jpg to ./val/dog.9654.jpg
Transferring ./train/cat.8402.jpg to ./val/cat.8402.jpg
Transferring ./train/cat.8601.jpg to ./val/cat.8601.jpg
Transferring ./train/cat.9819.jpg to ./val/cat.9819.jpg
Transferring ./train/cat.7759.jpg to ./val/cat.7759.jpg
Transferring ./train/dog.304.jpg to ./val/dog.304.jpg
Transferring ./train/dog.4192.jpg to ./val/dog.4192.jpg
Transferring ./train/dog.2013.jpg to ./val/dog.2013.jpg
Transferring ./train/dog.221.jpg to ./val/dog.221.jpg
Transferring ./train/cat.5071.jpg to ./val/cat.5071.jpg
Transferring ./train/cat.11759.jpg to ./val/cat.11759.jpg
Transferring ./train/dog.2669.jpg to ./val/dog.2669.jpg
Transferring ./train/dog.11782.jpg to ./val/dog.11782.jpg
Transferring ./train/dog.2999.jpg to ./val/dog.2999.jpg
Transferring ./train/cat.4793.jpg to ./val/cat.4793.jpg
Transferring ./train/cat.1121.jpg to ./val/cat.1121.jpg
Transferring ./train/dog.572.jpg to ./val/dog.572.jpg
Transferring ./train/cat.9008.jpg to ./val/cat.9008.jpg
Transferring ./train/cat.5680.jpg to ./val/cat.5680.jpg
Transferring ./train/dog.4624.jpg to ./val/dog.4624.jpg
Transferring ./train/cat.2095.jpg to ./val/cat.2095.jpg
Transferring ./train/cat.2869.jpg to ./val/cat.2869.jpg
Transferring ./train/dog.1000.jpg to ./val/dog.1000.jpg
Transferring ./train/dog.5192.jpg to ./val/dog.5192.jpg
Transferring ./train/cat.6801.jpg to ./val/cat.6801.jpg
Transferring ./train/cat.8859.jpg to ./val/cat.8859.jpg
Transferring ./train/cat.10352.jpg to ./val/cat.10352.jpg
Transferring ./train/cat.568.jpg to ./val/cat.568.jpg
Transferring ./train/dog.8152.jpg to ./val/dog.8152.jpg
Transferring ./train/cat.4063.jpg to ./val/cat.4063.jpg
Transferring ./train/cat.2391.jpg to ./val/cat.2391.jpg
Transferring ./train/cat.161.jpg to ./val/cat.161.jpg
Transferring ./train/dog.6491.jpg to ./val/dog.6491.jpg
Transferring ./train/cat.4366.jpg to ./val/cat.4366.jpg
Transferring ./train/cat.7089.jpg to ./val/cat.7089.jpg
Transferring ./train/cat.2126.jpg to ./val/cat.2126.jpg
```

```
Transferring ./train/dog.4616.jpg to ./val/dog.4616.jpg
Transferring ./train/dog.3331.jpg to ./val/dog.3331.jpg
Transferring ./train/dog.3284.jpg to ./val/dog.3284.jpg
Transferring ./train/cat.10734.jpg to ./val/cat.10734.jpg
Transferring ./train/cat.12229.jpg to ./val/cat.12229.jpg
Transferring ./train/dog.12339.jpg to ./val/dog.12339.jpg
Transferring ./train/cat.12148.jpg to ./val/cat.12148.jpg
Transferring ./train/dog.2750.jpg to ./val/dog.2750.jpg
Transferring ./train/dog.7408.jpg to ./val/dog.7408.jpg
Transferring ./train/cat.4550.jpg to ./val/cat.4550.jpg
Transferring ./train/cat.7173.jpg to ./val/cat.7173.jpg
Transferring ./train/cat.2365.jpg to ./val/cat.2365.jpg
Transferring ./train/cat.11039.jpg to ./val/cat.11039.jpg
Transferring ./train/dog.6155.jpg to ./val/dog.6155.jpg
Transferring ./train/cat.9119.jpg to ./val/cat.9119.jpg
Transferring ./train/cat.6902.jpg to ./val/cat.6902.jpg
Transferring ./train/cat.10923.jpg to ./val/cat.10923.jpg
Transferring ./train/cat.2756.jpg to ./val/cat.2756.jpg
Transferring ./train/cat.1601.jpg to ./val/cat.1601.jpg
Transferring ./train/cat.3224.jpg to ./val/cat.3224.jpg
Transferring ./train/cat.11929.jpg to ./val/cat.11929.jpg
Transferring ./train/cat.1498.jpg to ./val/cat.1498.jpg
Transferring ./train/cat.9390.jpg to ./val/cat.9390.jpg
Transferring ./train/cat.9540.jpg to ./val/cat.9540.jpg
Transferring ./train/cat.5995.jpg to ./val/cat.5995.jpg
Transferring ./train/dog.8635.jpg to ./val/dog.8635.jpg
Transferring ./train/dog.9103.jpg to ./val/dog.9103.jpg
Transferring ./train/cat.8595.jpg to ./val/cat.8595.jpg
Transferring ./train/dog.5771.jpg to ./val/dog.5771.jpg
Transferring ./train/cat.8467.jpg to ./val/cat.8467.jpg
Transferring ./train/dog.23.jpg to ./val/dog.23.jpg
Transferring ./train/cat.3259.jpg to ./val/cat.3259.jpg
Transferring ./train/cat.8748.jpg to ./val/cat.8748.jpg
Transferring ./train/dog.6925.jpg to ./val/dog.6925.jpg
Transferring ./train/cat.5278.jpg to ./val/cat.5278.jpg
Transferring ./train/cat.8571.jpg to ./val/cat.8571.jpg
Transferring ./train/cat.5639.jpg to ./val/cat.5639.jpg
Transferring ./train/dog.7767.jpg to ./val/dog.7767.jpg
Transferring ./train/dog.12304.jpg to ./val/dog.12304.jpg
Transferring ./train/cat.11742.jpg to ./val/cat.11742.jpg
Transferring ./train/dog.302.jpg to ./val/dog.302.jpg
Transferring ./train/cat.7754.jpg to ./val/cat.7754.jpg
Transferring ./train/dog.259.jpg to ./val/dog.259.jpg
Transferring ./train/cat.6239.jpg to ./val/cat.6239.jpg
Transferring ./train/dog.3133.jpg to ./val/dog.3133.jpg
Transferring ./train/cat.10995.jpg to ./val/cat.10995.jpg
Transferring ./train/dog.10802.jpg to ./val/dog.10802.jpg
Transferring ./train/dog.3695.jpg to ./val/dog.3695.jpg
Transferring ./train/dog.4424.jpg to ./val/dog.4424.jpg
Transferring ./train/dog.8599.jpg to ./val/dog.8599.jpg
Transferring ./train/dog.10094.jpg to ./val/dog.10094.jpg
Transferring ./train/cat.2732.jpg to ./val/cat.2732.jpg
Transferring ./train/cat.12334.jpg to ./val/cat.12334.jpg
Transferring ./train/dog.11974.jpg to ./val/dog.11974.jpg
```

```
Transferring ./train/cat.1637.jpg to ./val/cat.1637.jpg
Transferring ./train/cat.172.jpg to ./val/cat.172.jpg
Transferring ./train/dog.1113.jpg to ./val/dog.1113.jpg
Transferring ./train/dog.4029.jpg to ./val/dog.4029.jpg
Transferring ./train/cat.8761.jpg to ./val/cat.8761.jpg
Transferring ./train/cat.9792.jpg to ./val/cat.9792.jpg
Transferring ./train/cat.6211.jpg to ./val/cat.6211.jpg
Transferring ./train/cat.244.jpg to ./val/cat.244.jpg
Transferring ./train/cat.4624.jpg to ./val/cat.4624.jpg
Transferring ./train/dog.39.jpg to ./val/dog.39.jpg
Transferring ./train/cat.4046.jpg to ./val/cat.4046.jpg
Transferring ./train/cat.11421.jpg to ./val/cat.11421.jpg
Transferring ./train/cat.937.jpg to ./val/cat.937.jpg
Transferring ./train/cat.1004.jpg to ./val/cat.1004.jpg
Transferring ./train/dog.969.jpg to ./val/dog.969.jpg
Transferring ./train/dog.1311.jpg to ./val/dog.1311.jpg
Transferring ./train/dog.4432.jpg to ./val/dog.4432.jpg
Transferring ./train/cat.4760.jpg to ./val/cat.4760.jpg
Transferring ./train/dog.5426.jpg to ./val/dog.5426.jpg
Transferring ./train/dog.11890.jpg to ./val/dog.11890.jpg
Transferring ./train/dog.7895.jpg to ./val/dog.7895.jpg
Transferring ./train/cat.4527.jpg to ./val/cat.4527.jpg
Transferring ./train/dog.6965.jpg to ./val/dog.6965.jpg
Transferring ./train/cat.4885.jpg to ./val/cat.4885.jpg
Transferring ./train/dog.4219.jpg to ./val/dog.4219.jpg
Transferring ./train/dog.10052.jpg to ./val/dog.10052.jpg
Transferring ./train/dog.955.jpg to ./val/dog.955.jpg
Transferring ./train/cat.7070.jpg to ./val/cat.7070.jpg
Transferring ./train/cat.6906.jpg to ./val/cat.6906.jpg
Transferring ./train/dog.2278.jpg to ./val/dog.2278.jpg
Transferring ./train/cat.3130.jpg to ./val/cat.3130.jpg
Transferring ./train/dog.5163.jpg to ./val/dog.5163.jpg
Transferring ./train/cat.8291.jpg to ./val/cat.8291.jpg
Transferring ./train/dog.4858.jpg to ./val/dog.4858.jpg
Transferring ./train/cat.3261.jpg to ./val/cat.3261.jpg
Transferring ./train/dog.1045.jpg to ./val/dog.1045.jpg
Transferring ./train/dog.11898.jpg to ./val/dog.11898.jpg
Transferring ./train/cat.6425.jpg to ./val/cat.6425.jpg
Transferring ./train/cat.12292.jpg to ./val/cat.12292.jpg
Transferring ./train/cat.7729.jpg to ./val/cat.7729.jpg
Transferring ./train/cat.10666.jpg to ./val/cat.10666.jpg
Transferring ./train/dog.907.jpg to ./val/dog.907.jpg
Transferring ./train/dog.12416.jpg to ./val/dog.12416.jpg
Transferring ./train/cat.8453.jpg to ./val/cat.8453.jpg
Transferring ./train/dog.9941.jpg to ./val/dog.9941.jpg
Transferring ./train/cat.4405.jpg to ./val/cat.4405.jpg
Transferring ./train/cat.6240.jpg to ./val/cat.6240.jpg
Transferring ./train/dog.1225.jpg to ./val/dog.1225.jpg
Transferring ./train/dog.9857.jpg to ./val/dog.9857.jpg
Transferring ./train/dog.3962.jpg to ./val/dog.3962.jpg
Transferring ./train/cat.6668.jpg to ./val/cat.6668.jpg
Transferring ./train/cat.4390.jpg to ./val/cat.4390.jpg
Transferring ./train/dog.8759.jpg to ./val/dog.8759.jpg
Transferring ./train/dog.692.jpg to ./val/dog.692.jpg
```

```
Transferring ./train/dog.4556.jpg to ./val/dog.4556.jpg
Transferring ./train/cat.11631.jpg to ./val/cat.11631.jpg
Transferring ./train/dog.11439.jpg to ./val/dog.11439.jpg
Transferring ./train/dog.2199.jpg to ./val/dog.2199.jpg
Transferring ./train/cat.2147.jpg to ./val/cat.2147.jpg
Transferring ./train/dog.4001.jpg to ./val/dog.4001.jpg
Transferring ./train/dog.2742.jpg to ./val/dog.2742.jpg
Transferring ./train/cat.2761.jpg to ./val/cat.2761.jpg
Transferring ./train/cat.5184.jpg to ./val/cat.5184.jpg
Transferring ./train/cat.2378.jpg to ./val/cat.2378.jpg
Transferring ./train/cat.2593.jpg to ./val/cat.2593.jpg
Transferring ./train/cat.5392.jpg to ./val/cat.5392.jpg
Transferring ./train/dog.4569.jpg to ./val/dog.4569.jpg
Transferring ./train/cat.5159.jpg to ./val/cat.5159.jpg
Transferring ./train/cat.12291.jpg to ./val/cat.12291.jpg
Transferring ./train/dog.278.jpg to ./val/dog.278.jpg
Transferring ./train/dog.6797.jpg to ./val/dog.6797.jpg
Transferring ./train/cat.5384.jpg to ./val/cat.5384.jpg
Transferring ./train/cat.4410.jpg to ./val/cat.4410.jpg
Transferring ./train/dog.6646.jpg to ./val/dog.6646.jpg
Transferring ./train/cat.12101.jpg to ./val/cat.12101.jpg
Transferring ./train/dog.9144.jpg to ./val/dog.9144.jpg
Transferring ./train/cat.9690.jpg to ./val/cat.9690.jpg
Transferring ./train/dog.3197.jpg to ./val/dog.3197.jpg
Transferring ./train/dog.6449.jpg to ./val/dog.6449.jpg
Transferring ./train/dog.5018.jpg to ./val/dog.5018.jpg
Transferring ./train/cat.12001.jpg to ./val/cat.12001.jpg
Transferring ./train/cat.4505.jpg to ./val/cat.4505.jpg
Transferring ./train/dog.1057.jpg to ./val/dog.1057.jpg
Transferring ./train/dog.9064.jpg to ./val/dog.9064.jpg
Transferring ./train/cat.6830.jpg to ./val/cat.6830.jpg
Transferring ./train/cat.10456.jpg to ./val/cat.10456.jpg
Transferring ./train/cat.10759.jpg to ./val/cat.10759.jpg
Transferring ./train/cat.8187.jpg to ./val/cat.8187.jpg
Transferring ./train/dog.2782.jpg to ./val/dog.2782.jpg
Transferring ./train/cat.3883.jpg to ./val/cat.3883.jpg
Transferring ./train/cat.5534.jpg to ./val/cat.5534.jpg
Transferring ./train/cat.4556.jpg to ./val/cat.4556.jpg
Transferring ./train/dog.5029.jpg to ./val/dog.5029.jpg
Transferring ./train/dog.2209.jpg to ./val/dog.2209.jpg
Transferring ./train/cat.9168.jpg to ./val/cat.9168.jpg
Transferring ./train/cat.2604.jpg to ./val/cat.2604.jpg
Transferring ./train/dog.10197.jpg to ./val/dog.10197.jpg
Transferring ./train/cat.10882.jpg to ./val/cat.10882.jpg
Transferring ./train/cat.10574.jpg to ./val/cat.10574.jpg
Transferring ./train/dog.2477.jpg to ./val/dog.2477.jpg
Transferring ./train/dog.308.jpg to ./val/dog.308.jpg
Transferring ./train/dog.481.jpg to ./val/dog.481.jpg
Transferring ./train/cat.12345.jpg to ./val/cat.12345.jpg
Transferring ./train/cat.7731.jpg to ./val/cat.7731.jpg
Transferring ./train/dog.8671.jpg to ./val/dog.8671.jpg
Transferring ./train/cat.8828.jpg to ./val/cat.8828.jpg
Transferring ./train/cat.12491.jpg to ./val/cat.12491.jpg
Transferring ./train/dog.5150.jpg to ./val/dog.5150.jpg
```

```
Transferring ./train/dog.874.jpg to ./val/dog.874.jpg
Transferring ./train/dog.981.jpg to ./val/dog.981.jpg
Transferring ./train/dog.11894.jpg to ./val/dog.11894.jpg
Transferring ./train/dog.12093.jpg to ./val/dog.12093.jpg
Transferring ./train/dog.12436.jpg to ./val/dog.12436.jpg
Transferring ./train/dog.3985.jpg to ./val/dog.3985.jpg
Transferring ./train/cat.11027.jpg to ./val/cat.11027.jpg
Transferring ./train/dog.2328.jpg to ./val/dog.2328.jpg
Transferring ./train/cat.12255.jpg to ./val/cat.12255.jpg
Transferring ./train/cat.12311.jpg to ./val/cat.12311.jpg
Transferring ./train/cat.7412.jpg to ./val/cat.7412.jpg
Transferring ./train/cat.1627.jpg to ./val/cat.1627.jpg
Transferring ./train/dog.3142.jpg to ./val/dog.3142.jpg
Transferring ./train/cat.329.jpg to ./val/cat.329.jpg
Transferring ./train/dog.483.jpg to ./val/dog.483.jpg
Transferring ./train/dog.3972.jpg to ./val/dog.3972.jpg
Transferring ./train/dog.468.jpg to ./val/dog.468.jpg
Transferring ./train/cat.5893.jpg to ./val/cat.5893.jpg
Transferring ./train/cat.11282.jpg to ./val/cat.11282.jpg
Transferring ./train/dog.4405.jpg to ./val/dog.4405.jpg
Transferring ./train/cat.2087.jpg to ./val/cat.2087.jpg
Transferring ./train/dog.604.jpg to ./val/dog.604.jpg
Transferring ./train/cat.1942.jpg to ./val/cat.1942.jpg
Transferring ./train/dog.3163.jpg to ./val/dog.3163.jpg
Transferring ./train/dog.10084.jpg to ./val/dog.10084.jpg
Transferring ./train/dog.5991.jpg to ./val/dog.5991.jpg
Transferring ./train/cat.1225.jpg to ./val/cat.1225.jpg
Transferring ./train/dog.11519.jpg to ./val/dog.11519.jpg
Transferring ./train/cat.9395.jpg to ./val/cat.9395.jpg
Transferring ./train/cat.2463.jpg to ./val/cat.2463.jpg
Transferring ./train/cat.159.jpg to ./val/cat.159.jpg
Transferring ./train/cat.145.jpg to ./val/cat.145.jpg
Transferring ./train/dog.6921.jpg to ./val/dog.6921.jpg
Transferring ./train/dog.998.jpg to ./val/dog.998.jpg
Transferring ./train/dog.6228.jpg to ./val/dog.6228.jpg
Transferring ./train/cat.4311.jpg to ./val/cat.4311.jpg
Transferring ./train/dog.10088.jpg to ./val/dog.10088.jpg
Transferring ./train/cat.6084.jpg to ./val/cat.6084.jpg
Transferring ./train/cat.588.jpg to ./val/cat.588.jpg
Transferring ./train/cat.9856.jpg to ./val/cat.9856.jpg
Transferring ./train/cat.8629.jpg to ./val/cat.8629.jpg
Transferring ./train/cat.2332.jpg to ./val/cat.2332.jpg
Transferring ./train/cat.133.jpg to ./val/cat.133.jpg
Transferring ./train/dog.12210.jpg to ./val/dog.12210.jpg
Transferring ./train/cat.3763.jpg to ./val/cat.3763.jpg
Transferring ./train/cat.5177.jpg to ./val/cat.5177.jpg
Transferring ./train/dog.2169.jpg to ./val/dog.2169.jpg
Transferring ./train/cat.8233.jpg to ./val/cat.8233.jpg
Transferring ./train/dog.10174.jpg to ./val/dog.10174.jpg
Transferring ./train/cat.7228.jpg to ./val/cat.7228.jpg
Transferring ./train/dog.523.jpg to ./val/dog.523.jpg
Transferring ./train/dog.11300.jpg to ./val/dog.11300.jpg
Transferring ./train/dog.2212.jpg to ./val/dog.2212.jpg
Transferring ./train/cat.8769.jpg to ./val/cat.8769.jpg
```

```
Transferring ./train/dog.429.jpg to ./val/dog.429.jpg
Transferring ./train/cat.4942.jpg to ./val/cat.4942.jpg
Transferring ./train/cat.5383.jpg to ./val/cat.5383.jpg
Transferring ./train/dog.8043.jpg to ./val/dog.8043.jpg
Transferring ./train/dog.3760.jpg to ./val/dog.3760.jpg
Transferring ./train/cat.2757.jpg to ./val/cat.2757.jpg
Transferring ./train/cat.11003.jpg to ./val/cat.11003.jpg
Transferring ./train/cat.2410.jpg to ./val/cat.2410.jpg
Transferring ./train/cat.6657.jpg to ./val/cat.6657.jpg
Transferring ./train/dog.2379.jpg to ./val/dog.2379.jpg
Transferring ./train/dog.6815.jpg to ./val/dog.6815.jpg
Transferring ./train/cat.8969.jpg to ./val/cat.8969.jpg
Transferring ./train/cat.5336.jpg to ./val/cat.5336.jpg
Transferring ./train/dog.6804.jpg to ./val/dog.6804.jpg
Transferring ./train/cat.5422.jpg to ./val/cat.5422.jpg
Transferring ./train/dog.5127.jpg to ./val/dog.5127.jpg
Transferring ./train/cat.8587.jpg to ./val/cat.8587.jpg
Transferring ./train/cat.6921.jpg to ./val/cat.6921.jpg
Transferring ./train/dog.7182.jpg to ./val/dog.7182.jpg
Transferring ./train/dog.3391.jpg to ./val/dog.3391.jpg
Transferring ./train/dog.1025.jpg to ./val/dog.1025.jpg
Transferring ./train/cat.12180.jpg to ./val/cat.12180.jpg
Transferring ./train/dog.3523.jpg to ./val/dog.3523.jpg
Transferring ./train/dog.1372.jpg to ./val/dog.1372.jpg
Transferring ./train/cat.10381.jpg to ./val/cat.10381.jpg
Transferring ./train/cat.8298.jpg to ./val/cat.8298.jpg
Transferring ./train/dog.11343.jpg to ./val/dog.11343.jpg
Transferring ./train/cat.965.jpg to ./val/cat.965.jpg
Transferring ./train/cat.11057.jpg to ./val/cat.11057.jpg
Transferring ./train/dog.1432.jpg to ./val/dog.1432.jpg
Transferring ./train/cat.10346.jpg to ./val/cat.10346.jpg
Transferring ./train/cat.3779.jpg to ./val/cat.3779.jpg
Transferring ./train/cat.2329.jpg to ./val/cat.2329.jpg
Transferring ./train/cat.8062.jpg to ./val/cat.8062.jpg
Transferring ./train/dog.8399.jpg to ./val/dog.8399.jpg
Transferring ./train/dog.9630.jpg to ./val/dog.9630.jpg
Transferring ./train/dog.5766.jpg to ./val/dog.5766.jpg
Transferring ./train/cat.1545.jpg to ./val/cat.1545.jpg
Transferring ./train/cat.10505.jpg to ./val/cat.10505.jpg
Transferring ./train/dog.4509.jpg to ./val/dog.4509.jpg
Transferring ./train/cat.5749.jpg to ./val/cat.5749.jpg
Transferring ./train/cat.10967.jpg to ./val/cat.10967.jpg
Transferring ./train/dog.4316.jpg to ./val/dog.4316.jpg
Transferring ./train/cat.5465.jpg to ./val/cat.5465.jpg
Transferring ./train/dog.10761.jpg to ./val/dog.10761.jpg
Transferring ./train/cat.10398.jpg to ./val/cat.10398.jpg
Transferring ./train/dog.5701.jpg to ./val/dog.5701.jpg
Transferring ./train/dog.12498.jpg to ./val/dog.12498.jpg
Transferring ./train/dog.10451.jpg to ./val/dog.10451.jpg
Transferring ./train/cat.12007.jpg to ./val/cat.12007.jpg
Transferring ./train/cat.10793.jpg to ./val/cat.10793.jpg
Transferring ./train/dog.5664.jpg to ./val/dog.5664.jpg
Transferring ./train/dog.1901.jpg to ./val/dog.1901.jpg
Transferring ./train/dog.2759.jpg to ./val/dog.2759.jpg
```

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Transferring ./train/cat.10176.jpg to ./val/cat.10176.jpg
Transferring ./train/dog.10768.jpg to ./val/dog.10768.jpg
Transferring ./train/cat.7550.jpg to ./val/cat.7550.jpg
Transferring ./train/dog.8012.jpg to ./val/dog.8012.jpg
Transferring ./train/dog.7007.jpg to ./val/dog.7007.jpg
Transferring ./train/dog.1456.jpg to ./val/dog.1456.jpg
Transferring ./train/dog.12171.jpg to ./val/dog.12171.jpg
Transferring ./train/cat.4468.jpg to ./val/cat.4468.jpg
Transferring ./train/dog.2113.jpg to ./val/dog.2113.jpg
Transferring ./train/cat.3372.jpg to ./val/cat.3372.jpg
Transferring ./train/dog.1970.jpg to ./val/dog.1970.jpg
Transferring ./train/cat.10677.jpg to ./val/cat.10677.jpg
Transferring ./train/cat.8727.jpg to ./val/cat.8727.jpg
Transferring ./train/cat.10171.jpg to ./val/cat.10171.jpg
Transferring ./train/dog.11459.jpg to ./val/dog.11459.jpg
Transferring ./train/cat.4469.jpg to ./val/cat.4469.jpg
Transferring ./train/dog.9441.jpg to ./val/dog.9441.jpg
Transferring ./train/cat.4632.jpg to ./val/cat.4632.jpg
Transferring ./train/dog.757.jpg to ./val/dog.757.jpg
Transferring ./train/dog.10318.jpg to ./val/dog.10318.jpg
Transferring ./train/cat.7627.jpg to ./val/cat.7627.jpg
Transferring ./train/dog.4993.jpg to ./val/dog.4993.jpg
Transferring ./train/dog.403.jpg to ./val/dog.403.jpg
Transferring ./train/cat.4056.jpg to ./val/cat.4056.jpg
Transferring ./train/cat.695.jpg to ./val/cat.695.jpg
Transferring ./train/dog.2796.jpg to ./val/dog.2796.jpg
Transferring ./train/dog.5834.jpg to ./val/dog.5834.jpg
Transferring ./train/cat.4728.jpg to ./val/cat.4728.jpg
Transferring ./train/cat.8449.jpg to ./val/cat.8449.jpg
Transferring ./train/cat.3139.jpg to ./val/cat.3139.jpg
Transferring ./train/dog.6138.jpg to ./val/dog.6138.jpg
Transferring ./train/cat.217.jpg to ./val/cat.217.jpg
Transferring ./train/dog.2974.jpg to ./val/dog.2974.jpg
Transferring ./train/cat.1525.jpg to ./val/cat.1525.jpg
Transferring ./train/cat.1739.jpg to ./val/cat.1739.jpg
Transferring ./train/dog.12169.jpg to ./val/dog.12169.jpg
Transferring ./train/cat.1109.jpg to ./val/cat.1109.jpg
Transferring ./train/cat.4662.jpg to ./val/cat.4662.jpg
Transferring ./train/cat.5136.jpg to ./val/cat.5136.jpg
Transferring ./train/cat.8898.jpg to ./val/cat.8898.jpg
Transferring ./train/cat.5437.jpg to ./val/cat.5437.jpg
Transferring ./train/dog.12313.jpg to ./val/dog.12313.jpg
Transferring ./train/dog.1766.jpg to ./val/dog.1766.jpg
Transferring ./train/cat.9960.jpg to ./val/cat.9960.jpg
Transferring ./train/dog.10912.jpg to ./val/dog.10912.jpg
Transferring ./train/cat.583.jpg to ./val/cat.583.jpg
Transferring ./train/cat.9430.jpg to ./val/cat.9430.jpg
Transferring ./train/cat.1050.jpg to ./val/cat.1050.jpg
Transferring ./train/dog.4470.jpg to ./val/dog.4470.jpg
Transferring ./train/dog.1827.jpg to ./val/dog.1827.jpg
Transferring ./train/dog.1034.jpg to ./val/dog.1034.jpg
Transferring ./train/dog.4387.jpg to ./val/dog.4387.jpg
Transferring ./train/dog.7160.jpg to ./val/dog.7160.jpg
Transferring ./train/cat.10917.jpg to ./val/cat.10917.jpg
```

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Transferring ./train/cat.8275.jpg to ./val/cat.8275.jpg
Transferring ./train/dog.1817.jpg to ./val/dog.1817.jpg
Transferring ./train/dog.8461.jpg to ./val/dog.8461.jpg
Transferring ./train/cat.3010.jpg to ./val/cat.3010.jpg
Transferring ./train/dog.7213.jpg to ./val/dog.7213.jpg
Transferring ./train/dog.2483.jpg to ./val/dog.2483.jpg
Transferring ./train/dog.3984.jpg to ./val/dog.3984.jpg
Transferring ./train/cat.9165.jpg to ./val/cat.9165.jpg
Transferring ./train/cat.11479.jpg to ./val/cat.11479.jpg
Transferring ./train/cat.12377.jpg to ./val/cat.12377.jpg
Transferring ./train/cat.2835.jpg to ./val/cat.2835.jpg
Transferring ./train/cat.11685.jpg to ./val/cat.11685.jpg
Transferring ./train/cat.10955.jpg to ./val/cat.10955.jpg
Transferring ./train/cat.3957.jpg to ./val/cat.3957.jpg
Transferring ./train/cat.6669.jpg to ./val/cat.6669.jpg
Transferring ./train/dog.8004.jpg to ./val/dog.8004.jpg
Transferring ./train/cat.8118.jpg to ./val/cat.8118.jpg
Transferring ./train/dog.7442.jpg to ./val/dog.7442.jpg
Transferring ./train/dog.10891.jpg to ./val/dog.10891.jpg
Transferring ./train/cat.2533.jpg to ./val/cat.2533.jpg
Transferring ./train/dog.1306.jpg to ./val/dog.1306.jpg
Transferring ./train/dog.453.jpg to ./val/dog.453.jpg
Transferring ./train/dog.5649.jpg to ./val/dog.5649.jpg
Transferring ./train/cat.668.jpg to ./val/cat.668.jpg
Transferring ./train/cat.5699.jpg to ./val/cat.5699.jpg
Transferring ./train/dog.6200.jpg to ./val/dog.6200.jpg
Transferring ./train/dog.5560.jpg to ./val/dog.5560.jpg
Transferring ./train/dog.4664.jpg to ./val/dog.4664.jpg
Transferring ./train/cat.6464.jpg to ./val/cat.6464.jpg
Transferring ./train/dog.7987.jpg to ./val/dog.7987.jpg
Transferring ./train/dog.891.jpg to ./val/dog.891.jpg
Transferring ./train/dog.8682.jpg to ./val/dog.8682.jpg
Transferring ./train/dog.3752.jpg to ./val/dog.3752.jpg
Transferring ./train/dog.7896.jpg to ./val/dog.7896.jpg
Transferring ./train/dog.5201.jpg to ./val/dog.5201.jpg
Transferring ./train/dog.8144.jpg to ./val/dog.8144.jpg
Transferring ./train/cat.1380.jpg to ./val/cat.1380.jpg
Transferring ./train/dog.7637.jpg to ./val/dog.7637.jpg
Transferring ./train/cat.4955.jpg to ./val/cat.4955.jpg
Transferring ./train/dog.7883.jpg to ./val/dog.7883.jpg
Transferring ./train/cat.6153.jpg to ./val/cat.6153.jpg
Transferring ./train/dog.855.jpg to ./val/dog.855.jpg
Transferring ./train/cat.1260.jpg to ./val/cat.1260.jpg
Transferring ./train/cat.147.jpg to ./val/cat.147.jpg
Transferring ./train/cat.4947.jpg to ./val/cat.4947.jpg
Transferring ./train/dog.3908.jpg to ./val/dog.3908.jpg
Transferring ./train/dog.5802.jpg to ./val/dog.5802.jpg
Transferring ./train/cat.8388.jpg to ./val/cat.8388.jpg
Transferring ./train/dog.3146.jpg to ./val/dog.3146.jpg
Transferring ./train/dog.11235.jpg to ./val/dog.11235.jpg
Transferring ./train/dog.11566.jpg to ./val/dog.11566.jpg
Transferring ./train/cat.11482.jpg to ./val/cat.11482.jpg
Transferring ./train/cat.3304.jpg to ./val/cat.3304.jpg
Transferring ./train/dog.2276.jpg to ./val/dog.2276.jpg
```

```
Transferring ./train/dog.443.jpg to ./val/dog.443.jpg
Transferring ./train/dog.10211.jpg to ./val/dog.10211.jpg
Transferring ./train/dog.6834.jpg to ./val/dog.6834.jpg
Transferring ./train/cat.5623.jpg to ./val/cat.5623.jpg
Transferring ./train/dog.6425.jpg to ./val/dog.6425.jpg
Transferring ./train/dog.3548.jpg to ./val/dog.3548.jpg
Transferring ./train/cat.7396.jpg to ./val/cat.7396.jpg
Transferring ./train/cat.1261.jpg to ./val/cat.1261.jpg
Transferring ./train/dog.7869.jpg to ./val/dog.7869.jpg
Transferring ./train/dog.5647.jpg to ./val/dog.5647.jpg
Transferring ./train/cat.9235.jpg to ./val/cat.9235.jpg
Transferring ./train/dog.9561.jpg to ./val/dog.9561.jpg
Transferring ./train/dog.11091.jpg to ./val/dog.11091.jpg
Transferring ./train/cat.3706.jpg to ./val/cat.3706.jpg
Transferring ./train/cat.4082.jpg to ./val/cat.4082.jpg
Transferring ./train/cat.3162.jpg to ./val/cat.3162.jpg
Transferring ./train/dog.12319.jpg to ./val/dog.12319.jpg
Transferring ./train/cat.8185.jpg to ./val/cat.8185.jpg
Transferring ./train/cat.4054.jpg to ./val/cat.4054.jpg
Transferring ./train/dog.796.jpg to ./val/dog.796.jpg
Transferring ./train/cat.7845.jpg to ./val/cat.7845.jpg
Transferring ./train/dog.1190.jpg to ./val/dog.1190.jpg
Transferring ./train/dog.12372.jpg to ./val/dog.12372.jpg
Transferring ./train/cat.1987.jpg to ./val/cat.1987.jpg
Transferring ./train/dog.1495.jpg to ./val/dog.1495.jpg
Transferring ./train/dog.2515.jpg to ./val/dog.2515.jpg
Transferring ./train/dog.2163.jpg to ./val/dog.2163.jpg
Transferring ./train/dog.3060.jpg to ./val/dog.3060.jpg
Transferring ./train/cat.10571.jpg to ./val/cat.10571.jpg
Transferring ./train/cat.8806.jpg to ./val/cat.8806.jpg
Transferring ./train/dog.10101.jpg to ./val/dog.10101.jpg
Transferring ./train/cat.6867.jpg to ./val/cat.6867.jpg
Transferring ./train/dog.7773.jpg to ./val/dog.7773.jpg
Transferring ./train/dog.7732.jpg to ./val/dog.7732.jpg
Transferring ./train/cat.9024.jpg to ./val/cat.9024.jpg
Transferring ./train/cat.7529.jpg to ./val/cat.7529.jpg
Transferring ./train/dog.9279.jpg to ./val/dog.9279.jpg
Transferring ./train/cat.3011.jpg to ./val/cat.3011.jpg
Transferring ./train/cat.5296.jpg to ./val/cat.5296.jpg
Transferring ./train/cat.6802.jpg to ./val/cat.6802.jpg
Transferring ./train/cat.12217.jpg to ./val/cat.12217.jpg
Transferring ./train/cat.1648.jpg to ./val/cat.1648.jpg
Transferring ./train/dog.11016.jpg to ./val/dog.11016.jpg
Transferring ./train/cat.3577.jpg to ./val/cat.3577.jpg
Transferring ./train/cat.3657.jpg to ./val/cat.3657.jpg
Transferring ./train/cat.12089.jpg to ./val/cat.12089.jpg
Transferring ./train/cat.2609.jpg to ./val/cat.2609.jpg
Transferring ./train/dog.9879.jpg to ./val/dog.9879.jpg
Transferring ./train/cat.499.jpg to ./val/cat.499.jpg
Transferring ./train/cat.11997.jpg to ./val/cat.11997.jpg
Transferring ./train/dog.6823.jpg to ./val/dog.6823.jpg
Transferring ./train/dog.7755.jpg to ./val/dog.7755.jpg
Transferring ./train/dog.7262.jpg to ./val/dog.7262.jpg
Transferring ./train/dog.4471.jpg to ./val/dog.4471.jpg
```

```
Transferring ./train/dog.4207.jpg to ./val/dog.4207.jpg
Transferring ./train/dog.9985.jpg to ./val/dog.9985.jpg
Transferring ./train/dog.10511.jpg to ./val/dog.10511.jpg
Transferring ./train/dog.10516.jpg to ./val/dog.10516.jpg
Transferring ./train/cat.5216.jpg to ./val/cat.5216.jpg
Transferring ./train/dog.8740.jpg to ./val/dog.8740.jpg
Transferring ./train/dog.7511.jpg to ./val/dog.7511.jpg
Transferring ./train/dog.8595.jpg to ./val/dog.8595.jpg
Transferring ./train/cat.256.jpg to ./val/cat.256.jpg
Transferring ./train/cat.2131.jpg to ./val/cat.2131.jpg
Transferring ./train/dog.3892.jpg to ./val/dog.3892.jpg
Transferring ./train/dog.8961.jpg to ./val/dog.8961.jpg
Transferring ./train/cat.365.jpg to ./val/cat.365.jpg
Transferring ./train/dog.2464.jpg to ./val/dog.2464.jpg
Transferring ./train/dog.2178.jpg to ./val/dog.2178.jpg
Transferring ./train/cat.8254.jpg to ./val/cat.8254.jpg
Transferring ./train/cat.3028.jpg to ./val/cat.3028.jpg
Transferring ./train/cat.3852.jpg to ./val/cat.3852.jpg
Transferring ./train/cat.3715.jpg to ./val/cat.3715.jpg
Transferring ./train/cat.6894.jpg to ./val/cat.6894.jpg
Transferring ./train/dog.8339.jpg to ./val/dog.8339.jpg
Transferring ./train/dog.4938.jpg to ./val/dog.4938.jpg
Transferring ./train/dog.1486.jpg to ./val/dog.1486.jpg
Transferring ./train/dog.9543.jpg to ./val/dog.9543.jpg
Transferring ./train/cat.4669.jpg to ./val/cat.4669.jpg
Transferring ./train/cat.9751.jpg to ./val/cat.9751.jpg
Transferring ./train/cat.4846.jpg to ./val/cat.4846.jpg
Transferring ./train/dog.2124.jpg to ./val/dog.2124.jpg
Transferring ./train/dog.11238.jpg to ./val/dog.11238.jpg
Transferring ./train/cat.11126.jpg to ./val/cat.11126.jpg
Transferring ./train/dog.1369.jpg to ./val/dog.1369.jpg
Transferring ./train/dog.3683.jpg to ./val/dog.3683.jpg
Transferring ./train/dog.535.jpg to ./val/dog.535.jpg
Transferring ./train/cat.6857.jpg to ./val/cat.6857.jpg
Transferring ./train/cat.4130.jpg to ./val/cat.4130.jpg
Transferring ./train/dog.860.jpg to ./val/dog.860.jpg
Transferring ./train/dog.1107.jpg to ./val/dog.1107.jpg
Transferring ./train/dog.4694.jpg to ./val/dog.4694.jpg
Transferring ./train/dog.3371.jpg to ./val/dog.3371.jpg
Transferring ./train/cat.6978.jpg to ./val/cat.6978.jpg
Transferring ./train/cat.9936.jpg to ./val/cat.9936.jpg
Transferring ./train/dog.122.jpg to ./val/dog.122.jpg
Transferring ./train/cat.9567.jpg to ./val/cat.9567.jpg
Transferring ./train/cat.8832.jpg to ./val/cat.8832.jpg
Transferring ./train/cat.9925.jpg to ./val/cat.9925.jpg
Transferring ./train/dog.6983.jpg to ./val/dog.6983.jpg
Transferring ./train/dog.3395.jpg to ./val/dog.3395.jpg
Transferring ./train/dog.6211.jpg to ./val/dog.6211.jpg
Transferring ./train/dog.7424.jpg to ./val/dog.7424.jpg
Transferring ./train/cat.1918.jpg to ./val/cat.1918.jpg
Transferring ./train/dog.9262.jpg to ./val/dog.9262.jpg
Transferring ./train/cat.4222.jpg to ./val/cat.4222.jpg
Transferring ./train/cat.4726.jpg to ./val/cat.4726.jpg
Transferring ./train/dog.9128.jpg to ./val/dog.9128.jpg
```

```
Transferring ./train/cat.1635.jpg to ./val/cat.1635.jpg
Transferring ./train/cat.9194.jpg to ./val/cat.9194.jpg
Transferring ./train/cat.5204.jpg to ./val/cat.5204.jpg
Transferring ./train/dog.8567.jpg to ./val/dog.8567.jpg
Transferring ./train/cat.9166.jpg to ./val/cat.9166.jpg
Transferring ./train/cat.12099.jpg to ./val/cat.12099.jpg
Transferring ./train/cat.5083.jpg to ./val/cat.5083.jpg
Transferring ./train/dog.5809.jpg to ./val/dog.5809.jpg
Transferring ./train/dog.2690.jpg to ./val/dog.2690.jpg
Transferring ./train/dog.6707.jpg to ./val/dog.6707.jpg
Transferring ./train/cat.4035.jpg to ./val/cat.4035.jpg
Transferring ./train/dog.8414.jpg to ./val/dog.8414.jpg
Transferring ./train/cat.5158.jpg to ./val/cat.5158.jpg
Transferring ./train/dog.190.jpg to ./val/dog.190.jpg
Transferring ./train/cat.10579.jpg to ./val/cat.10579.jpg
Transferring ./train/dog.3754.jpg to ./val/dog.3754.jpg
Transferring ./train/dog.10711.jpg to ./val/dog.10711.jpg
Transferring ./train/dog.4386.jpg to ./val/dog.4386.jpg
Transferring ./train/cat.4684.jpg to ./val/cat.4684.jpg
Transferring ./train/cat.11335.jpg to ./val/cat.11335.jpg
Transferring ./train/cat.1321.jpg to ./val/cat.1321.jpg
Transferring ./train/dog.9133.jpg to ./val/dog.9133.jpg
Transferring ./train/dog.9648.jpg to ./val/dog.9648.jpg
Transferring ./train/cat.11267.jpg to ./val/cat.11267.jpg
Transferring ./train/dog.1336.jpg to ./val/dog.1336.jpg
Transferring ./train/dog.4666.jpg to ./val/dog.4666.jpg
Transferring ./train/dog.4278.jpg to ./val/dog.4278.jpg
Transferring ./train/dog.11135.jpg to ./val/dog.11135.jpg
Transferring ./train/cat.7939.jpg to ./val/cat.7939.jpg
Transferring ./train/dog.2587.jpg to ./val/dog.2587.jpg
Transferring ./train/dog.8444.jpg to ./val/dog.8444.jpg
Transferring ./train/dog.10803.jpg to ./val/dog.10803.jpg
Transferring ./train/cat.3773.jpg to ./val/cat.3773.jpg
Transferring ./train/cat.5618.jpg to ./val/cat.5618.jpg
Transferring ./train/cat.2714.jpg to ./val/cat.2714.jpg
Transferring ./train/cat.2838.jpg to ./val/cat.2838.jpg
Transferring ./train/dog.7766.jpg to ./val/dog.7766.jpg
Transferring ./train/cat.612.jpg to ./val/cat.612.jpg
Transferring ./train/dog.1861.jpg to ./val/dog.1861.jpg
Transferring ./train/dog.1104.jpg to ./val/dog.1104.jpg
Transferring ./train/cat.12361.jpg to ./val/cat.12361.jpg
Transferring ./train/dog.1234.jpg to ./val/dog.1234.jpg
Transferring ./train/dog.10566.jpg to ./val/dog.10566.jpg
Transferring ./train/dog.2390.jpg to ./val/dog.2390.jpg
Transferring ./train/cat.2121.jpg to ./val/cat.2121.jpg
Transferring ./train/cat.10887.jpg to ./val/cat.10887.jpg
Transferring ./train/dog.5202.jpg to ./val/dog.5202.jpg
Transferring ./train/dog.9469.jpg to ./val/dog.9469.jpg
Transferring ./train/cat.12194.jpg to ./val/cat.12194.jpg
Transferring ./train/dog.7320.jpg to ./val/dog.7320.jpg
Transferring ./train/cat.5590.jpg to ./val/cat.5590.jpg
Transferring ./train/dog.3876.jpg to ./val/dog.3876.jpg
Transferring ./train/dog.7668.jpg to ./val/dog.7668.jpg
Transferring ./train/cat.6651.jpg to ./val/cat.6651.jpg
```

```
Transferring ./train/cat.1856.jpg to ./val/cat.1856.jpg
Transferring ./train/cat.5312.jpg to ./val/cat.5312.jpg
Transferring ./train/dog.8847.jpg to ./val/dog.8847.jpg
Transferring ./train/dog.11573.jpg to ./val/dog.11573.jpg
Transferring ./train/dog.10350.jpg to ./val/dog.10350.jpg
Transferring ./train/cat.2852.jpg to ./val/cat.2852.jpg
Transferring ./train/dog.8363.jpg to ./val/dog.8363.jpg
Transferring ./train/cat.4981.jpg to ./val/cat.4981.jpg
Transferring ./train/cat.9276.jpg to ./val/cat.9276.jpg
Transferring ./train/dog.8177.jpg to ./val/dog.8177.jpg
Transferring ./train/dog.1623.jpg to ./val/dog.1623.jpg
Transferring ./train/dog.2295.jpg to ./val/dog.2295.jpg
Transferring ./train/cat.1765.jpg to ./val/cat.1765.jpg
Transferring ./train/dog.6139.jpg to ./val/dog.6139.jpg
Transferring ./train/cat.10943.jpg to ./val/cat.10943.jpg
Transferring ./train/cat.2348.jpg to ./val/cat.2348.jpg
Transferring ./train/dog.3661.jpg to ./val/dog.3661.jpg
Transferring ./train/dog.5138.jpg to ./val/dog.5138.jpg
Transferring ./train/dog.8283.jpg to ./val/dog.8283.jpg
Transferring ./train/cat.4797.jpg to ./val/cat.4797.jpg
Transferring ./train/cat.12344.jpg to ./val/cat.12344.jpg
Transferring ./train/dog.12312.jpg to ./val/dog.12312.jpg
Transferring ./train/dog.3470.jpg to ./val/dog.3470.jpg
Transferring ./train/dog.5745.jpg to ./val/dog.5745.jpg
Transferring ./train/cat.977.jpg to ./val/cat.977.jpg
Transferring ./train/dog.6791.jpg to ./val/dog.6791.jpg
Transferring ./train/dog.10650.jpg to ./val/dog.10650.jpg
Transferring ./train/cat.2393.jpg to ./val/cat.2393.jpg
Transferring ./train/dog.5071.jpg to ./val/dog.5071.jpg
Transferring ./train/dog.2679.jpg to ./val/dog.2679.jpg
Transferring ./train/dog.10140.jpg to ./val/dog.10140.jpg
Transferring ./train/dog.11239.jpg to ./val/dog.11239.jpg
Transferring ./train/dog.8724.jpg to ./val/dog.8724.jpg
Transferring ./train/dog.9134.jpg to ./val/dog.9134.jpg
Transferring ./train/dog.8274.jpg to ./val/dog.8274.jpg
Transferring ./train/cat.6155.jpg to ./val/cat.6155.jpg
Transferring ./train/dog.4581.jpg to ./val/dog.4581.jpg
Transferring ./train/cat.6295.jpg to ./val/cat.6295.jpg
Transferring ./train/dog.193.jpg to ./val/dog.193.jpg
Transferring ./train/cat.11383.jpg to ./val/cat.11383.jpg
Transferring ./train/cat.6910.jpg to ./val/cat.6910.jpg
Transferring ./train/dog.10539.jpg to ./val/dog.10539.jpg
Transferring ./train/cat.9127.jpg to ./val/cat.9127.jpg
Transferring ./train/dog.6295.jpg to ./val/dog.6295.jpg
Transferring ./train/dog.6206.jpg to ./val/dog.6206.jpg
Transferring ./train/cat.563.jpg to ./val/cat.563.jpg
Transferring ./train/cat.2036.jpg to ./val/cat.2036.jpg
Transferring ./train/cat.8951.jpg to ./val/cat.8951.jpg
Transferring ./train/dog.11513.jpg to ./val/dog.11513.jpg
Transferring ./train/cat.11208.jpg to ./val/cat.11208.jpg
Transferring ./train/dog.8443.jpg to ./val/dog.8443.jpg
Transferring ./train/cat.1564.jpg to ./val/cat.1564.jpg
Transferring ./train/dog.3493.jpg to ./val/dog.3493.jpg
Transferring ./train/cat.11210.jpg to ./val/cat.11210.jpg
```

```
Transferring ./train/cat.12310.jpg to ./val/cat.12310.jpg
Transferring ./train/dog.11476.jpg to ./val/dog.11476.jpg
Transferring ./train/dog.3563.jpg to ./val/dog.3563.jpg
Transferring ./train/dog.4426.jpg to ./val/dog.4426.jpg
Transferring ./train/dog.5646.jpg to ./val/dog.5646.jpg
Transferring ./train/dog.1440.jpg to ./val/dog.1440.jpg
Transferring ./train/cat.8104.jpg to ./val/cat.8104.jpg
Transferring ./train/dog.7082.jpg to ./val/dog.7082.jpg
Transferring ./train/dog.4592.jpg to ./val/dog.4592.jpg
Transferring ./train/dog.2817.jpg to ./val/dog.2817.jpg
Transferring ./train/dog.447.jpg to ./val/dog.447.jpg
Transferring ./train/dog.1944.jpg to ./val/dog.1944.jpg
Transferring ./train/cat.4163.jpg to ./val/cat.4163.jpg
Transferring ./train/cat.4776.jpg to ./val/cat.4776.jpg
Transferring ./train/cat.10240.jpg to ./val/cat.10240.jpg
Transferring ./train/dog.11826.jpg to ./val/dog.11826.jpg
Transferring ./train/cat.6966.jpg to ./val/cat.6966.jpg
Transferring ./train/cat.5989.jpg to ./val/cat.5989.jpg
Transferring ./train/dog.10141.jpg to ./val/dog.10141.jpg
Transferring ./train/cat.4318.jpg to ./val/cat.4318.jpg
Transferring ./train/cat.9183.jpg to ./val/cat.9183.jpg
Transferring ./train/dog.6235.jpg to ./val/dog.6235.jpg
Transferring ./train/dog.6550.jpg to ./val/dog.6550.jpg
Transferring ./train/cat.9739.jpg to ./val/cat.9739.jpg
Transferring ./train/dog.2001.jpg to ./val/dog.2001.jpg
Transferring ./train/dog.5020.jpg to ./val/dog.5020.jpg
Transferring ./train/cat.3149.jpg to ./val/cat.3149.jpg
Transferring ./train/cat.3874.jpg to ./val/cat.3874.jpg
Transferring ./train/cat.9561.jpg to ./val/cat.9561.jpg
Transferring ./train/dog.12044.jpg to ./val/dog.12044.jpg
Transferring ./train/dog.9509.jpg to ./val/dog.9509.jpg
Transferring ./train/dog.7925.jpg to ./val/dog.7925.jpg
Transferring ./train/dog.10131.jpg to ./val/dog.10131.jpg
Transferring ./train/cat.10304.jpg to ./val/cat.10304.jpg
Transferring ./train/dog.10556.jpg to ./val/dog.10556.jpg
Transferring ./train/dog.7825.jpg to ./val/dog.7825.jpg
Transferring ./train/dog.4126.jpg to ./val/dog.4126.jpg
Transferring ./train/dog.9715.jpg to ./val/dog.9715.jpg
Transferring ./train/cat.7605.jpg to ./val/cat.7605.jpg
Transferring ./train/dog.10690.jpg to ./val/dog.10690.jpg
Transferring ./train/dog.13.jpg to ./val/dog.13.jpg
Transferring ./train/cat.9051.jpg to ./val/cat.9051.jpg
Transferring ./train/dog.5116.jpg to ./val/dog.5116.jpg
Transferring ./train/dog.11067.jpg to ./val/dog.11067.jpg
Transferring ./train/dog.6386.jpg to ./val/dog.6386.jpg
Transferring ./train/cat.5811.jpg to ./val/cat.5811.jpg
Transferring ./train/cat.2669.jpg to ./val/cat.2669.jpg
Transferring ./train/cat.4933.jpg to ./val/cat.4933.jpg
Transferring ./train/cat.3083.jpg to ./val/cat.3083.jpg
Transferring ./train/dog.2111.jpg to ./val/dog.2111.jpg
Transferring ./train/cat.5054.jpg to ./val/cat.5054.jpg
Transferring ./train/cat.342.jpg to ./val/cat.342.jpg
Transferring ./train/cat.1805.jpg to ./val/cat.1805.jpg
Transferring ./train/dog.3273.jpg to ./val/dog.3273.jpg
```

```
Transferring ./train/dog.8454.jpg to ./val/dog.8454.jpg
Transferring ./train/dog.2960.jpg to ./val/dog.2960.jpg
Transferring ./train/dog.10667.jpg to ./val/dog.10667.jpg
Transferring ./train/cat.7780.jpg to ./val/cat.7780.jpg
Transferring ./train/dog.5905.jpg to ./val/dog.5905.jpg
Transferring ./train/dog.8480.jpg to ./val/dog.8480.jpg
Transferring ./train/cat.7842.jpg to ./val/cat.7842.jpg
Transferring ./train/dog.1546.jpg to ./val/dog.1546.jpg
Transferring ./train/dog.7789.jpg to ./val/dog.7789.jpg
Transferring ./train/cat.4247.jpg to ./val/cat.4247.jpg
Transferring ./train/cat.8750.jpg to ./val/cat.8750.jpg
Transferring ./train/cat.6119.jpg to ./val/cat.6119.jpg
Transferring ./train/cat.3366.jpg to ./val/cat.3366.jpg
Transferring ./train/dog.3788.jpg to ./val/dog.3788.jpg
Transferring ./train/dog.3458.jpg to ./val/dog.3458.jpg
Transferring ./train/dog.7907.jpg to ./val/dog.7907.jpg
Transferring ./train/cat.3171.jpg to ./val/cat.3171.jpg
Transferring ./train/dog.6529.jpg to ./val/dog.6529.jpg
Transferring ./train/dog.10675.jpg to ./val/dog.10675.jpg
Transferring ./train/dog.11187.jpg to ./val/dog.11187.jpg
Transferring ./train/cat.6202.jpg to ./val/cat.6202.jpg
Transferring ./train/cat.6589.jpg to ./val/cat.6589.jpg
Transferring ./train/cat.10735.jpg to ./val/cat.10735.jpg
Transferring ./train/cat.6541.jpg to ./val/cat.6541.jpg
Transferring ./train/dog.1718.jpg to ./val/dog.1718.jpg
Transferring ./train/cat.4110.jpg to ./val/cat.4110.jpg
Transferring ./train/cat.6656.jpg to ./val/cat.6656.jpg
Transferring ./train/cat.11899.jpg to ./val/cat.11899.jpg
Transferring ./train/cat.684.jpg to ./val/cat.684.jpg
Transferring ./train/cat.4524.jpg to ./val/cat.4524.jpg
Transferring ./train/dog.8391.jpg to ./val/dog.8391.jpg
Transferring ./train/cat.7942.jpg to ./val/cat.7942.jpg
Transferring ./train/dog.4077.jpg to ./val/dog.4077.jpg
Transferring ./train/cat.2285.jpg to ./val/cat.2285.jpg
Transferring ./train/cat.1146.jpg to ./val/cat.1146.jpg
Transferring ./train/cat.7190.jpg to ./val/cat.7190.jpg
Transferring ./train/dog.2196.jpg to ./val/dog.2196.jpg
Transferring ./train/cat.9843.jpg to ./val/cat.9843.jpg
Transferring ./train/cat.3504.jpg to ./val/cat.3504.jpg
Transferring ./train/dog.12323.jpg to ./val/dog.12323.jpg
Transferring ./train/dog.6248.jpg to ./val/dog.6248.jpg
Transferring ./train/dog.11380.jpg to ./val/dog.11380.jpg
Transferring ./train/dog.12371.jpg to ./val/dog.12371.jpg
Transferring ./train/dog.12303.jpg to ./val/dog.12303.jpg
Transferring ./train/dog.8998.jpg to ./val/dog.8998.jpg
Transferring ./train/cat.759.jpg to ./val/cat.759.jpg
Transferring ./train/dog.8469.jpg to ./val/dog.8469.jpg
Transferring ./train/dog.2256.jpg to ./val/dog.2256.jpg
Transferring ./train/dog.10804.jpg to ./val/dog.10804.jpg
Transferring ./train/dog.96.jpg to ./val/dog.96.jpg
Transferring ./train/cat.11812.jpg to ./val/cat.11812.jpg
Transferring ./train/dog.3749.jpg to ./val/dog.3749.jpg
Transferring ./train/dog.6485.jpg to ./val/dog.6485.jpg
Transferring ./train/cat.5323.jpg to ./val/cat.5323.jpg
```

```
Transferring ./train/cat.6253.jpg to ./val/cat.6253.jpg
Transferring ./train/cat.2208.jpg to ./val/cat.2208.jpg
Transferring ./train/dog.6586.jpg to ./val/dog.6586.jpg
Transferring ./train/cat.2090.jpg to ./val/cat.2090.jpg
Transferring ./train/dog.265.jpg to ./val/dog.265.jpg
Transferring ./train/cat.2808.jpg to ./val/cat.2808.jpg
Transferring ./train/cat.5351.jpg to ./val/cat.5351.jpg
Transferring ./train/cat.3465.jpg to ./val/cat.3465.jpg
Transferring ./train/cat.6876.jpg to ./val/cat.6876.jpg
Transferring ./train/cat.10822.jpg to ./val/cat.10822.jpg
Transferring ./train/dog.10440.jpg to ./val/dog.10440.jpg
Transferring ./train/cat.7268.jpg to ./val/cat.7268.jpg
Transferring ./train/cat.5805.jpg to ./val/cat.5805.jpg
Transferring ./train/cat.9242.jpg to ./val/cat.9242.jpg
Transferring ./train/dog.2548.jpg to ./val/dog.2548.jpg
Transferring ./train/cat.209.jpg to ./val/cat.209.jpg
Transferring ./train/cat.611.jpg to ./val/cat.611.jpg
Transferring ./train/dog.2560.jpg to ./val/dog.2560.jpg
Transferring ./train/dog.4772.jpg to ./val/dog.4772.jpg
Transferring ./train/dog.6403.jpg to ./val/dog.6403.jpg
Transferring ./train/cat.8125.jpg to ./val/cat.8125.jpg
Transferring ./train/dog.6954.jpg to ./val/dog.6954.jpg
Transferring ./train/cat.316.jpg to ./val/cat.316.jpg
Transferring ./train/dog.2072.jpg to ./val/dog.2072.jpg
Transferring ./train/dog.9276.jpg to ./val/dog.9276.jpg
Transferring ./train/cat.5084.jpg to ./val/cat.5084.jpg
Transferring ./train/dog.8263.jpg to ./val/dog.8263.jpg
Transferring ./train/cat.11195.jpg to ./val/cat.11195.jpg
Transferring ./train/dog.5128.jpg to ./val/dog.5128.jpg
Transferring ./train/cat.2291.jpg to ./val/cat.2291.jpg
Transferring ./train/dog.2763.jpg to ./val/dog.2763.jpg
Transferring ./train/dog.11871.jpg to ./val/dog.11871.jpg
Transferring ./train/dog.12483.jpg to ./val/dog.12483.jpg
Transferring ./train/dog.9525.jpg to ./val/dog.9525.jpg
Transferring ./train/cat.2855.jpg to ./val/cat.2855.jpg
Transferring ./train/cat.6909.jpg to ./val/cat.6909.jpg
Transferring ./train/dog.9743.jpg to ./val/dog.9743.jpg
Transferring ./train/cat.9924.jpg to ./val/cat.9924.jpg
Transferring ./train/cat.8419.jpg to ./val/cat.8419.jpg
Transferring ./train/cat.2014.jpg to ./val/cat.2014.jpg
Transferring ./train/dog.11933.jpg to ./val/dog.11933.jpg
Transferring ./train/dog.12226.jpg to ./val/dog.12226.jpg
Transferring ./train/cat.6331.jpg to ./val/cat.6331.jpg
Transferring ./train/cat.11706.jpg to ./val/cat.11706.jpg
Transferring ./train/dog.7032.jpg to ./val/dog.7032.jpg
Transferring ./train/cat.10756.jpg to ./val/cat.10756.jpg
Transferring ./train/cat.7511.jpg to ./val/cat.7511.jpg
Transferring ./train/dog.7418.jpg to ./val/dog.7418.jpg
Transferring ./train/dog.9919.jpg to ./val/dog.9919.jpg
Transferring ./train/dog.8498.jpg to ./val/dog.8498.jpg
Transferring ./train/dog.2343.jpg to ./val/dog.2343.jpg
Transferring ./train/cat.3080.jpg to ./val/cat.3080.jpg
Transferring ./train/dog.8953.jpg to ./val/dog.8953.jpg
Transferring ./train/dog.11375.jpg to ./val/dog.11375.jpg
```

```
Transferring ./train/cat.1861.jpg to ./val/cat.1861.jpg
Transferring ./train/dog.10041.jpg to ./val/dog.10041.jpg
Transferring ./train/cat.4546.jpg to ./val/cat.4546.jpg
Transferring ./train/dog.680.jpg to ./val/dog.680.jpg
Transferring ./train/cat.6258.jpg to ./val/cat.6258.jpg
Transferring ./train/dog.22.jpg to ./val/dog.22.jpg
Transferring ./train/dog.3586.jpg to ./val/dog.3586.jpg
Transferring ./train/dog.10496.jpg to ./val/dog.10496.jpg
Transferring ./train/dog.10823.jpg to ./val/dog.10823.jpg
Transferring ./train/dog.1267.jpg to ./val/dog.1267.jpg
Transferring ./train/dog.10082.jpg to ./val/dog.10082.jpg
Transferring ./train/dog.12431.jpg to ./val/dog.12431.jpg
Transferring ./train/cat.8379.jpg to ./val/cat.8379.jpg
Transferring ./train/dog.7302.jpg to ./val/dog.7302.jpg
Transferring ./train/dog.1571.jpg to ./val/dog.1571.jpg
Transferring ./train/cat.1045.jpg to ./val/cat.1045.jpg
Transferring ./train/dog.5899.jpg to ./val/dog.5899.jpg
Transferring ./train/dog.1988.jpg to ./val/dog.1988.jpg
Transferring ./train/dog.12366.jpg to ./val/dog.12366.jpg
Transferring ./train/cat.9804.jpg to ./val/cat.9804.jpg
Transferring ./train/dog.8213.jpg to ./val/dog.8213.jpg
Transferring ./train/dog.9796.jpg to ./val/dog.9796.jpg
Transferring ./train/dog.1062.jpg to ./val/dog.1062.jpg
Transferring ./train/dog.7064.jpg to ./val/dog.7064.jpg
Transferring ./train/cat.5470.jpg to ./val/cat.5470.jpg
Transferring ./train/dog.8115.jpg to ./val/dog.8115.jpg
Transferring ./train/dog.11437.jpg to ./val/dog.11437.jpg
Transferring ./train/dog.10230.jpg to ./val/dog.10230.jpg
Transferring ./train/cat.7091.jpg to ./val/cat.7091.jpg
Transferring ./train/cat.1245.jpg to ./val/cat.1245.jpg
Transferring ./train/dog.4418.jpg to ./val/dog.4418.jpg
Transferring ./train/dog.7059.jpg to ./val/dog.7059.jpg
Transferring ./train/dog.8348.jpg to ./val/dog.8348.jpg
Transferring ./train/dog.685.jpg to ./val/dog.685.jpg
Transferring ./train/cat.7725.jpg to ./val/cat.7725.jpg
Transferring ./train/cat.6247.jpg to ./val/cat.6247.jpg
Transferring ./train/dog.9230.jpg to ./val/dog.9230.jpg
Transferring ./train/dog.3598.jpg to ./val/dog.3598.jpg
Transferring ./train/cat.11197.jpg to ./val/cat.11197.jpg
Transferring ./train/dog.8181.jpg to ./val/dog.8181.jpg
Transferring ./train/cat.9912.jpg to ./val/cat.9912.jpg
Transferring ./train/cat.3847.jpg to ./val/cat.3847.jpg
Transferring ./train/cat.2759.jpg to ./val/cat.2759.jpg
Transferring ./train/cat.7840.jpg to ./val/cat.7840.jpg
Transferring ./train/dog.9503.jpg to ./val/dog.9503.jpg
Transferring ./train/cat.8423.jpg to ./val/cat.8423.jpg
Transferring ./train/cat.5358.jpg to ./val/cat.5358.jpg
Transferring ./train/cat.9289.jpg to ./val/cat.9289.jpg
Transferring ./train/dog.11623.jpg to ./val/dog.11623.jpg
Transferring ./train/dog.8216.jpg to ./val/dog.8216.jpg
Transferring ./train/cat.39.jpg to ./val/cat.39.jpg
Transferring ./train/dog.12460.jpg to ./val/dog.12460.jpg
Transferring ./train/cat.8340.jpg to ./val/cat.8340.jpg
Transferring ./train/dog.11309.jpg to ./val/dog.11309.jpg
```

```
Transferring ./train/cat.226.jpg to ./val/cat.226.jpg
Transferring ./train/cat.774.jpg to ./val/cat.774.jpg
Transferring ./train/cat.11740.jpg to ./val/cat.11740.jpg
Transferring ./train/cat.11043.jpg to ./val/cat.11043.jpg
Transferring ./train/cat.12009.jpg to ./val/cat.12009.jpg
Transferring ./train/dog.4967.jpg to ./val/dog.4967.jpg
Transferring ./train/cat.1526.jpg to ./val/cat.1526.jpg
Transferring ./train/cat.1660.jpg to ./val/cat.1660.jpg
Transferring ./train/dog.4006.jpg to ./val/dog.4006.jpg
Transferring ./train/dog.4048.jpg to ./val/dog.4048.jpg
Transferring ./train/dog.9375.jpg to ./val/dog.9375.jpg
Transferring ./train/dog.3206.jpg to ./val/dog.3206.jpg
Transferring ./train/dog.9482.jpg to ./val/dog.9482.jpg
Transferring ./train/cat.6380.jpg to ./val/cat.6380.jpg
Transferring ./train/dog.5380.jpg to ./val/dog.5380.jpg
Transferring ./train/dog.4590.jpg to ./val/dog.4590.jpg
Transferring ./train/cat.1418.jpg to ./val/cat.1418.jpg
Transferring ./train/cat.242.jpg to ./val/cat.242.jpg
Transferring ./train/cat.1839.jpg to ./val/cat.1839.jpg
Transferring ./train/dog.11074.jpg to ./val/dog.11074.jpg
Transferring ./train/dog.6341.jpg to ./val/dog.6341.jpg
Transferring ./train/dog.11559.jpg to ./val/dog.11559.jpg
Transferring ./train/cat.1187.jpg to ./val/cat.1187.jpg
Transferring ./train/cat.7724.jpg to ./val/cat.7724.jpg
Transferring ./train/dog.5282.jpg to ./val/dog.5282.jpg
Transferring ./train/cat.3378.jpg to ./val/cat.3378.jpg
Transferring ./train/cat.1621.jpg to ./val/cat.1621.jpg
Transferring ./train/cat.10871.jpg to ./val/cat.10871.jpg
Transferring ./train/cat.590.jpg to ./val/cat.590.jpg
Transferring ./train/cat.6574.jpg to ./val/cat.6574.jpg
Transferring ./train/dog.6246.jpg to ./val/dog.6246.jpg
Transferring ./train/dog.11316.jpg to ./val/dog.11316.jpg
Transferring ./train/dog.11144.jpg to ./val/dog.11144.jpg
Transferring ./train/cat.6143.jpg to ./val/cat.6143.jpg
Transferring ./train/dog.5574.jpg to ./val/dog.5574.jpg
Transferring ./train/cat.4729.jpg to ./val/cat.4729.jpg
Transferring ./train/dog.4860.jpg to ./val/dog.4860.jpg
Transferring ./train/cat.10001.jpg to ./val/cat.10001.jpg
Transferring ./train/dog.6790.jpg to ./val/dog.6790.jpg
Transferring ./train/dog.7459.jpg to ./val/dog.7459.jpg
Transferring ./train/cat.11101.jpg to ./val/cat.11101.jpg
Transferring ./train/cat.2236.jpg to ./val/cat.2236.jpg
Transferring ./train/dog.10335.jpg to ./val/dog.10335.jpg
Transferring ./train/cat.4216.jpg to ./val/cat.4216.jpg
Transferring ./train/dog.779.jpg to ./val/dog.779.jpg
Transferring ./train/dog.1324.jpg to ./val/dog.1324.jpg
Transferring ./train/cat.8362.jpg to ./val/cat.8362.jpg
Transferring ./train/dog.2121.jpg to ./val/dog.2121.jpg
Transferring ./train/dog.8673.jpg to ./val/dog.8673.jpg
Transferring ./train/cat.12308.jpg to ./val/cat.12308.jpg
Transferring ./train/cat.6581.jpg to ./val/cat.6581.jpg
Transferring ./train/dog.10115.jpg to ./val/dog.10115.jpg
Transferring ./train/cat.3479.jpg to ./val/cat.3479.jpg
Transferring ./train/cat.6882.jpg to ./val/cat.6882.jpg
```

```
Transferring ./train/cat.5380.jpg to ./val/cat.5380.jpg
Transferring ./train/cat.4610.jpg to ./val/cat.4610.jpg
Transferring ./train/cat.2408.jpg to ./val/cat.2408.jpg
Transferring ./train/cat.3988.jpg to ./val/cat.3988.jpg
Transferring ./train/cat.6973.jpg to ./val/cat.6973.jpg
Transferring ./train/cat.9407.jpg to ./val/cat.9407.jpg
Transferring ./train/dog.11485.jpg to ./val/dog.11485.jpg
Transferring ./train/cat.1308.jpg to ./val/cat.1308.jpg
Transferring ./train/cat.1149.jpg to ./val/cat.1149.jpg
Transferring ./train/dog.12289.jpg to ./val/dog.12289.jpg
Transferring ./train/cat.4706.jpg to ./val/cat.4706.jpg
Transferring ./train/dog.8700.jpg to ./val/dog.8700.jpg
Transferring ./train/cat.1530.jpg to ./val/cat.1530.jpg
Transferring ./train/cat.8460.jpg to ./val/cat.8460.jpg
Transferring ./train/dog.6438.jpg to ./val/dog.6438.jpg
Transferring ./train/dog.5299.jpg to ./val/dog.5299.jpg
Transferring ./train/dog.4370.jpg to ./val/dog.4370.jpg
Transferring ./train/dog.9106.jpg to ./val/dog.9106.jpg
Transferring ./train/cat.8548.jpg to ./val/cat.8548.jpg
Transferring ./train/cat.6974.jpg to ./val/cat.6974.jpg
Transferring ./train/dog.2886.jpg to ./val/dog.2886.jpg
Transferring ./train/dog.3221.jpg to ./val/dog.3221.jpg
Transferring ./train/cat.8916.jpg to ./val/cat.8916.jpg
Transferring ./train/dog.7309.jpg to ./val/dog.7309.jpg
Transferring ./train/cat.9922.jpg to ./val/cat.9922.jpg
Transferring ./train/dog.3821.jpg to ./val/dog.3821.jpg
Transferring ./train/cat.573.jpg to ./val/cat.573.jpg
Transferring ./train/cat.5591.jpg to ./val/cat.5591.jpg
Transferring ./train/dog.622.jpg to ./val/dog.622.jpg
Transferring ./train/cat.7822.jpg to ./val/cat.7822.jpg
Transferring ./train/dog.11017.jpg to ./val/dog.11017.jpg
Transferring ./train/cat.10415.jpg to ./val/cat.10415.jpg
Transferring ./train/dog.954.jpg to ./val/dog.954.jpg
Transferring ./train/dog.7328.jpg to ./val/dog.7328.jpg
Transferring ./train/cat.5196.jpg to ./val/cat.5196.jpg
Transferring ./train/dog.5109.jpg to ./val/dog.5109.jpg
Transferring ./train/cat.6908.jpg to ./val/cat.6908.jpg
Transferring ./train/dog.4978.jpg to ./val/dog.4978.jpg
Transferring ./train/cat.11739.jpg to ./val/cat.11739.jpg
Transferring ./train/dog.1937.jpg to ./val/dog.1937.jpg
Transferring ./train/dog.9701.jpg to ./val/dog.9701.jpg
Transferring ./train/cat.9086.jpg to ./val/cat.9086.jpg
Transferring ./train/cat.2302.jpg to ./val/cat.2302.jpg
Transferring ./train/dog.12496.jpg to ./val/dog.12496.jpg
Transferring ./train/cat.8608.jpg to ./val/cat.8608.jpg
Transferring ./train/cat.5784.jpg to ./val/cat.5784.jpg
Transferring ./train/dog.2678.jpg to ./val/dog.2678.jpg
Transferring ./train/cat.7039.jpg to ./val/cat.7039.jpg
Transferring ./train/dog.4332.jpg to ./val/dog.4332.jpg
Transferring ./train/cat.675.jpg to ./val/cat.675.jpg
Transferring ./train/dog.5534.jpg to ./val/dog.5534.jpg
Transferring ./train/cat.12474.jpg to ./val/cat.12474.jpg
Transferring ./train/cat.8211.jpg to ./val/cat.8211.jpg
Transferring ./train/dog.1143.jpg to ./val/dog.1143.jpg
```

```
Transferring ./train/dog.4124.jpg to ./val/dog.4124.jpg
Transferring ./train/dog.10569.jpg to ./val/dog.10569.jpg
Transferring ./train/dog.723.jpg to ./val/dog.723.jpg
Transferring ./train/cat.9011.jpg to ./val/cat.9011.jpg
Transferring ./train/dog.7976.jpg to ./val/dog.7976.jpg
Transferring ./train/cat.9410.jpg to ./val/cat.9410.jpg
Transferring ./train/dog.10924.jpg to ./val/dog.10924.jpg
Transferring ./train/cat.11165.jpg to ./val/cat.11165.jpg
Transferring ./train/cat.1166.jpg to ./val/cat.1166.jpg
Transferring ./train/dog.2579.jpg to ./val/dog.2579.jpg
Transferring ./train/dog.2284.jpg to ./val/dog.2284.jpg
Transferring ./train/dog.8771.jpg to ./val/dog.8771.jpg
Transferring ./train/cat.2122.jpg to ./val/cat.2122.jpg
Transferring ./train/dog.814.jpg to ./val/dog.814.jpg
Transferring ./train/cat.4113.jpg to ./val/cat.4113.jpg
Transferring ./train/cat.9369.jpg to ./val/cat.9369.jpg
Transferring ./train/dog.11641.jpg to ./val/dog.11641.jpg
Transferring ./train/dog.3370.jpg to ./val/dog.3370.jpg
Transferring ./train/cat.6286.jpg to ./val/cat.6286.jpg
Transferring ./train/cat.11967.jpg to ./val/cat.11967.jpg
Transferring ./train/cat.2129.jpg to ./val/cat.2129.jpg
Transferring ./train/cat.5688.jpg to ./val/cat.5688.jpg
Transferring ./train/cat.7417.jpg to ./val/cat.7417.jpg
Transferring ./train/cat.9266.jpg to ./val/cat.9266.jpg
Transferring ./train/cat.4336.jpg to ./val/cat.4336.jpg
Transferring ./train/cat.8525.jpg to ./val/cat.8525.jpg
Transferring ./train/cat.5333.jpg to ./val/cat.5333.jpg
Transferring ./train/cat.2176.jpg to ./val/cat.2176.jpg
Transferring ./train/dog.10179.jpg to ./val/dog.10179.jpg
Transferring ./train/dog.9055.jpg to ./val/dog.9055.jpg
Transferring ./train/dog.11126.jpg to ./val/dog.11126.jpg
Transferring ./train/cat.10223.jpg to ./val/cat.10223.jpg
Transferring ./train/cat.3784.jpg to ./val/cat.3784.jpg
Transferring ./train/dog.4422.jpg to ./val/dog.4422.jpg
Transferring ./train/cat.6467.jpg to ./val/cat.6467.jpg
Transferring ./train/dog.6527.jpg to ./val/dog.6527.jpg
Transferring ./train/dog.6717.jpg to ./val/dog.6717.jpg
Transferring ./train/dog.6263.jpg to ./val/dog.6263.jpg
Transferring ./train/dog.1828.jpg to ./val/dog.1828.jpg
Transferring ./train/dog.11666.jpg to ./val/dog.11666.jpg
Transferring ./train/dog.5620.jpg to ./val/dog.5620.jpg
Transferring ./train/dog.10468.jpg to ./val/dog.10468.jpg
Transferring ./train/cat.7957.jpg to ./val/cat.7957.jpg
Transferring ./train/cat.7352.jpg to ./val/cat.7352.jpg
Transferring ./train/dog.7606.jpg to ./val/dog.7606.jpg
Transferring ./train/cat.2985.jpg to ./val/cat.2985.jpg
Transferring ./train/dog.4706.jpg to ./val/dog.4706.jpg
Transferring ./train/cat.3989.jpg to ./val/cat.3989.jpg
Transferring ./train/cat.102.jpg to ./val/cat.102.jpg
Transferring ./train/cat.11118.jpg to ./val/cat.11118.jpg
Transferring ./train/dog.9417.jpg to ./val/dog.9417.jpg
Transferring ./train/cat.5859.jpg to ./val/cat.5859.jpg
Transferring ./train/cat.5128.jpg to ./val/cat.5128.jpg
Transferring ./train/dog.6257.jpg to ./val/dog.6257.jpg
```

```
Transferring ./train/dog.8486.jpg to ./val/dog.8486.jpg
Transferring ./train/dog.12311.jpg to ./val/dog.12311.jpg
Transferring ./train/dog.1675.jpg to ./val/dog.1675.jpg
Transferring ./train/cat.7025.jpg to ./val/cat.7025.jpg
Transferring ./train/cat.10572.jpg to ./val/cat.10572.jpg
Transferring ./train/dog.3494.jpg to ./val/dog.3494.jpg
Transferring ./train/cat.9081.jpg to ./val/cat.9081.jpg
Transferring ./train/dog.12488.jpg to ./val/dog.12488.jpg
Transferring ./train/cat.4376.jpg to ./val/cat.4376.jpg
Transferring ./train/cat.9955.jpg to ./val/cat.9955.jpg
Transferring ./train/dog.1415.jpg to ./val/dog.1415.jpg
Transferring ./train/dog.2114.jpg to ./val/dog.2114.jpg
Transferring ./train/cat.4178.jpg to ./val/cat.4178.jpg
Transferring ./train/dog.6367.jpg to ./val/dog.6367.jpg
Transferring ./train/dog.11649.jpg to ./val/dog.11649.jpg
Transferring ./train/cat.800.jpg to ./val/cat.800.jpg
Transferring ./train/cat.7703.jpg to ./val/cat.7703.jpg
Transferring ./train/dog.1207.jpg to ./val/dog.1207.jpg
Transferring ./train/cat.4535.jpg to ./val/cat.4535.jpg
Transferring ./train/dog.2182.jpg to ./val/dog.2182.jpg
Transferring ./train/cat.8458.jpg to ./val/cat.8458.jpg
Transferring ./train/cat.11845.jpg to ./val/cat.11845.jpg
Transferring ./train/dog.4951.jpg to ./val/dog.4951.jpg
Transferring ./train/dog.7510.jpg to ./val/dog.7510.jpg
Transferring ./train/dog.3186.jpg to ./val/dog.3186.jpg
Transferring ./train/dog.11029.jpg to ./val/dog.11029.jpg
Transferring ./train/dog.10728.jpg to ./val/dog.10728.jpg
Transferring ./train/cat.7115.jpg to ./val/cat.7115.jpg
Transferring ./train/cat.1029.jpg to ./val/cat.1029.jpg
Transferring ./train/cat.5218.jpg to ./val/cat.5218.jpg
Transferring ./train/dog.10644.jpg to ./val/dog.10644.jpg
Transferring ./train/dog.7494.jpg to ./val/dog.7494.jpg
Transferring ./train/cat.3169.jpg to ./val/cat.3169.jpg
Transferring ./train/cat.1182.jpg to ./val/cat.1182.jpg
Transferring ./train/cat.8289.jpg to ./val/cat.8289.jpg
Transferring ./train/dog.4963.jpg to ./val/dog.4963.jpg
Transferring ./train/dog.5001.jpg to ./val/dog.5001.jpg
Transferring ./train/dog.69.jpg to ./val/dog.69.jpg
Transferring ./train/dog.6801.jpg to ./val/dog.6801.jpg
Transferring ./train/cat.11692.jpg to ./val/cat.11692.jpg
Transferring ./train/dog.3921.jpg to ./val/dog.3921.jpg
Transferring ./train/cat.9593.jpg to ./val/cat.9593.jpg
Transferring ./train/dog.8242.jpg to ./val/dog.8242.jpg
Transferring ./train/dog.12354.jpg to ./val/dog.12354.jpg
Transferring ./train/dog.5622.jpg to ./val/dog.5622.jpg
Transferring ./train/cat.1638.jpg to ./val/cat.1638.jpg
Transferring ./train/dog.7740.jpg to ./val/dog.7740.jpg
Transferring ./train/cat.7443.jpg to ./val/cat.7443.jpg
Transferring ./train/cat.5156.jpg to ./val/cat.5156.jpg
Transferring ./train/cat.4927.jpg to ./val/cat.4927.jpg
Transferring ./train/cat.9682.jpg to ./val/cat.9682.jpg
Transferring ./train/cat.8614.jpg to ./val/cat.8614.jpg
Transferring ./train/cat.3165.jpg to ./val/cat.3165.jpg
Transferring ./train/dog.11248.jpg to ./val/dog.11248.jpg
```

```
Transferring ./train/dog.3919.jpg to ./val/dog.3919.jpg
Transferring ./train/dog.3113.jpg to ./val/dog.3113.jpg
Transferring ./train/cat.1330.jpg to ./val/cat.1330.jpg
Transferring ./train/dog.12152.jpg to ./val/dog.12152.jpg
Transferring ./train/cat.1299.jpg to ./val/cat.1299.jpg
Transferring ./train/dog.9861.jpg to ./val/dog.9861.jpg
Transferring ./train/cat.6136.jpg to ./val/cat.6136.jpg
Transferring ./train/cat.6485.jpg to ./val/cat.6485.jpg
Transferring ./train/dog.5060.jpg to ./val/dog.5060.jpg
Transferring ./train/dog.767.jpg to ./val/dog.767.jpg
Transferring ./train/dog.7997.jpg to ./val/dog.7997.jpg
Transferring ./train/cat.2174.jpg to ./val/cat.2174.jpg
Transferring ./train/dog.460.jpg to ./val/dog.460.jpg
Transferring ./train/dog.2333.jpg to ./val/dog.2333.jpg
Transferring ./train/dog.10411.jpg to ./val/dog.10411.jpg
Transferring ./train/dog.9512.jpg to ./val/dog.9512.jpg
Transferring ./train/dog.3461.jpg to ./val/dog.3461.jpg
Transferring ./train/dog.7815.jpg to ./val/dog.7815.jpg
Transferring ./train/cat.8039.jpg to ./val/cat.8039.jpg
Transferring ./train/dog.2321.jpg to ./val/dog.2321.jpg
Transferring ./train/cat.3654.jpg to ./val/cat.3654.jpg
Transferring ./train/cat.7196.jpg to ./val/cat.7196.jpg
Transferring ./train/dog.4507.jpg to ./val/dog.4507.jpg
Transferring ./train/cat.1466.jpg to ./val/cat.1466.jpg
Transferring ./train/cat.8578.jpg to ./val/cat.8578.jpg
Transferring ./train/cat.12331.jpg to ./val/cat.12331.jpg
Transferring ./train/cat.4922.jpg to ./val/cat.4922.jpg
Transferring ./train/cat.6914.jpg to ./val/cat.6914.jpg
Transferring ./train/dog.11219.jpg to ./val/dog.11219.jpg
Transferring ./train/cat.1908.jpg to ./val/cat.1908.jpg
Transferring ./train/cat.12372.jpg to ./val/cat.12372.jpg
Transferring ./train/dog.6803.jpg to ./val/dog.6803.jpg
Transferring ./train/dog.6372.jpg to ./val/dog.6372.jpg
Transferring ./train/dog.9439.jpg to ./val/dog.9439.jpg
Transferring ./train/cat.10989.jpg to ./val/cat.10989.jpg
Transferring ./train/dog.2658.jpg to ./val/dog.2658.jpg
Transferring ./train/cat.2964.jpg to ./val/cat.2964.jpg
Transferring ./train/dog.1866.jpg to ./val/dog.1866.jpg
Transferring ./train/cat.5926.jpg to ./val/cat.5926.jpg
Transferring ./train/dog.803.jpg to ./val/dog.803.jpg
Transferring ./train/dog.5154.jpg to ./val/dog.5154.jpg
Transferring ./train/dog.7760.jpg to ./val/dog.7760.jpg
Transferring ./train/dog.11433.jpg to ./val/dog.11433.jpg
Transferring ./train/dog.7643.jpg to ./val/dog.7643.jpg
Transferring ./train/dog.7033.jpg to ./val/dog.7033.jpg
Transferring ./train/dog.9163.jpg to ./val/dog.9163.jpg
Transferring ./train/cat.1551.jpg to ./val/cat.1551.jpg
Transferring ./train/cat.10413.jpg to ./val/cat.10413.jpg
Transferring ./train/cat.10702.jpg to ./val/cat.10702.jpg
Transferring ./train/cat.1160.jpg to ./val/cat.1160.jpg
Transferring ./train/cat.9874.jpg to ./val/cat.9874.jpg
Transferring ./train/dog.7176.jpg to ./val/dog.7176.jpg
Transferring ./train/cat.1881.jpg to ./val/cat.1881.jpg
Transferring ./train/dog.1930.jpg to ./val/dog.1930.jpg
```

```
Transferring ./train/cat.3903.jpg to ./val/cat.3903.jpg
Transferring ./train/cat.5997.jpg to ./val/cat.5997.jpg
Transferring ./train/cat.3841.jpg to ./val/cat.3841.jpg
Transferring ./train/cat.7262.jpg to ./val/cat.7262.jpg
Transferring ./train/dog.5368.jpg to ./val/dog.5368.jpg
Transferring ./train/dog.2332.jpg to ./val/dog.2332.jpg
Transferring ./train/dog.1878.jpg to ./val/dog.1878.jpg
Transferring ./train/cat.673.jpg to ./val/cat.673.jpg
Transferring ./train/dog.6997.jpg to ./val/dog.6997.jpg
Transferring ./train/dog.910.jpg to ./val/dog.910.jpg
Transferring ./train/cat.4343.jpg to ./val/cat.4343.jpg
Transferring ./train/dog.5756.jpg to ./val/dog.5756.jpg
Transferring ./train/dog.3408.jpg to ./val/dog.3408.jpg
Transferring ./train/cat.3529.jpg to ./val/cat.3529.jpg
Transferring ./train/cat.5430.jpg to ./val/cat.5430.jpg
Transferring ./train/dog.10273.jpg to ./val/dog.10273.jpg
Transferring ./train/dog.70.jpg to ./val/dog.70.jpg
Transferring ./train/dog.10988.jpg to ./val/dog.10988.jpg
Transferring ./train/dog.9669.jpg to ./val/dog.9669.jpg
Transferring ./train/dog.8600.jpg to ./val/dog.8600.jpg
Transferring ./train/dog.1381.jpg to ./val/dog.1381.jpg
Transferring ./train/cat.5373.jpg to ./val/cat.5373.jpg
Transferring ./train/dog.3545.jpg to ./val/dog.3545.jpg
Transferring ./train/cat.11588.jpg to ./val/cat.11588.jpg
Transferring ./train/cat.7938.jpg to ./val/cat.7938.jpg
Transferring ./train/cat.3642.jpg to ./val/cat.3642.jpg
Transferring ./train/cat.7989.jpg to ./val/cat.7989.jpg
Transferring ./train/dog.1160.jpg to ./val/dog.1160.jpg
Transferring ./train/cat.1695.jpg to ./val/cat.1695.jpg
Transferring ./train/cat.5139.jpg to ./val/cat.5139.jpg
Transferring ./train/dog.6666.jpg to ./val/dog.6666.jpg
Transferring ./train/cat.9020.jpg to ./val/cat.9020.jpg
Transferring ./train/dog.9130.jpg to ./val/dog.9130.jpg
Transferring ./train/cat.11392.jpg to ./val/cat.11392.jpg
Transferring ./train/dog.7647.jpg to ./val/dog.7647.jpg
Transferring ./train/dog.8788.jpg to ./val/dog.8788.jpg
Transferring ./train/cat.4037.jpg to ./val/cat.4037.jpg
Transferring ./train/dog.3247.jpg to ./val/dog.3247.jpg
Transferring ./train/dog.6578.jpg to ./val/dog.6578.jpg
Transferring ./train/cat.8016.jpg to ./val/cat.8016.jpg
Transferring ./train/cat.1829.jpg to ./val/cat.1829.jpg
Transferring ./train/cat.7480.jpg to ./val/cat.7480.jpg
Transferring ./train/cat.2860.jpg to ./val/cat.2860.jpg
Transferring ./train/cat.6989.jpg to ./val/cat.6989.jpg
Transferring ./train/dog.7706.jpg to ./val/dog.7706.jpg
Transferring ./train/dog.10602.jpg to ./val/dog.10602.jpg
Transferring ./train/dog.8052.jpg to ./val/dog.8052.jpg
Transferring ./train/dog.2218.jpg to ./val/dog.2218.jpg
Transferring ./train/cat.5057.jpg to ./val/cat.5057.jpg
Transferring ./train/cat.8184.jpg to ./val/cat.8184.jpg
Transferring ./train/cat.4094.jpg to ./val/cat.4094.jpg
Transferring ./train/dog.4217.jpg to ./val/dog.4217.jpg
Transferring ./train/dog.6929.jpg to ./val/dog.6929.jpg
Transferring ./train/dog.4689.jpg to ./val/dog.4689.jpg
```

```
Transferring ./train/dog.8019.jpg to ./val/dog.8019.jpg
Transferring ./train/cat.4351.jpg to ./val/cat.4351.jpg
Transferring ./train/cat.4973.jpg to ./val/cat.4973.jpg
Transferring ./train/cat.1013.jpg to ./val/cat.1013.jpg
Transferring ./train/dog.6267.jpg to ./val/dog.6267.jpg
Transferring ./train/cat.10384.jpg to ./val/cat.10384.jpg
Transferring ./train/cat.6583.jpg to ./val/cat.6583.jpg
Transferring ./train/dog.5057.jpg to ./val/dog.5057.jpg
Transferring ./train/dog.3659.jpg to ./val/dog.3659.jpg
Transferring ./train/cat.8944.jpg to ./val/cat.8944.jpg
Transferring ./train/dog.7721.jpg to ./val/dog.7721.jpg
Transferring ./train/cat.1464.jpg to ./val/cat.1464.jpg
Transferring ./train/cat.9136.jpg to ./val/cat.9136.jpg
Transferring ./train/cat.824.jpg to ./val/cat.824.jpg
Transferring ./train/dog.4153.jpg to ./val/dog.4153.jpg
Transferring ./train/cat.10054.jpg to ./val/cat.10054.jpg
Transferring ./train/cat.8261.jpg to ./val/cat.8261.jpg
Transferring ./train/dog.1952.jpg to ./val/dog.1952.jpg
Transferring ./train/cat.11555.jpg to ./val/cat.11555.jpg
Transferring ./train/cat.11561.jpg to ./val/cat.11561.jpg
Transferring ./train/dog.986.jpg to ./val/dog.986.jpg
Transferring ./train/cat.3781.jpg to ./val/cat.3781.jpg
Transferring ./train/cat.731.jpg to ./val/cat.731.jpg
Transferring ./train/cat.10668.jpg to ./val/cat.10668.jpg
Transferring ./train/cat.2665.jpg to ./val/cat.2665.jpg
Transferring ./train/cat.1589.jpg to ./val/cat.1589.jpg
Transferring ./train/dog.2318.jpg to ./val/dog.2318.jpg
Transferring ./train/dog.4776.jpg to ./val/dog.4776.jpg
Transferring ./train/cat.9093.jpg to ./val/cat.9093.jpg
Transferring ./train/dog.3619.jpg to ./val/dog.3619.jpg
Transferring ./train/cat.7829.jpg to ./val/cat.7829.jpg
Transferring ./train/dog.10254.jpg to ./val/dog.10254.jpg
Transferring ./train/dog.1105.jpg to ./val/dog.1105.jpg
Transferring ./train/cat.6955.jpg to ./val/cat.6955.jpg
Transferring ./train/dog.11738.jpg to ./val/dog.11738.jpg
Transferring ./train/dog.11664.jpg to ./val/dog.11664.jpg
Transferring ./train/cat.10777.jpg to ./val/cat.10777.jpg
Transferring ./train/cat.5707.jpg to ./val/cat.5707.jpg
Transferring ./train/cat.11585.jpg to ./val/cat.11585.jpg
Transferring ./train/cat.10982.jpg to ./val/cat.10982.jpg
Transferring ./train/cat.9842.jpg to ./val/cat.9842.jpg
Transferring ./train/cat.8871.jpg to ./val/cat.8871.jpg
Transferring ./train/dog.7679.jpg to ./val/dog.7679.jpg
Transferring ./train/dog.6829.jpg to ./val/dog.6829.jpg
Transferring ./train/dog.901.jpg to ./val/dog.901.jpg
Transferring ./train/dog.9188.jpg to ./val/dog.9188.jpg
Transferring ./train/dog.5096.jpg to ./val/dog.5096.jpg
Transferring ./train/dog.10260.jpg to ./val/dog.10260.jpg
Transferring ./train/dog.9397.jpg to ./val/dog.9397.jpg
Transferring ./train/dog.10544.jpg to ./val/dog.10544.jpg
Transferring ./train/cat.5366.jpg to ./val/cat.5366.jpg
Transferring ./train/dog.4456.jpg to ./val/dog.4456.jpg
Transferring ./train/cat.8256.jpg to ./val/cat.8256.jpg
Transferring ./train/cat.3457.jpg to ./val/cat.3457.jpg
```

```
Transferring ./train/dog.4190.jpg to ./val/dog.4190.jpg
Transferring ./train/dog.5469.jpg to ./val/dog.5469.jpg
Transferring ./train/cat.11677.jpg to ./val/cat.11677.jpg
Transferring ./train/dog.1096.jpg to ./val/dog.1096.jpg
Transferring ./train/dog.4945.jpg to ./val/dog.4945.jpg
Transferring ./train/dog.5939.jpg to ./val/dog.5939.jpg
Transferring ./train/cat.980.jpg to ./val/cat.980.jpg
Transferring ./train/cat.8329.jpg to ./val/cat.8329.jpg
Transferring ./train/cat.1432.jpg to ./val/cat.1432.jpg
Transferring ./train/cat.1414.jpg to ./val/cat.1414.jpg
Transferring ./train/cat.8300.jpg to ./val/cat.8300.jpg
Transferring ./train/cat.6167.jpg to ./val/cat.6167.jpg
Transferring ./train/dog.9997.jpg to ./val/dog.9997.jpg
Transferring ./train/cat.8247.jpg to ./val/cat.8247.jpg
Transferring ./train/dog.8613.jpg to ./val/dog.8613.jpg
Transferring ./train/cat.11059.jpg to ./val/cat.11059.jpg
Transferring ./train/dog.9560.jpg to ./val/dog.9560.jpg
Transferring ./train/cat.6375.jpg to ./val/cat.6375.jpg
Transferring ./train/cat.7838.jpg to ./val/cat.7838.jpg
Transferring ./train/cat.10662.jpg to ./val/cat.10662.jpg
Transferring ./train/cat.9596.jpg to ./val/cat.9596.jpg
Transferring ./train/cat.12392.jpg to ./val/cat.12392.jpg
Transferring ./train/dog.5069.jpg to ./val/dog.5069.jpg
Transferring ./train/dog.6711.jpg to ./val/dog.6711.jpg
Transferring ./train/cat.788.jpg to ./val/cat.788.jpg
Transferring ./train/cat.9720.jpg to ./val/cat.9720.jpg
Transferring ./train/dog.6423.jpg to ./val/dog.6423.jpg
Transferring ./train/dog.1873.jpg to ./val/dog.1873.jpg
Transferring ./train/cat.5105.jpg to ./val/cat.5105.jpg
Transferring ./train/dog.11319.jpg to ./val/dog.11319.jpg
Transferring ./train/dog.12382.jpg to ./val/dog.12382.jpg
Transferring ./train/dog.4749.jpg to ./val/dog.4749.jpg
Transferring ./train/cat.2671.jpg to ./val/cat.2671.jpg
Transferring ./train/dog.4771.jpg to ./val/dog.4771.jpg
Transferring ./train/cat.143.jpg to ./val/cat.143.jpg
Transferring ./train/dog.5902.jpg to ./val/dog.5902.jpg
Transferring ./train/cat.8854.jpg to ./val/cat.8854.jpg
Transferring ./train/dog.5256.jpg to ./val/dog.5256.jpg
Transferring ./train/dog.12107.jpg to ./val/dog.12107.jpg
Transferring ./train/cat.4258.jpg to ./val/cat.4258.jpg
Transferring ./train/cat.10208.jpg to ./val/cat.10208.jpg
Transferring ./train/dog.2104.jpg to ./val/dog.2104.jpg
Transferring ./train/dog.4737.jpg to ./val/dog.4737.jpg
Transferring ./train/cat.12133.jpg to ./val/cat.12133.jpg
Transferring ./train/cat.9660.jpg to ./val/cat.9660.jpg
Transferring ./train/dog.916.jpg to ./val/dog.916.jpg
Transferring ./train/dog.4929.jpg to ./val/dog.4929.jpg
Transferring ./train/cat.7937.jpg to ./val/cat.7937.jpg
Transferring ./train/cat.10005.jpg to ./val/cat.10005.jpg
Transferring ./train/dog.1834.jpg to ./val/dog.1834.jpg
Transferring ./train/dog.3562.jpg to ./val/dog.3562.jpg
Transferring ./train/cat.1190.jpg to ./val/cat.1190.jpg
Transferring ./train/dog.7555.jpg to ./val/dog.7555.jpg
Transferring ./train/dog.10212.jpg to ./val/dog.10212.jpg
```

```
Transferring ./train/cat.12068.jpg to ./val/cat.12068.jpg
Transferring ./train/dog.1526.jpg to ./val/dog.1526.jpg
Transferring ./train/dog.6530.jpg to ./val/dog.6530.jpg
Transferring ./train/cat.8767.jpg to ./val/cat.8767.jpg
Transferring ./train/cat.2238.jpg to ./val/cat.2238.jpg
Transferring ./train/dog.5463.jpg to ./val/dog.5463.jpg
Transferring ./train/cat.10840.jpg to ./val/cat.10840.jpg
Transferring ./train/cat.11162.jpg to ./val/cat.11162.jpg
Transferring ./train/dog.7169.jpg to ./val/dog.7169.jpg
Transferring ./train/dog.4100.jpg to ./val/dog.4100.jpg
Transferring ./train/dog.2777.jpg to ./val/dog.2777.jpg
Transferring ./train/cat.1943.jpg to ./val/cat.1943.jpg
Transferring ./train/cat.4169.jpg to ./val/cat.4169.jpg
Transferring ./train/dog.12281.jpg to ./val/dog.12281.jpg
Transferring ./train/cat.8279.jpg to ./val/cat.8279.jpg
Transferring ./train/cat.10865.jpg to ./val/cat.10865.jpg
Transferring ./train/cat.10803.jpg to ./val/cat.10803.jpg
Transferring ./train/cat.3915.jpg to ./val/cat.3915.jpg
Transferring ./train/cat.10460.jpg to ./val/cat.10460.jpg
Transferring ./train/cat.5114.jpg to ./val/cat.5114.jpg
Transferring ./train/dog.10987.jpg to ./val/dog.10987.jpg
Transferring ./train/dog.12355.jpg to ./val/dog.12355.jpg
Transferring ./train/dog.8155.jpg to ./val/dog.8155.jpg
Transferring ./train/cat.1878.jpg to ./val/cat.1878.jpg
Transferring ./train/cat.3673.jpg to ./val/cat.3673.jpg
Transferring ./train/cat.4488.jpg to ./val/cat.4488.jpg
Transferring ./train/dog.10001.jpg to ./val/dog.10001.jpg
Transferring ./train/dog.5326.jpg to ./val/dog.5326.jpg
Transferring ./train/dog.11177.jpg to ./val/dog.11177.jpg
Transferring ./train/dog.2095.jpg to ./val/dog.2095.jpg
Transferring ./train/dog.4251.jpg to ./val/dog.4251.jpg
Transferring ./train/dog.7817.jpg to ./val/dog.7817.jpg
Transferring ./train/dog.6655.jpg to ./val/dog.6655.jpg
Transferring ./train/cat.3183.jpg to ./val/cat.3183.jpg
Transferring ./train/cat.9014.jpg to ./val/cat.9014.jpg
Transferring ./train/dog.11377.jpg to ./val/dog.11377.jpg
Transferring ./train/cat.2245.jpg to ./val/cat.2245.jpg
Transferring ./train/dog.7318.jpg to ./val/dog.7318.jpg
Transferring ./train/cat.3537.jpg to ./val/cat.3537.jpg
Transferring ./train/dog.2411.jpg to ./val/dog.2411.jpg
Transferring ./train/cat.2897.jpg to ./val/cat.2897.jpg
Transferring ./train/dog.6913.jpg to ./val/dog.6913.jpg
Transferring ./train/cat.10331.jpg to ./val/cat.10331.jpg
Transferring ./train/dog.1585.jpg to ./val/dog.1585.jpg
Transferring ./train/dog.12185.jpg to ./val/dog.12185.jpg
Transferring ./train/dog.7063.jpg to ./val/dog.7063.jpg
Transferring ./train/dog.7153.jpg to ./val/dog.7153.jpg
Transferring ./train/cat.1703.jpg to ./val/cat.1703.jpg
Transferring ./train/dog.9569.jpg to ./val/dog.9569.jpg
Transferring ./train/dog.9538.jpg to ./val/dog.9538.jpg
Transferring ./train/cat.4245.jpg to ./val/cat.4245.jpg
Transferring ./train/dog.1927.jpg to ./val/dog.1927.jpg
Transferring ./train/cat.1972.jpg to ./val/cat.1972.jpg
Transferring ./train/cat.5642.jpg to ./val/cat.5642.jpg
```

```
Transferring ./train/dog.10862.jpg to ./val/dog.10862.jpg
Transferring ./train/cat.450.jpg to ./val/cat.450.jpg
Transferring ./train/dog.77.jpg to ./val/dog.77.jpg
Transferring ./train/cat.8573.jpg to ./val/cat.8573.jpg
Transferring ./train/dog.6731.jpg to ./val/dog.6731.jpg
Transferring ./train/cat.10300.jpg to ./val/cat.10300.jpg
Transferring ./train/dog.8396.jpg to ./val/dog.8396.jpg
Transferring ./train/dog.12321.jpg to ./val/dog.12321.jpg
Transferring ./train/cat.4283.jpg to ./val/cat.4283.jpg
Transferring ./train/dog.11981.jpg to ./val/dog.11981.jpg
Transferring ./train/dog.7957.jpg to ./val/dog.7957.jpg
Transferring ./train/dog.1966.jpg to ./val/dog.1966.jpg
Transferring ./train/dog.4611.jpg to ./val/dog.4611.jpg
Transferring ./train/dog.12349.jpg to ./val/dog.12349.jpg
Transferring ./train/cat.872.jpg to ./val/cat.872.jpg
Transferring ./train/dog.3540.jpg to ./val/dog.3540.jpg
Transferring ./train/cat.6241.jpg to ./val/cat.6241.jpg
Transferring ./train/cat.3748.jpg to ./val/cat.3748.jpg
Transferring ./train/dog.9165.jpg to ./val/dog.9165.jpg
Transferring ./train/dog.9058.jpg to ./val/dog.9058.jpg
Transferring ./train/dog.7891.jpg to ./val/dog.7891.jpg
Transferring ./train/cat.3714.jpg to ./val/cat.3714.jpg
Transferring ./train/dog.11049.jpg to ./val/dog.11049.jpg
Transferring ./train/cat.11722.jpg to ./val/cat.11722.jpg
Transferring ./train/cat.274.jpg to ./val/cat.274.jpg
Transferring ./train/cat.5576.jpg to ./val/cat.5576.jpg
Transferring ./train/dog.2174.jpg to ./val/dog.2174.jpg
Transferring ./train/dog.7565.jpg to ./val/dog.7565.jpg
Transferring ./train/cat.9461.jpg to ./val/cat.9461.jpg
Transferring ./train/cat.4504.jpg to ./val/cat.4504.jpg
Transferring ./train/dog.9143.jpg to ./val/dog.9143.jpg
Transferring ./train/cat.1052.jpg to ./val/cat.1052.jpg
Transferring ./train/cat.469.jpg to ./val/cat.469.jpg
Transferring ./train/cat.10138.jpg to ./val/cat.10138.jpg
Transferring ./train/cat.6138.jpg to ./val/cat.6138.jpg
Transferring ./train/cat.11246.jpg to ./val/cat.11246.jpg
Transferring ./train/dog.3670.jpg to ./val/dog.3670.jpg
Transferring ./train/cat.7144.jpg to ./val/cat.7144.jpg
Transferring ./train/dog.11214.jpg to ./val/dog.11214.jpg
Transferring ./train/cat.3562.jpg to ./val/cat.3562.jpg
Transferring ./train/dog.3404.jpg to ./val/dog.3404.jpg
Transferring ./train/dog.9255.jpg to ./val/dog.9255.jpg
Transferring ./train/cat.4309.jpg to ./val/cat.4309.jpg
Transferring ./train/dog.1405.jpg to ./val/dog.1405.jpg
Transferring ./train/dog.7753.jpg to ./val/dog.7753.jpg
Transferring ./train/cat.10033.jpg to ./val/cat.10033.jpg
Transferring ./train/cat.8462.jpg to ./val/cat.8462.jpg
Transferring ./train/cat.9272.jpg to ./val/cat.9272.jpg
Transferring ./train/dog.9612.jpg to ./val/dog.9612.jpg
Transferring ./train/cat.227.jpg to ./val/cat.227.jpg
Transferring ./train/cat.404.jpg to ./val/cat.404.jpg
Transferring ./train/cat.4171.jpg to ./val/cat.4171.jpg
Transferring ./train/dog.8502.jpg to ./val/dog.8502.jpg
Transferring ./train/dog.11951.jpg to ./val/dog.11951.jpg
```

```
Transferring ./train/dog.11051.jpg to ./val/dog.11051.jpg
Transferring ./train/cat.3570.jpg to ./val/cat.3570.jpg
Transferring ./train/dog.10885.jpg to ./val/dog.10885.jpg
Transferring ./train/dog.3205.jpg to ./val/dog.3205.jpg
Transferring ./train/cat.6389.jpg to ./val/cat.6389.jpg
Transferring ./train/dog.1189.jpg to ./val/dog.1189.jpg
Transferring ./train/dog.9109.jpg to ./val/dog.9109.jpg
Transferring ./train/cat.7376.jpg to ./val/cat.7376.jpg
Transferring ./train/dog.7402.jpg to ./val/dog.7402.jpg
Transferring ./train/dog.4683.jpg to ./val/dog.4683.jpg
Transferring ./train/cat.11286.jpg to ./val/cat.11286.jpg
Transferring ./train/dog.8800.jpg to ./val/dog.8800.jpg
Transferring ./train/dog.291.jpg to ./val/dog.291.jpg
Transferring ./train/dog.960.jpg to ./val/dog.960.jpg
Transferring ./train/cat.10476.jpg to ./val/cat.10476.jpg
Transferring ./train/cat.9831.jpg to ./val/cat.9831.jpg
Transferring ./train/cat.3087.jpg to ./val/cat.3087.jpg
Transferring ./train/cat.5790.jpg to ./val/cat.5790.jpg
Transferring ./train/cat.11458.jpg to ./val/cat.11458.jpg
Transferring ./train/dog.4004.jpg to ./val/dog.4004.jpg
Transferring ./train/dog.360.jpg to ./val/dog.360.jpg
Transferring ./train/dog.11755.jpg to ./val/dog.11755.jpg
Transferring ./train/dog.7564.jpg to ./val/dog.7564.jpg
Transferring ./train/dog.1362.jpg to ./val/dog.1362.jpg
Transferring ./train/dog.1619.jpg to ./val/dog.1619.jpg
Transferring ./train/cat.10811.jpg to ./val/cat.10811.jpg
Transferring ./train/cat.10068.jpg to ./val/cat.10068.jpg
Transferring ./train/cat.11655.jpg to ./val/cat.11655.jpg
Transferring ./train/dog.6454.jpg to ./val/dog.6454.jpg
Transferring ./train/dog.9219.jpg to ./val/dog.9219.jpg
Transferring ./train/cat.10765.jpg to ./val/cat.10765.jpg
Transferring ./train/dog.7468.jpg to ./val/dog.7468.jpg
Transferring ./train/cat.11653.jpg to ./val/cat.11653.jpg
Transferring ./train/cat.5337.jpg to ./val/cat.5337.jpg
Transferring ./train/dog.3323.jpg to ./val/dog.3323.jpg
Transferring ./train/dog.6158.jpg to ./val/dog.6158.jpg
Transferring ./train/dog.2421.jpg to ./val/dog.2421.jpg
Transferring ./train/dog.11831.jpg to ./val/dog.11831.jpg
Transferring ./train/dog.10455.jpg to ./val/dog.10455.jpg
Transferring ./train/dog.12481.jpg to ./val/dog.12481.jpg
Transferring ./train/cat.7506.jpg to ./val/cat.7506.jpg
Transferring ./train/cat.3318.jpg to ./val/cat.3318.jpg
Transferring ./train/dog.6967.jpg to ./val/dog.6967.jpg
Transferring ./train/cat.8230.jpg to ./val/cat.8230.jpg
Transferring ./train/cat.1770.jpg to ./val/cat.1770.jpg
Transferring ./train/dog.2009.jpg to ./val/dog.2009.jpg
Transferring ./train/cat.11902.jpg to ./val/cat.11902.jpg
Transferring ./train/dog.3977.jpg to ./val/dog.3977.jpg
Transferring ./train/cat.6347.jpg to ./val/cat.6347.jpg
Transferring ./train/cat.4374.jpg to ./val/cat.4374.jpg
Transferring ./train/cat.3321.jpg to ./val/cat.3321.jpg
Transferring ./train/cat.9416.jpg to ./val/cat.9416.jpg
Transferring ./train/dog.937.jpg to ./val/dog.937.jpg
Transferring ./train/dog.6697.jpg to ./val/dog.6697.jpg
```

```
Transferring ./train/dog.12348.jpg to ./val/dog.12348.jpg
Transferring ./train/dog.1524.jpg to ./val/dog.1524.jpg
Transferring ./train/cat.9088.jpg to ./val/cat.9088.jpg
Transferring ./train/dog.10123.jpg to ./val/dog.10123.jpg
Transferring ./train/cat.1322.jpg to ./val/cat.1322.jpg
Transferring ./train/cat.770.jpg to ./val/cat.770.jpg
Transferring ./train/cat.9506.jpg to ./val/cat.9506.jpg
Transferring ./train/cat.3948.jpg to ./val/cat.3948.jpg
Transferring ./train/cat.2554.jpg to ./val/cat.2554.jpg
Transferring ./train/dog.342.jpg to ./val/dog.342.jpg
Transferring ./train/cat.11991.jpg to ./val/cat.11991.jpg
Transferring ./train/cat.4117.jpg to ./val/cat.4117.jpg
Transferring ./train/cat.8059.jpg to ./val/cat.8059.jpg
Transferring ./train/dog.9526.jpg to ./val/dog.9526.jpg
Transferring ./train/dog.1008.jpg to ./val/dog.1008.jpg
Transferring ./train/cat.4053.jpg to ./val/cat.4053.jpg
Transferring ./train/cat.9399.jpg to ./val/cat.9399.jpg
Transferring ./train/cat.2887.jpg to ./val/cat.2887.jpg
Transferring ./train/dog.9551.jpg to ./val/dog.9551.jpg
Transferring ./train/dog.6991.jpg to ./val/dog.6991.jpg
Transferring ./train/dog.6416.jpg to ./val/dog.6416.jpg
Transferring ./train/cat.6321.jpg to ./val/cat.6321.jpg
Transferring ./train/cat.9279.jpg to ./val/cat.9279.jpg
Transferring ./train/dog.3165.jpg to ./val/dog.3165.jpg
Transferring ./train/dog.7650.jpg to ./val/dog.7650.jpg
Transferring ./train/dog.8085.jpg to ./val/dog.8085.jpg
Transferring ./train/cat.4731.jpg to ./val/cat.4731.jpg
Transferring ./train/dog.6101.jpg to ./val/dog.6101.jpg
Transferring ./train/dog.241.jpg to ./val/dog.241.jpg
Transferring ./train/cat.8853.jpg to ./val/cat.8853.jpg
Transferring ./train/dog.3817.jpg to ./val/dog.3817.jpg
Transferring ./train/cat.3203.jpg to ./val/cat.3203.jpg
Transferring ./train/dog.9948.jpg to ./val/dog.9948.jpg
Transferring ./train/cat.8661.jpg to ./val/cat.8661.jpg
Transferring ./train/dog.8547.jpg to ./val/dog.8547.jpg
Transferring ./train/dog.9759.jpg to ./val/dog.9759.jpg
Transferring ./train/dog.2804.jpg to ./val/dog.2804.jpg
Transferring ./train/dog.8773.jpg to ./val/dog.8773.jpg
Transferring ./train/dog.8184.jpg to ./val/dog.8184.jpg
Transferring ./train/dog.11840.jpg to ./val/dog.11840.jpg
Transferring ./train/cat.6649.jpg to ./val/cat.6649.jpg
Transferring ./train/dog.6063.jpg to ./val/dog.6063.jpg
Transferring ./train/dog.11910.jpg to ./val/dog.11910.jpg
Transferring ./train/dog.10391.jpg to ./val/dog.10391.jpg
Transferring ./train/dog.2261.jpg to ./val/dog.2261.jpg
Transferring ./train/cat.3877.jpg to ./val/cat.3877.jpg
Transferring ./train/cat.8941.jpg to ./val/cat.8941.jpg
Transferring ./train/dog.5186.jpg to ./val/dog.5186.jpg
Transferring ./train/dog.5244.jpg to ./val/dog.5244.jpg
Transferring ./train/dog.12360.jpg to ./val/dog.12360.jpg
Transferring ./train/cat.6088.jpg to ./val/cat.6088.jpg
Transferring ./train/dog.2733.jpg to ./val/dog.2733.jpg
Transferring ./train/dog.1849.jpg to ./val/dog.1849.jpg
Transferring ./train/dog.7022.jpg to ./val/dog.7022.jpg
```

```
Transferring ./train/cat.2617.jpg to ./val/cat.2617.jpg
Transferring ./train/dog.2607.jpg to ./val/dog.2607.jpg
Transferring ./train/cat.7197.jpg to ./val/cat.7197.jpg
Transferring ./train/cat.10291.jpg to ./val/cat.10291.jpg
Transferring ./train/cat.2249.jpg to ./val/cat.2249.jpg
Transferring ./train/cat.2289.jpg to ./val/cat.2289.jpg
Transferring ./train/cat.7416.jpg to ./val/cat.7416.jpg
Transferring ./train/cat.3491.jpg to ./val/cat.3491.jpg
Transferring ./train/cat.5518.jpg to ./val/cat.5518.jpg
Transferring ./train/cat.7305.jpg to ./val/cat.7305.jpg
Transferring ./train/dog.12053.jpg to ./val/dog.12053.jpg
Transferring ./train/cat.2416.jpg to ./val/cat.2416.jpg
Transferring ./train/cat.1919.jpg to ./val/cat.1919.jpg
Transferring ./train/dog.2457.jpg to ./val/dog.2457.jpg
Transferring ./train/cat.9015.jpg to ./val/cat.9015.jpg
Transferring ./train/cat.1027.jpg to ./val/cat.1027.jpg
Transferring ./train/cat.2627.jpg to ./val/cat.2627.jpg
Transferring ./train/dog.9529.jpg to ./val/dog.9529.jpg
Transferring ./train/dog.6379.jpg to ./val/dog.6379.jpg
Transferring ./train/dog.372.jpg to ./val/dog.372.jpg
Transferring ./train/dog.6501.jpg to ./val/dog.6501.jpg
Transferring ./train/dog.1312.jpg to ./val/dog.1312.jpg
Transferring ./train/dog.5570.jpg to ./val/dog.5570.jpg
Transferring ./train/dog.11628.jpg to ./val/dog.11628.jpg
Transferring ./train/cat.12253.jpg to ./val/cat.12253.jpg
Transferring ./train/dog.3727.jpg to ./val/dog.3727.jpg
Transferring ./train/cat.2941.jpg to ./val/cat.2941.jpg
Transferring ./train/cat.11013.jpg to ./val/cat.11013.jpg
Transferring ./train/dog.2656.jpg to ./val/dog.2656.jpg
Transferring ./train/dog.9580.jpg to ./val/dog.9580.jpg
Transferring ./train/cat.2913.jpg to ./val/cat.2913.jpg
Transferring ./train/dog.10019.jpg to ./val/dog.10019.jpg
Transferring ./train/cat.3157.jpg to ./val/cat.3157.jpg
Transferring ./train/cat.5991.jpg to ./val/cat.5991.jpg
Transferring ./train/dog.9390.jpg to ./val/dog.9390.jpg
Transferring ./train/cat.9103.jpg to ./val/cat.9103.jpg
Transferring ./train/dog.605.jpg to ./val/dog.605.jpg
Transferring ./train/cat.10357.jpg to ./val/cat.10357.jpg
Transferring ./train/dog.5645.jpg to ./val/dog.5645.jpg
Transferring ./train/dog.7260.jpg to ./val/dog.7260.jpg
Transferring ./train/cat.8647.jpg to ./val/cat.8647.jpg
Transferring ./train/cat.6399.jpg to ./val/cat.6399.jpg
Transferring ./train/cat.1748.jpg to ./val/cat.1748.jpg
Transferring ./train/dog.12361.jpg to ./val/dog.12361.jpg
Transferring ./train/cat.10733.jpg to ./val/cat.10733.jpg
Transferring ./train/dog.8764.jpg to ./val/dog.8764.jpg
Transferring ./train/cat.9959.jpg to ./val/cat.9959.jpg
Transferring ./train/dog.236.jpg to ./val/dog.236.jpg
Transferring ./train/dog.10500.jpg to ./val/dog.10500.jpg
Transferring ./train/cat.11023.jpg to ./val/cat.11023.jpg
Transferring ./train/cat.2768.jpg to ./val/cat.2768.jpg
Transferring ./train/dog.6879.jpg to ./val/dog.6879.jpg
Transferring ./train/dog.9714.jpg to ./val/dog.9714.jpg
Transferring ./train/dog.1530.jpg to ./val/dog.1530.jpg
```

```
Transferring ./train/dog.12338.jpg to ./val/dog.12338.jpg
Transferring ./train/cat.2065.jpg to ./val/cat.2065.jpg
Transferring ./train/dog.7340.jpg to ./val/dog.7340.jpg
Transferring ./train/dog.10035.jpg to ./val/dog.10035.jpg
Transferring ./train/dog.92.jpg to ./val/dog.92.jpg
Transferring ./train/dog.12016.jpg to ./val/dog.12016.jpg
Transferring ./train/dog.6508.jpg to ./val/dog.6508.jpg
Transferring ./train/dog.7853.jpg to ./val/dog.7853.jpg
Transferring ./train/dog.11287.jpg to ./val/dog.11287.jpg
Transferring ./train/dog.11370.jpg to ./val/dog.11370.jpg
Transferring ./train/dog.1078.jpg to ./val/dog.1078.jpg
Transferring ./train/cat.10866.jpg to ./val/cat.10866.jpg
Transferring ./train/dog.1033.jpg to ./val/dog.1033.jpg
Transferring ./train/cat.1723.jpg to ./val/cat.1723.jpg
Transferring ./train/dog.10838.jpg to ./val/dog.10838.jpg
Transferring ./train/cat.1345.jpg to ./val/cat.1345.jpg
Transferring ./train/cat.11496.jpg to ./val/cat.11496.jpg
Transferring ./train/dog.4433.jpg to ./val/dog.4433.jpg
Transferring ./train/dog.3002.jpg to ./val/dog.3002.jpg
Transferring ./train/cat.3942.jpg to ./val/cat.3942.jpg
Transferring ./train/dog.11440.jpg to ./val/dog.11440.jpg
Transferring ./train/cat.8731.jpg to ./val/cat.8731.jpg
Transferring ./train/cat.1072.jpg to ./val/cat.1072.jpg
Transferring ./train/dog.4327.jpg to ./val/dog.4327.jpg
Transferring ./train/cat.6322.jpg to ./val/cat.6322.jpg
Transferring ./train/dog.4013.jpg to ./val/dog.4013.jpg
Transferring ./train/cat.10636.jpg to ./val/cat.10636.jpg
Transferring ./train/dog.5408.jpg to ./val/dog.5408.jpg
Transferring ./train/cat.9965.jpg to ./val/cat.9965.jpg
Transferring ./train/cat.11652.jpg to ./val/cat.11652.jpg
Transferring ./train/cat.8600.jpg to ./val/cat.8600.jpg
Transferring ./train/dog.11671.jpg to ./val/dog.11671.jpg
Transferring ./train/cat.3394.jpg to ./val/cat.3394.jpg
Transferring ./train/cat.9206.jpg to ./val/cat.9206.jpg
Transferring ./train/dog.5832.jpg to ./val/dog.5832.jpg
Transferring ./train/cat.4465.jpg to ./val/cat.4465.jpg
Transferring ./train/cat.4120.jpg to ./val/cat.4120.jpg
Transferring ./train/cat.9004.jpg to ./val/cat.9004.jpg
Transferring ./train/dog.4419.jpg to ./val/dog.4419.jpg
Transferring ./train/dog.7352.jpg to ./val/dog.7352.jpg
Transferring ./train/cat.5122.jpg to ./val/cat.5122.jpg
Transferring ./train/dog.8049.jpg to ./val/dog.8049.jpg
Transferring ./train/cat.8361.jpg to ./val/cat.8361.jpg
Transferring ./train/dog.8697.jpg to ./val/dog.8697.jpg
Transferring ./train/cat.3802.jpg to ./val/cat.3802.jpg
Transferring ./train/dog.2848.jpg to ./val/dog.2848.jpg
Transferring ./train/cat.4328.jpg to ./val/cat.4328.jpg
Transferring ./train/dog.3042.jpg to ./val/dog.3042.jpg
Transferring ./train/cat.22.jpg to ./val/cat.22.jpg
Transferring ./train/dog.169.jpg to ./val/dog.169.jpg
Transferring ./train/dog.11215.jpg to ./val/dog.11215.jpg
Transferring ./train/dog.1070.jpg to ./val/dog.1070.jpg
Transferring ./train/dog.9114.jpg to ./val/dog.9114.jpg
Transferring ./train/dog.2080.jpg to ./val/dog.2080.jpg
```

```
Transferring ./train/cat.2276.jpg to ./val/cat.2276.jpg
Transferring ./train/cat.11750.jpg to ./val/cat.11750.jpg
Transferring ./train/cat.1385.jpg to ./val/cat.1385.jpg
Transferring ./train/cat.5539.jpg to ./val/cat.5539.jpg
Transferring ./train/dog.6194.jpg to ./val/dog.6194.jpg
Transferring ./train/cat.9453.jpg to ./val/cat.9453.jpg
Transferring ./train/cat.347.jpg to ./val/cat.347.jpg
Transferring ./train/dog.9459.jpg to ./val/dog.9459.jpg
Transferring ./train/dog.6157.jpg to ./val/dog.6157.jpg
Transferring ./train/dog.10151.jpg to ./val/dog.10151.jpg
Transferring ./train/dog.3627.jpg to ./val/dog.3627.jpg
Transferring ./train/dog.9922.jpg to ./val/dog.9922.jpg
Transferring ./train/dog.4895.jpg to ./val/dog.4895.jpg
Transferring ./train/dog.6209.jpg to ./val/dog.6209.jpg
Transferring ./train/cat.2765.jpg to ./val/cat.2765.jpg
Transferring ./train/cat.5168.jpg to ./val/cat.5168.jpg
Transferring ./train/dog.4371.jpg to ./val/dog.4371.jpg
Transferring ./train/cat.2484.jpg to ./val/cat.2484.jpg
Transferring ./train/dog.7338.jpg to ./val/dog.7338.jpg
Transferring ./train/cat.2595.jpg to ./val/cat.2595.jpg
Transferring ./train/cat.10253.jpg to ./val/cat.10253.jpg
Transferring ./train/dog.4526.jpg to ./val/dog.4526.jpg
Transferring ./train/dog.769.jpg to ./val/dog.769.jpg
Transferring ./train/dog.2520.jpg to ./val/dog.2520.jpg
Transferring ./train/cat.3616.jpg to ./val/cat.3616.jpg
Transferring ./train/dog.11488.jpg to ./val/dog.11488.jpg
Transferring ./train/dog.3393.jpg to ./val/dog.3393.jpg
Transferring ./train/cat.9578.jpg to ./val/cat.9578.jpg
Transferring ./train/cat.3870.jpg to ./val/cat.3870.jpg
Transferring ./train/dog.1102.jpg to ./val/dog.1102.jpg
Transferring ./train/dog.9141.jpg to ./val/dog.9141.jpg
Transferring ./train/dog.9732.jpg to ./val/dog.9732.jpg
Transferring ./train/cat.5873.jpg to ./val/cat.5873.jpg
Transferring ./train/cat.8117.jpg to ./val/cat.8117.jpg
Transferring ./train/cat.3003.jpg to ./val/cat.3003.jpg
Transferring ./train/dog.10897.jpg to ./val/dog.10897.jpg
Transferring ./train/cat.7338.jpg to ./val/cat.7338.jpg
Transferring ./train/dog.11701.jpg to ./val/dog.11701.jpg
Transferring ./train/cat.6471.jpg to ./val/cat.6471.jpg
Transferring ./train/cat.3023.jpg to ./val/cat.3023.jpg
Transferring ./train/dog.4156.jpg to ./val/dog.4156.jpg
Transferring ./train/dog.7002.jpg to ./val/dog.7002.jpg
Transferring ./train/dog.9855.jpg to ./val/dog.9855.jpg
Transferring ./train/cat.8013.jpg to ./val/cat.8013.jpg
Transferring ./train/cat.2915.jpg to ./val/cat.2915.jpg
Transferring ./train/dog.3352.jpg to ./val/dog.3352.jpg
Transferring ./train/dog.9601.jpg to ./val/dog.9601.jpg
Transferring ./train/cat.9021.jpg to ./val/cat.9021.jpg
Transferring ./train/dog.10359.jpg to ./val/dog.10359.jpg
Transferring ./train/dog.11817.jpg to ./val/dog.11817.jpg
Transferring ./train/dog.7737.jpg to ./val/dog.7737.jpg
Transferring ./train/cat.3445.jpg to ./val/cat.3445.jpg
Transferring ./train/cat.10069.jpg to ./val/cat.10069.jpg
Transferring ./train/dog.9136.jpg to ./val/dog.9136.jpg
```

```

Transferring ./train/cat.1431.jpg to ./val/cat.1431.jpg
Transferring ./train/dog.7269.jpg to ./val/dog.7269.jpg
Transferring ./train/cat.2084.jpg to ./val/cat.2084.jpg
Transferring ./train/cat.3620.jpg to ./val/cat.3620.jpg
Transferring ./train/cat.8593.jpg to ./val/cat.8593.jpg
Transferring ./train/cat.6015.jpg to ./val/cat.6015.jpg
Transferring ./train/cat.7960.jpg to ./val/cat.7960.jpg
Transferring ./train/cat.1756.jpg to ./val/cat.1756.jpg
Transferring ./train/cat.8079.jpg to ./val/cat.8079.jpg
Transferring ./train/cat.2351.jpg to ./val/cat.2351.jpg
Transferring ./train/cat.2216.jpg to ./val/cat.2216.jpg
Transferring ./train/dog.976.jpg to ./val/dog.976.jpg
Transferring ./train/dog.9309.jpg to ./val/dog.9309.jpg
Transferring ./train/dog.8506.jpg to ./val/dog.8506.jpg
Transferring ./train/dog.1968.jpg to ./val/dog.1968.jpg
Transferring ./train/dog.10876.jpg to ./val/dog.10876.jpg
Transferring ./train/dog.4517.jpg to ./val/dog.4517.jpg
Transferring ./train/cat.9830.jpg to ./val/cat.9830.jpg
Transferring ./train/dog.7461.jpg to ./val/dog.7461.jpg
Transferring ./train/dog.3015.jpg to ./val/dog.3015.jpg
Transferring ./train/cat.7302.jpg to ./val/cat.7302.jpg
Transferring ./train/dog.2785.jpg to ./val/dog.2785.jpg
Transferring ./train/cat.3066.jpg to ./val/cat.3066.jpg
Transferring ./train/dog.2521.jpg to ./val/dog.2521.jpg
Transferring ./train/cat.9558.jpg to ./val/cat.9558.jpg
Transferring ./train/dog.8991.jpg to ./val/dog.8991.jpg
Transferring ./train/cat.11593.jpg to ./val/cat.11593.jpg
Transferring ./train/cat.7034.jpg to ./val/cat.7034.jpg
Transferring ./train/dog.9897.jpg to ./val/dog.9897.jpg
Transferring ./train/dog.7600.jpg to ./val/dog.7600.jpg
Transferring ./train/cat.2618.jpg to ./val/cat.2618.jpg
Transferring ./train/cat.5047.jpg to ./val/cat.5047.jpg
Transferring ./train/cat.10434.jpg to ./val/cat.10434.jpg
Transferring ./train/dog.10016.jpg to ./val/dog.10016.jpg
Transferring ./train/cat.5742.jpg to ./val/cat.5742.jpg
Transferring ./train/cat.5194.jpg to ./val/cat.5194.jpg
Transferring ./train/cat.1617.jpg to ./val/cat.1617.jpg

```

## 4.3 Kittypupsploration

Let's create some pointers to our directories and create lists that map to each directory and category, i.e., cat and dog.

```

TRAIN_DIR = './data/train/'
TEST_DIR = './data/test/'
VAL_DIR = './val'

ROWS = 64
COLS = 64
CHANNELS = 3

# len(train_images)
# val_set = random.sample(train_images, k=10000)

```

```
# val_imgs = [v[13:] for v in val_set]

# for i in range(len(val_set)):
#     os.rename(val_set[i], "./data/val/" + val_imgs[i])
```

We'll also make some functions to read our images using the cv2 package.

```
train_images = [TRAIN_DIR+i for i in os.listdir(TRAIN_DIR)]
train_dogs = [TRAIN_DIR+i for i in os.listdir(TRAIN_DIR) if 'dog' in i]
train_cats = [TRAIN_DIR+i for i in os.listdir(TRAIN_DIR) if 'cat' in i]
test_images = [TEST_DIR+i for i in os.listdir(TEST_DIR)]

def read_image(file_path):
    img = cv2.imread(file_path, cv2.IMREAD_COLOR)
    return cv2.resize(img, (ROWS, COLS), interpolation=cv2.INTER_CUBIC)

def prep_data(images):
    count = len(images)
    data = np.ndarray((count, CHANNELS, ROWS, COLS), dtype=np.uint8)

    for i, image_file in enumerate(images):
        image = read_image(image_file)
        data[i] = image.T
        if i%250 == 0: print('Processed {} of {}'.format(i, count))

    return data

# if you want in-memory collections of the images:
# train = prep_data(train_images)
# test = prep_data(test_images)

print("Train shape: {}".format(len(train_images)))
print("Test shape: {}".format(len(test_images)))
```

```
Train shape: 25000
Test shape: 12500
```

## 4.4 Data Readers in CNTK

CNTK's batch readers will often perform at their best when the underlying data is properly partitioned in separate directories by class. To make this especially easy for CNTK, we'll create a mapping file that maps each file path to its one hot encoded label. We first split the images by their labels, then create a dictionary for each image to its label (`create_class_mapping_from_folder`), and finally create a `map.txt` containing the complete training set paths and their labels.

Some additional helper functions for creating such datasets can be found in the `CNTK/Scripts` directory of the main repository.

```
%%bash
mkdir train/cats
mkdir train/dogs
mv train/cat.*.jpg train/cats
mv train/dog.*.jpg train/dogs
```

```

def create_class_mapping_from_folder(root_folder):
    classes = []
    for _, directories, _ in os.walk(root_folder):
        for directory in directories:
            classes.append(directory)
    classes.sort()
    return np.asarray(classes)

def create_map_file_from_folder(root_folder, class_mapping, include_unknown=False):
    map_file_name = os.path.join(root_folder, "map.txt")
    lines = []
    for class_id in range(0, len(class_mapping)):
        folder = os.path.join(root_folder, class_mapping[class_id])
        if os.path.exists(folder):
            for entry in os.listdir(folder):
                filename = os.path.join(folder, entry)
                if os.path.isfile(filename) and os.path.splitext(filename)[1] in file_endings:
                    lines.append("{0}\t{1}\n".format(filename, class_id))

    if include_unknown:
        for entry in os.listdir(root_folder):
            filename = os.path.join(root_folder, entry)
            if os.path.isfile(filename) and os.path.splitext(filename)[1] in file_endings:
                lines.append("{0}\t-1\n".format(filename))

    lines.sort()
    with open(map_file_name, 'w') as map_file:
        for line in lines:
            map_file.write(line)

    return map_file_name

train_image_folder = os.path.join("train")
file_endings = ['.jpg', '.JPG', '.jpeg', '.JPEG', '.png', '.PNG']
class_mapping = create_class_mapping_from_folder(os.path.abspath(path="train/"))
train_map_file = create_map_file_from_folder(train_image_folder, class_mapping)

%%bash
head train/map.txt
tail train/map.txt

```

```

train/cats/cat.0.jpg      0
train/cats/cat.1.jpg      0
train/cats/cat.10.jpg     0
train/cats/cat.100.jpg    0
train/cats/cat.1000.jpg   0
train/cats/cat.10000.jpg  0
train/cats/cat.10002.jpg  0
train/cats/cat.10004.jpg  0
train/cats/cat.10007.jpg  0
train/cats/cat.10008.jpg  0
train/dogs/dog.9988.jpg   1
train/dogs/dog.999.jpg    1
train/dogs/dog.9990.jpg   1

```

```
train/dogs/dog.9991.jpg 1
train/dogs/dog.9992.jpg 1
train/dogs/dog.9993.jpg 1
train/dogs/dog.9994.jpg 1
train/dogs/dog.9995.jpg 1
train/dogs/dog.9998.jpg 1
train/dogs/dog.9999.jpg 1
```

## 4.5 Pre-Trained Models

CNTK has a list of pre-trained models. These are models that were either trained from scratch with CNTK on a large image corpus like ImageNet 1K, or converted from other toolkits. You can find a list of pre-trained image models here.

Our first step is to download the pre-trained image model and load it into our local directory.

We'll try using the ResNet 18 model developed by Kaiming He while he was at MSR Asia. This model is a Convolutional Neural Network built using Residual Network techniques. Convolutional Neural Networks build up layers of convolutions, transforming an input image and distilling it down until they start recognizing composite features, with deeper layers of convolutions recognizing complex patterns are made possible.

Residual Deep Learning attempts to “pass through” the main signal of the input data, so that the network winds up “learning” on just the residual portions that differ between layers. This has proven, in practice, to allow the training of much deeper networks by avoiding issues that plague gradient descent on larger networks. These cells bypass convolution layers and then come back in later before ReLU (see below), but some have argued that even deeper networks can be built by avoiding even more nonlinearities in the bypass channel. This is an area of hot research right now, and one of the most exciting parts of Transfer Learning is that you get to benefit from all of the improvements by just integrating new trained models.

```
%autoreload
```

```
list_available_models()
```

Available models (for more information see `Readme.md`):

Model name	Category
AlexNet_ImageNet_CNTK	Image Classification
AlexNet_ImageNet_Caffe	Image Classification
BNInception_ImageNet_Caffe	Image Classification
InceptionV3_ImageNet_CNTK	Image Classification
ResNet101_ImageNet_Caffe	Image Classification
ResNet110_CIFAR10_CNTK	Image Classification
ResNet152_ImageNet_Caffe	Image Classification
ResNet18_ImageNet_CNTK	Image Classification
ResNet20_CIFAR10_CNTK	Image Classification
ResNet34_ImageNet_CNTK	Image Classification
ResNet50_ImageNet_CNTK	Image Classification
ResNet50_ImageNet_Caffe	Image Classification
VGG16_ImageNet_Caffe	Image Classification
VGG19_ImageNet_Caffe	Image Classification
Fast-RCNN_Pascal	Image Object Detection
Fast-RCNN_grocery100	Image Object Detection

```
base_model_file = download_model_by_name("ResNet18_ImageNet_CNTK")
```

CNTK model already available at /datadrive/kaggle/catsdogs/utils/ResNet18\_ImageNet\_CNTK.model

```
base_model_file
'/datadrive/kaggle/catsdogs/utils/ResNet18_ImageNet_CNTK.model'
```

## 4.6 Defining Model Architecture

Now that we have our pretrained model saved, we'll take a look at it's node labels and use that to define our new architecture.

```
!ls -lh utils/
base_model = {
    'model_file': base_model_file,
    'feature_node_name': 'features',
    'last_hidden_node_name': 'z.x',
    # Channel Depth x Height x Width
    'image_dims': (3, 224, 224)
}

print('Loading {} and printing all layers:'.format(base_model['model_file']))
node_outputs = C.logging.get_node_outputs(C.load_model(base_model['model_file']))
for l in node_outputs: print("  {} {}".format(l.name, l.shape))

Loading /datadrive/kaggle/catsdogs/utils/ResNet18_ImageNet_CNTK.model and printing all layers:
  ce ()
  errs ()
  top5Errs ()
  z (1000,)
  ce ()
  z (1000,)
  z.PlusArgs[0] (1000,)
  z.x (512, 1, 1)
  z.x.x.r (512, 7, 7)
  z.x.x.p (512, 7, 7)
  z.x.x.b (512, 7, 7)
  z.x.x.b.x.c (512, 7, 7)
  z.x.x.b.x (512, 7, 7)
  z.x.x.b.x._ (512, 7, 7)
  z.x.x.b.x._.x.c (512, 7, 7)
  z.x.x.x.r (512, 7, 7)
  z.x.x.x.p (512, 7, 7)
  z.x.x.x.b (512, 7, 7)
  z.x.x.x.b.x.c (512, 7, 7)
  z.x.x.x.b.x (512, 7, 7)
  z.x.x.x.b.x._ (512, 7, 7)
  z.x.x.x.b.x._.x.c (512, 7, 7)
  _z.x.x.x.r (512, 7, 7)
  _z.x.x.x.p (512, 7, 7)
  _z.x.x.x.b (512, 7, 7)
  _z.x.x.x.b.x.c (512, 7, 7)
  _z.x.x.x.b.x (512, 7, 7)
  _z.x.x.x.b.x._ (512, 7, 7)
  _z.x.x.x.b.x._.x.c (512, 7, 7)
  z.x.x.x.x.r (256, 14, 14)
```

```
z.x.x.x.x.x.p (256, 14, 14)
z.x.x.x.x.x.b (256, 14, 14)
z.x.x.x.x.x.b.x.c (256, 14, 14)
z.x.x.x.x.x.b.x (256, 14, 14)
z.x.x.x.x.x.b.x._ (256, 14, 14)
z.x.x.x.x.x.b.x._.x.c (256, 14, 14)
z.x.x.x.x.x.r (256, 14, 14)
z.x.x.x.x.x.p (256, 14, 14)
z.x.x.x.x.x.b (256, 14, 14)
z.x.x.x.x.x.b.x.c (256, 14, 14)
z.x.x.x.x.x.b.x (256, 14, 14)
z.x.x.x.x.x.b.x._ (256, 14, 14)
z.x.x.x.x.x.b.x._.x.c (256, 14, 14)
z.x.x.x.x.x.x.r (128, 28, 28)
z.x.x.x.x.x.x.p (128, 28, 28)
z.x.x.x.x.x.x.b (128, 28, 28)
z.x.x.x.x.x.x.b.x.c (128, 28, 28)
z.x.x.x.x.x.x.b.x (128, 28, 28)
z.x.x.x.x.x.x.b.x._ (128, 28, 28)
z.x.x.x.x.x.x.b.x._.x.c (128, 28, 28)
z.x.x.x.x.x.x.x.r (128, 28, 28)
z.x.x.x.x.x.x.x.p (128, 28, 28)
z.x.x.x.x.x.x.x.b (128, 28, 28)
z.x.x.x.x.x.x.x.b.x.c (128, 28, 28)
z.x.x.x.x.x.x.x.b.x (128, 28, 28)
z.x.x.x.x.x.x.b.x._ (128, 28, 28)
z.x.x.x.x.x.x.b.x._.x.c (128, 28, 28)
z.x.x.x.x.x.x.x.r (64, 56, 56)
z.x.x.x.x.x.x.x.x.p (64, 56, 56)
z.x.x.x.x.x.x.x.x.b (64, 56, 56)
z.x.x.x.x.x.x.x.x.b.x.c (64, 56, 56)
z.x.x.x.x.x.x.x.x.b.x (64, 56, 56)
z.x.x.x.x.x.x.x.x.b.x._ (64, 56, 56)
z.x.x.x.x.x.x.x.x.b.x._.x.c (64, 56, 56)
z.x.x.x.x.x.x.x.x.x.r (64, 56, 56)
z.x.x.x.x.x.x.x.x.x.p (64, 56, 56)
z.x.x.x.x.x.x.x.x.x.b (64, 56, 56)
z.x.x.x.x.x.x.x.x.b.x.c (64, 56, 56)
z.x.x.x.x.x.x.x.x.b.x (64, 56, 56)
z.x.x.x.x.x.x.x.x.b.x._ (64, 56, 56)
z.x.x.x.x.x.x.x.x.b.x._.x.c (64, 56, 56)
z.x.x.x.x.x.x.x.x.x (64, 56, 56)
z.x.x.x.x.x.x.x.x.x.x (64, 112, 112)
z.x.x.x.x.x.x.x.x.x._ (64, 112, 112)
z.x.x.x.x.x.x.x.x.x._.x.c (64, 112, 112)
z.x.x.x.x.x.x.x.s (128, 28, 28)
z.x.x.x.x.x.x.x.s.x.c (128, 28, 28)
z.x.x.x.x.x.s (256, 14, 14)
z.x.x.x.x.x.s.x.c (256, 14, 14)
z.x.x.x.s (512, 7, 7)
z.x.x.x.s.x.c (512, 7, 7)
errs ()
top5Errs ()
```

```

svg = C.logging.graph.plot(C.load_model(base_model['model_file']), "tmp.svg");

Warning: node 'ReLU1049', graph 'network_graph' size too small for label
Warning: node 'ReLU1018', graph 'network_graph' size too small for label
Warning: node 'ReLU1032', graph 'network_graph' size too small for label
Warning: node 'ReLU987', graph 'network_graph' size too small for label
Warning: node 'ReLU1001', graph 'network_graph' size too small for label
Warning: node 'ReLU956', graph 'network_graph' size too small for label
Warning: node 'ReLU942', graph 'network_graph' size too small for label
Warning: node 'ReLU911', graph 'network_graph' size too small for label
Warning: node 'ReLU925', graph 'network_graph' size too small for label
Warning: node 'ReLU880', graph 'network_graph' size too small for label
Warning: node 'ReLU866', graph 'network_graph' size too small for label
Warning: node 'ReLU835', graph 'network_graph' size too small for label
Warning: node 'ReLU849', graph 'network_graph' size too small for label
Warning: node 'ReLU804', graph 'network_graph' size too small for label
Warning: node 'ReLU790', graph 'network_graph' size too small for label
Warning: node 'ReLU759', graph 'network_graph' size too small for label
Warning: node 'ReLU773', graph 'network_graph' size too small for label
Warning: node 'ReLU742', graph 'network_graph' size too small for label
Warning: node 'ReLU725', graph 'network_graph' size too small for label

display(SVG(filename="tmp.svg"))

```

Visualizing the network architecture is tough due to it's complexity and size. Kitties and puppies are simpler, and more fun to visualize!

```

def plot_images(images, subplot_shape):
    plt.style.use('ggplot')
    fig, axes = plt.subplots(*subplot_shape)
    for image, ax in zip(images, axes.flatten()):
        ax.imshow(image.reshape(28, 28), vmin = 0, vmax = 1.0, cmap = 'gray')
        ax.axis('off')
    plt.show()

img = mpimg.imread(train_dogs[random.randint(0, len(train_dogs))])
plt.imshow(img)

```

```
<matplotlib.image.AxesImage at 0x7faf3058eb70>
```

```
img = mpimg.imread(train_cats[random.randint(0, len(train_cats))])
plt.imshow(img)
```

```
<matplotlib.image.AxesImage at 0x7faf306df4a8>
```

```

def show_pics(paths: list):

    f, ax = plt.subplots(1, len(paths))

    for i, path in enumerate(paths):
        ax[i].imshow(Image.open(path))
        ax[i].set_title(os.path.basename(path))
        ax[i].axis('off')

dog_sample = train_dogs[0:3]
cat_sample = train_cats[0:3]

```

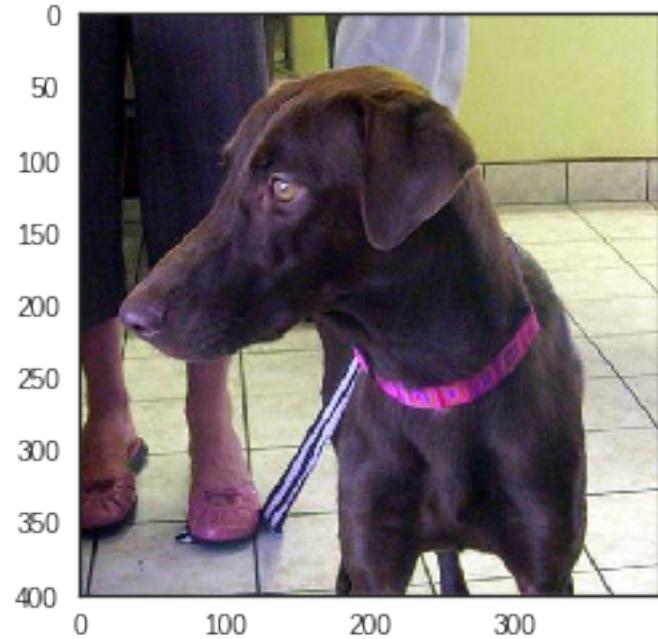


Figure 4.1: png

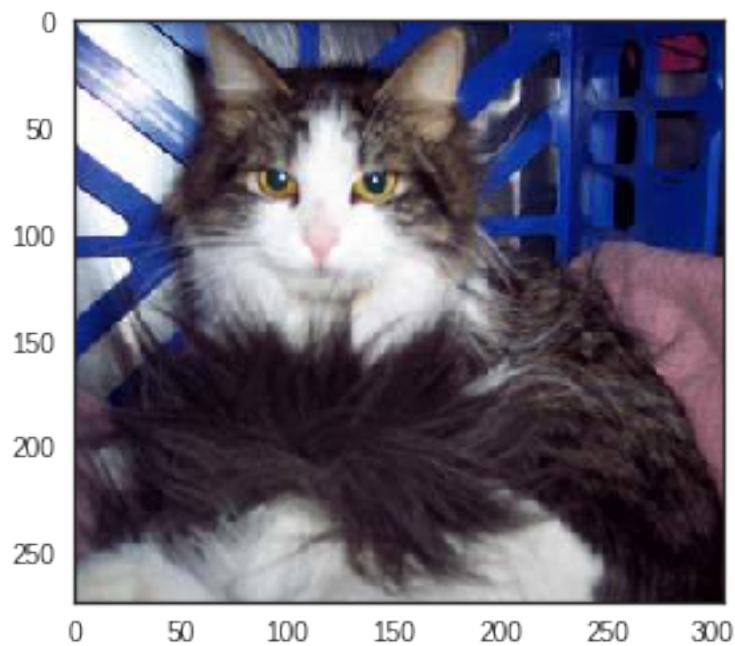


Figure 4.2: png



Figure 4.3: png



Figure 4.4: png

```
show_pics(dog_sample)
show_pics(cat_sample)
```

## 4.7 Training the Transfer Model

Okay, back to our model. Let's take a look at those node labels again. The last labels are the cross-entropy term, errors, and top-5 errors. These are needed to define our full computational graph and for training through backpropagation. The last actual label is  $z$ , which maps to our class labels (1000 in this case, for the number of classes in ImageNet). The last activation layer *prior* to the dense mapping to ImageNet classes is  $z \cdot x$ .

```
C.logging.get_node_outputs(C.load_model(base_model['model_file']))
```

```
[Output('ce', [], []),
 Output('errs', [], []),
 Output('top5Errs', [], [])],
```

```

Output('z', [#, ], [1000]),
Output('ce', [], []),
Output('z', [#, ], [1000]),
Output('z.PlusArgs[0]', [#, ], [1000]),
Output('z.x', [#, ], [512 x 1 x 1]),
Output('z.x.x.r', [#, ], [512 x 7 x 7]),
Output('z.x.x.p', [#, ], [512 x 7 x 7]),
Output('z.x.x.b', [#, ], [512 x 7 x 7]),
Output('z.x.x.b.x.c', [#, ], [512 x 7 x 7]),
Output('z.x.x.b.x', [#, ], [512 x 7 x 7]),
Output('z.x.x.b.x._', [#, ], [512 x 7 x 7]),
Output('z.x.x.b.x._.x.c', [#, ], [512 x 7 x 7]),
Output('z.x.x.x.r', [#, ], [512 x 7 x 7]),
Output('z.x.x.x.p', [#, ], [512 x 7 x 7]),
Output('z.x.x.x.b', [#, ], [512 x 7 x 7]),
Output('z.x.x.x.b.x.c', [#, ], [512 x 7 x 7]),
Output('z.x.x.x.b.x', [#, ], [512 x 7 x 7]),
Output('z.x.x.x.b.x._', [#, ], [512 x 7 x 7]),
Output('z.x.x.x.b.x._.x.c', [#, ], [512 x 7 x 7]),
Output('_z.x.x.x.r', [#, ], [512 x 7 x 7]),
Output('_z.x.x.x.p', [#, ], [512 x 7 x 7]),
Output('_z.x.x.x.b', [#, ], [512 x 7 x 7]),
Output('_z.x.x.x.b.x.c', [#, ], [512 x 7 x 7]),
Output('_z.x.x.x.b.x', [#, ], [512 x 7 x 7]),
Output('_z.x.x.x.b.x._', [#, ], [512 x 7 x 7]),
Output('_z.x.x.x.b.x._.x.c', [#, ], [512 x 7 x 7]),
Output('z.x.x.x.x.r', [#, ], [256 x 14 x 14]),
Output('z.x.x.x.x.p', [#, ], [256 x 14 x 14]),
Output('z.x.x.x.x.b', [#, ], [256 x 14 x 14]),
Output('z.x.x.x.x.b.x.c', [#, ], [256 x 14 x 14]),
Output('z.x.x.x.x.b.x', [#, ], [256 x 14 x 14]),
Output('z.x.x.x.x.b.x._', [#, ], [256 x 14 x 14]),
Output('z.x.x.x.x.b.x._.x.c', [#, ], [256 x 14 x 14]),
Output('z.x.x.x.x.r', [#, ], [256 x 14 x 14]),
Output('z.x.x.x.x.p', [#, ], [256 x 14 x 14]),
Output('z.x.x.x.x.b', [#, ], [256 x 14 x 14]),
Output('z.x.x.x.x.b.x.c', [#, ], [256 x 14 x 14]),
Output('z.x.x.x.x.b.x', [#, ], [256 x 14 x 14]),
Output('z.x.x.x.x.b.x._', [#, ], [256 x 14 x 14]),
Output('z.x.x.x.x.b.x._.x.c', [#, ], [256 x 14 x 14]),
Output('z.x.x.x.x.x.r', [#, ], [128 x 28 x 28]),
Output('z.x.x.x.x.x.p', [#, ], [128 x 28 x 28]),
Output('z.x.x.x.x.x.b', [#, ], [128 x 28 x 28]),
Output('z.x.x.x.x.x.b.x.c', [#, ], [128 x 28 x 28]),
Output('z.x.x.x.x.x.b.x', [#, ], [128 x 28 x 28]),
Output('z.x.x.x.x.x.b.x._', [#, ], [128 x 28 x 28]),
Output('z.x.x.x.x.x.b.x._.x.c', [#, ], [128 x 28 x 28]),
Output('z.x.x.x.x.x.x.r', [#, ], [128 x 28 x 28]),
Output('z.x.x.x.x.x.x.p', [#, ], [128 x 28 x 28]),
Output('z.x.x.x.x.x.x.b', [#, ], [128 x 28 x 28]),
Output('z.x.x.x.x.x.x.b.x.c', [#, ], [128 x 28 x 28]),
Output('z.x.x.x.x.x.x.b.x', [#, ], [128 x 28 x 28]),
Output('z.x.x.x.x.x.x.b.x._', [#, ], [128 x 28 x 28]),
Output('z.x.x.x.x.x.x.b.x._.x.c', [#, ], [128 x 28 x 28]),

```

```

Output('z.x.x.x.x.x.x.x.r', [#, ], [64 x 56 x 56]),
Output('z.x.x.x.x.x.x.x.p', [#, ], [64 x 56 x 56]),
Output('z.x.x.x.x.x.x.x.b', [#, ], [64 x 56 x 56]),
Output('z.x.x.x.x.x.x.x.b.x.c', [#, ], [64 x 56 x 56]),
Output('z.x.x.x.x.x.x.x.b.x.', [#, ], [64 x 56 x 56]),
Output('z.x.x.x.x.x.x.x.b.x._', [#, ], [64 x 56 x 56]),
Output('z.x.x.x.x.x.x.x.b.x._.x.c', [#, ], [64 x 56 x 56]),
Output('z.x.x.x.x.x.x.x.r', [#, ], [64 x 56 x 56]),
Output('z.x.x.x.x.x.x.x.p', [#, ], [64 x 56 x 56]),
Output('z.x.x.x.x.x.x.x.b', [#, ], [64 x 56 x 56]),
Output('z.x.x.x.x.x.x.x.b.x.c', [#, ], [64 x 56 x 56]),
Output('z.x.x.x.x.x.x.x.b.x.', [#, ], [64 x 56 x 56]),
Output('z.x.x.x.x.x.x.x.b.x._', [#, ], [64 x 56 x 56]),
Output('z.x.x.x.x.x.x.x.b.x._.x.c', [#, ], [64 x 56 x 56]),
Output('z.x.x.x.x.x.x.x.x', [#, ], [64 x 56 x 56]),
Output('z.x.x.x.x.x.x.x.x', [#, ], [64 x 112 x 112]),
Output('z.x.x.x.x.x.x.x.x._', [#, ], [64 x 112 x 112]),
Output('z.x.x.x.x.x.x.x.x._.x.c', [#, ], [64 x 112 x 112]),
Output('z.x.x.x.x.x.x.s', [#, ], [128 x 28 x 28]),
Output('z.x.x.x.x.x.s.x.c', [#, ], [128 x 28 x 28]),
Output('z.x.x.x.x.x.s', [#, ], [256 x 14 x 14]),
Output('z.x.x.x.x.x.s.x.c', [#, ], [256 x 14 x 14]),
Output('z.x.x.x.s', [#, ], [512 x 7 x 7]),
Output('z.x.x.x.s.x.c', [#, ], [512 x 7 x 7]),
Output('errs', [], []),
Output('top5Errs', [], [])

```

We clone the model so that we can re-use the same trained model multiple times, trained for different things - it is not strictly necessary if you are just training it for a single task, but this is why we would not use `CloneMethod.share`, we want to learn new parameters. If `freeze_weights` is true, we will freeze weights on all layers we clone and only learn weights on the final new features layer. This can often be useful if you are cloning higher up the tree (e.g., cloning after the first convolutional layer to just get basic image features).

We find the final hidden layer (`z.x`) using `find_by_name`, clone it and all of its predecessors, then attach a new `Dense` layer for classification.

```

def create_model(model_details, num_classes, input_features,
               new_prediction_node_name='prediction', freeze=False):
    base_model = C.load_model(model_details['model_file'])
    feature_node = C.logging.find_by_name(base_model, model_details['feature_node_name'])
    last_node = C.logging.find_by_name(base_model, model_details['last_hidden_node_name'])

    # Clone the desired layers with fixed weights
    cloned_layers = C.combine([last_node.owner]).clone(
        C.CloneMethod.freeze if freeze else C.CloneMethod.clone,
        {feature_node: C.placeholder(name='features')})

    # Add new dense layer for class prediction
    feat_norm = input_features
    cloned_out = cloned_layers(feat_norm)
    z = C.layers.Dense(num_classes, activation=None, name=new_prediction_node_name) (cloned_out)

    return z

```

## 4.8 Define Minibatch Source

Now that we have our model defined, we have to also tell CNTK how to read in batches to train the model using backprop. Here we'll use the `ImageDeserializer` class, designed specifically for the data we have here.

```
def create_mb_source(map_file, image_dims, num_classes, randomize=True):
    transforms = [xforms.scale(width=image_dims[2], height=image_dims[1],
                               channels=image_dims[0], interpolations='linear')]
    return C.io.MinibatchSource(C.io.ImageDeserializer(map_file), C.io.StreamDefs(
        features=C.io.StreamDef(field='image', transforms=transforms),
        labels=C.io.StreamDef(field='label', shape=num_classes)),
        randomize=randomize)
```

## 4.9 Training

Now our setup is nearly complete. We have our network architecture defined, and our minibatch reader setup. The last step is defining the loss function for our optimization algorithm (in this case `binary_cross_entropy`, or `cross_entropy_softmax` if we had more than two classes). We'll use a specific learning routine with a momentum schedule, and simple  $\ell_2$  regularization penalty on our model's weight terms.

```
def train_model(model_details, num_classes, train_map_file,
                learning_params, max_images=-1):
    num_epochs = learning_params['max_epochs']
    epoch_size = sum(1 for line in open(train_map_file))
    if max_images > 0:
        epoch_size = min(epoch_size, max_images)
    minibatch_size = learning_params['mb_size']

    # Create the minibatch source and input variables
    minibatch_source = create_mb_source(train_map_file, model_details['image_dims'], num_classes)
    image_input = C.input_variable(model_details['image_dims'])
    label_input = C.input_variable(num_classes)

    # Define mapping from reader streams to network inputs
    input_map = {
        image_input: minibatch_source['features'],
        label_input: minibatch_source['labels']
    }

    # Instantiate the transfer learning model and loss function
    tl_model = create_model(model_details, num_classes, image_input, freeze=learning_params['freeze_weight'])
    ce = C.binary_cross_entropy(tl_model, label_input)
    pe = C.classification_error(tl_model, label_input)

    # Instantiate the trainer object
    lr_schedule = C.learning_rate_schedule(learning_params['lr_per_mb'], unit=C.UnitType.minibatch)
    mm_schedule = C.momentum_schedule(learning_params['momentum_per_mb'])
    learner = C.momentum_sgd(tl_model.parameters, lr_schedule, mm_schedule,
                              l2_regularization_weight=learning_params['l2_reg_weight'])
    trainer = C.Trainer(tl_model, (ce, pe), learner)

    # Get minibatches of images and perform model training
    print("Training transfer learning model for {} epochs (epoch_size = {}).".format(num_epochs, epoch_size))
```

```

C.logging.log_number_of_parameters(tl_model)
progress_printer = C.logging.ProgressPrinter(tag='Training', num_epochs=num_epochs)
for epoch in range(num_epochs):          # loop over epochs
    sample_count = 0
    while sample_count < epoch_size:      # loop over minibatches in the epoch
        data = minibatch_source.next_minibatch(min(minibatch_size, epoch_size - sample_count), input)
        trainer.train_minibatch(data)           # update model with it
        sample_count += trainer.previous_minibatch_sample_count      # count samples processed
        progress_printer.update_with_trainer(trainer, with_metric=True) # log progress
        if sample_count % (100 * minibatch_size) == 0:
            print ("Processed {0} samples".format(sample_count))

    progress_printer.epoch_summary(with_metric=True)

return tl_model

force_retraining = True

max_training_epochs = 10

learning_params = {
    'max_epochs': max_training_epochs,
    'mb_size': 50,
    'lr_per_mb': [0.2]*10 + [0.1],
    'momentum_per_mb': 0.9,
    'l2_reg_weight': 0.0005,
    'freeze_weights': True
}

kitty_doggo_model = {
    'model_file': os.path.join('DogsCats.model'),
    'results_file': os.path.join('predictions.txt'),
    'num_classes': 2
}

if os.path.isfile(kitty_doggo_model['model_file']):
    print("Reload stored model from %s", kitty_doggo_model['model_file'])
    trained_model = C.load_model(kitty_doggo_model['model_file'])
else:
    print("Retraining model and saving to %s", kitty_doggo_model['model_file'])
    trained_model = train_model(base_model,
                                kitty_doggo_model['num_classes'],
                                base_model['training_map'],
                                learning_params)

Reload stored model from %s DogsCats.model
trained_model.save(kitty_doggo_model['model_file'])
print("Stored trained model at %s" % kitty_doggo_model['model_file'])

Stored trained model at DogsCats.model
# Evaluates a single image using the re-trained model
def eval_single_image(loaded_model, image_path, image_dims):
    # load and format image (resize, RGB -> BGR, CHW -> HWC)
    try:

```

```

    img = Image.open(image_path)

    if image_path.endswith("png"):
        temp = Image.new("RGB", img.size, (255, 255, 255))
        temp.paste(img, img)
        img = temp
    resized = img.resize((image_dims[2], image_dims[1]), Image.ANTIALIAS)
    bgr_image = np.asarray(resized, dtype=np.float32)[..., [2, 1, 0]]
    hwc_format = np.ascontiguousarray(np.rollaxis(bgr_image, 2))

    # compute model output
    arguments = {loaded_model.arguments[0]: [hwc_format]}
    output = loaded_model.eval(arguments)

    # return softmax probabilities
    sm = C.softmax(output[0])
    return sm.eval()

except FileNotFoundError:
    print("Could not open (skipping file): ", image_path)
    return ['None']

isFast = False # set to true if you want to evaluate fewer images

# Evaluates an image set using the provided model
def eval_test_images(loaded_model, output_file, test_map_file,
                     image_dims, max_images=-1, column_offset=0):
    num_images = sum(1 for line in open(test_map_file))
    if max_images > 0:
        num_images = min(num_images, max_images)
    if isFast:
        num_images = min(num_images, 300)

    print("Evaluating model output node '{0}' for {1} images.".format('prediction', num_images))

    pred_count = 0
    correct_count = 0
    np.seterr(over='raise')
    with open(output_file, 'wb') as results_file:
        with open(test_map_file, "r") as input_file:
            for line in input_file:
                tokens = line.rstrip().split('\t')
                img_file = tokens[0 + column_offset]
                probs = eval_single_image(loaded_model, img_file, image_dims)

                if probs[0]=='None':
                    print("Eval not possible: ", img_file)
                    continue

                pred_count += 1
                true_label = int(tokens[1 + column_offset])
                predicted_label = np.argmax(probs)
                if predicted_label == true_label:
                    correct_count += 1

```

```

        np.savetxt(results_file, probs[np.newaxis], fmt=".3f")
    if pred_count % 100 == 0:
        print("Processed {} samples ({:.2%} correct)".format(pred_count,
                                                               (float(correct_count) / pred_count)))
    if pred_count >= num_images:
        break
print ("{} of {} prediction were correct".format(correct_count, pred_count))
return correct_count, pred_count, (float(correct_count) / pred_count)

%%bash
mkdir val/cats
mkdir val/dogs
mv val/cat.*.jpg ./val/cats/
mv val/dog.*.jpg ./val/dogs

class_mapping = create_class_mapping_from_folder(os.path.abspath(path="val/"))
testing_map = create_map_file_from_folder("val/", class_mapping)

kitty_doggo_model

{'model_file': 'DogsCats.model',
 'num_classes': 2,
 'results_file': 'predictions.txt'}
predict_correct, predict_total, predict_accuracy =
    eval_test_images(trained_model, kitty_doggo_model['results_file'],
                     testing_map, base_model['image_dims'])
print("Done. Wrote output to %s" % kitty_doggo_model['results_file'])

Evaluating model output node 'prediction' for 5000 images.
Processed 100 samples (97.00% correct)
Processed 200 samples (97.50% correct)
Processed 300 samples (98.33% correct)
Processed 400 samples (98.25% correct)
Processed 500 samples (98.20% correct)
Processed 600 samples (98.50% correct)
Processed 700 samples (98.57% correct)
Processed 800 samples (98.62% correct)
Processed 900 samples (98.22% correct)
Processed 1000 samples (98.40% correct)
Processed 1100 samples (98.27% correct)
Processed 1200 samples (98.00% correct)
Processed 1300 samples (98.08% correct)
Processed 1400 samples (98.07% correct)
Processed 1500 samples (98.07% correct)
Processed 1600 samples (98.00% correct)
Processed 1700 samples (98.06% correct)
Processed 1800 samples (98.06% correct)
Processed 1900 samples (98.05% correct)
Processed 2000 samples (97.95% correct)
Processed 2100 samples (97.90% correct)
Processed 2200 samples (97.86% correct)
Processed 2300 samples (97.91% correct)
Processed 2400 samples (97.83% correct)
Processed 2500 samples (97.84% correct)

```

```

Processed 2600 samples (97.77% correct)
Processed 2700 samples (97.81% correct)
Processed 2800 samples (97.86% correct)
Processed 2900 samples (97.90% correct)
Processed 3000 samples (97.90% correct)
Processed 3100 samples (97.87% correct)
Processed 3200 samples (97.88% correct)
Processed 3300 samples (97.91% correct)
Processed 3400 samples (97.94% correct)
Processed 3500 samples (98.00% correct)
Processed 3600 samples (98.00% correct)
Processed 3700 samples (97.97% correct)
Processed 3800 samples (98.00% correct)
Processed 3900 samples (97.97% correct)
Processed 4000 samples (97.95% correct)
Processed 4100 samples (97.93% correct)
Processed 4200 samples (97.95% correct)
Processed 4300 samples (97.98% correct)
Processed 4400 samples (98.00% correct)
Processed 4500 samples (98.02% correct)
Processed 4600 samples (98.00% correct)
Processed 4700 samples (98.02% correct)
Processed 4800 samples (98.04% correct)
Processed 4900 samples (98.02% correct)
Processed 5000 samples (98.06% correct)
4903 of 5000 prediction were correct
Done. Wrote output to predictions.txt

```

```

# evaluate test images
with open(testing_map, 'r') as input_file:
    head = list(itertools.islice(input_file, 15))
    for line in head:
        tokens = line.rstrip().split('\t')
        img_file = tokens[0]
        true_label = int(tokens[1])
        probs = eval_single_image(trained_model, img_file, base_model['image_dims'])

        if probs[0]=='None':
            continue
        class_probs = np.column_stack((probs, class_mapping)).tolist()
        class_probs.sort(key=lambda x: float(x[0]), reverse=True)
        predictions = ' '.join(['%s:%.3f' % (class_probs[i][1], float(class_probs[i][0])) \
                               for i in range(0, kitty_doggo_model['num_classes'])])
        true_class_name = class_mapping[true_label] if true_label >= 0 else 'unknown'
        print('Class: %s, predictions: %s, image: %s' % (true_class_name, predictions, img_file))

```

```

Class: cats, predictions: cats:1.000 dogs:0.000, image: val/cats/cat.10001.jpg
Class: cats, predictions: cats:1.000 dogs:0.000, image: val/cats/cat.10003.jpg
Class: cats, predictions: cats:1.000 dogs:0.000, image: val/cats/cat.10005.jpg
Class: cats, predictions: cats:1.000 dogs:0.000, image: val/cats/cat.10006.jpg
Class: cats, predictions: cats:1.000 dogs:0.000, image: val/cats/cat.10010.jpg
Class: cats, predictions: cats:1.000 dogs:0.000, image: val/cats/cat.10016.jpg
Class: cats, predictions: cats:1.000 dogs:0.000, image: val/cats/cat.10017.jpg
Class: cats, predictions: cats:1.000 dogs:0.000, image: val/cats/cat.1002.jpg
Class: cats, predictions: cats:1.000 dogs:0.000, image: val/cats/cat.10032.jpg

```

```
Class: cats, predictions: cats:1.000 dogs:0.000, image: val/cats/cat.10033.jpg
Class: cats, predictions: cats:1.000 dogs:0.000, image: val/cats/cat.1004.jpg
Class: cats, predictions: cats:1.000 dogs:0.000, image: val/cats/cat.10047.jpg
Class: cats, predictions: cats:1.000 dogs:0.000, image: val/cats/cat.10054.jpg
Class: cats, predictions: cats:0.995 dogs:0.005, image: val/cats/cat.10058.jpg
Class: cats, predictions: cats:1.000 dogs:0.000, image: val/cats/cat.1006.jpg

def predictions_df(results=kitty_doggo_model['results_file'],
                   key_maps = "val/map.txt"):
    preds = pd.read_csv(results, sep=" ", names=['cat', 'dog'])
    maps_df = pd.read_csv(key_maps, names=['path', 'label'], sep='\t')
    preds = pd.concat([preds, maps_df], axis=1)

    return preds

preds = predictions_df()

preds.iloc[0:5]

<tr style="text-align: right;">
    <th></th>
    <th>cat</th>
    <th>dog</th>
    <th>path</th>
    <th>label</th>
</tr>

<tr>
    <th>0</th>
    <td>1.0</td>
    <td>0.0</td>
    <td>val/cats/cat.10001.jpg</td>
    <td>0</td>
</tr>
<tr>
    <th>1</th>
    <td>1.0</td>
    <td>0.0</td>
    <td>val/cats/cat.10003.jpg</td>
    <td>0</td>
</tr>
<tr>
    <th>2</th>
    <td>1.0</td>
    <td>0.0</td>
    <td>val/cats/cat.10005.jpg</td>
    <td>0</td>
</tr>
<tr>
    <th>3</th>
    <td>1.0</td>
    <td>0.0</td>
    <td>val/cats/cat.10006.jpg</td>
    <td>0</td>
</tr>
<tr>
```



Figure 4.5: png



Figure 4.6: png

```

<th>4</th>
<td>1.0</td>
<td>0.0</td>
<td>val/cats/cat.10010.jpg</td>
<td>0</td>
</tr>

def worst_preds(results = preds,
                 kitties = 0):
    results = results[results['label'] == kitties]
    if kitties == 0:
        results = results.sort_values(by="cat", ascending=True)
    else:
        results = results.sort_values(by="dog", ascending=True)
    return results

worst_kitties = worst_preds(kitties = 0)
worst_pups = worst_preds(kitties = 1)

show_pics(worst_kitties['path'].iloc[0:5])
show_pics(worst_pups['path'].iloc[0:5])

```

# Chapter 5

## Fashion MNIST

A MNIST-like dataset for fashion items. See the original repository for more information and visualization examples.

### 5.1 Import Core Libraries and Specify Keras Backend

First, we'll import some core libraries and some helper functions. Also note that we are updating the `KERAS_BACKEND` variable to point to CNTK rather than TensorFlow or Theano. This is a convenient way of doing this interactively in a single session. If you'd like to make this your default, modify the `~/.keras/keras.json` file to always point to CNTK.

```
import os
os.environ['KERAS_BACKEND'] = "cntk"

import sys
import urllib

from keras.layers import Dense, Dropout, Flatten
from keras.layers import Conv2D, MaxPooling2D
from keras.layers.normalization import BatchNormalization

from keras.models import Sequential
from keras.utils import to_categorical

from keras.callbacks import ModelCheckpoint, TensorBoard
from keras import optimizers
from keras import losses

from fashion import load_data

import numpy as np
from PIL import Image
from io import BytesIO
```

Using CNTK backend

## 5.2 Downloading Fashion Dataset

The Fashion dataset is not yet preloaded into Keras. We have a simple helper function called `load_data` which will load the data into memory for us.

```
(x_train, y_train), (x_test, y_test) = load_data()
```

```
Downloading data from http://fashion-mnist.s3-website.eu-central-1.amazonaws.com/train-labels-idx1-ubyte
16384/29515 [=====>.....] - ETA: 0s
Downloading data from http://fashion-mnist.s3-website.eu-central-1.amazonaws.com/t10k-labels-idx3-ubyte
23953408/26421880 [=====>...] - ETA: 0s
Downloading data from http://fashion-mnist.s3-website.eu-central-1.amazonaws.com/t10k-images-idx3-ubyte
8192/5148 [=====] - 0s
Downloading data from http://fashion-mnist.s3-website.eu-central-1.amazonaws.com/train-images-idx3-ubyte
3260416/4422102 [=====>.....] - ETA: 0s
```

## 5.3 Scale Data and Visualize

Now that we have our data ingested into memory, let's scale it into unit range and visualize a few examples.

```
x_train = x_train.reshape(60000, 28, 28, 1)
x_test = x_test.reshape(10000, 28, 28, 1)
x_train = x_train.astype('float32')
x_test = x_test.astype('float32')
x_train /= 255
x_test /= 255

# convert class vectors to binary class matrices
y_train = to_categorical(y_train, 10)
y_test = to_categorical(y_test, 10)

import matplotlib.pyplot as plt
%matplotlib inline
pixels = x_train[10].reshape((28, 28))
plt.imshow(pixels)
plt.show()
```

## 5.4 Create Network Architecture and Model Parameters

Keras has a very simple high-level sequential and functional API for defining network architectures. Here we'll use the sequential API and compile our model with a common optimization algorithm and loss metrics.

```
batch_size = 256
num_classes = 10
epochs = 10

img_rows, img_cols = 28, 28
input_shape = (img_rows, img_cols, 1)

model = Sequential()
model.add(Conv2D(32, kernel_size=(3, 3),
                activation='relu',
                kernel_initializer='he_normal',
                input_shape=input_shape))
```

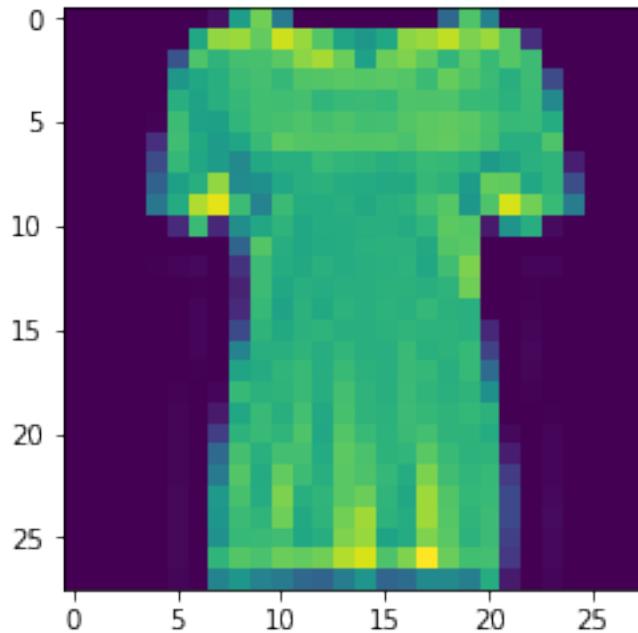


Figure 5.1: png

```

model.add(MaxPooling2D((2, 2)))
model.add(Dropout(0.25))
model.add(Conv2D(64, (3, 3), activation='relu'))
model.add(MaxPooling2D(pool_size=(2, 2)))
model.add(Dropout(0.25))
model.add(Conv2D(128, (3, 3), activation='relu'))
model.add(Dropout(0.4))
model.add(Flatten())
model.add(Dense(128, activation='relu'))
model.add(Dropout(0.3))
model.add(Dense(num_classes, activation='softmax'))

model.compile(loss=losses.categorical_crossentropy,
              optimizer=optimizers.Adam(),
              metrics=['accuracy'])

model.summary()

```

Layer (type)	Output Shape	Param #
conv2d_1 (Conv2D)	(None, 26, 26, 32)	320
max_pooling2d_1 (MaxPooling2D)	(None, 13, 13, 32)	0
dropout_1 (Dropout)	(None, 13, 13, 32)	0
conv2d_2 (Conv2D)	(None, 11, 11, 64)	18496

```

max_pooling2d_2 (MaxPooling2 (None, 5, 5, 64) 0
-----
dropout_2 (Dropout) (None, 5, 5, 64) 0
-----
conv2d_3 (Conv2D) (None, 3, 3, 128) 73856
-----
dropout_3 (Dropout) (None, 3, 3, 128) 0
-----
flatten_1 (Flatten) (None, 1152) 0
-----
dense_1 (Dense) (None, 128) 147584
-----
dropout_4 (Dropout) (None, 128) 0
-----
dense_2 (Dense) (None, 10) 1290
=====
Total params: 241,546
Trainable params: 241,546
Non-trainable params: 0
-----
```

## 5.5 Training Our Model

Training the model, i.e., backpropagating to fit model parameters to training data, is as simple as using the `fit` method in Keras.

```
history = model.fit(x_train, y_train,
                     batch_size=batch_size,
                     epochs=epochs)
```

Epoch 1/10

```
/home/mugen/.conda/envs/cntk-py35/lib/python3.5/site-packages/cntk/core.py:361: UserWarning: your data is
  (sample.dtype, var.uid, str(var.dtype)))
```

60000/60000 [=====] - 10s - loss: 0.8519 - acc: 0.6817  
 Epoch 2/10  
 60000/60000 [=====] - 7s - loss: 0.5029 - acc: 0.8138  
 Epoch 3/10  
 60000/60000 [=====] - 7s - loss: 0.4330 - acc: 0.8406  
 Epoch 4/10  
 60000/60000 [=====] - 7s - loss: 0.3867 - acc: 0.8575  
 Epoch 5/10  
 60000/60000 [=====] - 7s - loss: 0.3595 - acc: 0.8675  
 Epoch 6/10  
 60000/60000 [=====] - 7s - loss: 0.3365 - acc: 0.8777  
 Epoch 7/10  
 60000/60000 [=====] - 7s - loss: 0.3203 - acc: 0.8822  
 Epoch 8/10  
 60000/60000 [=====] - 7s - loss: 0.3112 - acc: 0.8868  
 Epoch 9/10

```
60000/60000 [=====] - 7s - loss: 0.3001 - acc: 0.8896
Epoch 10/10
60000/60000 [=====] - 7s - loss: 0.2889 - acc: 0.8936
```

## 5.6 Scoring the Model

Just as simple is scoring it on our test set. We can simply pass the `x_test` and `y_test` arrays to the `evaluate` method and Keras will score the model for us.

```
test_val = model.evaluate(x_test, y_test)
```

```
1312/10000 [==>.....] - ETA: 1s
```

```
/anaconda/envs/cntk-22/lib/python3.5/site-packages/cntk/core.py:361: UserWarning: your data is of type "f
  (sample.dtype, var.uid, str(var.dtype)))
```

```
9856/10000 [=====>.] - ETA: 0s
```

```
print("Model's Accuracy on Test Set = "
  + "{0:.2f}%".format(test_val[1] * 100))
```

```
Model's Accuracy on Test Set = 90.14%
```

```
import matplotlib.pyplot as plt
%matplotlib inline
```

```
accuracy = history.history['acc']
# val_accuracy = history.history['val_acc']
loss = history.history['loss']
# val_loss = history.history['val_loss']
epochs = range(len(accuracy))
plt.plot(epochs, accuracy, 'bo', label='Training accuracy')
plt.title('Training accuracy')
plt.legend()
plt.figure()
plt.plot(epochs, loss, 'bo', label='Training loss')
plt.title('Training loss')
plt.legend()
plt.show()
```

```
test_im = x_train[3]
plt.imshow(test_im.reshape(28,28), cmap='gray', interpolation='none')
plt.show()
```

```
from keras import models
layer_outputs = [layer.output for layer in model.layers[:8]]
activation_model = models.Model(input=model.input, output=layer_outputs)
activations = activation_model.predict(test_im.reshape(1,28,28,1))

first_layer_activation = activations[0]
plt.matshow(first_layer_activation[0, :, :, 4], cmap='gray')
```

```
/anaconda/envs/cntk-22/lib/python3.5/site-packages/ipykernel/_main_.py:3: UserWarning: Update your `Mod
  app.launch_new_instance()
```

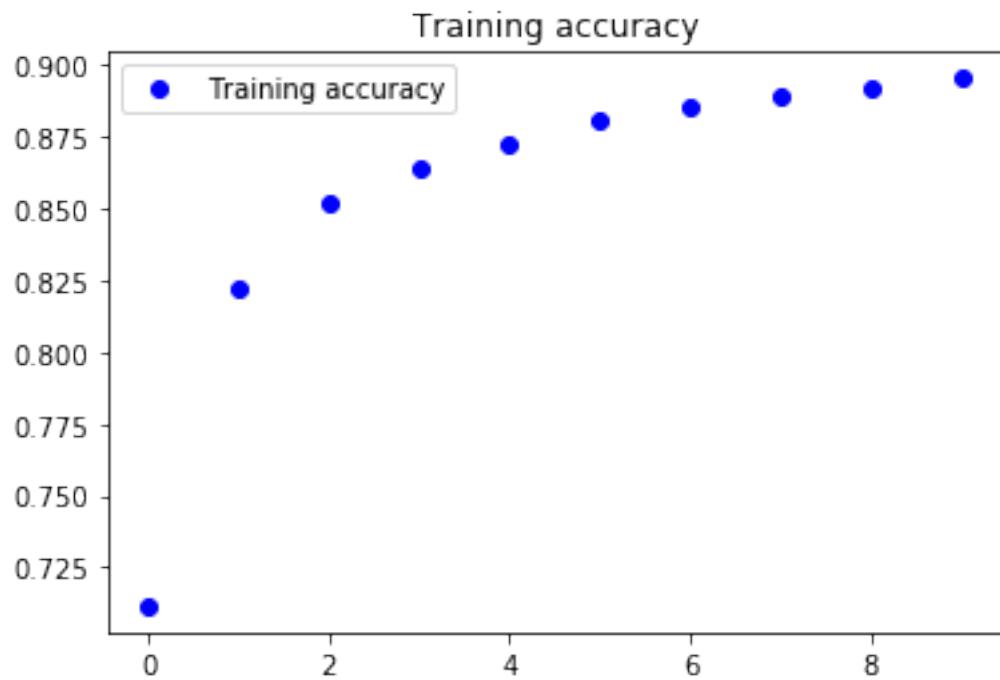


Figure 5.2: png

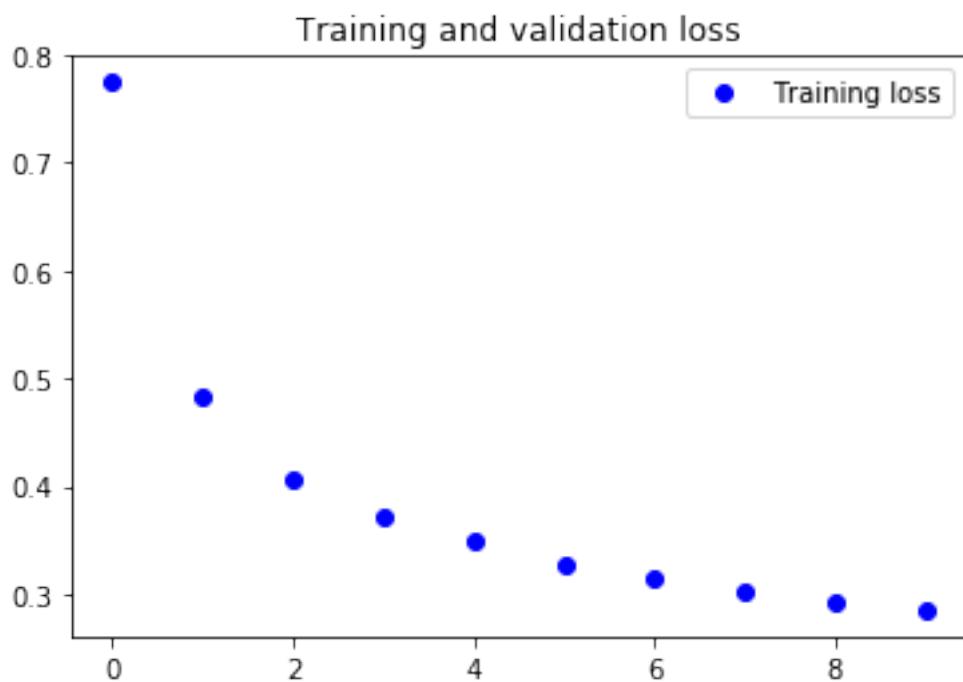


Figure 5.3: png

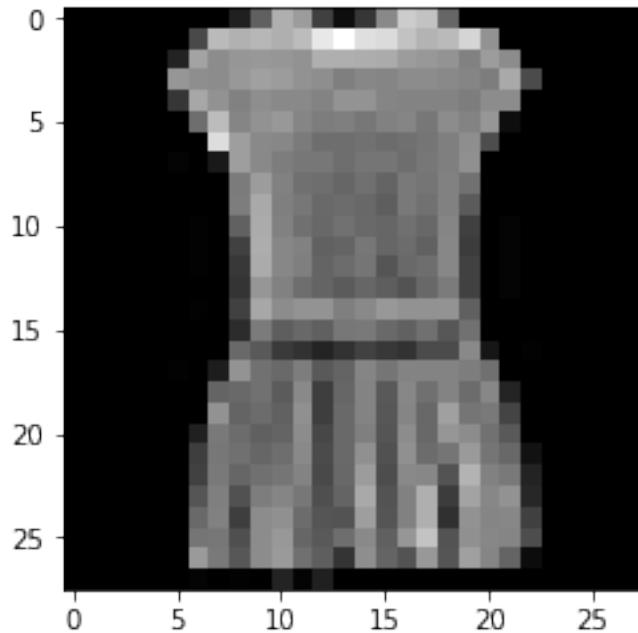


Figure 5.4: png

```
<matplotlib.image.AxesImage at 0x7f08c0f78278>

layer_names = []
for layer in model.layers[:-1]:
    if isinstance(layer, Conv2D):
        layer_names.append(layer.name)
images_per_row = 16

for layer_name, layer_activation in zip(layer_names, activations):
    n_features = layer_activation.shape[-1]
    size = layer_activation.shape[1]
    n_cols = n_features / images_per_row
    n_cols = int(n_cols)
    display_grid = np.zeros((size * n_cols, images_per_row * size))
    for col in range(n_cols):
        for row in range(images_per_row):
            channel_image = layer_activation[0, :, :, col * images_per_row + row]
            channel_image -= channel_image.mean()
            channel_image /= channel_image.std()
            channel_image *= 64
            channel_image += 128
            channel_image = np.clip(channel_image, 0, 255).astype('uint8')
            display_grid[col * size : (col + 1) * size,
                         row * size : (row + 1) * size] = channel_image
scale = 1. / size
```

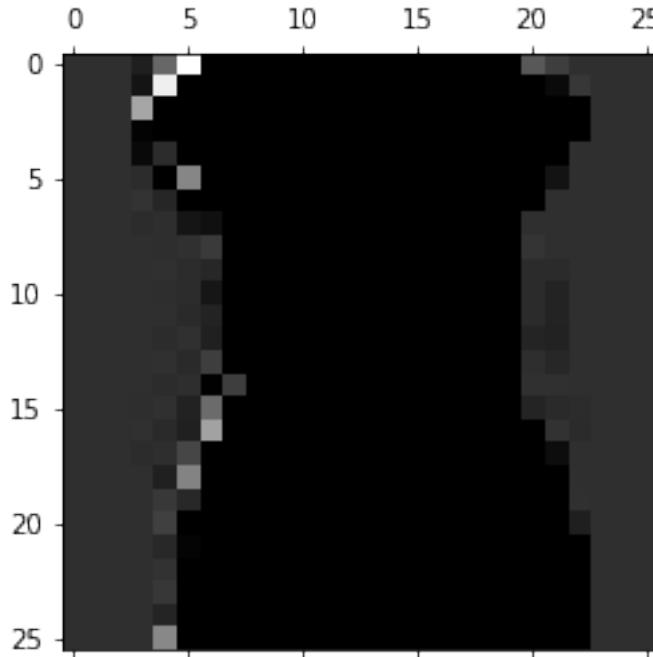


Figure 5.5: png

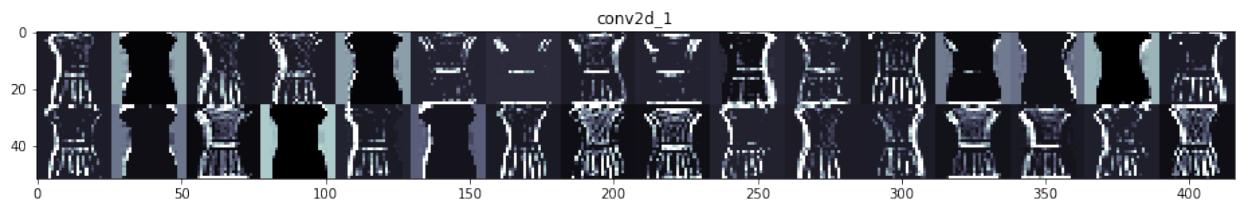


Figure 5.6: png

```
plt.figure(figsize=(scale * display_grid.shape[1],  
                scale * display_grid.shape[0]))  
plt.title(layer_name)  
plt.grid(False)  
plt.imshow(display_grid, aspect='auto', cmap='bone')
```

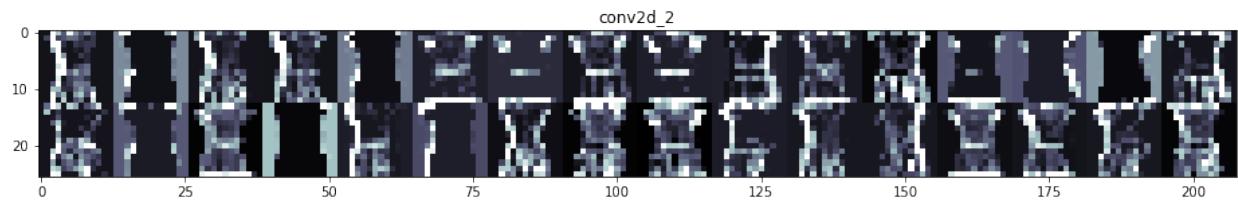


Figure 5.7: png

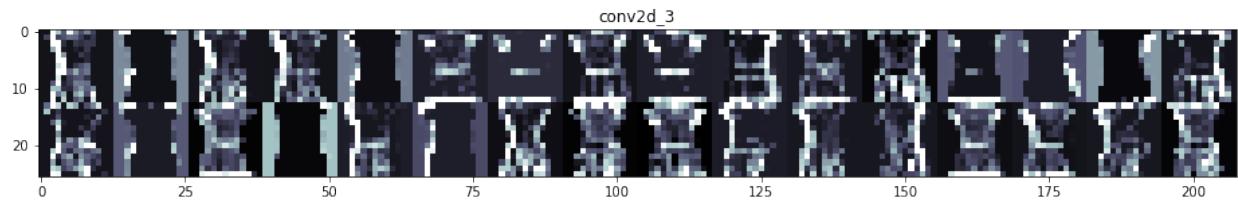


Figure 5.8: png



# Chapter 6

## Neural Style Transfer

This tutorial shows how to transfer the style / texture of one image to another. This allows us to take our ordinary photos and render them in the style of famous images or paintings.

Apart from creating nice looking pictures, in this tutorial you will learn how to load a pretrained VGG model into CNTK, how to get the gradient of a function with respect to an input variable (rather than a parameter), and how to use the gradient outside of CNTK.

We will follow the approach of Gatys et. al. with some of the improvements in Novak and Nikulin. While faster techniques exist, these are limited to transferring a particular style.

We begin by importing the necessary packages. In addition to the usual suspects (`numpy`, `scipy`, and `cntk`) we will need `PIL` to work with images, `requests` to download a pretrained model and `h5py` to read in the weights of the pretrained model.

```
from __future__ import print_function
import numpy as np
from scipy import optimize as opt
import cntk as C
from PIL import Image
import requests
import h5py
import os
%matplotlib inline
import matplotlib.pyplot as plt
# Select the right target device when this notebook is being tested:
if 'TEST_DEVICE' in os.environ:
    if os.environ['TEST_DEVICE'] == 'cpu':
        C.device.try_set_default_device(C.device.cpu())
    else:
        C.device.try_set_default_device(C.device.gpu(0))
```

The pretrained model is a VGG network which we originally got from this page. We host it in a place which permits easy downloading. Below we download it if it is not already available locally and load the weights into numpy arrays.

```
def download(url, filename):
    response = requests.get(url, stream=True)
    with open(filename, 'wb') as handle:
        for data in response.iter_content(chunk_size=2**20):
            if data: handle.write(data)
```

```

def load_vgg(path):
    f = h5py.File(path)
    layers = []
    for k in range(f.attrs['nb_layers']):
        g = f['layer_{0}'.format(k)]
        n = g.attrs['nb_params']
        layers.append([g['param_{0}'.format(p)][:] for p in range(n)])
    f.close()
    return layers

# Check for an environment variable defined in CNTK's test infrastructure
envvar = 'CNTK_EXTERNAL_TESTDATA_SOURCE_DIRECTORY'
def is_test(): return envvar in os.environ

path = 'vgg16_weights.bin'
url = 'https://cntk.ai/jup/models/vgg16_weights.bin'
# We check for the model locally
if not os.path.exists(path):
    # If not there we might be running in CNTK's test infrastructure
    if is_test():
        path = os.path.join(os.environ[envvar], 'PreTrainedModels', 'Vgg16', 'v0', path)
    else:
        #If neither is true we download the file from the web
        print('downloading VGG model (~0.5GB)')
        download(url, path)
layers = load_vgg(path)
print('loaded VGG model')

```

downloading VGG model (~0.5GB)  
loaded VGG model

Next we define the VGG network as a CNTK graph.

```

# A convolutional layer in the VGG network
def vggblock(x, arrays, layer_map, name):
    f = arrays[0]
    b = arrays[1]
    k = C.constant(value=f)
    t = C.constant(value=np.reshape(b, (-1, 1, 1)))
    y = C.relu(C.convolution(k, x, auto_padding=[False, True, True]) + t)
    layer_map[name] = y
    return y

# A pooling layer in the VGG network
def vggpool(x):
    return C.pooling(x, C.AVG_POOLING, (2, 2), (2, 2))

# Build the graph for the VGG network (excluding fully connected layers)
def model(x, layers):
    model_layers = []
    def convolutional(z): return len(z) == 2 and len(z[0].shape) == 4
    conv = [layer for layer in layers if convolutional(layer)]

```

```

cnt = 0
num_convs = {1: 2, 2: 2, 3: 3, 4: 3, 5: 3}
for outer in range(1,6):
    for inner in range(num_convs[outer]):
        x = vggblock(x, conv[cnt], model_layers, 'conv%d_%d' % (outer, 1+inner))
        cnt += 1
    x = vggpool(x)

return x, C.combine([model_layers[k] for k in sorted(model_layers.keys())])

```

## 6.1 Defining the loss function

The interesting part in this line of work is the definition of a loss function that, when optimized, leads to a result that is close to both the content of one image, as well as the style of the other image. This loss contains multiple terms some of which are defined in terms of the VGG network we just created. Concretely, the loss takes a candidate image  $x$  and takes a weighted sum of three terms: the content loss, the style loss and the total variation loss:

$$L(x) = \alpha C(x) + \beta S(x) + T(x)$$

where  $\alpha$  and  $\beta$  are weights on the content loss and the style loss, respectively. We have normalized the weights so that the weight in front of the total variation loss is 1. How are each of these terms computed?

- The total variation loss  $T(x)$  is the simplest one to understand: It measures the average sum of squared differences among adjacent pixel values and encourages the result  $x$  to be a smooth image. We implement this by convolving the image with a kernel containing  $(-1,1)$  both horizontally and vertically, squaring the results and computing their average.
- The content loss is measuring the squared difference between the content image and  $x$ . We can measure this difference on the raw pixels or at various layers inside the VGG network. While we write the content loss as  $C(x)$  it implicitly depends on the content image we provide. However since that image is fixed we do not write this dependence explicitly.
- The style loss  $S(x)$  is similar to the content loss in that it also implicitly depends on another image. The main idea of Gatys et. al. was to define the style as the correlations among the activations of the network and measure the style loss as the squared difference between these correlations. In particular for a particular layer we compute a covariance matrix among the output channels averaging across all positions. The style loss is just the squared error between the covariance matrix induced by the style image and the covariance matrix induced by  $x$ . We are deliberately vague here as to which layer of the network is used for creating the covariance loss. Different implementations do this differently and below we will use a weighted sum of all the style losses of all layers.

Below we define these loss functions:

```

def flatten(x):
    assert len(x.shape) >= 3
    return C.reshape(x, (x.shape[-3], x.shape[-2] * x.shape[-1]))

def gram(x):
    features = C.minus(flatten(x), C.reduce_mean(x))
    return C.times_transpose(features, features)

def npgram(x):
    features = np.reshape(x, (-1, x.shape[-2]*x.shape[-1])) - np.mean(x)
    return features.dot(features.T)

```

```

def style_loss(a, b):
    channels, x, y = a.shape
    assert x == y
    A = gram(a)
    B = npgram(b)
    return C.squared_error(A, B)/(channels**2 * x**4)

def content_loss(a,b):
    channels, x, y = a.shape
    return C.squared_error(a, b)/(channels*x*y)

def total_variation_loss(x):
    xx = C.reshape(x, (1,)+x.shape)
    delta = np.array([-1, 1], dtype=np.float32)
    kh = C.constant(value=delta.reshape(1, 1, 1, 1, 2))
    kv = C.constant(value=delta.reshape(1, 1, 1, 2, 1))
    dh = C.convolution(kh, xx, auto_padding=[False])
    dv = C.convolution(kv, xx, auto_padding=[False])
    avg = 0.5 * (C.reduce_mean(C.square(dv)) + C.reduce_mean(C.square(dh)))
    return avg

```

## 6.2 Instantiating the loss

Now we are ready to instantiate a loss with two particular images. We will use an image of Portland's landscape and The Starry Night by Vincent van Gogh. We first define a few tuning parameters whose explanation is below:

- Depending on whether the code runs on a GPU or a CPU we resize the images to 300 x 300 or 64 x 64 respectively and adjust the number of iterations of optimization to speed up the process and for ease of experimentation. You can use a larger size if you like the results. If you only have a CPU you will have to wait a while.
- The content weight and style weight are the main parameters that affect the quality of the resulting image.
- The decay factor is a number in (0,1) which decides how to weigh the contribution of each layer. Following Novak and Nikulin, all layers contribute to both the content loss and the style loss. The content loss weighs the input more heavily and each later layer in the VGG network contributes with a weight that is exponentially smaller with its distance from the input. The style loss weighs the output of the VGG network more heavily and each earlier layer in the VGG network contributes with a weight that is exponentially smaller with its distance from the output. As in Novak and Nikulin we use a decay factor of 0.5.
- The inner and outer parameters define how we are going to obtain our final result. We will take outer snapshots during our search for the image that minimizes the loss. Each snapshot will be taken after inner steps of optimization.
- Finally, a very important thing to know about our pretrained network is how it was trained. In particular, a constant vector was subtracted from all input images that contained the average value for the red, green, and blue channels in the training set. This makes the inputs zero centered which helps the training procedure. If we do not subtract this vector our images will not look like the training images and this will lead to bad results. This vector is referred to as SHIFT below.

```

style_path = 'style.jpg'
content_path = 'azthinksR.jpg'

start_from_random = False
content_weight = 5.0
style_weight = 1.0

```

```

decay = 0.5

if is_test():
    outer = 2
    inner = 2
    SIZE = 64
else:
    outer = 10
    inner = 20
    SIZE = 300

SHIFT = np.reshape([103.939, 116.779, 123.68], (3, 1, 1)).astype('f')

def load_image(path):
    with Image.open(path) as pic:
        hw = pic.size[0] / 2
        hh = pic.size[1] / 2
        mh = min(hw, hh)
        cropped = pic.crop((hw - mh, hh - mh, hw + mh, hh + mh))
        array = np.array(cropped.resize((SIZE, SIZE), Image.BICUBIC), dtype=np.float32)
    return np.ascontiguousarray(np.transpose(array, (2, 0, 1))) - SHIFT

def save_image(img, path):
    sanitized_img = np.maximum(0, np.minimum(255, img + SHIFT))
    pic = Image.fromarray(np.uint8(np.transpose(sanitized_img, (1, 2, 0))))
    pic.save(path)

def ordered_outputs(f, binding):
    _, output_dict = f.forward(binding, f.outputs)
    return [np.squeeze(output_dict[out]) for out in f.outputs]

# download the images if they are not available locally
for local_path in content_path, style_path:
    if not os.path.exists(local_path):
        download('https://cntk.ai/jup/%s' % local_path, local_path)

# Load the images
style = load_image(style_path)
content = load_image(content_path)

# Display the images
for img in content, style:
    plt.figure()
    plt.imshow(np.asarray(np.transpose(img + SHIFT, (1, 2, 0)), dtype=np.uint8))

# Push the images through the VGG network
# First define the input and the output
y = C.input_variable((3, SIZE, SIZE), needs_gradient=True)
z, intermediate_layers = model(y, layers)
# Now get the activations for the two images
content_activations = ordered_outputs(intermediate_layers, {y: [[content]]})
style_activations = ordered_outputs(intermediate_layers, {y: [[style]]})
style_output = np.squeeze(z.eval({y: [[style]]}))

```

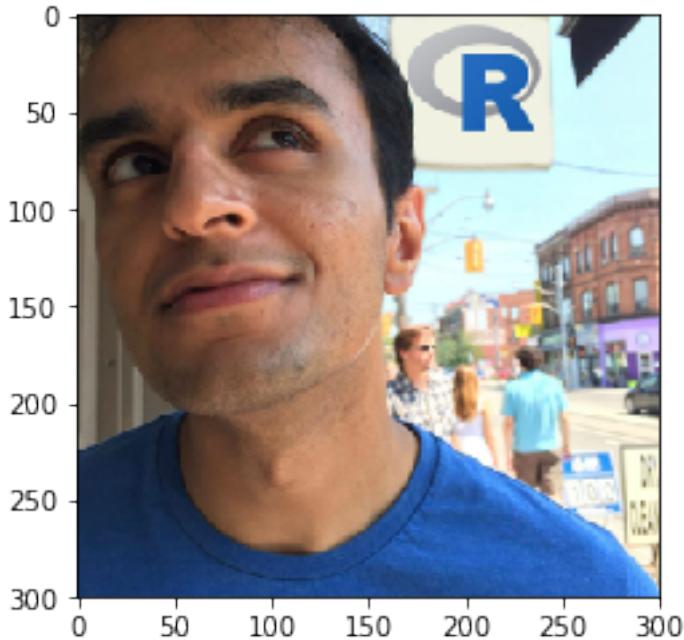


Figure 6.1: png

```
# Finally define the loss
n = len(content_activations)
total = (1-decay**((n+1))/(1-decay) # makes sure that changing the decay does not affect the magnitude of
loss = (1.0/total * content_weight * content_loss(y, content)
      + 1.0/total * style_weight * style_loss(z, style_output)
      + total_variation_loss(y))

for i in range(n):
    loss = (loss
            + decay**(i+1)/total * content_weight * content_loss(intermediate_layers.outputs[i], content_activations[i])
            + decay**(n-i)/total * style_weight * style_loss(intermediate_layers.outputs[i], style_activations[i]))
```

### 6.3 Optimizing the loss

Now we are finally ready to find the image that minimizes the loss we defined. We will use the optimization package in scipy and in particular the LBFGS method. LBFGS is a great optimization procedure which is very popular when computing the full gradient is feasible as is the case here.

Notice that we are computing the gradient with respect to the input. This is quite different from most other use cases where we compute the gradient with respect to the network parameters. By default, input variables do not ask for gradients, however we defined our input variable as

```
y = C.input_variable((3, SIZE, SIZE), needs_gradient=True)
```

which means that CNTK will compute the gradient with respect to this input variable as well.

The rest of the code is straightforward and most of the complexity comes from interacting with the scipy optimization package:

- The optimizer works only with vectors of double precision so img2vec takes a

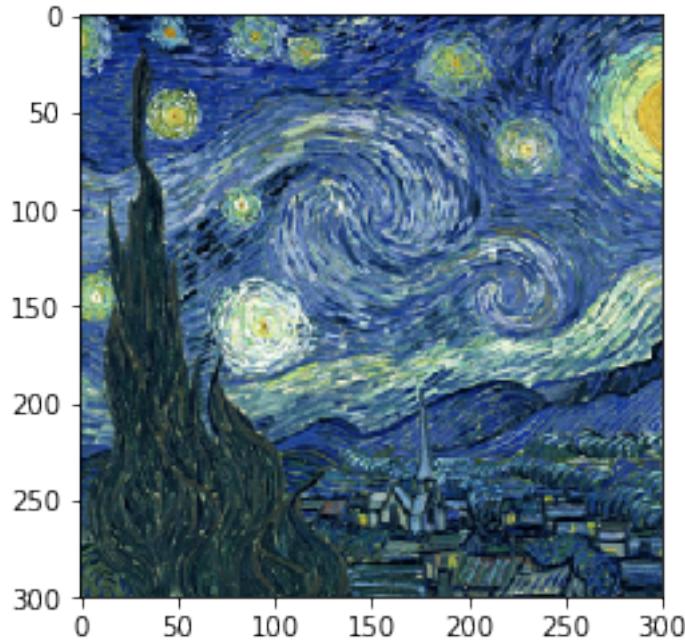


Figure 6.2: png

(3,SIZE,SIZE) image and converts it to a vector of doubles - CNTK needs the input as an image but scipy is calling us back with a vector - CNTK computes a gradient as an image but scipy wants the gradient as a vector

Besides these complexities we just start from the content image (or a random image), perform our optimization and display the final result.

```
# utility to convert a vector to an image
def vec2img(x):
    d = np.round(np.sqrt(x.size / 3)).astype('i')
    return np.reshape(x.astype(np.float32), (3, d, d))

# utility to convert an image to a vector
def img2vec(img):
    return img.flatten().astype(np.float64)

# utility to compute the value and the gradient of f at a particular place defined by binding
def value_and_grads(f, binding):
    if len(f.outputs) != 1:
        raise ValueError('function must return a single tensor')
    df, valdict = f.forward(binding, [f.output], set([f.output]))
    value = list(valdict.values())[0]
    grads = f.backward(df, {f.output: np.ones_like(value)}, set(binding.keys()))
    return value, grads

# an objective function that scipy will be happy with
def objfun(x, loss):
    y = vec2img(x)
    v, g = value_and_grads(loss, {loss.arguments[0]: [[y]]})
    v = np.reshape(v, (1,))
```

```

g = img2vec(list(g.values())[0])
return v, g

# the actual optimization procedure
def optimize(loss, x0, inner, outer):
    bounds = [(-np.min SHIFT), 255-np.max SHIFT)]*x0.size
    for i in range(outer):
        s = opt.minimize(objfun, img2vec(x0), args=(loss,), method='L-BFGS-B',
                          bounds=bounds, options={'maxiter': inner}, jac=True)
        print('objective : %s' % s.fun[0])
        x0 = vec2img(s.x)
        path = 'output_%d.jpg' % i
        save_image(x0, path)
    return x0

np.random.seed(98052)
if start_from_random:
    x0 = np.random.randn(3, SIZE, SIZE).astype(np.float32)
else:
    x0 = content
xstar = optimize(loss, x0, inner, outer)
plt.imshow(np.asarray(np.transpose(xstar+SHIFT, (1, 2, 0)), dtype=np.uint8))

```

objective : 70194.4  
 objective : 60445.3  
 objective : 57855.2  
 objective : 56728.0  
 objective : 56166.7  
 objective : 55840.4  
 objective : 55627.4  
 objective : 55493.8  
 objective : 55395.1  
 objective : 55325.0

```

<matplotlib.image.AxesImage at 0x7fe962aa0e10>
# For testing purposes
objfun(xstar, loss)[0][0]

```

55325.039

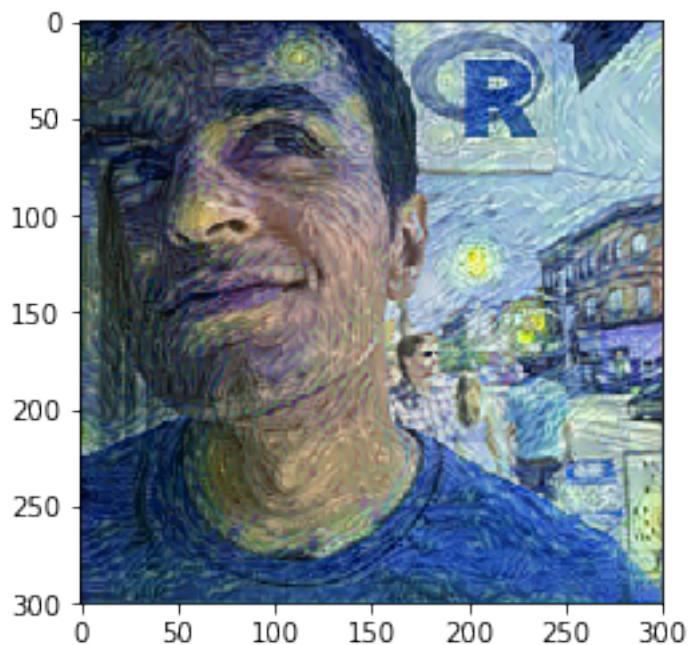


Figure 6.3: png



## Chapter 7

# Network Visualization (TensorFlow)

*Credit:* This notebook was derived from a homework assignment in CS231N, taught in 2017 by Justin Johnson, Fei Fei Li, and Serena Yeung

In this notebook we will explore the use of *image gradients* for generating new images.

When training a model, we define a loss function which measures our current unhappiness with the model's performance; we then use backpropagation to compute the gradient of the loss with respect to the model parameters, and perform gradient descent on the model parameters to minimize the loss.

Here we will do something slightly different. We will start from a convolutional neural network model which has been pretrained to perform image classification on the ImageNet dataset. We will use this model to define a loss function which quantifies our current unhappiness with our image, then use backpropagation to compute the gradient of this loss with respect to the pixels of the image. We will then keep the model fixed, and perform gradient descent *on the image* to synthesize a new image which minimizes the loss.

In this notebook we will explore three techniques for image generation:

1. **Saliency Maps:** Saliency maps are a quick way to tell which part of the image influenced the classification decision made by the network.
2. **Fooling Images:** We can perturb an input image so that it appears the same to humans, but will be misclassified by the pretrained network.
3. **Class Visualization:** We can synthesize an image to maximize the classification score of a particular class; this can give us some sense of what the network is looking for when it classifies images of that class.

```
# As usual, a bit of setup
from __future__ import print_function
import subprocess
import time, os, json
import numpy as np
import matplotlib.pyplot as plt
import tensorflow as tf

from utils.classifiers.squeeze import SqueezeNet
from utils.data_utils import load_tiny_imagenet
from utils.image_utils import preprocess_image, deprocess_image
from utils.image_utils import SQUEEZENET_MEAN, SQUEEZENET_STD

%matplotlib inline
```

```
plt.rcParams['figure.figsize'] = (10.0, 8.0) # set default size of plots
plt.rcParams['image.interpolation'] = 'nearest'
plt.rcParams['image.cmap'] = 'gray'

def get_session():
    """Create a session that dynamically allocates memory."""
    # See: https://www.tensorflow.org/tutorials/using_gpu#allowing_gpu_memory_growth
    config = tf.ConfigProto()
    config.gpu_options.allow_growth = True
    session = tf.Session(config=config)
    return session

# for auto-reloading external modules
# see http://stackoverflow.com/questions/1907993/autoreload-of-modules-in-ipython
%load_ext autoreload
%autoreload 2
```

# Chapter 8

## Pretrained Model

For all of our image generation experiments, we will start with a convolutional neural network which was pretrained to perform image classification on ImageNet. We can use any model here, but for the purposes of this assignment we will use SqueezeNet [1], which achieves accuracies comparable to AlexNet but with a significantly reduced parameter count and computational complexity.

Using SqueezeNet rather than AlexNet or VGG or ResNet means that we can easily perform all image generation experiments on CPU.

We have ported the PyTorch SqueezeNet model to TensorFlow; see: `utils/classifiers/squeeze.py` for the model architecture.

To use SqueezeNet, you will need to first **download the weights** by changing into the `utils/datasets` directory and running `get_squeeze_tf.sh`. Note that if you ran `get_data.sh` then SqueezeNet will already be downloaded.

Once you've downloaded the SqueezeNet model, we can load it into a new TensorFlow session:

[1] [Iandola et al, "SqueezeNet: AlexNet-level accuracy with 50x fewer parameters and < 0.5MB model size", arXiv 2016](<https://arxiv.org/abs/1602.07360>)

```
os.getcwd()
```

```
'/datadrive/az-courses/learnanalytics-deeplearning-azure/Students/10-adversarial-attacks/tensorflow'  
# %%bash  
# cd utils/datasets  
# chmod +x *.sh  
# ./get_data.sh  
  
tf.reset_default_graph()  
sess = get_session()  
  
SAVE_PATH = 'utils/datasets/squeeze.ckpt'  
# if not os.path.exists(SAVE_PATH):  
#     raise ValueError("You need to download SqueezeNet!")  
model = SqueezeNet(save_path=SAVE_PATH, sess=sess)
```

INFO:tensorflow:Restoring parameters from utils/datasets/squeeze.ckpt



Figure 8.1: png

## 8.1 Load some ImageNet images

We have provided a few example images from the validation set of the ImageNet ILSVRC 2012 Classification dataset. To download these images, change to `utils/datasets/` and run `get_imagenet_val.sh`.

Since they come from the validation set, our pretrained model did not see these images during training.

Run the following cell to visualize some of these images, along with their ground-truth labels.

```
from utils.data_utils import load_imagenet_val
X_raw, y, class_names = load_imagenet_val(num=5)

plt.figure(figsize=(12, 6))
for i in range(5):
    plt.subplot(1, 5, i + 1)
    plt.imshow(X_raw[i])
    plt.title(class_names[y[i]])
    plt.axis('off')
plt.gcf().tight_layout()
```

## 8.2 Preprocess images

The input to the pretrained model is expected to be normalized, so we first preprocess the images by subtracting the pixelwise mean and dividing by the pixelwise standard deviation.

```
X = np.array([preprocess_image(img) for img in X_raw])
```

# Chapter 9

## Saliency Maps

Using this pretrained model, we will compute class saliency maps as described in Section 3.1 of [2].

A **saliency map** tells us the degree to which each pixel in the image affects the classification score for that image. To compute it, we compute the gradient of the unnormalized score corresponding to the correct class (which is a scalar) with respect to the pixels of the image. If the image has shape  $(H, W, 3)$  then this gradient will also have shape  $(H, W, 3)$ ; for each pixel in the image, this gradient tells us the amount by which the classification score will change if the pixel changes by a small amount. To compute the saliency map, we take the absolute value of this gradient, then take the maximum value over the 3 input channels; the final saliency map thus has shape  $(H, W)$  and all entries are nonnegative.

You will need to use the `model.classifier` Tensor containing the scores for each input, and will need to feed in values for the `model.image` and `model.labels` placeholder when evaluating the gradient. Open the file `utils/classifiers/squeeze.py` and read the documentation to make sure you understand how to use the model. For example usage, you can see the `loss` attribute.

[2] [Karen Simonyan, Andrea Vedaldi, and Andrew Zisserman. “Deep Inside Convolutional Networks: Visualising Image Classification Models and Saliency Maps”, ICLR Workshop 2014](<https://arxiv.org/abs/1312.6034>).

```
def compute_saliency_maps(X, y, model):
    """
    Compute a class saliency map using the model for images X and labels y.

    Input:
    - X: Input images, numpy array of shape (N, H, W, 3)
    - y: Labels for X, numpy array of shape (N,)
    - model: A SqueezeNet model that will be used to compute the saliency map.

    Returns:
    - saliency: A numpy array of shape (N, H, W) giving the saliency maps for the
      input images.
    """
    saliency = None
    # Compute the score of the correct class for each example.
    # This gives a Tensor with shape [N], the number of examples.
    #
    # Note: this is equivalent to scores[np.arange(N), y] we used in NumPy
    # for computing vectorized losses.
    correct_scores = tf.gather_nd(model.classifier,
```

```

        tf.stack((tf.range(X.shape[0]), model.labels), axis=1))
#####
# TODO: Implement this function. You should use the correct_scores to compute #
# the loss, and tf.gradients to compute the gradient of the loss with respect #
# to the input image stored in model.image.                                      #
# Use the global sess variable to finally run the computation.                  #
# Note: model.image and model.labels are placeholders and must be fed values # #
# when you call sess.run().                                                    #
#####
grad = tf.gradients(correct_scores, model.image)[0]
grad_val = sess.run(grad, {model.image: X,
                           model.labels: y})
saliency = np.max(np.absolute(grad_val), axis=3)
#####
#                                              END OF YOUR CODE                 #
#####
return saliency

```

Once you have completed the implementation in the cell above, run the following to visualize some class saliency maps on our example images from the ImageNet validation set:

```

def show_saliency_maps(X, y, mask):
    mask = np.asarray(mask)
    Xm = X[mask]
    ym = y[mask]

    saliency = compute_saliency_maps(Xm, ym, model)

    for i in range(mask.size):
        plt.subplot(2, mask.size, i + 1)
        plt.imshow(deprocess_image(Xm[i]))
        plt.axis('off')
        plt.title(class_names[ym[i]])
        plt.subplot(2, mask.size, mask.size + i + 1)
        plt.title(mask[i])
        plt.imshow(saliency[i], cmap=plt.cm.hot)
        plt.axis('off')
        plt.gcf().set_size_inches(10, 4)
    plt.show()

mask = np.arange(5)
show_saliency_maps(X, y, mask)

```

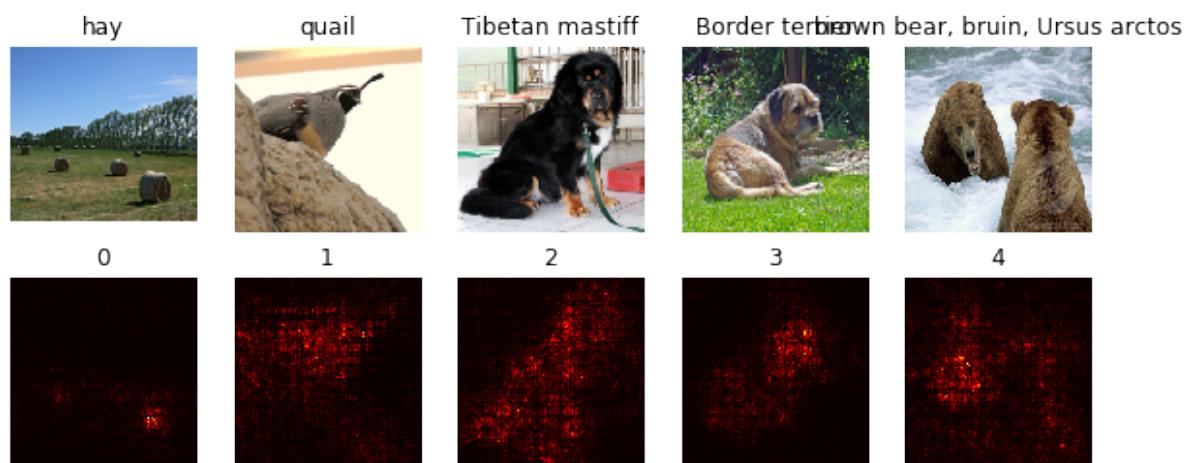


Figure 9.1: png



# Chapter 10

## Fooling Images

We can also use image gradients to generate “fooling images” as discussed in [3]. Given an image and a target class, we can perform gradient **ascent** over the image to maximize the target class, stopping when the network classifies the image as the target class. Implement the following function to generate fooling images.

[3] [Szegedy et al, “Intriguing properties of neural networks”, ICLR 2014](<https://arxiv.org/abs/1312.6199>)

```
def make_fooling_image(X, target_y, model):
    """
    Generate a fooling image that is close to X, but that the model classifies
    as target_y.

    Inputs:
    - X: Input image, of shape (1, 224, 224, 3)
    - target_y: An integer in the range [0, 1000)
    - model: Pretrained SqueezeNet model

    Returns:
    - X_fooling: An image that is close to X, but that is classified as target_y
      by the model.
    """
    X_fooling = X.copy()
    learning_rate = 1
    #####
    # TODO: Generate a fooling image X_fooling that the model will classify as #
    # the class target_y. Use gradient ascent on the target class score, using #
    # the model.classifier Tensor to get the class scores for the model.image. #
    # When computing an update step, first normalize the gradient: #
    #   dX = learning_rate * g / ||g||_2 #
    #
    # You should write a training loop #
    #
    # HINT: For most examples, you should be able to generate a fooling image #
    # in fewer than 100 iterations of gradient ascent. #
    # You can print your progress over iterations to check your algorithm. #
    #####
    iterations = 100
    loss = model.classifier[0][target_y]
```

```

grad = tf.gradients(loss, model.image)[0]

for i in range(iterations):
    scores = sess.run(model.classifier, feed_dict={model.image: X_fooling})
    g = sess.run(grad, feed_dict={model.image: X_fooling})
    target_i = np.argmax(scores[0])
    if target_i == target_y:
        break;
    else:
        dX = learning_rate * g / np.sqrt(np.sum(g*g))
        X_fooling += dX
#####
#                                     END OF YOUR CODE
#####
return X_fooling

```

Run the following to generate a fooling image. Feel free to change the `idx` variable to explore other images.

```

idx = 2
Xi = X[idx][None]
target_y = 9
X_fooling = make_fooling_image(Xi, target_y, model)

# Make sure that X_fooling is classified as y_target
scores = sess.run(model.classifier, {model.image: X_fooling})
assert scores[0].argmax() == target_y, 'The network is not fooled!'

# Show original image, fooling image, and difference
orig_img = deprocess_image(Xi[0])
fool_img = deprocess_image(X_fooling[0])
# Rescale
plt.subplot(1, 4, 1)
plt.imshow(orig_img)
plt.axis('off')
plt.title(class_names[y[idx]])
plt.subplot(1, 4, 2)
plt.imshow(fool_img)
plt.title(class_names[target_y])
plt.axis('off')
plt.subplot(1, 4, 3)
plt.title('Difference')
plt.imshow(deprocess_image((Xi-X_fooling)[0]))
plt.axis('off')
plt.subplot(1, 4, 4)
plt.title('Magnified difference (10x)')
plt.imshow(deprocess_image(10 * (Xi-X_fooling)[0]))
plt.axis('off')
plt.gcf().tight_layout()

```

#### 10.0.0.0.1 Class visualization

By starting with a random noise image and performing gradient ascent on a target class, we can generate an image that the network will recognize as the target class. This idea was first presented in [2]; [3] extended this idea by suggesting several regularization techniques that can improve the quality of the generated image.

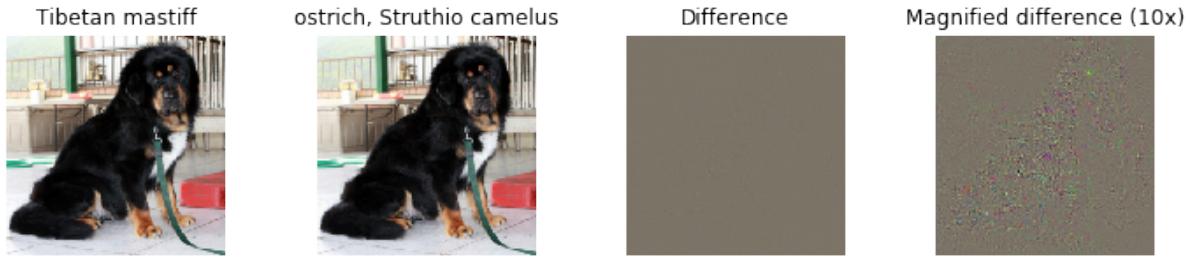


Figure 10.1: png

Concretely, let  $I$  be an image and let  $y$  be a target class. Let  $s_y(I)$  be the score that a convolutional network assigns to the image  $I$  for class  $y$ ; note that these are raw unnormalized scores, not class probabilities. We wish to generate an image  $I^*$  that achieves a high score for the class  $y$  by solving the problem

$$I^* = \arg \max_I s_y(I) - R(I)$$

where  $R$  is a (possibly implicit) regularizer (note the sign of  $R(I)$  in the argmax: we want to minimize this regularization term). We can solve this optimization problem using gradient ascent, computing gradients with respect to the generated image. We will use (explicit) L2 regularization of the form

$$R(I) = \lambda \|I\|_2^2$$

and implicit regularization as suggested by [3] by periodically blurring the generated image. We can solve this problem using gradient ascent on the generated image.

In the cell below, complete the implementation of the `create_class_visualization` function.

[2] [Karen Simonyan, Andrea Vedaldi, and Andrew Zisserman. “Deep Inside Convolutional Networks: Visualising Image Classification Models and Saliency Maps”, ICLR Workshop 2014](<https://arxiv.org/abs/1312.6034>).

[3] [Yosinski et al, “Understanding Neural Networks Through Deep Visualization”, ICML 2015 Deep Learning Workshop](<https://arxiv.org/abs/1506.06579>).

```
from scipy.ndimage.filters import gaussian_filter1d
def blur_image(X, sigma=1):
    X = gaussian_filter1d(X, sigma, axis=1)
    X = gaussian_filter1d(X, sigma, axis=2)
    return X

def create_class_visualization(target_y, model, **kwargs):
    """
    Generate an image to maximize the score of target_y under a pretrained model.
    
```

*Inputs:*

- `target_y`: Integer in the range [0, 1000) giving the index of the class
- `model`: A pretrained CNN that will be used to generate the image

*Keyword arguments:*

- `l2_reg`: Strength of L2 regularization on the image
- `learning_rate`: How big of a step to take
- `num_iterations`: How many iterations to use

```

- blur_every: How often to blur the image as an implicit regularizer
- max_jitter: How much to jitter the image as an implicit regularizer
- show_every: How often to show the intermediate result
"""

l2_reg = kwargs.pop('l2_reg', 1e-3)
learning_rate = kwargs.pop('learning_rate', 25)
num_iterations = kwargs.pop('num_iterations', 1000)
blur_every = kwargs.pop('blur_every', 10)
max_jitter = kwargs.pop('max_jitter', 1)
show_every = kwargs.pop('show_every', 25)

X = 255 * np.random.rand(224, 224, 3)
X = preprocess_image(X) [None]

#####
# TODO: Compute the loss and the gradient of the loss with respect to #
# the input image, model.image. We compute these outside the loop so   #
# that we don't have to recompute the gradient graph at each iteration #
#
# Note: loss and grad should be TensorFlow Tensors, not numpy arrays! #
#
# The loss is the score for the target label, target_y. You should      #
# use model.classifier to get the scores, and tf.gradients to compute    #
# gradients. Don't forget the (subtracted) L2 regularization term!      #
#####
loss = None # scalar loss
grad = None # gradient of loss with respect to model.image, same size as model.image
penalty = l2_reg * tf.norm(model.image)
loss = model.classifier[0, target_y] - penalty
grad = tf.gradients(loss, model.image)[0]
#####
# END OF YOUR CODE #
#####

for t in range(num_iterations):
    # Randomly jitter the image a bit; this gives slightly nicer results
    ox, oy = np.random.randint(-max_jitter, max_jitter+1, 2)
    Xi = X.copy()
    X = np.roll(np.roll(X, ox, 1), oy, 2)

    #####
    # TODO: Use sess to compute the value of the gradient of the score for #
    # class target_y with respect to the pixels of the image, and make a   #
    # gradient step on the image using the learning rate. You should use    #
    # the grad variable you defined above.                                    #
    #
    # Be very careful about the signs of elements in your code.           #
    #####
    grad_val = sess.run(grad, {model.image: X})
    dX = learning_rate * grad_val / np.linalg.norm(grad_val)
    X += dX
#####

```

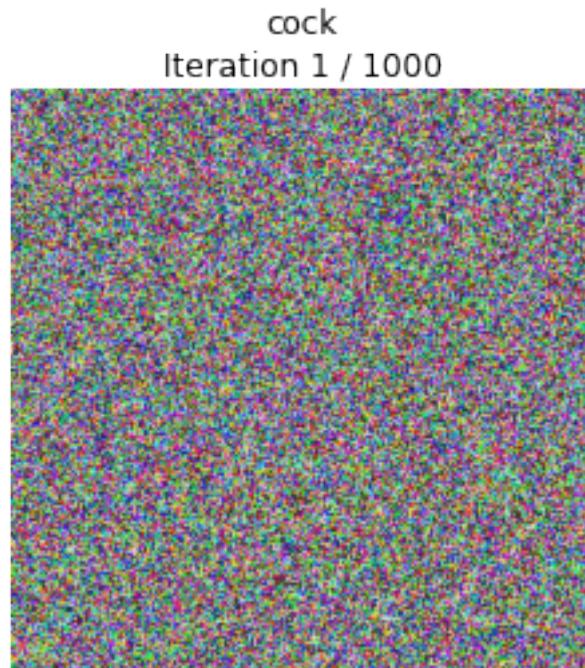


Figure 10.2: png

```

#                                     END OF YOUR CODE #
#####
# Undo the jitter
X = np.roll(np.roll(X, -ox, 1), -oy, 2)

# As a regularizer, clip and periodically blur
X = np.clip(X, -SQUEEZENET_MEAN/SQUEEZENET_STD, (1.0 - SQUEEZENET_MEAN)/SQUEEZENET_STD)
if t % blur_every == 0:
    X = blur_image(X, sigma=0.5)

# Periodically show the image
if t == 0 or (t + 1) % show_every == 0 or t == num_iterations - 1:
    plt.imshow(deprocess_image(X[0]))
    class_name = class_names[target_y]
    plt.title('%s\nIteration %d / %d' % (class_name, t + 1, num_iterations))
    plt.gcf().set_size_inches(4, 4)
    plt.axis('off')
    plt.show()

return X

```

Once you have completed the implementation in the cell above, run the following cell to generate an image of Tarantula:

```

target_y = 7 # Tarantula
out = create_class_visualization(target_y, model)

```

Try out your class visualization on other classes! You should also feel free to play with various hyperparam-

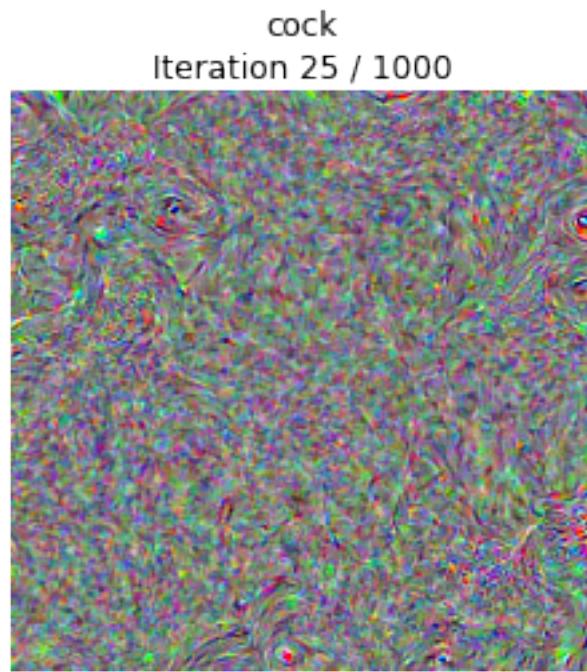


Figure 10.3: png

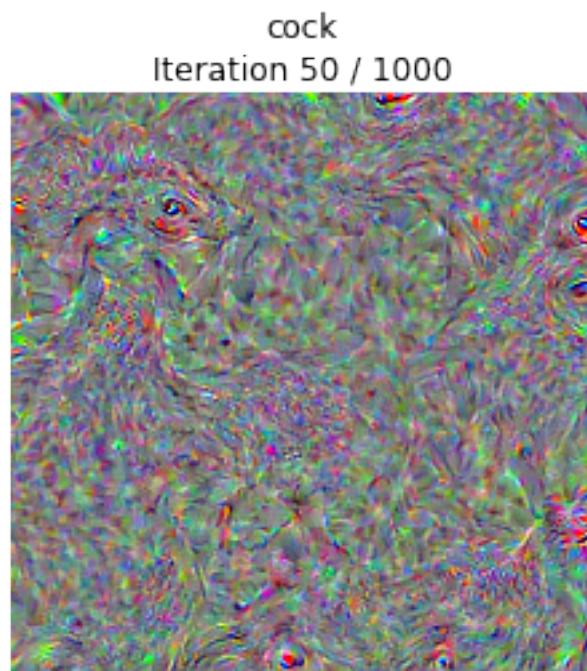


Figure 10.4: png

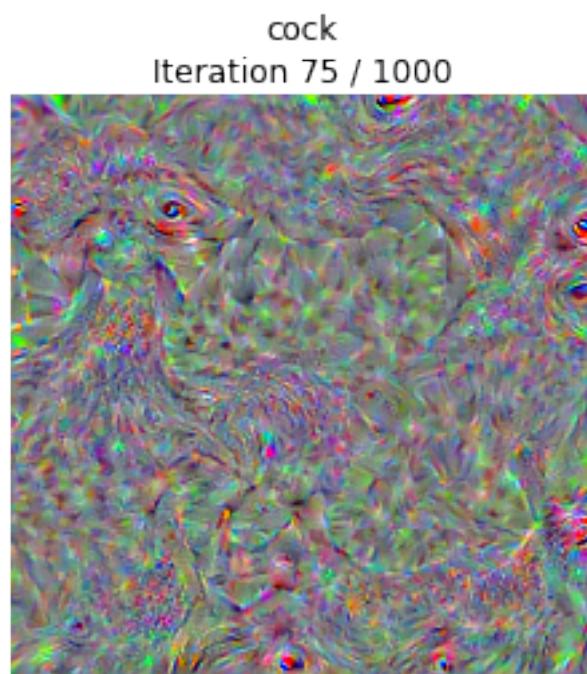


Figure 10.5: png

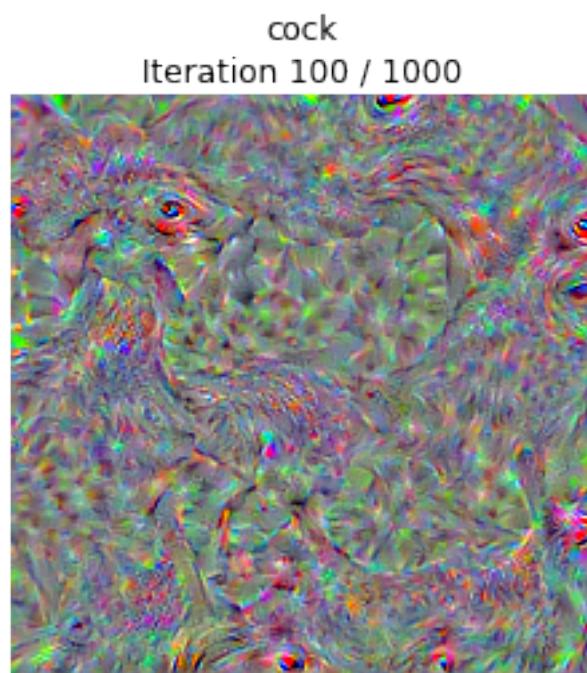


Figure 10.6: png

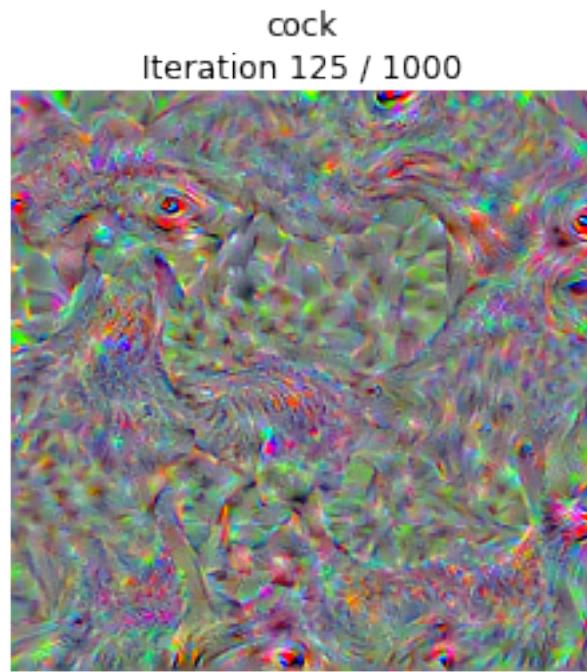


Figure 10.7: png

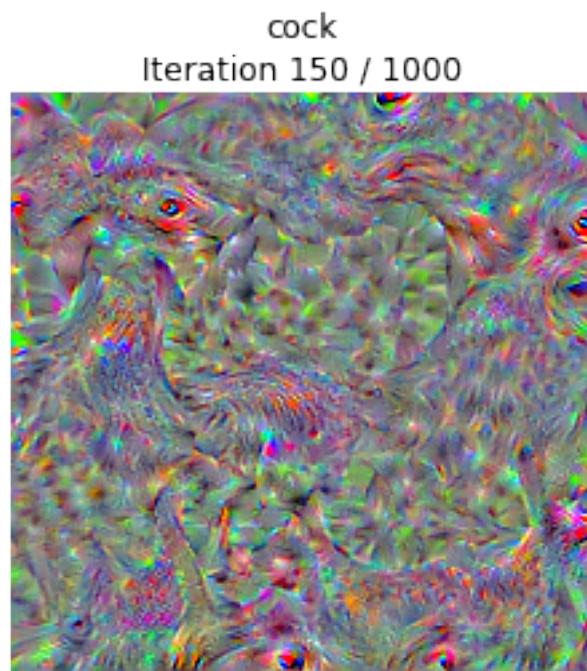


Figure 10.8: png

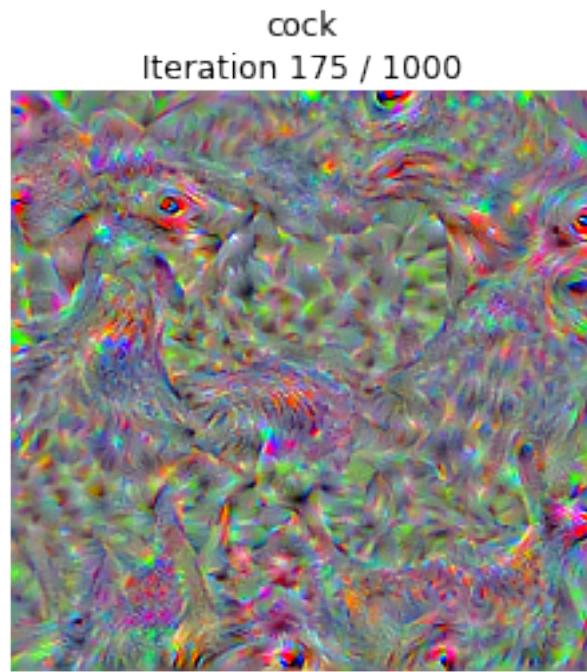


Figure 10.9: png

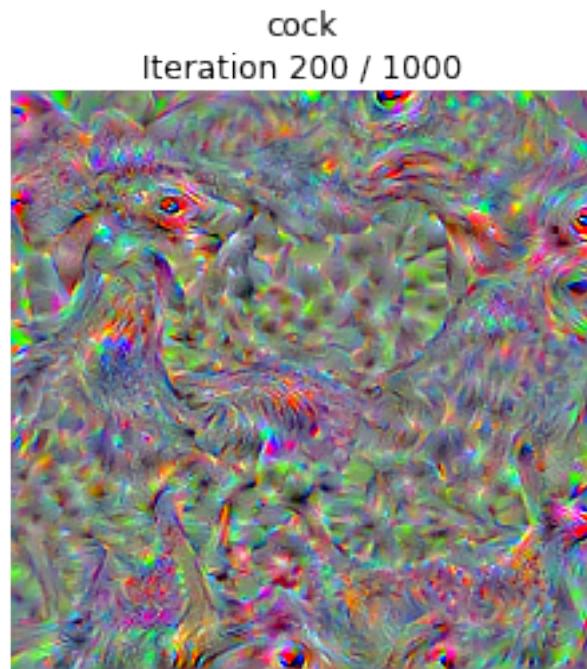


Figure 10.10: png

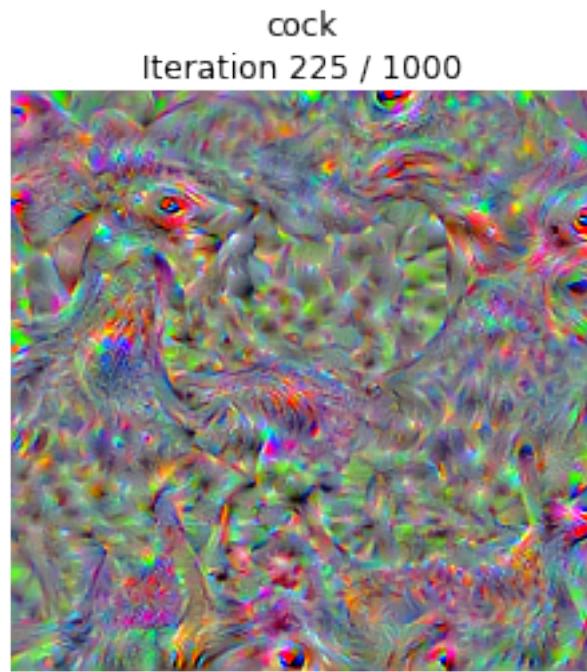


Figure 10.11: png

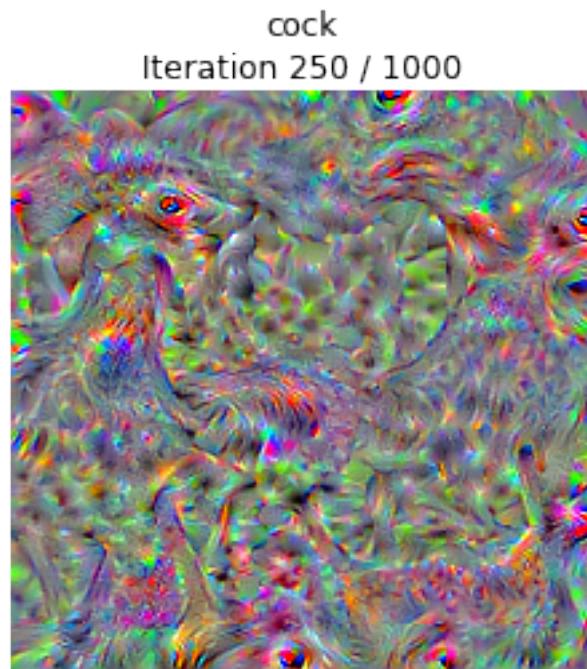


Figure 10.12: png

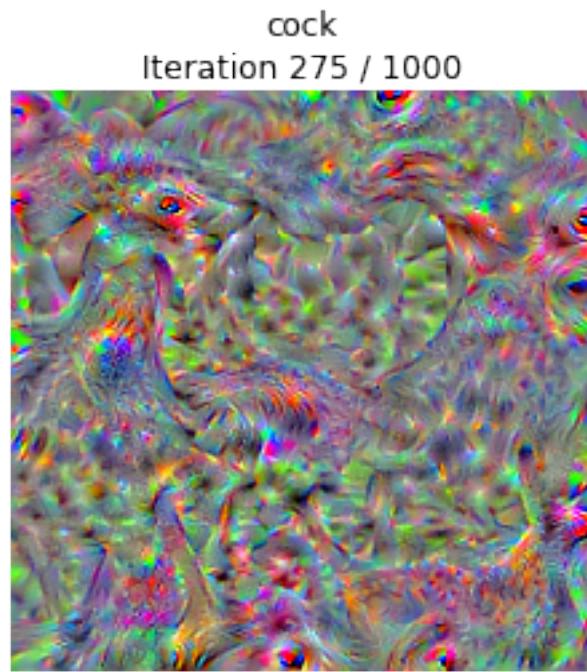


Figure 10.13: png

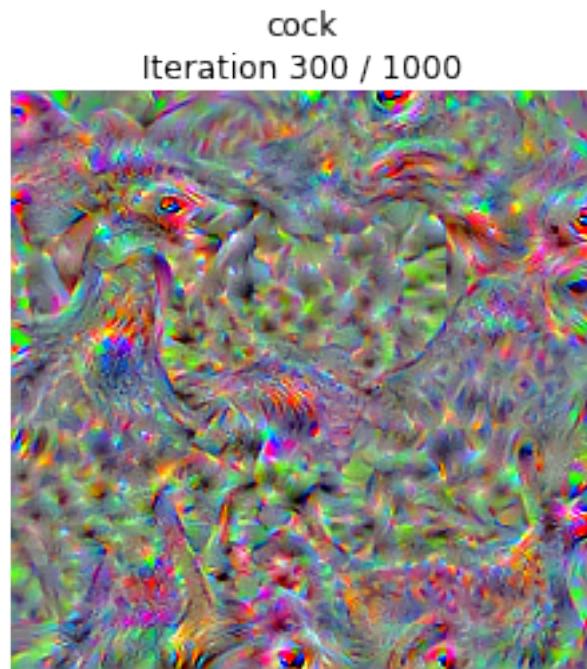


Figure 10.14: png

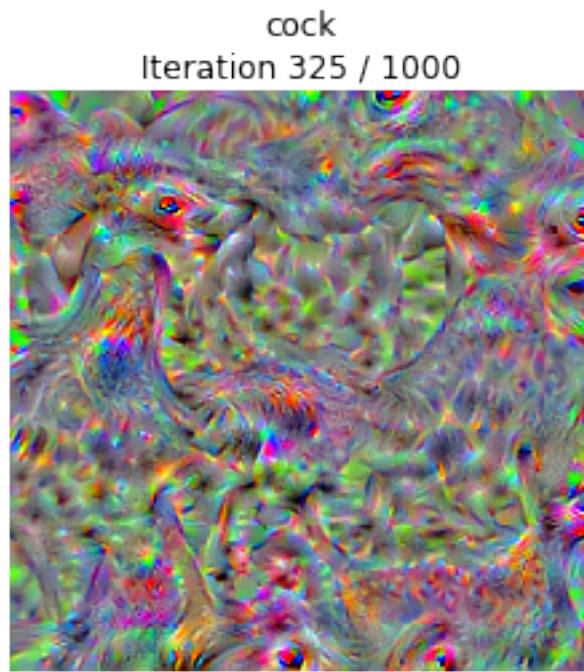


Figure 10.15: png

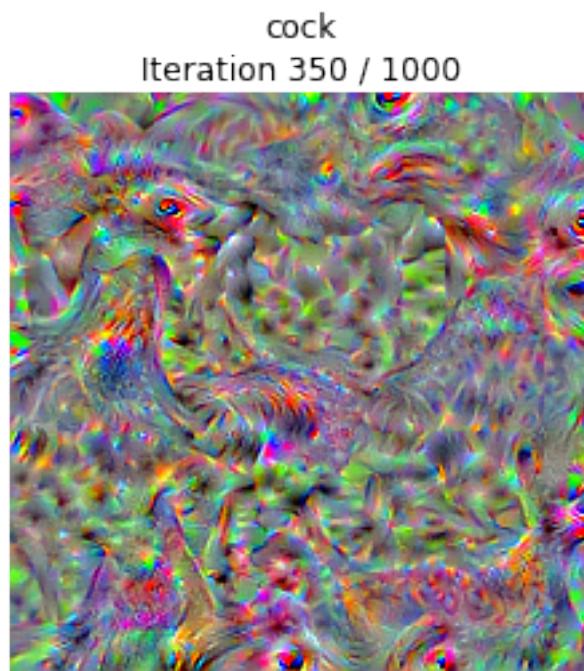


Figure 10.16: png

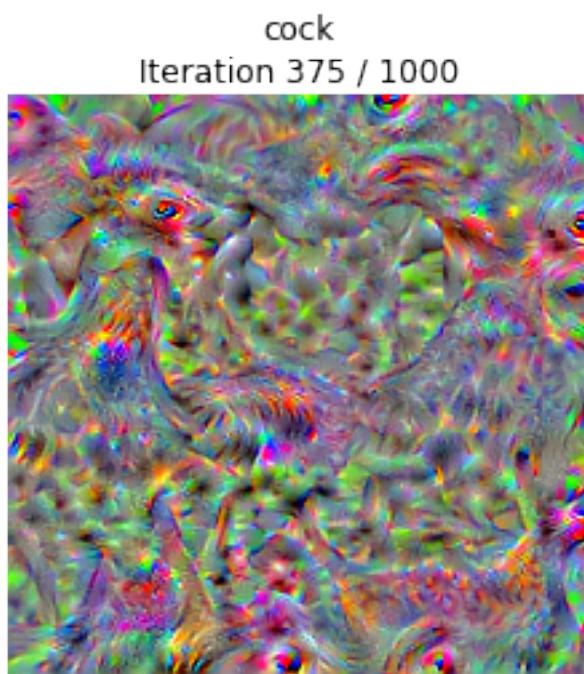


Figure 10.17: png

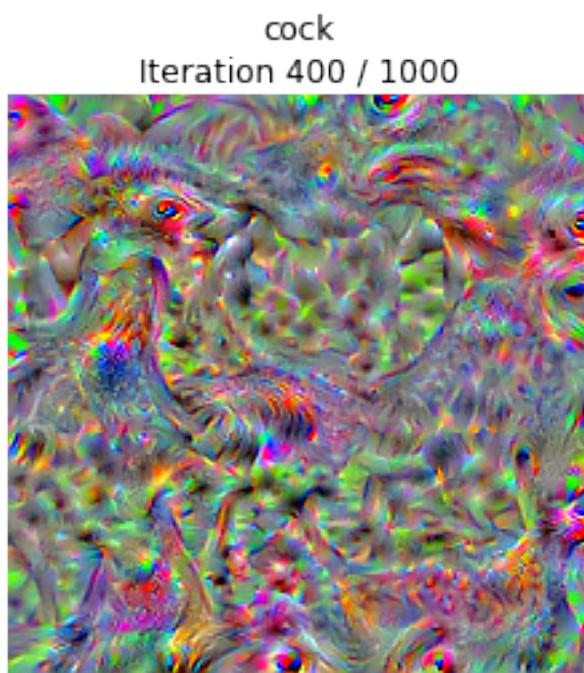


Figure 10.18: png

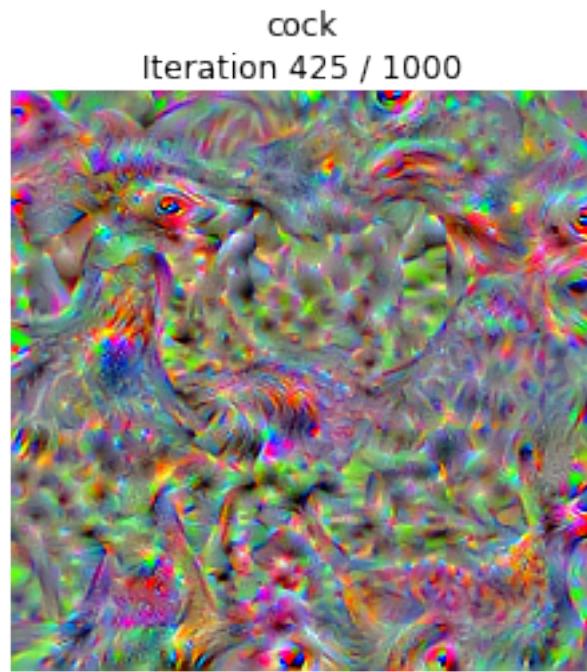


Figure 10.19: png

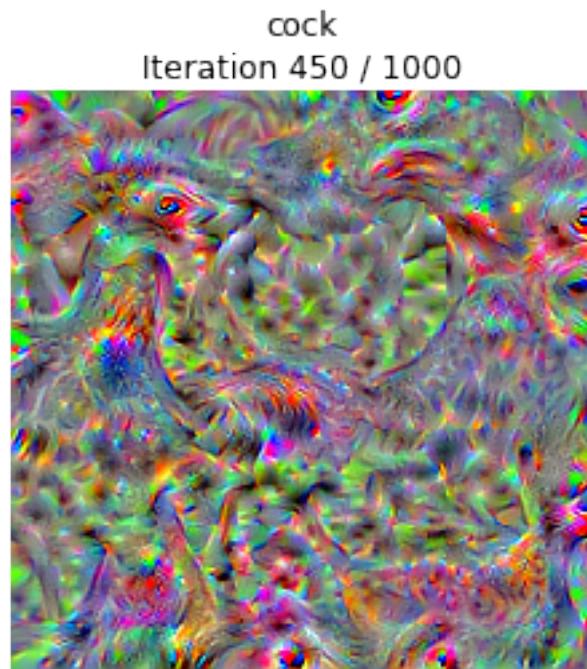


Figure 10.20: png

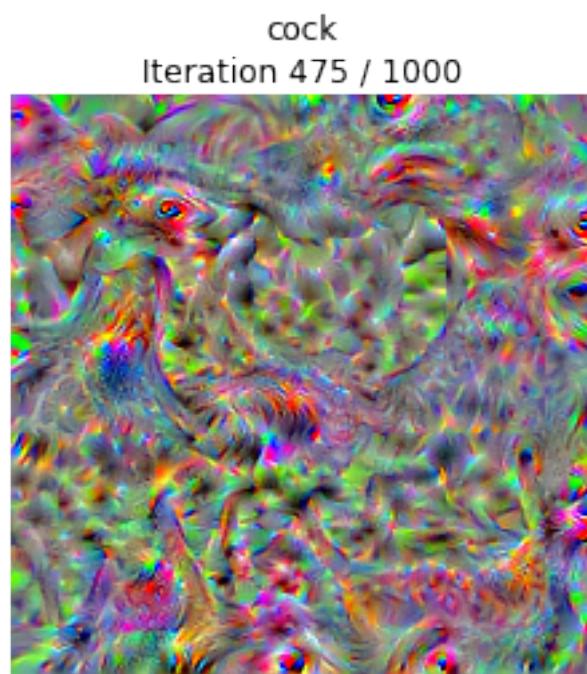


Figure 10.21: png

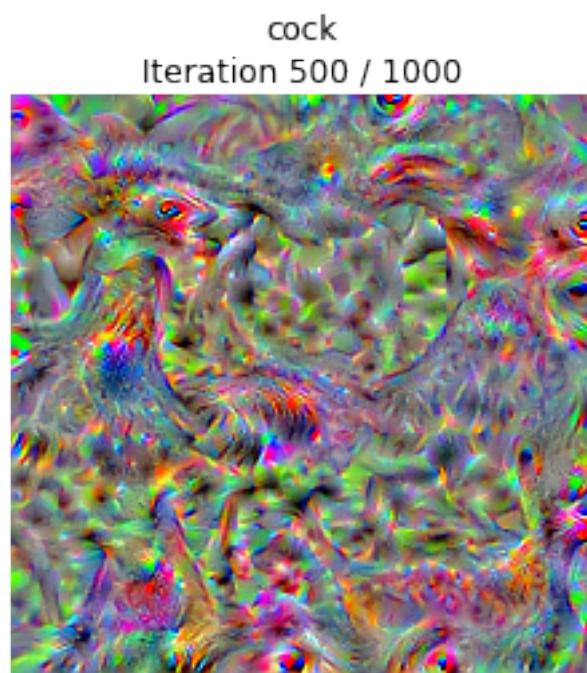


Figure 10.22: png

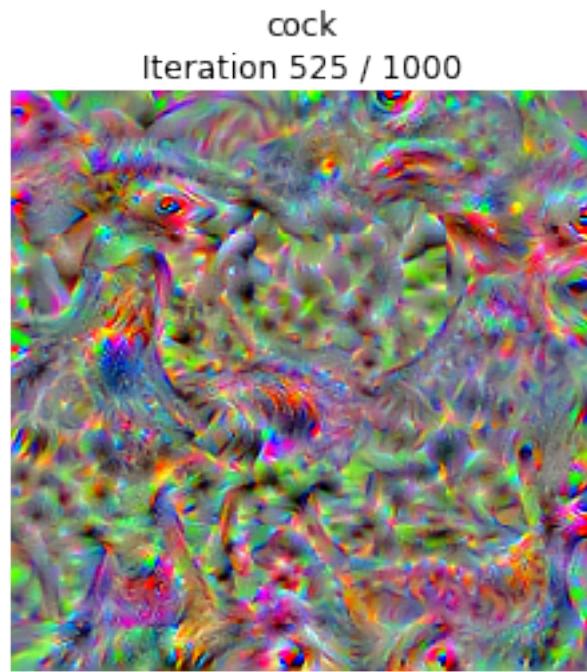


Figure 10.23: png

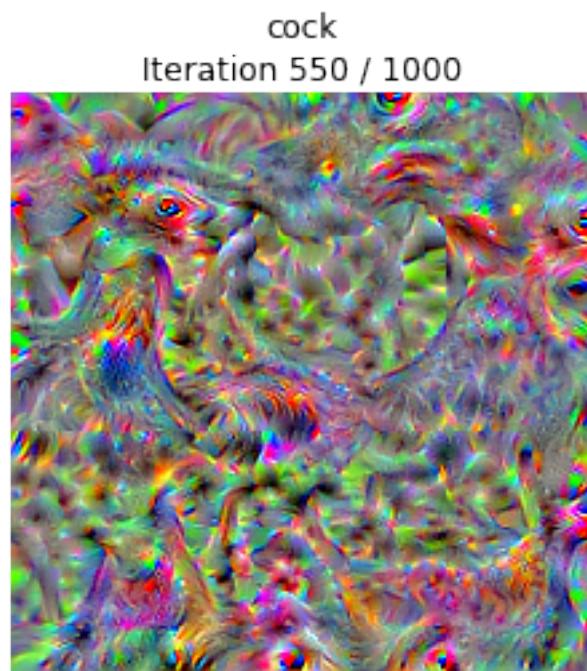


Figure 10.24: png

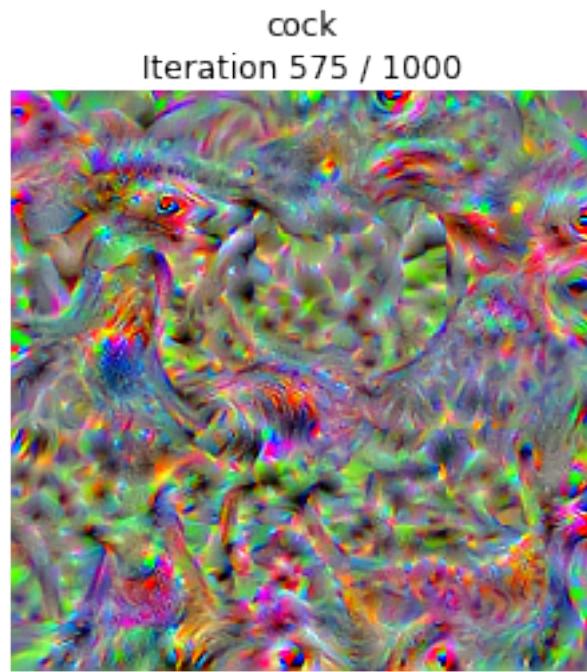


Figure 10.25: png

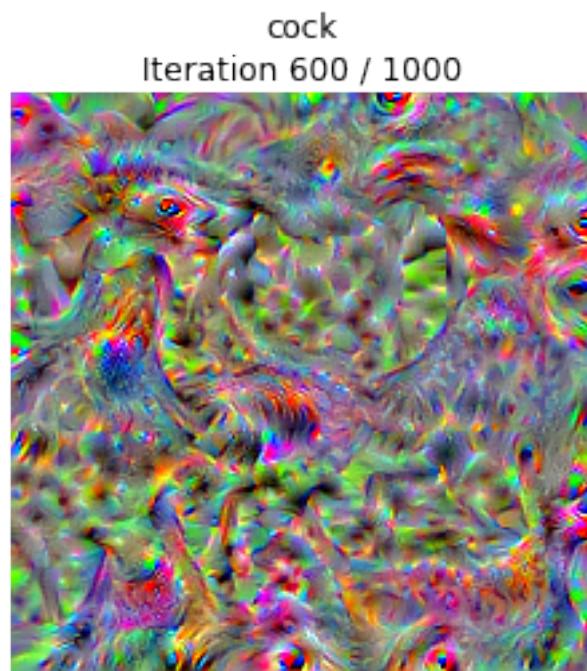


Figure 10.26: png

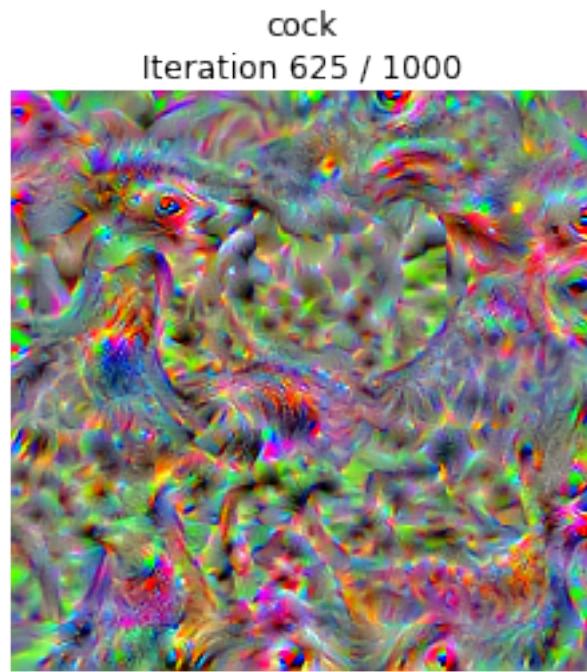


Figure 10.27: png

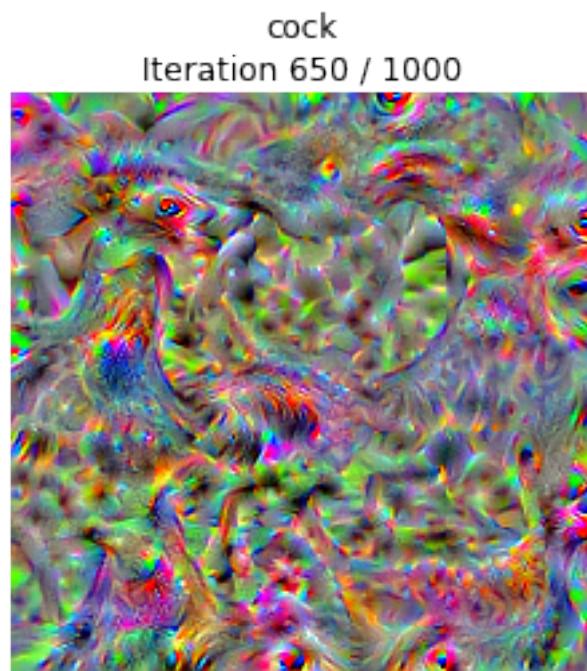


Figure 10.28: png

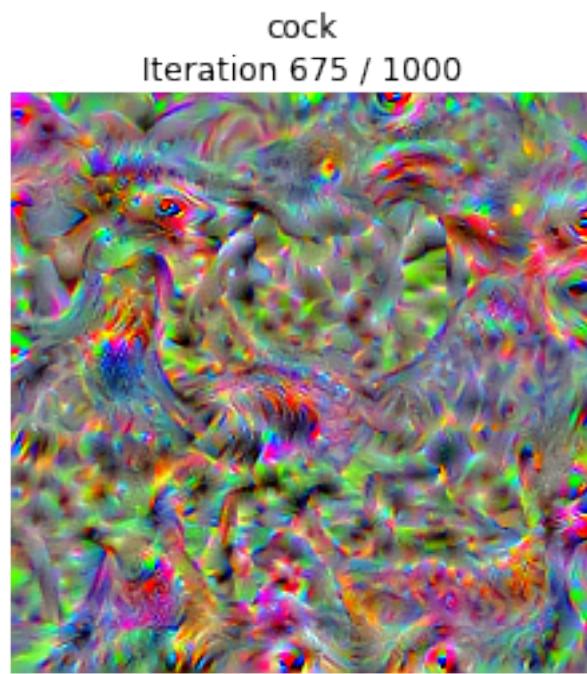


Figure 10.29: png

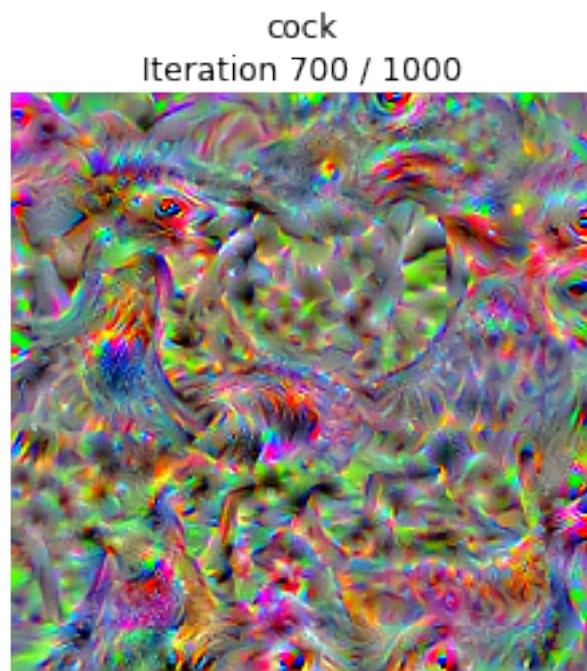


Figure 10.30: png

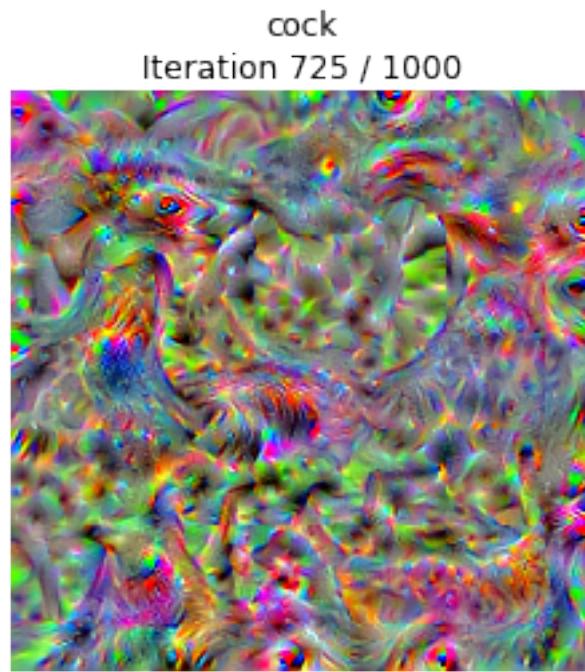


Figure 10.31: png

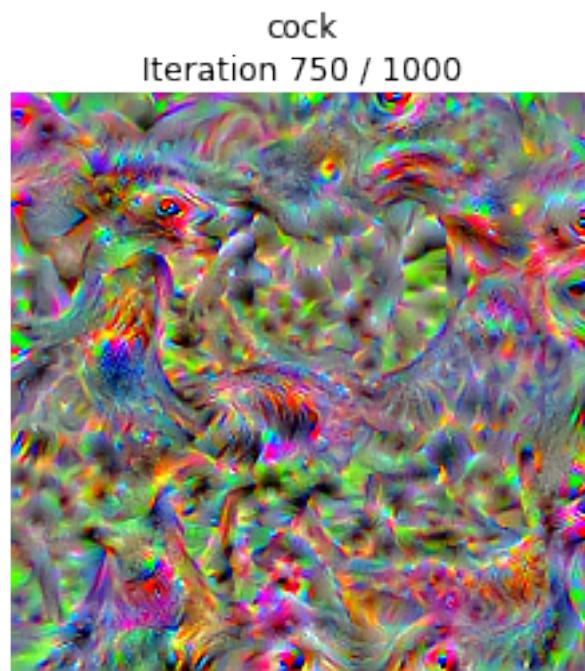


Figure 10.32: png

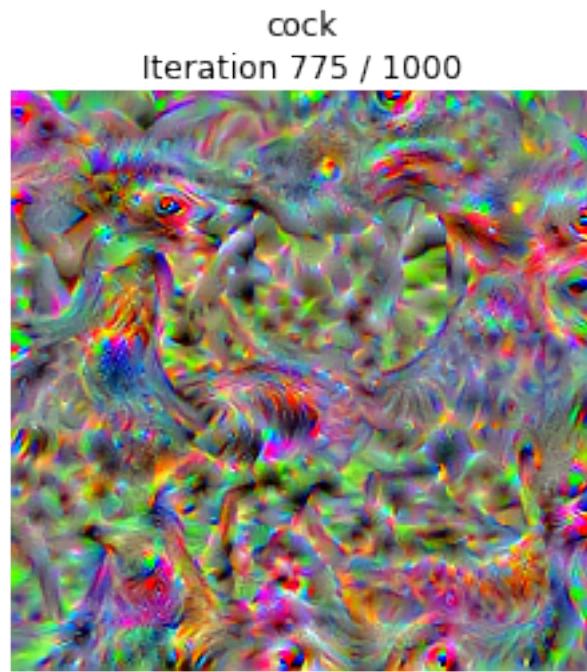


Figure 10.33: png

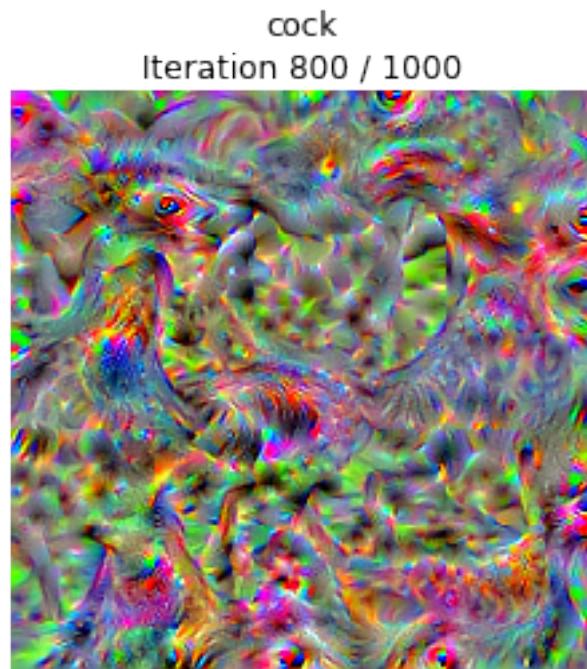


Figure 10.34: png

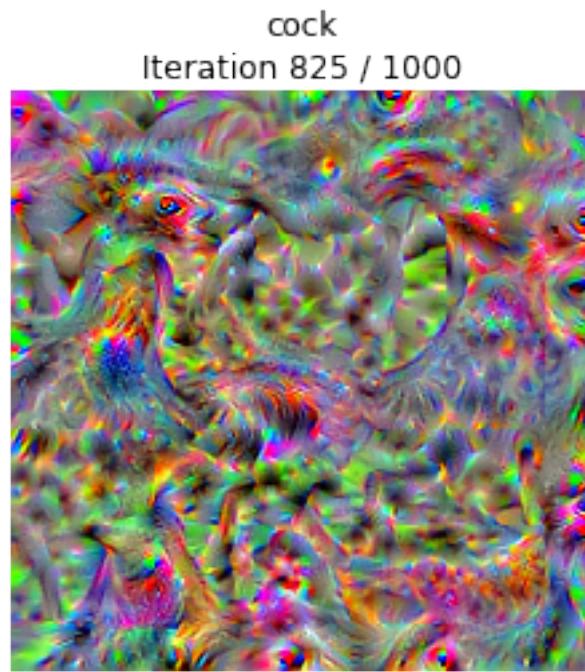


Figure 10.35: png

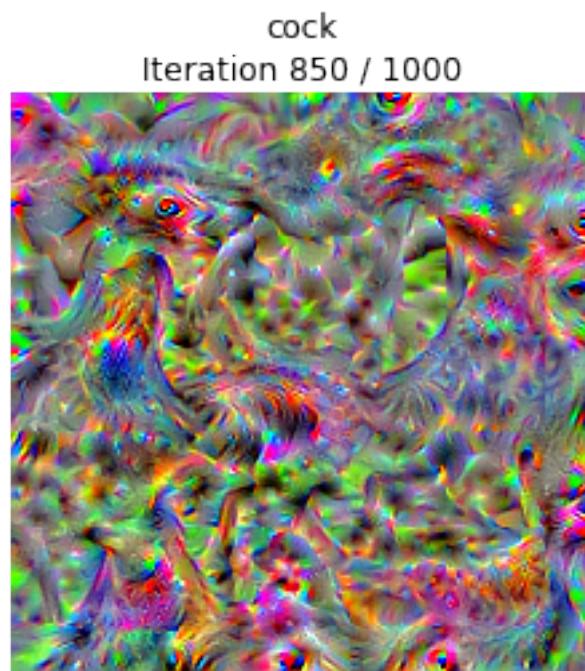


Figure 10.36: png

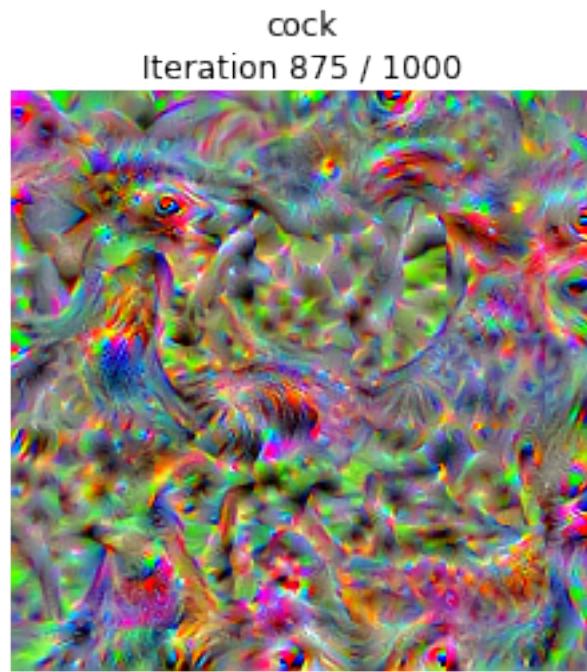


Figure 10.37: png

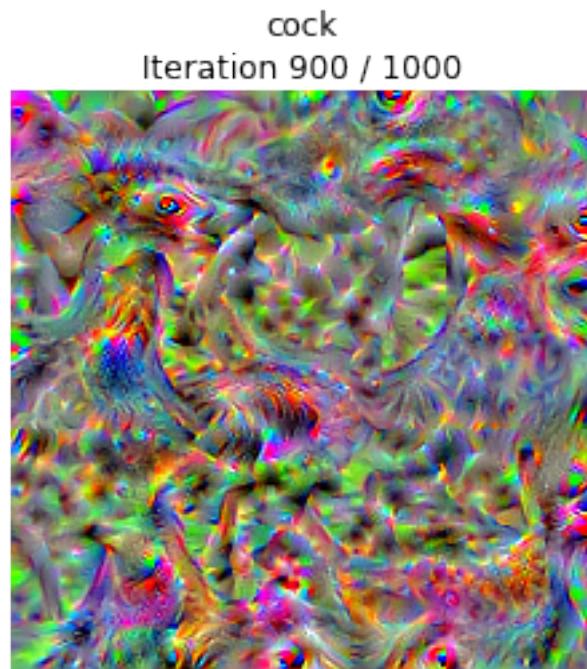


Figure 10.38: png

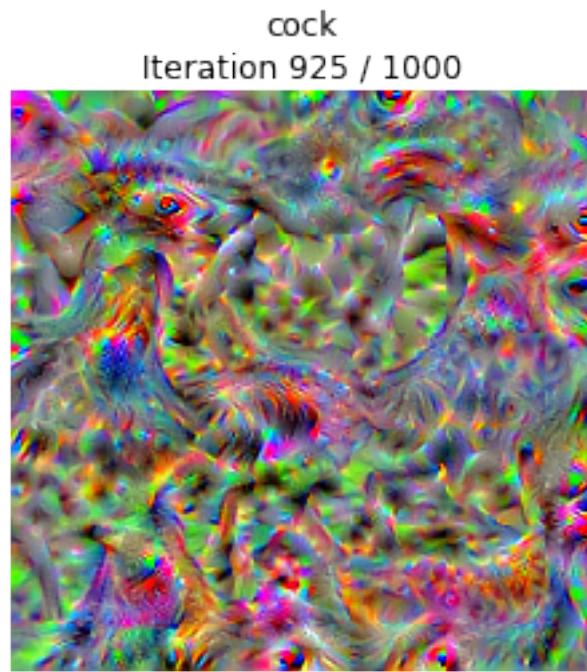


Figure 10.39: png

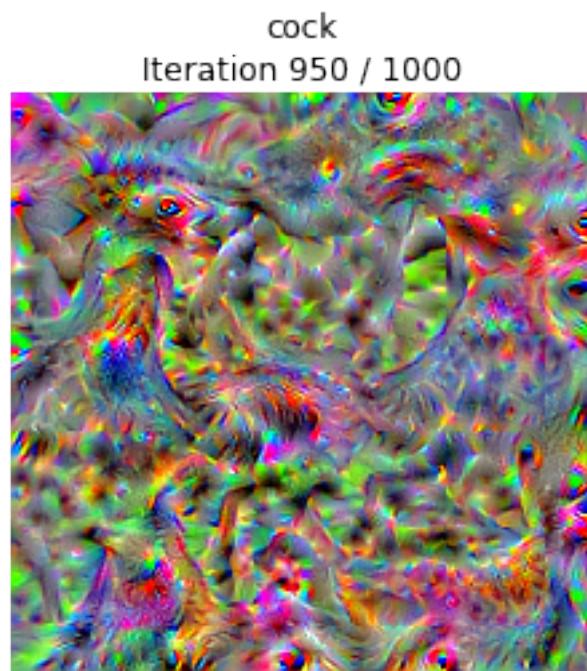


Figure 10.40: png

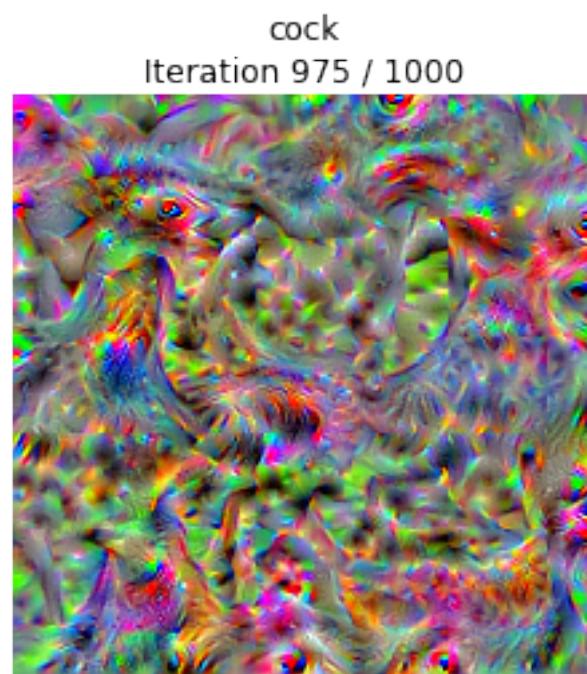


Figure 10.41: png

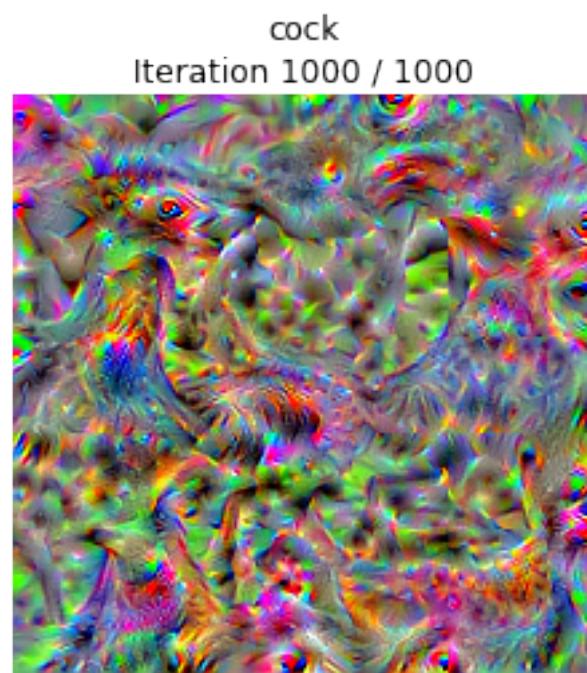


Figure 10.42: png

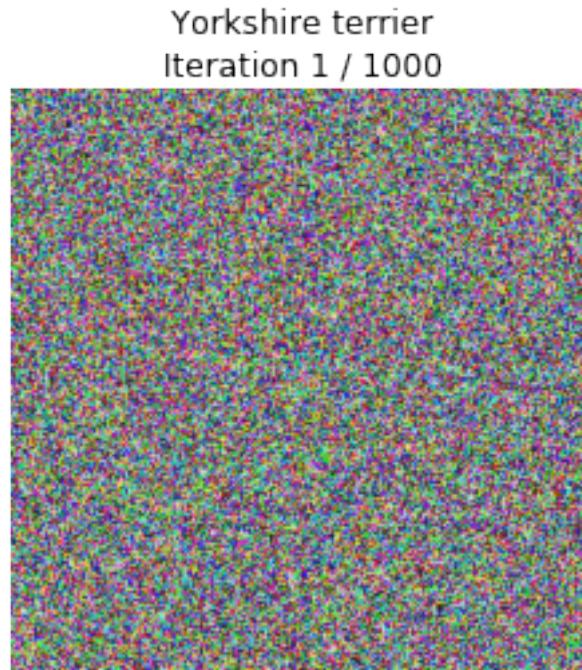


Figure 10.43: png

eters to try and improve the quality of the generated image, but this is not required.

```
# target_y = 78 # Tick
target_y = 187 # Yorkshire Terrier
# target_y = 683 # Oboe
# target_y = 366 # Gorilla
# target_y = 604 # Hourglass
# target_y = np.random.randint(1000)
print(class_names[target_y])
X = create_class_visualization(target_y, model)
```

Yorkshire terrier

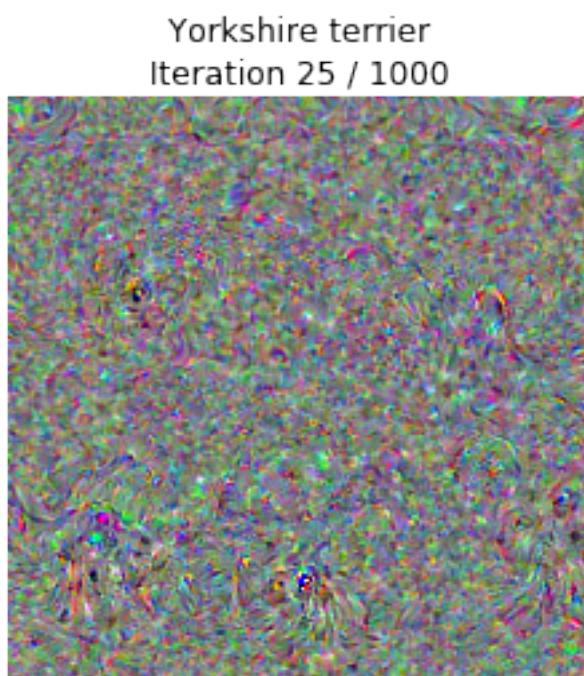


Figure 10.44: png

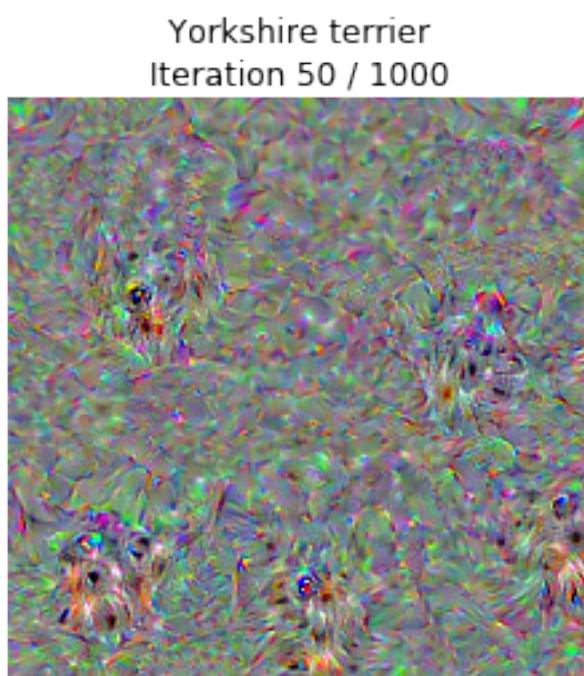


Figure 10.45: png

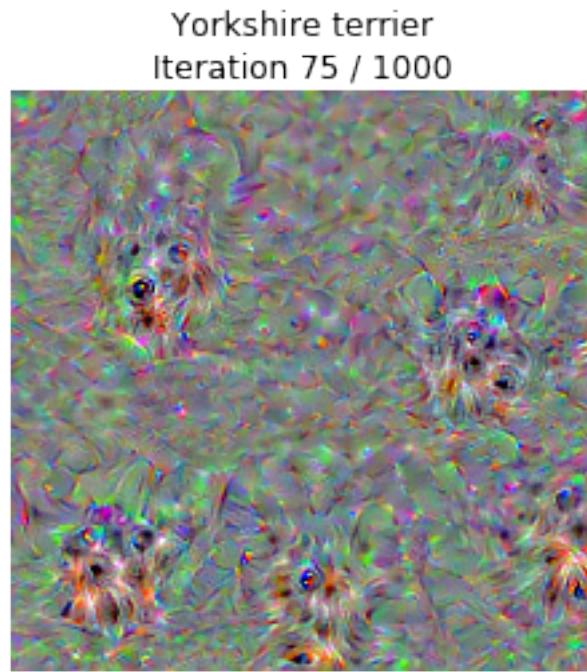


Figure 10.46: png

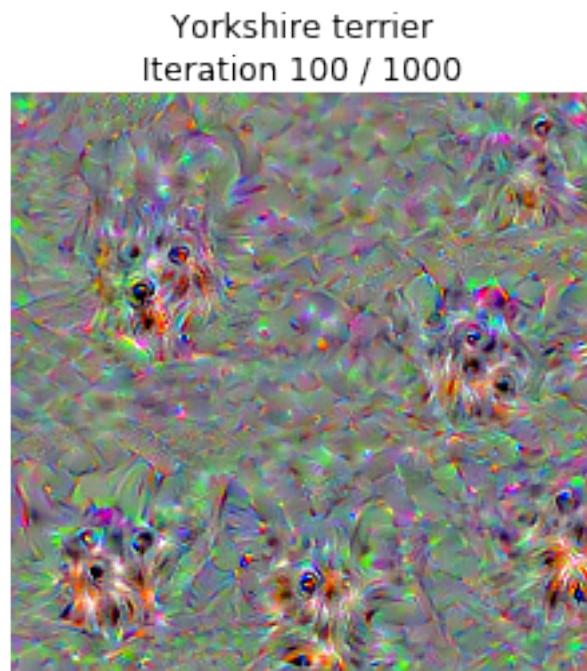


Figure 10.47: png

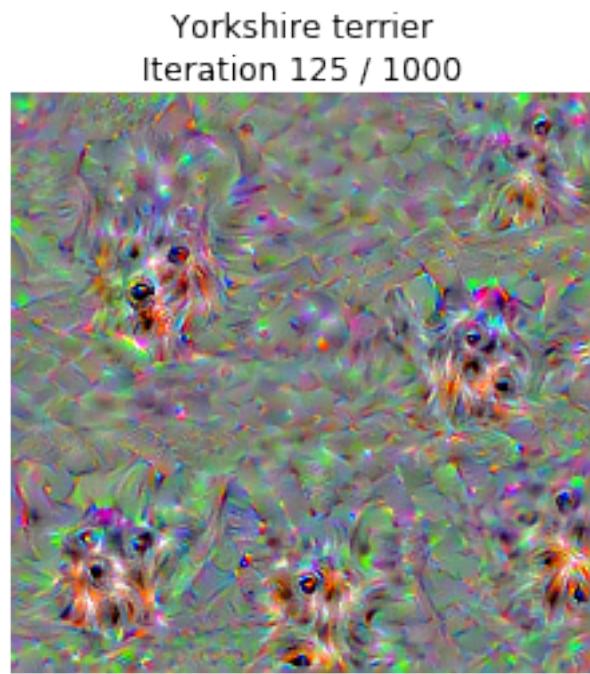


Figure 10.48: png

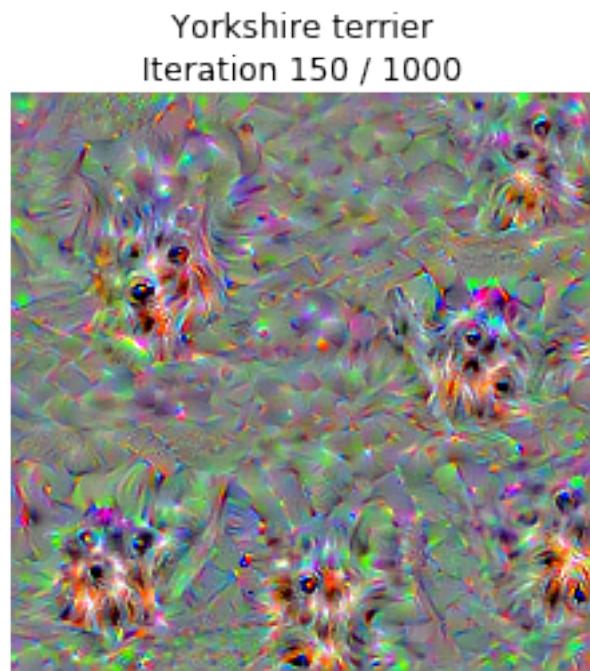


Figure 10.49: png

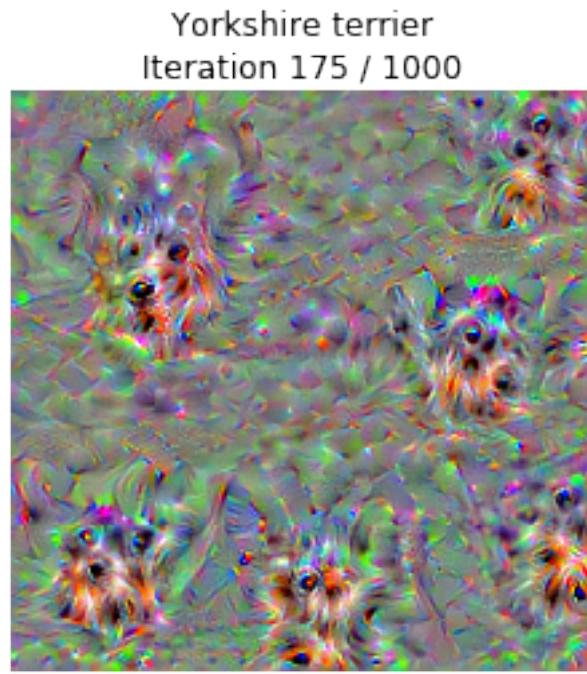


Figure 10.50: png

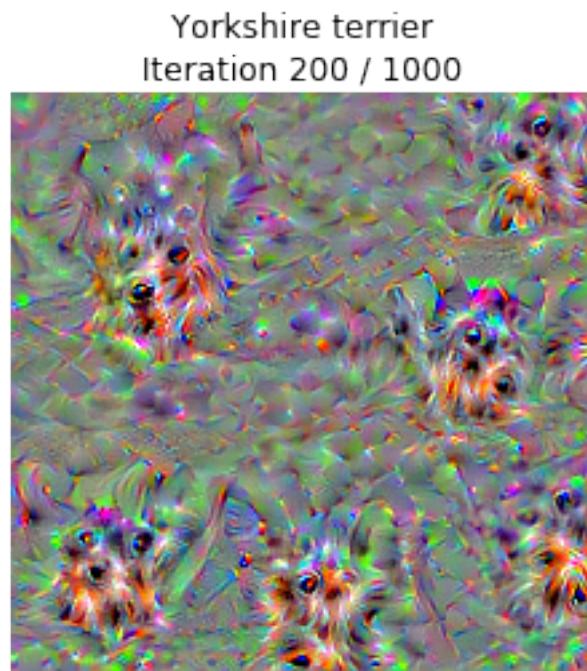


Figure 10.51: png

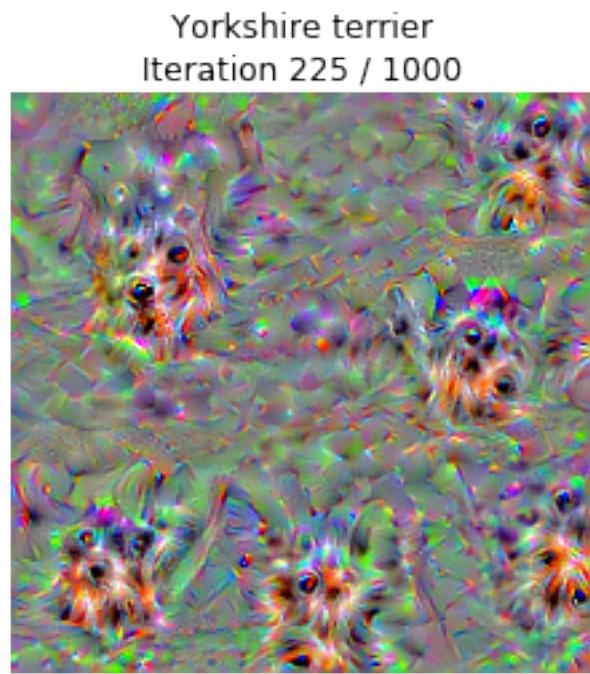


Figure 10.52: png

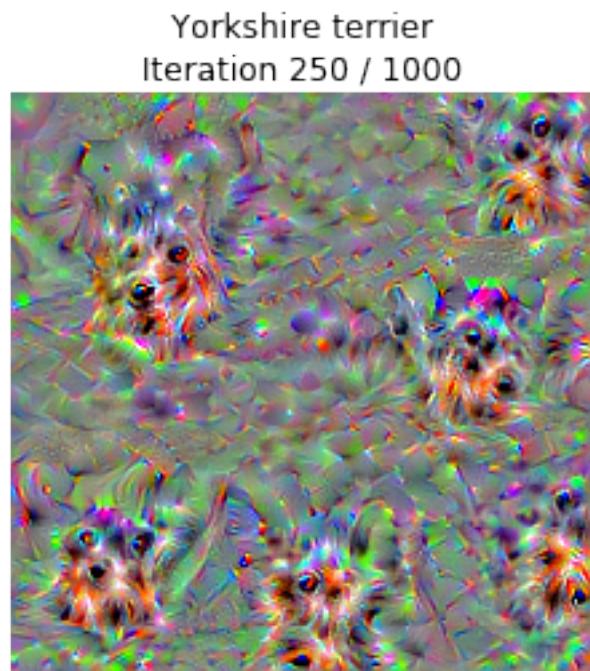


Figure 10.53: png

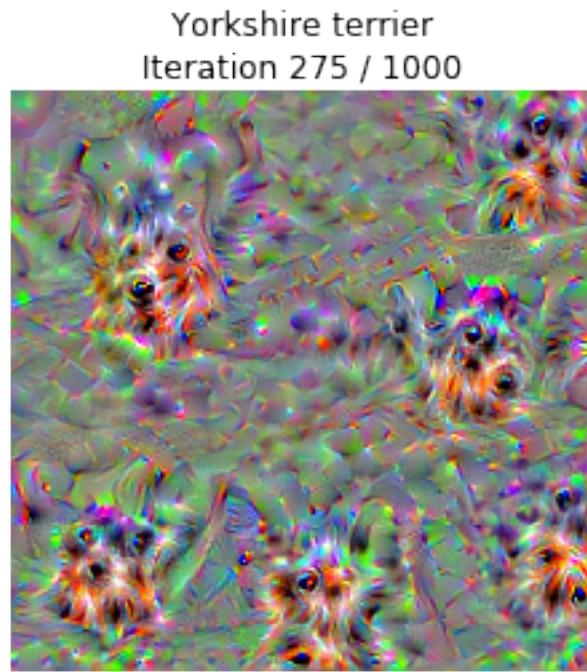


Figure 10.54: png

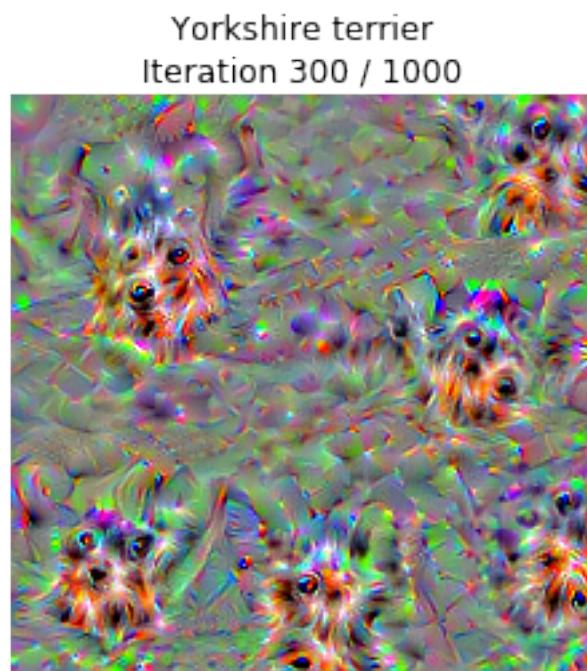


Figure 10.55: png

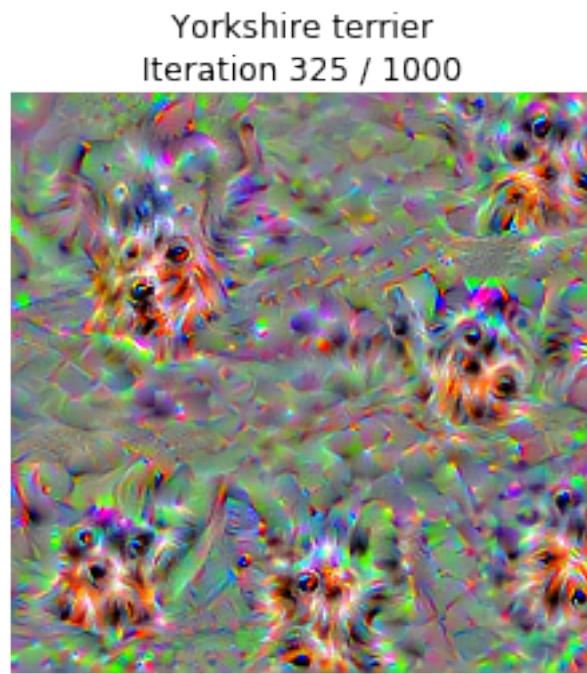


Figure 10.56: png

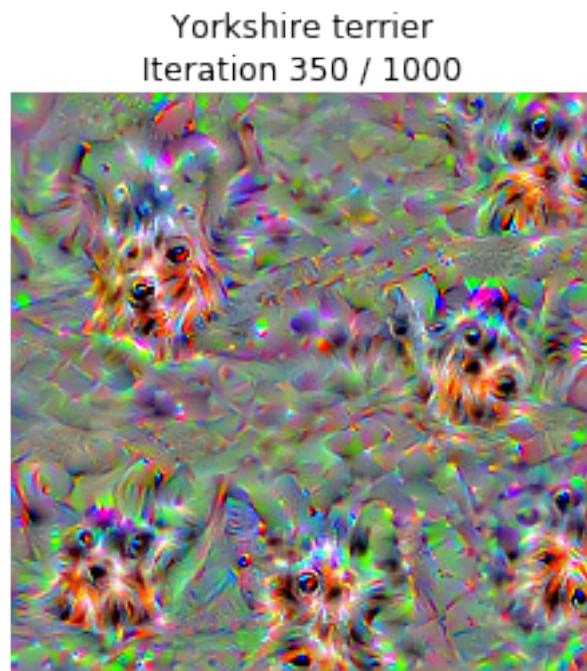


Figure 10.57: png

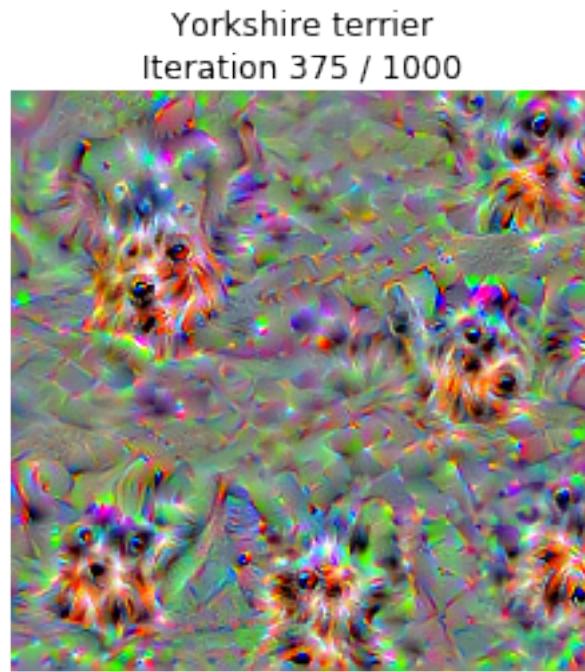


Figure 10.58: png

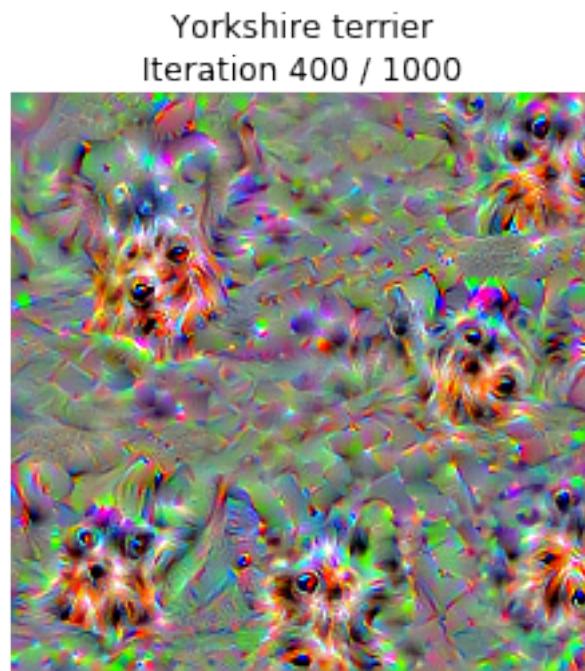


Figure 10.59: png

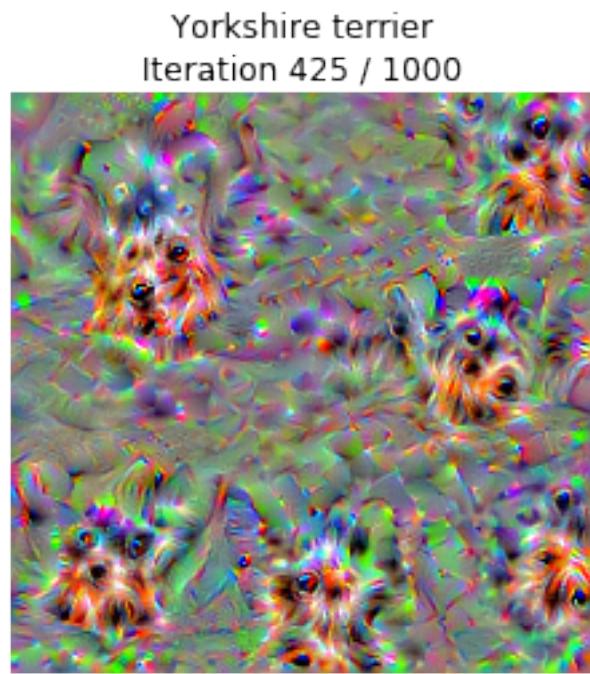


Figure 10.60: png

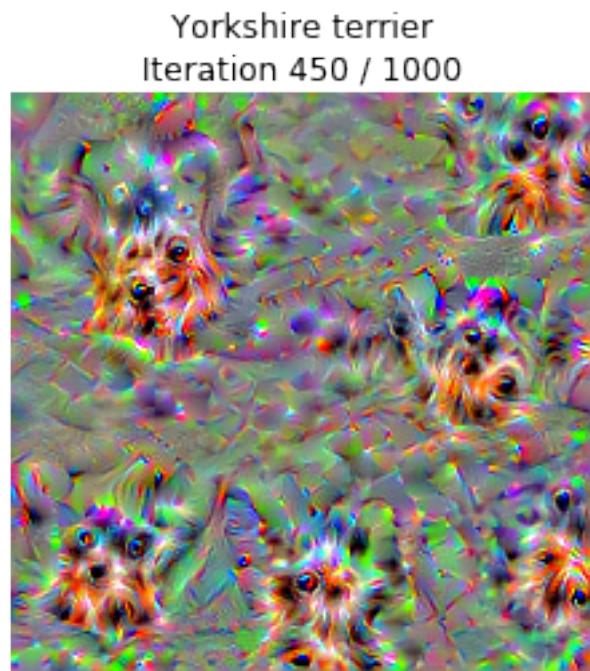


Figure 10.61: png

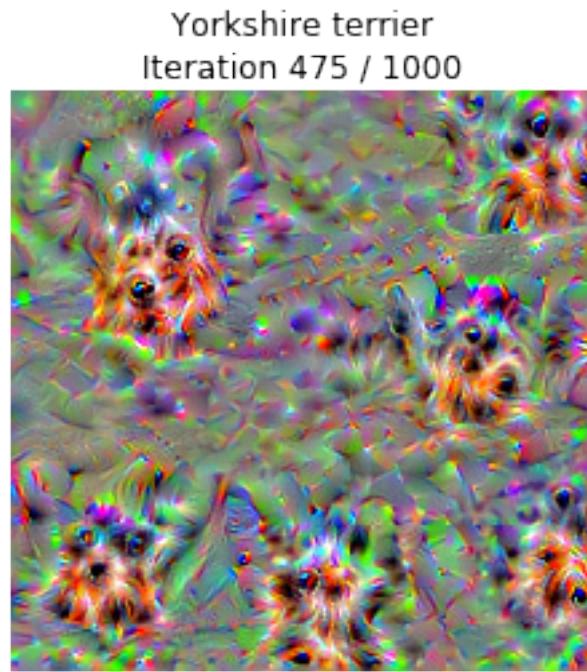


Figure 10.62: png

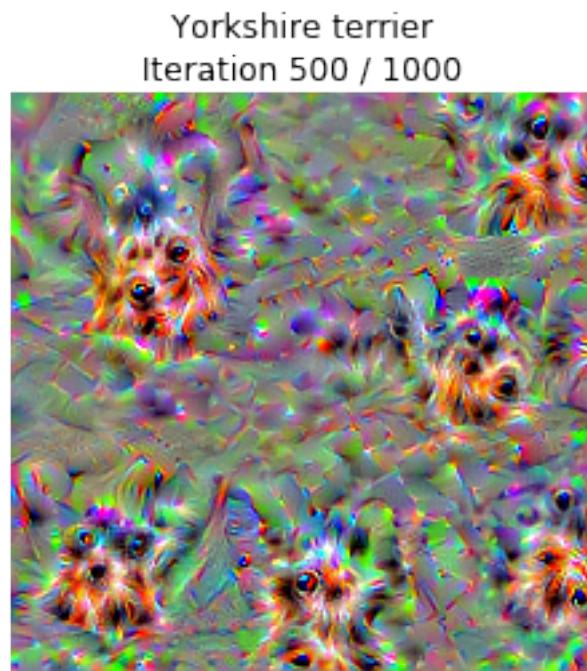


Figure 10.63: png

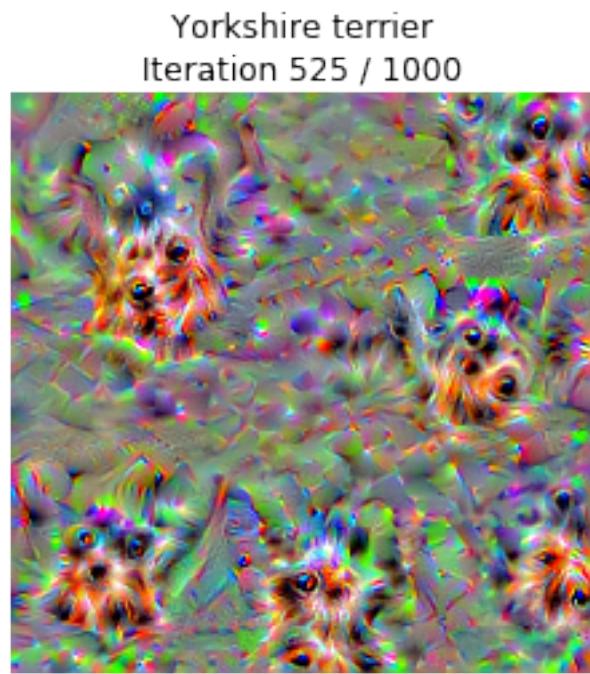


Figure 10.64: png

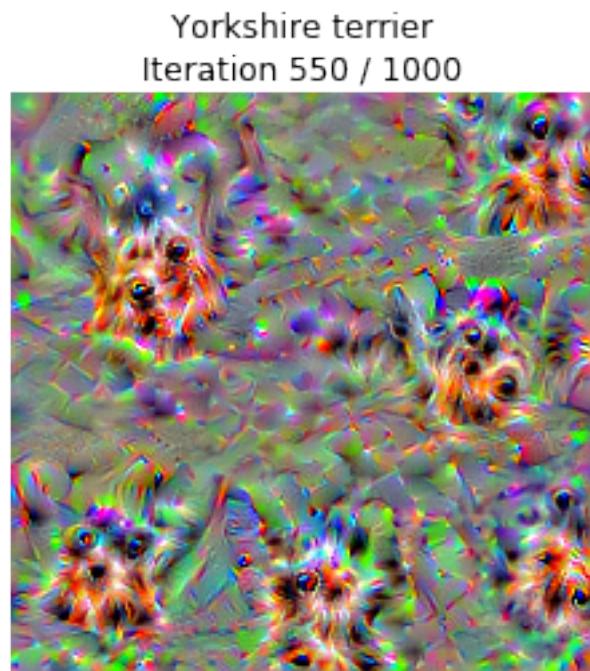


Figure 10.65: png

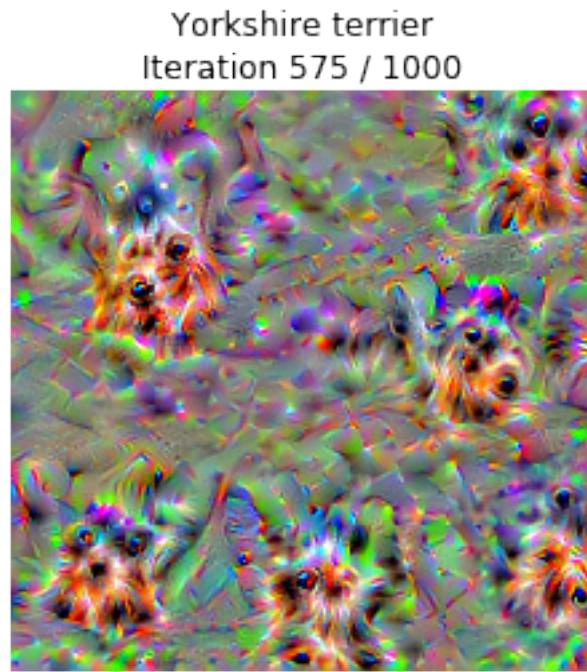


Figure 10.66: png

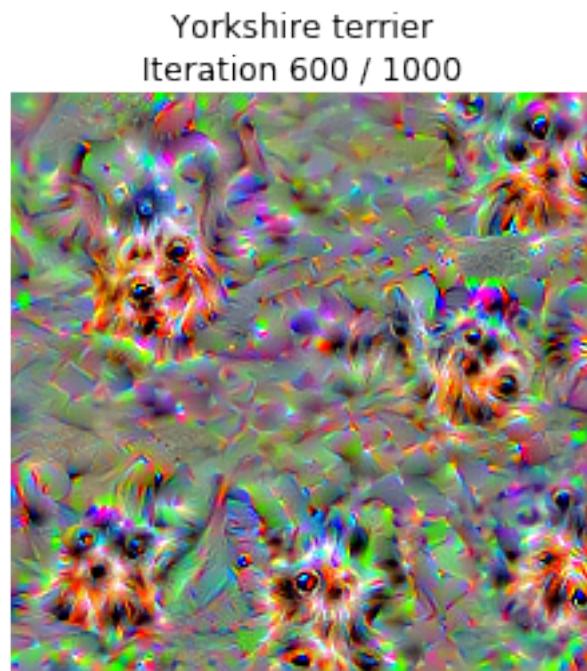


Figure 10.67: png

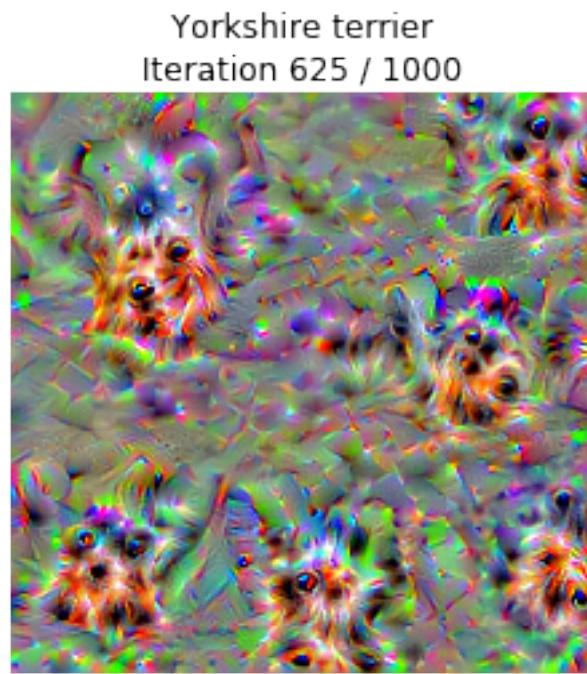


Figure 10.68: png

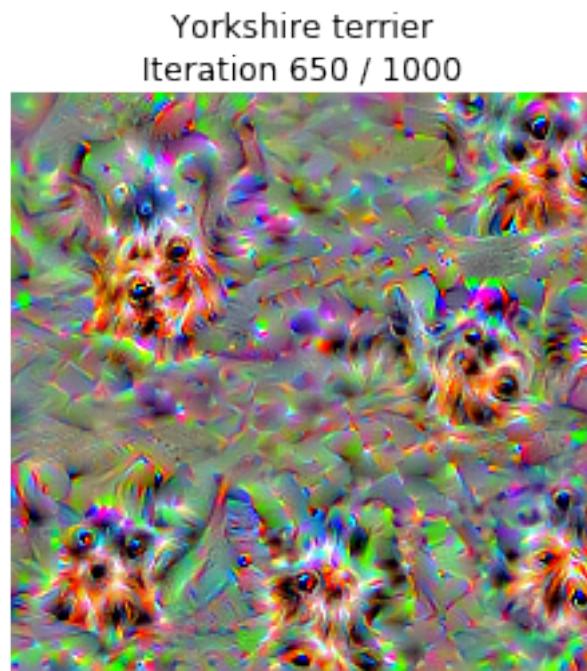


Figure 10.69: png

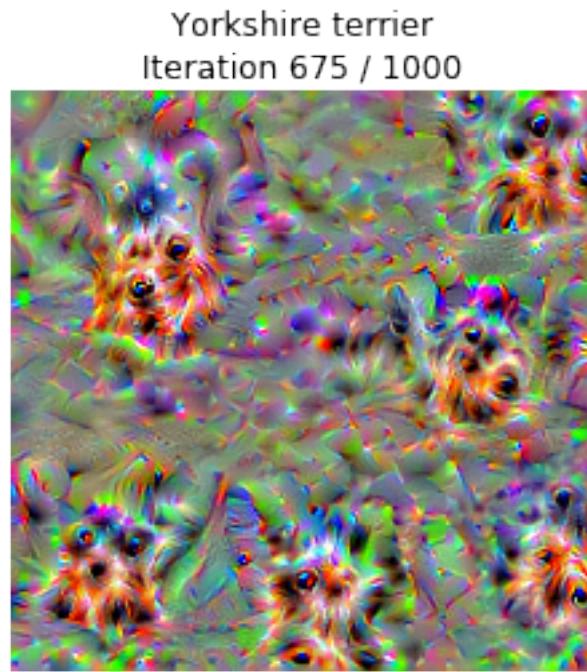


Figure 10.70: png

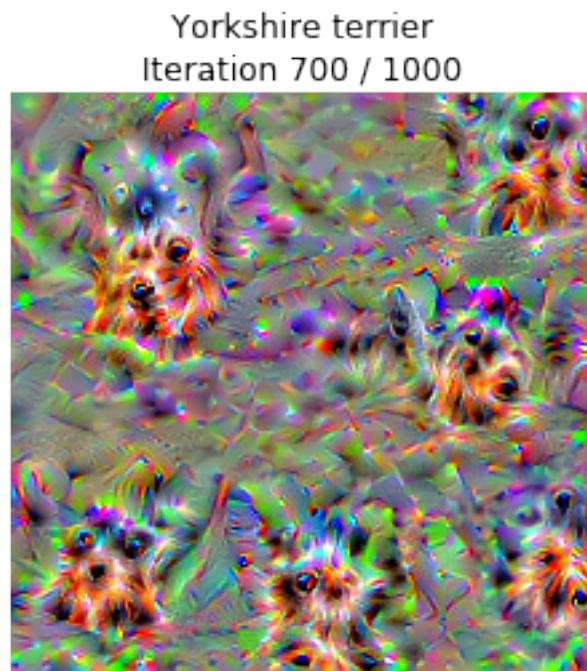


Figure 10.71: png

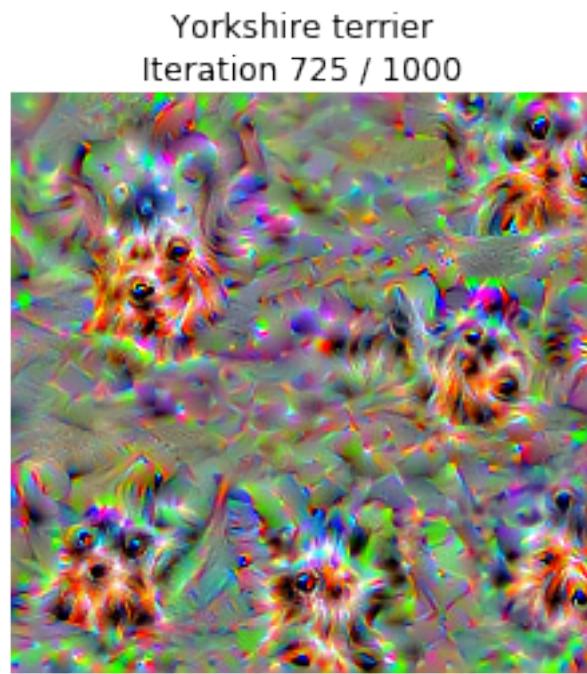


Figure 10.72: png

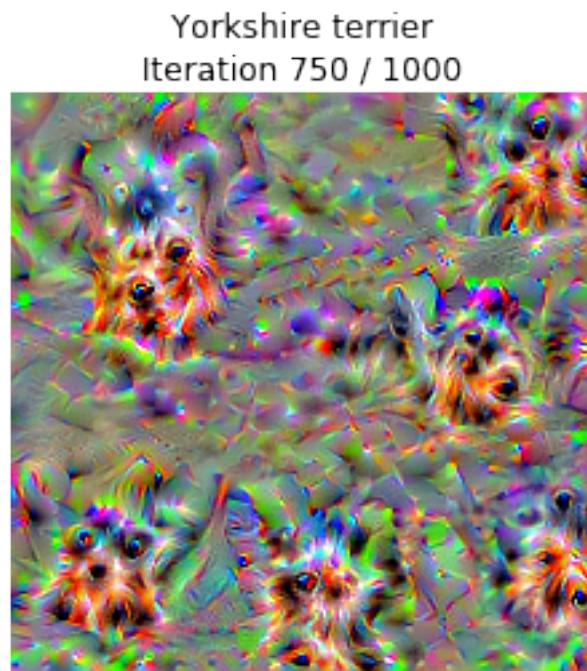


Figure 10.73: png

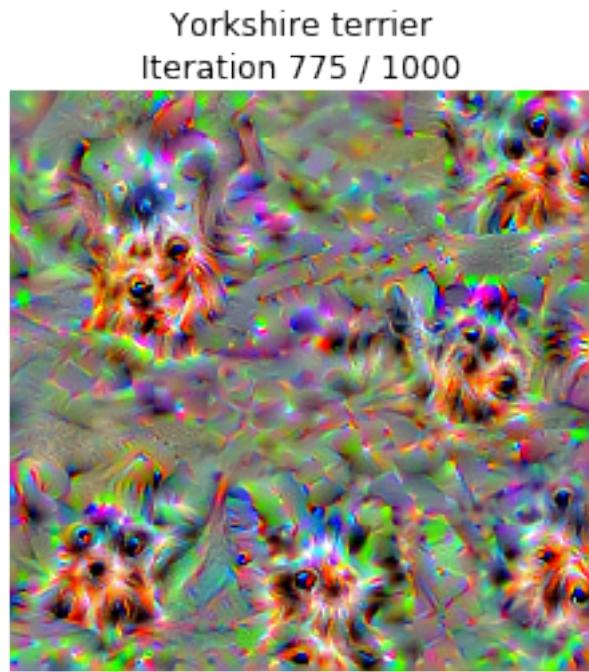


Figure 10.74: png

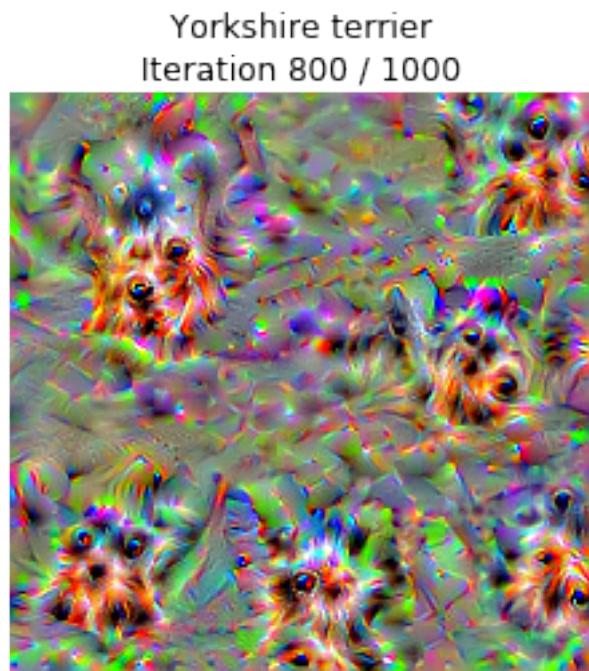


Figure 10.75: png

Yorkshire terrier  
Iteration 825 / 1000

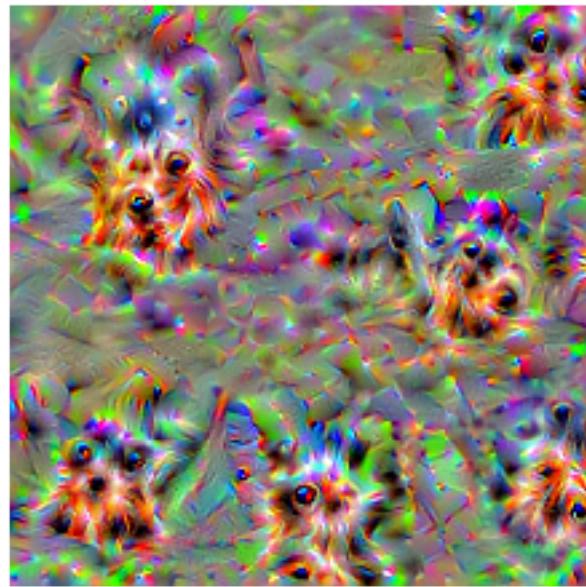


Figure 10.76: png

Yorkshire terrier  
Iteration 850 / 1000

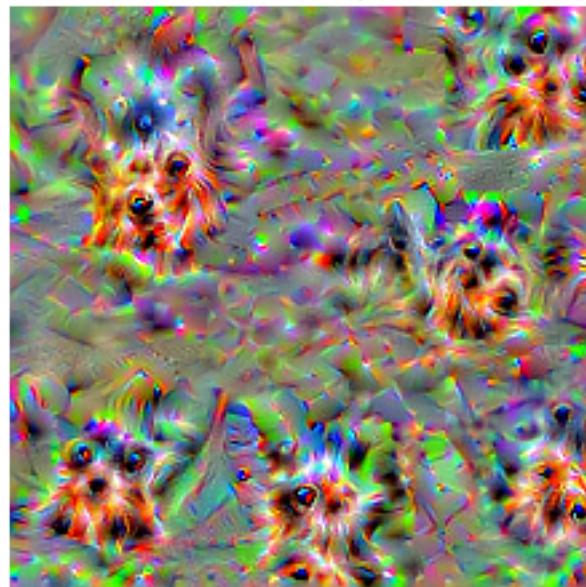


Figure 10.77: png

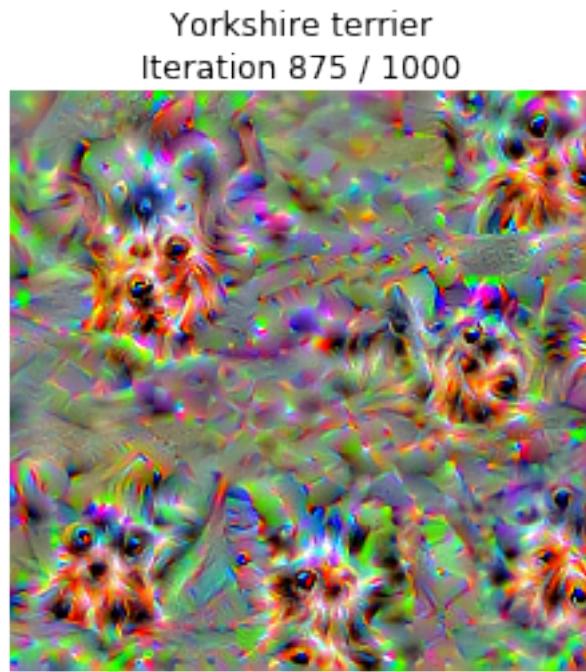


Figure 10.78: png

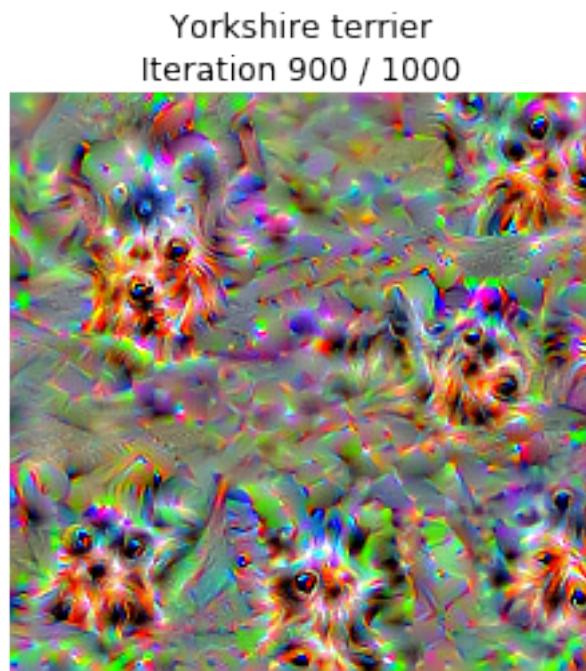


Figure 10.79: png

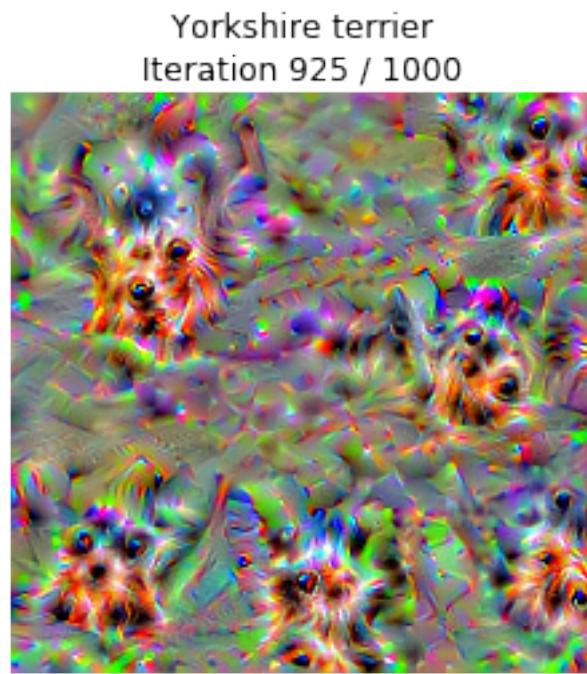


Figure 10.80: png

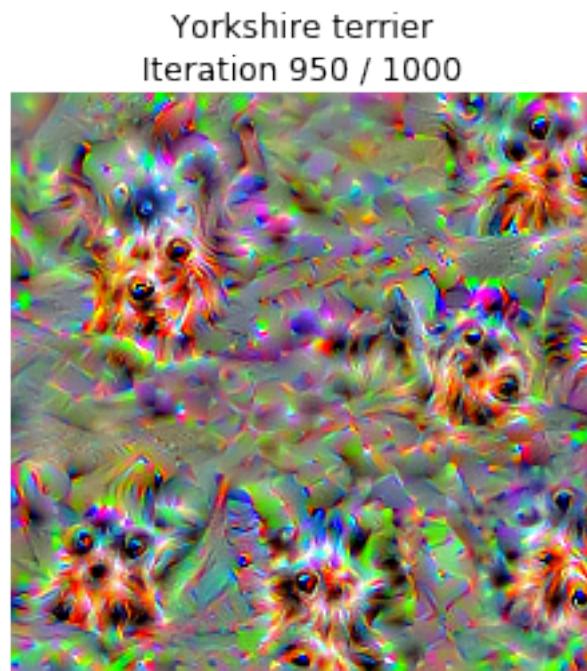


Figure 10.81: png

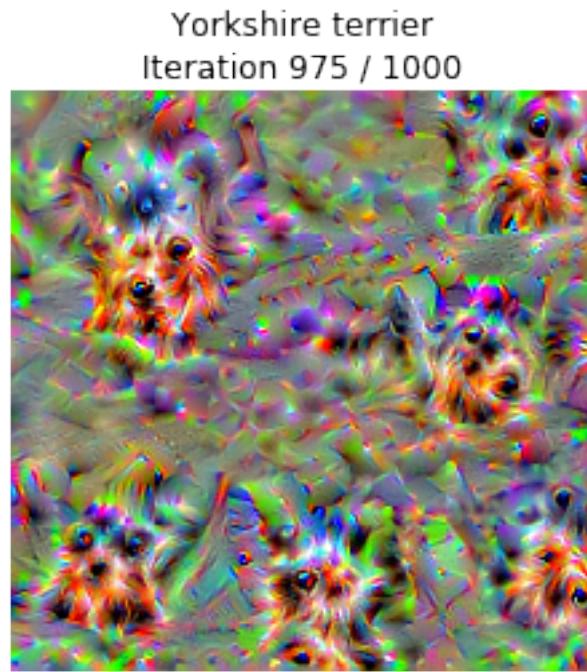


Figure 10.82: png

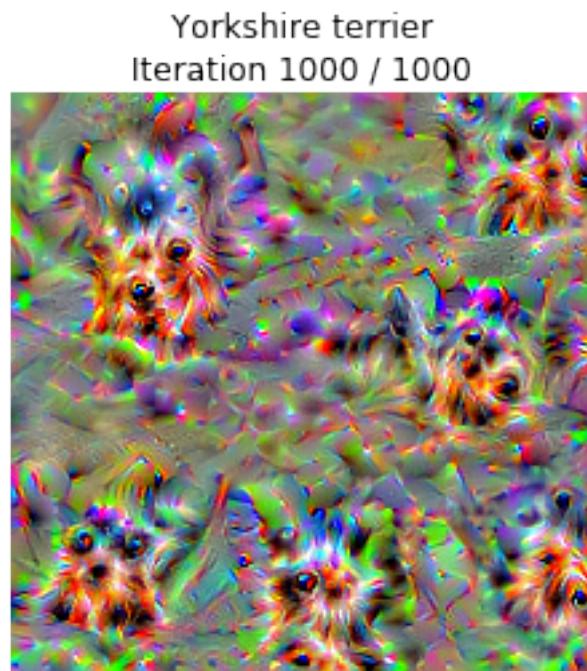


Figure 10.83: png

# Chapter 11

## Wasserstein GAN and Loss Sensitive GAN with CIFAR Data

**Prerequisites:** Please run the notebook *CIFAR-10\_DataLoader.ipynb* prior to this notebook. Be patient, it'll take 10-15 minutes to run!

### 11.1 Introduction

Generative models have gained a lot of attention in deep learning community which has traditionally leveraged discriminative models for semi-supervised and unsupervised learning. Generative Adversarial Network (GAN) (Goodfellow *et al.*, 2014) is one of the most popular generative model because of its promising results in various tasks in computer vision and natural language processing. However, the original version of GANs are notorious for being difficult to train. Without carefully-chosen hyper-parameters and network architecture that balances Generator and Discriminator training, GANs could easily suffer from vanishing gradient or mode collapse (where the model is only able to produce a single or a few samples). In this tutorial, we introduce several improved GAN models, namely Wasserstein GAN (W-GAN) (Arjovsky *et al.*, 2017) and Loss Sensitive GAN (LS-GAN) (Qi, 2017), that are proposed to address the problems of vanishing gradient and mode collapse.

### 11.2 Overview

In this section, we will briefly overview of main differences between Wasserstein GANs and original GANs in both theory and implementation perspective.

#### 11.2.1 Why is GAN hard to train?

*[TL;DR]* In the training of the original GANs, balancing the convergence of the discriminator and the generator is extremely important because if one is far ahead of the other, the other can not get enough gradient to improve. However, balancing the convergence of two neural networks is hard.

If you are interested in the math behind it, you can take a look at the rest of this part and this paper here. If not, you can just skip the math and look at the implementation details for W-GAN and LS-GAN.

In the original GAN paper, GAN includes two neural network, a Generator  $G$  and a Discriminator  $D$ . The training of GAN is modeled as a two-player zeros-sum game. The Discriminator  $D$  is trained to predict the

probability that a sample is a real sample rather than generated from the generator  $G$ , while the generator  $G$  is trained to better fool the discriminator by producing real-looking samples. The objective for GAN training is,

$$\min_G \max_D V(D, G) = \mathbb{E}_{x \sim p_{data}(x)} [\log D(x)] + \mathbb{E}_{z \sim p_z(x)} [\log(1 - D(G(z)))]$$

In the original GAN paper, the author proves that the optimal strategy for discriminator is predicting

$$D^*(x) = \frac{p_{data}(x)}{p_{data}(x) + p_{model}(x)}$$

By plugging it into the GAN objective function, one may find that the discriminator is actually an estimation of *Jensen-Shannon* divergence (JS divergence or JSD) of two distributions (data and model).

$$L(D^*, g_\theta) = 2JSD(\mathbb{P}_{data} \parallel \mathbb{P}_{model}) - 2\log 2$$

JS distance may become locally saturated and gets vanishing gradient to train the GAN generator if the discriminator is over-trained.

### 11.2.2 Wasserstein GAN

To address this problem, Wasserstein GAN was proposed to use a different distance measurement for probability distributions, namely *Earth-Mover* (EM) distance or *Wasserstein* distance instead of JS divergence. The authors claimed that by using EM distance, one no longer needs to carefully maintain the balance between the generator and the discriminator, and, notably, the output of the discriminator (they call it critic instead in the paper), which is an estimation of EM distance serves as a good indicator of image quality of generated samples. The EM distance of two distribution is defined as

$$W(p_{data}, p_{model}) = \inf_{\gamma \in \prod(p_{data}, p_{model})} \mathbb{E}_{(x,y) \sim \gamma} [\|x - y\|]$$

In the paper shows that EM distance is a more sensible distance measurement than JS divergence since EM distance is continuous and differentiable anywhere while JS divergence is not. The authors uses the Kantorovich-Rubinstein duality to derive the objective for Wasserstein GAN,

$$\min_G \max_{\|D\|_L \leq K} \mathbb{E}_{x \sim p_{data}(x)} [D(x)] - \mathbb{E}_{z \sim p_z(x)} [D(G(z))]$$

**Note:** the Kantorovich-Rubinstein duality requires the function to be K-Lipschitz. The authors suggests *clipping the weights of discriminator* to satisfy Lipschitz continuity.

#### 11.2.2.1 Implementation details

The modification needed on implementation side is minor. One can change an original GAN into a Wasserstein GAN with a few lines of code:

1. Use W-GAN loss function
2. Remove the sigmoid activation for the last layer of discriminator
3. Clip the weights of the discriminator after updates (e.g., to [-0.01, 0.01])
4. Train discriminator more iterations than generator (e.g., train the discriminator for 5 iterations and train the generator for one iteration only at each round)

5. Use non-momentum-based optimizer (e.g., RMSProp) instead of Adam (Note: in this tutorial we use Adam with `momentum=0`)
6. Use small learning rate (e.g., 0.00005)

### 11.2.3 Loss Sensitive GAN

Loss Sensitive GAN was proposed to address the problem of vanishing gradient. LS-GAN is trained on a loss function that allows the generator to focus on improving poor generated samples that are far from the real sample manifold. The author shows that the loss learned by LS-GAN has non-vanishing gradient almost everywhere, even when the discriminator is over-trained.

$$\min_D L_D = \mathbb{E}_{x \sim p_{data}(x)} [D(x)] + \lambda \mathbb{E}_{x \sim p_{data}(x), z \sim p_z(x)} [(\|x - G(z)\|_1 + D(x) - D(G(z)))_+]$$

$$\min_G L_G = \mathbb{E}_{z \sim p_z(x)} [D(G(z))]$$

#### 11.2.3.1 Implementation details

The modification needed on implementation side is also minor. One can change an original GAN into a Wasserstein GAN with a few lines of code:

1. Use the LS-GAN loss function
2. Remove the sigmoid activation for the last layer of discriminator
3. Update both the generator and the discriminator with weight decay
4. Train discriminator and generator each with one iteration at each round

```
import matplotlib as mpl
import matplotlib.pyplot as plt
import numpy as np
import os

import cntk as C
import cntk.tests.test_utils
cntk.tests.test_utils.set_device_from_pytest_env() # (only needed for our build system)
C.cntk_py.set_fixed_random_seed(1) # fix a random seed for CNTK components

%matplotlib inline
```

There are two run modes: \* *Fast mode*: `isFast` is set to `True`. This is the default mode for the notebooks, which means we train for fewer iterations or train / test on limited data. This ensures functional correctness of the notebook though the models produced are far from what a completed training would produce. \* *Slow mode*: We recommend the user to set this flag to `False` once the user has gained familiarity with the notebook content and wants to gain insight from running the notebooks for a longer period with different parameters for training.

**Note:** If the `isFlag` is set to `False` the notebook will take a hours or even days on a GPU enabled machine. You can try fewer iterations by setting the `num_minibatches` to a smaller number which comes at the expense of quality of the generated images.

```
isFast = True
```

## 11.3 Data Reading

The input to the GANs will be a vector of random numbers. At the end of the training, the GAN “learns” to generate images drawn from the CIFAR dataset. We will be using the same CIFAR data prepared in tutorial CNTK 201A. For our purposes, you only need to know that the following function returns an object that will be used to read images from the CIFAR dataset.

```
# image dimensionalities
img_h, img_w = 32, 32
img_c = 3

# Determine the data path for testing
# Check for an environment variable defined in CNTK's test infrastructure
envvar = 'CNTK_EXTERNAL_TESTDATA_SOURCE_DIRECTORY'
def is_test(): return envvar in os.environ

if is_test():
    data_path = os.path.join(os.environ[envvar], 'Image', 'CIFAR', 'v0', 'tutorial201')
    data_path = os.path.normpath(data_path)
else:
    data_path = os.path.join('data', 'CIFAR-10')

train_file = os.path.join(data_path, 'train_map.txt')

def create_reader(map_file, train):
    print("Reading map file:", map_file)

    if not os.path.exists(map_file):
        raise RuntimeError("This tutorials depends 201A tutorials, please run 201A first.")

    import cntk.io.transforms as xforms
    transforms = [xforms.crop(crop_type='center', side_ratio=0.8),
                  xforms.scale(width=img_w, height=img_h, channels=img_c, interpolations='linear')]
    # deserializer
    return C.io.MinibatchSource(C.io.ImageDeserializer(map_file, C.io.StreamDefs(
        features = C.io.StreamDef(field='image', transforms=transforms), # first column in map file is
        labels   = C.io.StreamDef(field='label', shape=10)           # and second as 'label'
    )))

def noise_sample(num_samples):
    return np.random.uniform(
        low = -1.0,
        high = 1.0,
        size = [num_samples, g_input_dim]
    ).astype(np.float32)
```

## 11.4 Model Creation (W-GAN)

Note that we assume that you have already completed the DCGAN tutorial. If you need a basic recap of GAN concepts or DCGAN architecture, please visit our DCGAN tutorial. #### Model Configuration We implemented the W-GAN based on DCGAN architecture. In this step, we establish some of the architectural and training hyper-parameters for our model. \* The generator is fractional strided convolutional network with  $5 \times 5$  kernels and strides of 2 \* The input of the generator is a 100-dimensional random vector \*

The output of the generator is a flattened  $64 \times 64$  image with 3 channels \* The discriminator is a strided convolutional network with  $5 \times 5$  kernels and strides of 2 \* The input of the discriminator is also a flattened  $64 \times 64$  image with 3 channels \* The output of the discriminator is a scalar which is an estimation of EM distance

```
# architectural hyper-parameters
gkernel = dkernle = 5
gstride = dstride = 2

# Input / Output parameter of Generator and Discriminator
g_input_dim = 100
g_output_dim = d_input_dim = (img_c, img_h, img_w)
```

We first establish some of the helper functions (batch normalization with relu and batch normalization with leaky relu) that will make our lives easier when defining the generator and the discriminator.

```
# Helper functions
def bn_with_relu(x, activation=C.relu):
    h = C.layers.BatchNormalization(map_rank=1)(x)
    return C.relu(h)

# We use param-relu function to use a leak=0.2 since CNTK implementation
# of Leaky ReLU is fixed to 0.01
def bn_with_leaky_relu(x, leak=0.2):
    h = C.layers.BatchNormalization(map_rank=1)(x)
    r = C.param_relu(C.constant((np.ones(h.shape)*leak).astype(np.float32)), h)
    return r

def leaky_relu(x, leak=0.2):
    return C.param_relu(C.constant((np.ones(x.shape)*leak).astype(np.float32)), x)
```

#### 11.4.0.1 Generator

We define the generator according to the DCGAN architecture. The generator takes a 100-dimensional random vector as input and outputs a flattened  $3 \times 64 \times 64$  image. We use fractionally strided convolution layers with relu convolution and batch normalization except for the last layer, where we use tanh to normalize the output to the interval  $[-1, 1]$ .

```

        activation=None)(h0)

h1 = bn_with_relu(h1)
print('h1 shape', h1.shape)

h2 = C.layers.ConvolutionTranspose2D(gkernel,
                                    num_filters=gf_dim,
                                    strides=gstride,
                                    pad=True,
                                    output_shape=(img_h//2, img_w//2),
                                    activation=None)(h1)

h2 = bn_with_relu(h2)
print('h2 shape :', h2.shape)

h3 = C.layers.ConvolutionTranspose2D(gkernel,
                                    num_filters=img_c,
                                    strides=gstride,
                                    pad=True,
                                    output_shape=(img_h, img_w),
                                    activation=C.tanh)(h2)

print('h3 shape :', h3.shape)

return h3

```

#### 11.4.0.2 Discriminator

We define the discriminator according to the DCGAN architecture except for the last layer. The discriminator takes a flattened image as input and outputs a single scalar. We do not use any activation at the last layer.

```

def convolutional_discriminator(x):
    with C.layers.default_options(init=C.normal(scale=0.02)):

        dfc_dim = 256
        df_dim = 64

        print('Discriminator convolution input shape', x.shape)

        h0 = C.layers.Convolution2D(dkernel, df_dim, strides=dstride, pad=True)(x)
        h0 = leaky_relu(h0, leak=0.2)
        print('h0 shape :', h0.shape)

        h1 = C.layers.Convolution2D(dkernel, df_dim*2, strides=dstride, pad=True)(h0)
        h1 = bn_with_leaky_relu(h1, leak=0.2)
        print('h1 shape :', h1.shape)

        h2 = C.layers.Convolution2D(dkernel, dfc_dim, strides=dstride, pad=True)(h1)
        h2 = bn_with_leaky_relu(h2, leak=0.2)
        print('h2 shape :', h2.shape)

        h3 = C.layers.Dense(1, activation=None)(h2)
        print('h3 shape :', h3.shape)

    return h3

```

```
# training config
minibatch_size = 64
num_minibatches = 500 if isFast else 20000
lr = 0.00005 # small learning rates are preferred
momentum = 0.0 # momentum is not suggested since it can make W-GANs unstable
clip = 0.01 # the weight clipping parameter
```

### 11.4.1 Build the graph

The discriminator must be used on both the real CIFAR images and fake images generated by the generator function. One way to represent this in the computational graph is to create a clone of the output of the discriminator function, but with substituted inputs. Setting `method=share` in the clone function ensures that both paths through the discriminator model use the same set of parameters

We need to update the parameters for the generator and discriminator model separately using the gradients from different loss functions. We can get the parameters for a Function in the graph with the `parameters` attribute. However, when updating the model parameters, update only the parameters of the respective models while keeping the other parameters unchanged. In other words, when updating the generator we will update only the parameters of the function while keeping the parameters of the function fixed and vice versa.

Because W-GAN needs to clip the weights of the discriminator before every updates in order to maintain K-Lipschitz continuity. We build a graph with clipped parameters stored in `clipped_D_params`. The suggested value of clipping threshold is 0.01.

**Note:** CNTK parameter learner uses sum of gradient within a minibatch by default instead of mean of gradient. To reproduce results with the same hyper-parameter in the paper, we need to set `use_mean_gradient = True`, and `unit_gain = False`.

```
def build_WGAN_graph(noise_shape, image_shape, generator, discriminator):

    input_dynamic_axes = [C.Axis.default_batch_axis()]
    Z = C.input_variable(noise_shape, dynamic_axes=input_dynamic_axes)
    X_real = C.input_variable(image_shape, dynamic_axes=input_dynamic_axes)
    X_real_scaled = (X_real - 127.5) / 127.5

    # Create the model function for the generator and discriminator models
    X_fake = generator(Z)
    D_real = discriminator(X_real_scaled)
    D_fake = D_real.clone(
        method = 'share',
        substitutions = {X_real_scaled.output: X_fake.output}
    )

    clipped_D_params = [C.clip(p, -clip, clip) for p in D_real.parameters]

    G_loss = - D_fake
    D_loss = - D_real + D_fake

    G_learner = C.adam(
        parameters = X_fake.parameters,
        lr = C.learning_rate_schedule(lr, C.UnitType.sample),
        momentum = C.momentum_schedule(momentum),
        variance_momentum = C.momentum_schedule(0.999),
```

```

        unit_gain=False,
        use_mean_gradient=True
    )

D_learner = C.adam(
    parameters = D_real.parameters,
    lr = C.learning_rate_schedule(lr, C.UnitType.sample),
    momentum = C.momentum_schedule(momentum),
    variance_momentum = C.momentum_schedule(0.999),
    unit_gain=False,
    use_mean_gradient=True
)

# Instantiate the trainers
G_trainer = C.Trainer(X_fake,
                      (G_loss, None),
                      G_learner)
D_trainer = C.Trainer(D_real,
                      (D_loss, None),
                      D_learner)

return X_real, X_fake, D_real, clipped_D_params, Z, G_trainer, D_trainer

```

### 11.4.2 Train the Model

The code for training the GAN closely follows Algorithm 1 in the W-GAN paper. Note that compared to original GANs, we train the discriminator many more times than the generator. The reason behind that is the output of the discriminator serves as an estimation of the EM distance. We want to train the discriminator until it can closely estimate the EM distance. In order to make sure that the discriminator has a sufficient good estimation at the very beginning of the training, we even train it for 100 iterations before train the generator (this is disabled in fast mode because this will significantly take longer time).

[placeholder for WGAN algorithm]

```

def train_WGAN(reader_train, generator, discriminator):
    X_real, X_fake, D_real, clipped_D_params, Z, G_trainer, D_trainer =
        build_WGAN_graph(g_input_dim, d_input_dim, generator, discriminator)
    # print out loss for each model for upto 25 times

    print_frequency_mbsize = num_minibatches // 25

    print("First row is Generator loss, second row is Discriminator loss")
    pp_G = C.logging.ProgressPrinter(print_frequency_mbsize)
    pp_D = C.logging.ProgressPrinter(print_frequency_mbsize)

    input_map = {X_real: reader_train.streams.features}

    for training_step in range(num_minibatches):
        # train the discriminator model for diter steps
        if not isFast and (training_step < 25 or training_step % 500 == 0):
            diter = 100
        else:
            diter = 5

```

```

        for d_train_step in range(diter):
            for parameter, clipped in zip(D_real.parameters, clipped_D_params):
                C.assign(parameter, clipped).eval()
            Z_data = noise_sample(minibatch_size)
            X_data = reader_train.next_minibatch(minibatch_size, input_map)
            batch_inputs = {X_real: X_data[X_real].data, Z: Z_data}
            D_trainer.train_minibatch(batch_inputs)

            Z_data = noise_sample(minibatch_size)
            batch_inputs = {Z: Z_data}
            G_trainer.train_minibatch(batch_inputs)

            pp_G.update_with_trainer(G_trainer)
            pp_D.update_with_trainer(D_trainer)

            G_trainer_loss = G_trainer.previous_minibatch_loss_average
        return Z, X_fake, G_trainer_loss

reader_train = create_reader(train_file, True)

# G_input, G_output, G_trainer_loss = train(reader_train, dense_generator, dense_discriminator)
G_input, G_output, G_trainer_loss = train_WGAN(reader_train,
                                                convolutional_generator,
                                                convolutional_discriminator)

# Print the generator loss
print("Training loss of the generator is: {:.2f}".format(G_trainer_loss))

```

## 11.5 Generating Fake (Synthetic) Images (W-GAN)

Now that we have trained the model, we can create fake images simply by feeding random noise into the generator and displaying the outputs. Below are a few images generated from random samples. To get a new set of samples, you can re-run the last cell.

```

def plot_images(images, subplot_shape):
    plt.style.use('ggplot')
    fig, axes = plt.subplots(*subplot_shape)
    for image, ax in zip(images, axes.flatten()):
        image = image[np.array([2,1,0]),:,:]
        image = np.rollaxis(image / 2 + 0.5, 0, 3)
        ax.imshow(image, vmin=-1.0, vmax=1.0)
        ax.axis('off')
    plt.show()

noise = noise_sample(36)
images = G_output.eval({G_input: noise})
plot_images(images, subplot_shape=[6, 6])

```

Larger number of iterations should generate more realistic looking images. A sampling of such generated images is shown below.

[placeholder for W-GAN slow mode results]

## 11.6 Model Creation (LS-GAN)

Since the generator and discriminator architectures of LS-GAN is the same as W-GAN, we will reuse the generator and the discriminator we defined for W-GAN. The main difference between W-GAN and LS-GAN is their loss function and optimizer they use. We redefine the training parameters for LS-GAN.

```
# training config
minibatch_size = 64
num_minibatches = 1000 if isFast else 20000
lr = 0.0001
momentum = 0.5
lambda_ = 0.0002 # lambda in LS-GAN loss function, controls the size of margin
weight_decay = 0.00005
```

### 11.6.1 Build the graph

As we mentioned above, one of the differences between LS-GAN and W-GAN is there loss function. In `build_LSGAN_graph`, we should define the loss function for the generator and the discriminator. Another difference is that we do not do weight clipping in LS-GAN, so `clipped_D_params` is no longer needed. Instead, we use weight decay which is mathematically equivalent to adding an l2 regularization in the optimizer.

```
def build_LSGAN_graph(noise_shape, image_shape, generator, discriminator):

    input_dynamic_axes = [C.Axis.default_batch_axis()]
    Z = C.input_variable(noise_shape, dynamic_axes=input_dynamic_axes)
    X_real = C.input_variable(image_shape, dynamic_axes=input_dynamic_axes)
    X_real_scaled = (X_real - 127.5) / 127.5

    # Create the model function for the generator and discriminator models
    X_fake = generator(Z)
    D_real = discriminator(X_real_scaled)
    D_fake = D_real.clone(
        method = 'share',
        substitutions = {X_real_scaled.output: X_fake.output}
    )

    G_loss = D_fake
    D_loss = C.element_max(D_real - D_fake + lambda_ * C.reduce_sum(C.abs(X_fake - X_real_scaled)), [0])

    G_learner = C.adam(
        parameters = X_fake.parameters,
        lr = C.learning_rate_schedule(lr, C.UnitType.sample),
        momentum = C.momentum_schedule(momentum),
        variance_momentum = C.momentum_schedule(0.999),
        l2_regularization_weight=weight_decay,
        unit_gain=False,
        use_mean_gradient=True
    )

    D_learner = C.adam(
        parameters = D_real.parameters,
        lr = C.learning_rate_schedule(lr, C.UnitType.sample),
```

```

        momentum = C.momentum_schedule(momentum),
        variance_momentum = C.momentum_schedule(0.999),
        l2_regularization_weight=0.00005,
        unit_gain=False,
        use_mean_gradient=True
    )

# Instantiate the trainers
G_trainer = C.Trainer(X_fake,
                      (G_loss, None),
                      G_learner)
D_trainer = C.Trainer(D_real,
                      (D_loss, None),
                      D_learner)

return X_real, X_fake, Z, G_trainer, D_trainer

```

## 11.7 Train the model

To train the LS-GAN model, we can just simply update the discriminator and the generator alternatively at each round.

```

def train_LSGAN(reader_train, generator, discriminator):
    X_real, X_fake, Z, G_trainer, D_trainer = \
        build_LSGAN_graph(g_input_dim, d_input_dim, generator, discriminator)

    # print out loss for each model for upto 25 times
    print_frequency_mbsize = num_minibatches // 25

    print("First row is Generator loss, second row is Discriminator loss")
    pp_G = C.logging.ProgressPrinter(print_frequency_mbsize)
    pp_D = C.logging.ProgressPrinter(print_frequency_mbsize)

    input_map = {X_real: reader_train.streams.features}

    for training_step in range(num_minibatches):
        # Train the discriminator and the generator alternatively
        Z_data = noise_sample(minibatch_size)
        X_data = reader_train.next_minibatch(minibatch_size, input_map)
        batch_inputs = {X_real: X_data[X_real].data, Z: Z_data}
        D_trainer.train_minibatch(batch_inputs)

        Z_data = noise_sample(minibatch_size)
        batch_inputs = {Z: Z_data}
        G_trainer.train_minibatch(batch_inputs)

        pp_G.update_with_trainer(G_trainer)
        pp_D.update_with_trainer(D_trainer)

    G_trainer_loss = G_trainer.previous_minibatch_loss_average
    return Z, X_fake, G_trainer_loss

```

```

reader_train = create_reader(train_file, True)

# G_input, G_output, G_trainer_loss = train(reader_train, dense_generator, dense_discriminator)
G_input, G_output, G_trainer_loss = train_LSGAN(reader_train,
                                                convolutional_generator,
                                                convolutional_discriminator)

# Print the generator loss
print("Training loss of the generator is: {:.2f}".format(G_trainer_loss))

```

## 11.8 Generating Fake (Synthetic) Images (LS-GAN)

Now that we have trained the LS-GAN model, we can create fake images simply by feeding random noise into the generator and displaying the outputs. Below are a few images generated from random samples. To get a new set of samples, you can re-run the last cell.

```

def plot_images(images, subplot_shape):
    plt.style.use('ggplot')
    fig, axes = plt.subplots(*subplot_shape)
    for image, ax in zip(images, axes.flatten()):
        image = image[np.array([2,1,0]),:,:]
        image = np.rollaxis(image / 2 + 0.5, 0, 3)
        ax.imshow(image, vmin=-1.0, vmax=1.0)
        ax.axis('off')
    plt.show()

noise = noise_sample(36)
images = G_output.eval({G_input: noise})
plot_images(images, subplot_shape=[6, 6])

```

Larger number of iterations should generate more realistic looking images. A sampling of such generated images is shown below.

[placeholder for LS-GAN slow mode results]

# Chapter 12

## Synthesizing Faces of Celebrities Boundary Equilibrium GAN with CelebA data

### 12.1 Introduction

Generative models have gained a lot of attention in deep learning community which has traditionally leveraged discriminative models for semi-supervised and unsupervised learning. Generative Adversarial Network (GAN) (Goodfellow *et al.*, 2014) is one of the most popular generative model because of its promising results in various tasks in computer vision and natural language processing. However, the original version of GANs are notorious for being difficult to train. Without carefully balancing the convergence of the generator and discriminator, GANs could easily suffer from vanishing gradient or mode collapse (where the model is only able to produce a single or a few samples). In this tutorial, we will introduce an implementation of Boundary Equilibrium GAN (BEGAN) which improves stability of GAN training and quality of generated samples.

```
import matplotlib as mpl
import matplotlib.pyplot as plt
import numpy as np
import os

import cntk as C
import cntk.tests.test_utils
cntk.tests.test_utils.set_device_from_pytest_env() # (only needed for our build system)
C.cntk_py.set_fixed_random_seed(1) # fix a random seed for CNTK components

%matplotlib inline
```

There are two run modes: \* *Fast mode*: `isFast` is set to `True`. This is the default mode for the notebooks, which means we train for fewer iterations or train / test on limited data. This ensures functional correctness of the notebook though the models produced are far from what a completed training would produce. \* *Slow mode*: We recommend the user to set this flag to `False` once the user has gained familiarity with the notebook content and wants to gain insight from running the notebooks for a longer period with different parameters for training.

**Note:** If the `isFlag` is set to `False` the notebook will take a few hours on a GPU enabled machine. You can try fewer iterations by setting the `num_minibatches` to a smaller number which comes at the expense of quality of the generated images.

```
isFast = True
```

In the BEGAN network, the generator is a convolutional neural network consists of convolution and upscale layers. The input of the generator is a 100-dimensional random vector, and the output of the generator is a flattened  $3 \times 64 \times 64$  image. The discriminator is has an autoencoder architecture. Both the input and the output of the discriminator are a flattened image. The encoder is consisted of convolution and strided convolution layers, and the decoder has the same structure as the generator. During training, we want the discriminator to have low reconstruction error for real images and high reconstruction error for fake images (those generated from the generator). The generator tries to confuse the discriminator by generating images that the discriminator can reconstruction with low error.

To balance the training of generator and discriminator, BEGAN introduce a hyper-parameter  $\gamma$  as an equilibrium we are going to maintain in order to balance the training.

$$\gamma = \frac{\mathbb{E}[\mathcal{L}(G(z))]}{\mathbb{E}[\mathcal{L}(x)]}$$

where  $\mathcal{L}$  is the reconstruction error measured in L-1 norm.

In order to maintain this equilibrium, we need to control the effort allocated to the generator and the discriminator. BEGAN uses a proportional control law to maintain this equilibrium,

$$\begin{cases} \mathcal{L}_D = \mathcal{L}(x) - k_t \mathcal{L}(G(z_D)) & \text{for } \theta_D \\ \mathcal{L}_G = \mathcal{L}(G(z_G)) & \text{for } \theta_G \\ k_{t+1} = k_t + \lambda_k (\gamma \mathcal{L}(x) - \mathcal{L}(G(z_G))) & \text{for each training step } t \end{cases}$$

where  $\mathcal{L}_D$  and  $\mathcal{L}_G$  are the loss of the discriminator and the generator, respectively. In this proportional control rule,  $k_t \in [0, 1]$  controls how much emphasis is put on  $\mathcal{L}(G(z_D))$  during gradient descent.  $\lambda_k$  is the proportional gain, or learning rate in machine learning terms, for  $k$ .

## 12.2 Download Data

In this tutorial, we will use CelebA dataset [1]. The dataset contains 202599 celebrity face images. Among them we use the first 162770 images as training images for BEGAN. Images in the dataset are  $178 \times 218 \times 3$ . We download the dataset from Google drive and prepare it by creating map files for training.

```
# %%bash
# pip install tqdm

"""
Modification of
- https://github.com/carpedm20/BEGAN-tensorflow/blob/master/download.py
"""

from __future__ import print_function
import os
import zipfile
import requests
from tqdm import tqdm

def download_file_from_google_drive(id, destination):
    URL = "https://docs.google.com/uc?export=download"
    session = requests.Session()

    response = session.get(URL, params={ 'id': id }, stream=True)
```

```

token = get_confirm_token(response)

if token:
    params = { 'id' : id, 'confirm' : token }
    response = session.get(URL, params=params, stream=True)

save_response_content(response, destination)

def get_confirm_token(response):
    for key, value in response.cookies.items():
        if key.startswith('download_warning'):
            return value
    return None

def save_response_content(response, destination, chunk_size=32*1024):
    total_size = int(response.headers.get('content-length', 0))
    with open(destination, "wb") as f:
        for chunk in tqdm(response.iter_content(chunk_size), total=total_size,
                           unit='B', unit_scale=True, desc=destination):
            if chunk: # filter out keep-alive new chunks
                f.write(chunk)

def loadData():
    print ('Downloading CelebA')
    images_path = 'images'
    filename, drive_id = "img_align_celeba.zip", "0B7EVK8r0v71pZjFTYXZWM3FlRnM"
    save_path = filename
    download_file_from_google_drive(drive_id, save_path)
    print ('Done.')
    try:
        print ('Extracting files...')
        with zipfile.ZipFile(save_path) as zf:
            zf.extractall('.')
        print ('Done.')
    finally:
        os.rename("img_align_celeba", images_path)
        os.remove(save_path)

# Paths for saving the map files
data_dir = './data/CelebA/'
train_map = './train_map.txt'

root_dir = os.getcwd()

if not os.path.exists(data_dir):
    os.makedirs(data_dir)

try:
    os.chdir(data_dir)
    loadData()
    print ('Writing train map file...')
    with open(train_map, 'w') as f:

```

```

        for i in range(1, 162771):
            f.write(os.path.abspath('images'), '{:06d}'.format(i) + '.jpg\n')
    print ('Done.')
finally:
    os.chdir("../..")

```

Downloading CelebA

img\_align\_celeba.zip: 44.1KB [00:08, 5.15KB/s]

```

Done.
Extracting files...
Done.
Writing train map file...
Done.

```

### 12.3 Read Data

The input to the GANs will be a vector of random numbers. At the end of the training, the GAN “learns” to generate images drawn from the CelebA dataset. Because the images in CelebA is  $3 \times 218 \times 178$ , we crop the  $3 \times 128 \times 128$  center part of the images and resize them to  $3 \times 64 \times 64$  while reading the data.

```

# image dimensionalities
img_h, img_w = 64, 64
img_c = 3

data_path = os.path.join('data', 'CelebA')
train_file = os.path.join(data_path, 'train_map.txt')

def create_reader(map_file, train):
    print("Reading map file:", map_file)

    import cntk.io.transforms as xforms
    transforms = [xforms.crop(crop_type='center', crop_size=128),
                  xforms.scale(width=img_w, height=img_h, channels=img_c, interpolations='linear')]
    # deserializer
    return C.io.MinibatchSource(C.io.ImageDeserializer(map_file, C.io.StreamDefs(
        features = C.io.StreamDef(field='image', transforms=transforms), # first column in map file is
        labels   = C.io.StreamDef(field='label', shape=10)           # and second as 'label'
    )))

```

The random noise we will use to train the GAN is provided by the `noise_sample` function to generate random noise samples from a uniform distribution within the interval  $[-1, 1]$ .

```

np.random.seed(123)
def noise_sample(num_samples):
    return np.random.uniform(
        low = -1.0,
        high = 1.0,
        size = [num_samples, g_input_dim]
    ).astype(np.float32)

```

## 12.4 Model Creation

We assume that you already have some basic familiarity with GAN framework. If not, we refer you to our GAN tutorial CNTK 206A for a brief introduction of the basics of GAN.

### 12.4.1 Model components

We build a computational graph for our model, one for the generator and one for the discriminator. First, we establish some of the architectural parameters for our model.

```
# architectural parameters
kernel_h, kernel_w = 5, 5
stride_h, stride_w = 2, 2

# Input / Output parameter of Generator and Discriminator
g_input_dim = 64
g_output_dim = d_input_dim = (img_c, img_h, img_w)
repeat_num = int(np.log2(img_h)) - 2

# Convolutional kernel size
dkernel = 3

# gamma controls the balance between G/D training
gamma = 0.5
```

#### 12.4.1.1 Generator

The generator takes a 100-dimensional random vector as input ( $z$ ) and outputs a  $12288(3 \times 64 \times 64)$  dimensional flattened image. In this tutorial, we use blocks of  $3 \times 3$  convolution layers with exponential linear units (ELUs) repeated by 2 times, then each block is followed by an upscale layer except for the last layer. In the last block, we use a tanh activation to make sure that the outputs are in the interval  $[-1, 1]$ . Note that we DO NOT use fractionally strided convolutions and batch normalizations as in traditional GAN frameworks.

```
def upscale(x):
    x = C.reshape(x, (1, x.shape[0], x.shape[1], x.shape[2]))
    size = (1, 2, 2)
    kernel = C.constant(np.ones((1, 1, 2, 2), dtype=np.float32))
    up = C.convolution_transpose(kernel, x, auto_padding=[False], strides=size)
    return C.reshape(up, (up.shape[1:]))

def generator(z):
    print('Generator input shape:', z.shape)

    hidden_num = 128

    h = C.layers.Dense((hidden_num, 8, 8), activation=None)(z)
    print('h0 shape:', h.shape)

    for i in range(repeat_num):
        h = C.layers.Convolution2D(dkernel, hidden_num, activation=C.elu, pad=[True])(h)
        h = C.layers.Convolution2D(dkernel, hidden_num, activation=C.elu, pad=[True])(h)
        if i < repeat_num - 1:
            h = upscale(h)
```

```

    print('h' + str(i+1), 'shape:', h.shape)

    h = C.layers.Convolution2D(dkernel, img_c, activation=None, pad=[True])(h)
    print('Generator output shape: ', h.shape)
    return h

```

### 12.4.1.2 Discriminator

The discriminator has an auto-encoder structure. The input and output of the discriminator are both 12288-dimensional flattened image. In the encoder, we use blocks of  $3 \times 3$  convolution layers with ELUs repeated by 2 times, then each block is followed by a strided convolution layer except for the last block. The decoder has the same structure as the generator. The layer between the encoder and the decoder is a fully connected (dense) layer with no non-linearity.

```

def discriminator(x):
    print('Discriminator input shape: ', x.shape)

    hidden_num = 128
    h = C.layers.Convolution2D(dkernel, hidden_num, activation=C.elu, pad=[True])(x)
    print('Encoder h0 shape: ', h.shape)

    for i in range(repeat_num):
        h = C.layers.Convolution2D(dkernel, hidden_num * (i + 1), activation=C.elu, pad=[True])(h)
        h = C.layers.Convolution2D(dkernel, hidden_num * (i + 1), activation=C.elu, pad=[True])(h)
        if i < repeat_num - 1:
            h = C.layers.Convolution2D(dkernel, hidden_num * (i + 1), activation=C.elu, pad=[True], str
    print('Encoder h' + str(i+1), 'shape:', h.shape)

    h = C.layers.Dense(g_input_dim, activation=None)(h)
    print('Latent code shape: ', h.shape)
    h = C.layers.Dense((hidden_num, 8, 8), activation=None)(h)
    print('Decoder h0 shape: ', h.shape)

    print(h.shape)

    for i in range(repeat_num):
        h = C.layers.Convolution2D(dkernel, hidden_num, activation=C.elu, pad=[True])(h)
        h = C.layers.Convolution2D(dkernel, hidden_num, activation=C.elu, pad=[True])(h)
        if i < repeat_num - 1:
            h = upscale(h)
        print('Decoder h' + str(i+1), 'shape:', h.shape)

    h = C.layers.Convolution2D(dkernel, img_c, activation=None, pad=[True])(h)
    print('Discriminator output shape: ', h.shape)
    return h

```

We use a minibatch size of 16 and an initial learning rate of 0.00004 for training. We decay the learning rate by half every 75000 training steps until it is no greater than 0.00001. In the fast mode (`isFast=True`) we verify only functional correctness with 2000 iterations.

```

# Training config
minibatch_size = 16
num_minibatches = 2000 if isFast else 200000
lr = 0.00004

```

```

momentum = 0.5
lr_update_step = 500 if isFast else 75000
lr_lower_bound = 0.00001
lambda_k = 0.001

```

### 12.4.2 Build the graph

The rest of the computational graph is mostly responsible for coordinating the training algorithms and parameter updates. There are several useful tricks for training a GAN network.

- \* The discriminator must be used on both the real images and the fake images generated by the generator. One way to represent this in the computational graph is to create a clone of the discriminator function with shared parameters and substituted inputs.
- \* We need to update the parameters for the generator and discriminator separately using different learner and trainer. `Function.parameters` method is important since we should specify the parameters to be learned by a particular learner.
- \* We need to update  $k_t$  according to  $\gamma\mathcal{L}(x) - \mathcal{L}(G(z_G))$  (we will call it balance later). One way to easily get the averaged balance for each minibatch is to set it as a metric in the trainer. Then we can access the averaged balance of each minibatch using `Trainer.previous_minibatch_evaluation_average` method. Then, we can use `Variable.set_value` method to update  $k_t$ .

```

def build_graph(generator, discriminator):
    input_dynamic_axes = [C.Axis.default_batch_axis()]
    Z = C.input_variable(g_input_dim, dynamic_axes=input_dynamic_axes)
    X_real = C.input_variable(d_input_dim, dynamic_axes=input_dynamic_axes)
    X_real_scaled = (X_real - 127.5) / 127.5

    # initialize k_t as 0
    k_t = C.constant(0.)

    # Create the model function for the generator and discriminator models
    X_fake = generator(Z)
    D_real = discriminator(X_real_scaled)

    D_fake = D_real.clone(
        method = 'share',
        substitutions = {X_real_scaled.output: X_fake.output}
    )

    # Create loss functions and configure optimization algorithms
    D_loss_real = C.reduce_mean(C.abs(X_real_scaled - D_real))
    D_loss_fake = C.reduce_mean(C.abs(X_fake - D_fake))

    D_loss = D_loss_real - k_t * D_loss_fake
    G_loss = D_loss_fake

    # Compute balance for proportional control law
    balance = gamma * D_loss_real - D_loss_fake

    G_learner = C.adam(
        parameters = X_fake.parameters,
        lr = C.learning_rate_schedule(lr, C.UnitType.sample),
        momentum = C.momentum_schedule(momentum),
        variance_momentum = C.momentum_schedule(0.999),
        unit_gain=False,
        use_mean_gradient=True
    )

```

```

)
D_learner = C.adam(
    parameters = D_real.parameters,
    lr = C.learning_rate_schedule(lr, C.UnitType.sample),
    momentum = C.momentum_schedule(momentum),
    variance_momentum = C.momentum_schedule(0.999),
    unit_gain=False,
    use_mean_gradient=True
)

G_trainer = C.Trainer(X_fake,
                      (G_loss, balance),
                      G_learner)
D_trainer = C.Trainer(D_real,
                      (D_loss, None),
                      D_learner)

return Z, X_real, X_fake, k_t, G_trainer, D_trainer

```

### 12.4.3 Train the Model

The code for training the GAN is very similar to the code for training GAN in the DCGAN Tutorial. There are three main changes: 1. At each training step, we update the discriminator once and then update the generator once (in the DCGAN tutorial we update the discriminator twice and generator twice). 1. After updating the discriminator and the generator, we update  $k_t$  according to the balance. 1. We decay the learning rate by half every time we have trained 75000 steps until it reaches 0.00001.

Note that in the original BEGAN, the authors mentioned that the generator and discriminator do not need to be trained alternatively. But we do train them alternatively since it is more convenient to train it this way. We didn't observe any performance decay or unstable behavior by training them alternatively.

Another note is that the training of the model can take significantly long time especially if `isFast` flag is turned off.

```

def train(reader_train, generator, discriminator):
    Z, X_real, X_fake, k_t, G_trainer, D_trainer = \
        build_graph(generator, discriminator)

    # print out loss for each model for upto 25 times
    print_frequency_mbsize = num_minibatches // 25

    print("First row is Generator loss, second row is Discriminator loss")
    pp_G = C.logging.ProgressPrinter(print_frequency_mbsize)
    pp_D = C.logging.ProgressPrinter(print_frequency_mbsize)

    input_map = {X_real: reader_train.streams.features}

    # Current training rate
    lr_t = lr

    for train_step in range(num_minibatches):
        # Train the discriminator and the generator alternatively

```

```

X_data = reader_train.next_minibatch(minibatch_size, input_map)
Z_data = noise_sample(minibatch_size)
batch_inputs = {X_real: X_data[X_real].data, Z: Z_data}
D_trainer.train_minibatch(batch_inputs)
G_trainer.train_minibatch(batch_inputs)

PP_G.update_with_trainer(G_trainer)
PP_D.update_with_trainer(D_trainer)

G_trainer_loss = G_trainer.previous_minibatch_loss_average

# Update k_t
balance = G_trainer.previous_minibatch_evaluation_average
k_update = max(min(k_t.value + lambda_k * balance, 1), 0)
k_t.set_value(C.NDArrayView.from_dense(np.asarray(k_update, dtype=np.float32)))

# Decay learning rate by half after 75000 steps
if train_step % lr_update_step == lr_update_step - 1:
    lr_t = max(lr_t * 0.5, lr_lower_bound)
    print('reset learning rate to ', lr_t)
    for learner in G_trainer.parameter_learners:
        learner.reset_learning_rate(
            C.learning_rate_schedule(lr_t, C.UnitType.sample)
        )
    for learner in D_trainer.parameter_learners:
        learner.reset_learning_rate(
            C.learning_rate_schedule(lr_t, C.UnitType.sample)
        )

return Z, X_fake, G_trainer_loss

reader_train = create_reader(train_file, True)

# G_input, G_output, G_trainer_loss = train(reader_train, dense_generator, dense_discriminator)
G_input, G_output, G_trainer_loss = train(reader_train,
                                         generator,
                                         discriminator)

```

Reading map file: data/CelebA/train\_map.txt  
Generator input shape: (64,)  
h0 shape: (128, 8, 8)  
h1 shape: (128, 16, 16)  
h2 shape: (128, 32, 32)  
h3 shape: (128, 64, 64)  
h4 shape: (128, 64, 64)  
Generator output shape: (3, 64, 64)  
Discriminator input shape: (3, 64, 64)  
Encoder h0 shape: (128, 64, 64)  
Encoder h1 shape: (128, 32, 32)  
Encoder h2 shape: (256, 16, 16)  
Encoder h3 shape: (384, 8, 8)  
Encoder h4 shape: (512, 8, 8)  
Latent code shape: (64,)  
Decoder h0 shape: (128, 8, 8)

```
(128, 8, 8)
Decoder h1 shape: (128, 16, 16)
Decoder h2 shape: (128, 32, 32)
Decoder h3 shape: (128, 64, 64)
Decoder h4 shape: (128, 64, 64)
Discriminator output shape: (3, 64, 64)
First row is Generator loss, second row is Discriminator loss
Minibatch[ 1- 80]: loss = 0.048302 * 1280;
Minibatch[ 1- 80]: loss = 0.282839 * 1280;
Minibatch[ 81- 160]: loss = 0.055735 * 1280;
Minibatch[ 81- 160]: loss = 0.220001 * 1280;
Minibatch[ 161- 240]: loss = 0.061942 * 1280;
Minibatch[ 161- 240]: loss = 0.196855 * 1280;
Minibatch[ 241- 320]: loss = 0.059266 * 1280;
Minibatch[ 241- 320]: loss = 0.192490 * 1280;
Minibatch[ 321- 400]: loss = 0.068152 * 1280;
Minibatch[ 321- 400]: loss = 0.177560 * 1280;
Minibatch[ 401- 480]: loss = 0.070673 * 1280;
Minibatch[ 401- 480]: loss = 0.178666 * 1280;
reset learning rate to 2e-05
Minibatch[ 481- 560]: loss = 0.066776 * 1280;
Minibatch[ 481- 560]: loss = 0.157682 * 1280;
Minibatch[ 561- 640]: loss = 0.060707 * 1280;
Minibatch[ 561- 640]: loss = 0.151392 * 1280;
Minibatch[ 641- 720]: loss = 0.060980 * 1280;
Minibatch[ 641- 720]: loss = 0.151376 * 1280;
Minibatch[ 721- 800]: loss = 0.063692 * 1280;
Minibatch[ 721- 800]: loss = 0.148562 * 1280;
Minibatch[ 801- 880]: loss = 0.065244 * 1280;
Minibatch[ 801- 880]: loss = 0.148002 * 1280;
Minibatch[ 881- 960]: loss = 0.064476 * 1280;
Minibatch[ 881- 960]: loss = 0.145166 * 1280;
reset learning rate to 1e-05
Minibatch[ 961-1040]: loss = 0.062203 * 1280;
Minibatch[ 961-1040]: loss = 0.142907 * 1280;
Minibatch[1041-1120]: loss = 0.054184 * 1280;
Minibatch[1041-1120]: loss = 0.140169 * 1280;
Minibatch[1121-1200]: loss = 0.053335 * 1280;
Minibatch[1121-1200]: loss = 0.139749 * 1280;
Minibatch[1201-1280]: loss = 0.052748 * 1280;
Minibatch[1201-1280]: loss = 0.136396 * 1280;
Minibatch[1281-1360]: loss = 0.052045 * 1280;
Minibatch[1281-1360]: loss = 0.138423 * 1280;
Minibatch[1361-1440]: loss = 0.051707 * 1280;
Minibatch[1361-1440]: loss = 0.135890 * 1280;
reset learning rate to 1e-05
Minibatch[1441-1520]: loss = 0.050012 * 1280;
Minibatch[1441-1520]: loss = 0.137379 * 1280;
Minibatch[1521-1600]: loss = 0.048039 * 1280;
Minibatch[1521-1600]: loss = 0.135170 * 1280;
Minibatch[1601-1680]: loss = 0.047182 * 1280;
Minibatch[1601-1680]: loss = 0.135060 * 1280;
Minibatch[1681-1760]: loss = 0.047798 * 1280;
Minibatch[1681-1760]: loss = 0.133962 * 1280;
```

```

Minibatch[1761-1840]: loss = 0.047922 * 1280;
Minibatch[1761-1840]: loss = 0.133726 * 1280;
Minibatch[1841-1920]: loss = 0.047045 * 1280;
Minibatch[1841-1920]: loss = 0.135555 * 1280;
Minibatch[1921-2000]: loss = 0.049095 * 1280;
Minibatch[1921-2000]: loss = 0.134137 * 1280;
reset learning rate to 1e-05
# Print the generator loss
print("Training loss of the generator is: {0:.2f}".format(G_trainer_loss))

```

Training loss of the generator is: 0.05

## 12.5 Generating Fake (Synthesized) Images

Now that we have trained the model, we can create fake images simply by feeding random noise into the generator and displaying the outputs. Below are a few images generated from random samples. To get a new set of samples, you can re-run the last cell.

```

def plot_images(images, subplot_shape):
    plt.style.use('ggplot')
    fig, axes = plt.subplots(*subplot_shape)
    for image, ax in zip(images, axes.flatten()):
        image = image[np.array([2,1,0]),:,:]
        image = np.rollaxis(image / 2 + 0.5, 0, 3)
        ax.imshow(image, vmin=-1.0, vmax=1.0)
        ax.axis('off')
    plt.show()

noise = noise_sample(36)
images = G_output.eval({G_input: noise})
plot_images(images, subplot_shape=[6, 6])

```

Larger number of iterations should generate more realistic looking face images. A sampling of such generated images is shown below.

[1] S. Yang, P. Luo, C. C. Loy, and X. Tang, “From Facial Parts Responses to Face Detection: A Deep Learning Approach”, in *IEEE International Conference on Computer Vision (ICCV)*, 2015

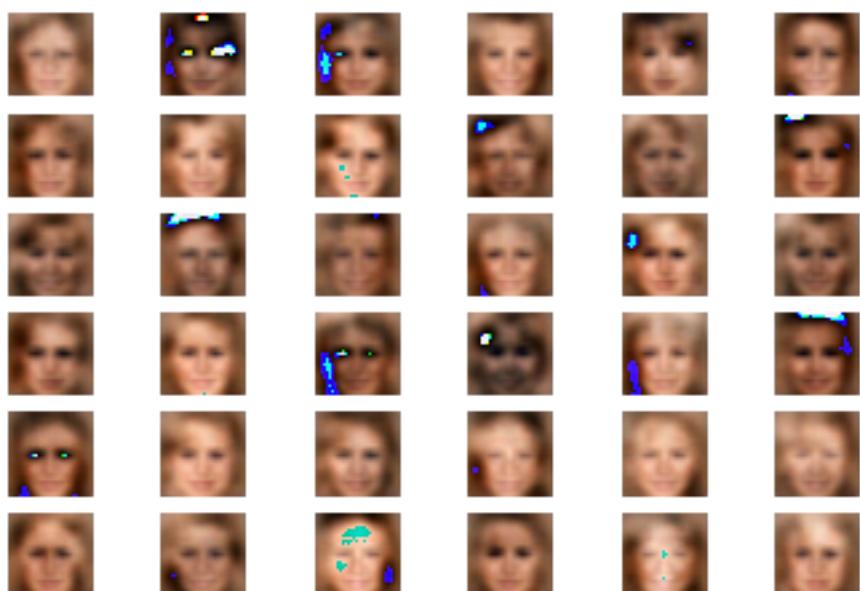


Figure 12.1: png

# Chapter 13

## How to make a racist AI without really trying

A cautionary tutorial.

### 13.1 Let's make a sentiment classifier!

Sentiment analysis is a very frequently-implemented task in NLP, and it's no surprise. Recognizing whether people are expressing positive or negative opinions about things has obvious business applications. It's used in social media monitoring, customer feedback, and even automatic stock trading (leading to bots that buy Berkshire Hathaway when Anne Hathaway gets a good movie review).

It's simplistic, sometimes too simplistic, but it's one of the easiest ways to get measurable results from NLP. In a few steps, you can put text in one end and get positive and negative scores out the other, and you never have to figure out what you should do with a parse tree or a graph of entities or any difficult representation like that.

So that's what we're going to do here, following the path of least resistance at every step, obtaining a classifier that should look very familiar to anyone involved in current NLP. For example, you can find this model described in the Deep Averaging Networks paper (Iyyer et al., 2015). This model is not the point of that paper, so don't take this as an attack on their results; it was there as an example of a well-known way to use word vectors.

Here's the outline of what we're going to do:

- Acquire some typical **word embeddings** to represent the meanings of words
- Acquire **training and test data**, with gold-standard examples of positive and negative words
- **Train a classifier**, using gradient descent, to recognize other positive and negative words based on their word embeddings
- Compute **sentiment scores** for sentences of text using this classifier
- **Behold the monstrosity** that we have created

And at that point we will have shown "how to make a racist AI without really trying". Of course that would be a terrible place to leave it, so afterward, we're going to:

- **Measure the problem** statistically, so we can recognize if we're solving it
- **Improve the data** to obtain a semantic model that's more accurate *and* less racist

## 13.2 Software dependencies

This tutorial is written in Python, and relies on a typical Python machine-learning stack: `numpy` and `scipy` for numerical computing, `pandas` for managing our data, and `scikit-learn` for machine learning. Later on we'll graph some things with `matplotlib` and `seaborn`.

You could also replace `scikit-learn` with TensorFlow or Keras or something like that, as they can also train classifiers using gradient descent. But there's no need for the deep-learning abstractions they provide, as it only takes a single layer of machine learning to solve this problem.

```
import numpy as np
import pandas as pd
import matplotlib
import seaborn
import re
import statsmodels.formula.api

from sklearn.linear_model import SGDClassifier
from sklearn.model_selection import train_test_split
from sklearn.metrics import accuracy_score

# Configure how graphs will show up in this notebook
%matplotlib inline
seaborn.set_context('notebook', rc={'figure.figsize': (10, 6)}, font_scale=1.5)
```

## 13.3 Step 1: Word embeddings

Word embeddings are frequently used to represent words as inputs to machine learning. The words become vectors in a multi-dimensional space, where nearby vectors represent similar meanings. With word embeddings, you can compare words by (roughly) what they mean, not just exact string matches.

Successfully training word vectors requires starting from hundreds of gigabytes of input text. Fortunately, various machine-learning groups have already done this and provided pre-trained word embeddings that we can download.

Two very well-known datasets of pre-trained English word embeddings are `word2vec`, pretrained on Google News data, and `GloVe`, pretrained on the Common Crawl of web pages. We would get similar results for either one, but here we'll use GloVe because its source of data is more transparent.

GloVe comes in three sizes: 6B, 42B, and 840B. The 840B size is powerful, but requires significant post-processing to use it in a way that's an improvement over 42B. The 42B version is pretty good and is also neatly trimmed to a vocabulary of 1 million words. Because we're following the path of least resistance, we'll just use the 42B version.

### Why does it matter that the word embeddings are “well-known”?

I'm glad you asked, hypothetical questioner! We're trying to do something extremely typical at each step, and for some reason, comparison-shopping for better word embeddings isn't typical yet. Read on, and I hope you'll come out of this tutorial with the desire to use modern, high-quality word embeddings, especially those that are aware of algorithmic bias and try to mitigate it. But that's getting ahead of things.

We download `glove.42B.300d.zip` from the GloVe web page, and extract it into `data/glove.42B.300d.txt`. Next we define a function to read the simple format of its word vectors.

```

%%bash
mkdir data/
cd data/
wget http://nlp.stanford.edu/data/glove.840B.300d.zip
unzip glove.840B.300d.zip

Archive: glove.840B.300d.zip
  inflating: glove.840B.300d.txt

IOPub data rate exceeded.
The notebook server will temporarily stop sending output
to the client in order to avoid crashing it.
To change this limit, set the config variable
`--NotebookApp.iopub_data_rate_limit`.

def load_embeddings(filename):
    """
    Load a DataFrame from the generalized text format used by word2vec, GloVe,
    fastText, and ConceptNet Numberbatch. The main point where they differ is
    whether there is an initial line with the dimensions of the matrix.
    """
    labels = []
    rows = []
    with open(filename, encoding='utf-8') as infile:
        for i, line in enumerate(infile):
            items = line.rstrip().split(' ')
            if len(items) == 2:
                # This is a header row giving the shape of the matrix
                continue
            labels.append(items[0])
            values = np.array([float(x) for x in items[1:]], 'f')
            rows.append(values)

    arr = np.vstack(rows)
    return pd.DataFrame(arr, index=labels, dtype='f')

embeddings = load_embeddings('data/glove.840B.300d.txt')
embeddings.shape

```

(2196017, 300)

## 13.4 Step 2: A gold-standard sentiment lexicon

We need some input about which words are positive and which words are negative. There are many sentiment lexicons you could use, but we're going to go with a very straightforward lexicon (Hu and Liu, 2004), the same one used by the Deep Averaging Networks paper.

We download the lexicon from Bing Liu's web site (<https://www.cs.uic.edu/~liub/FBS/sentiment-analysis.html#lexicon>) and extract it into `data/positive-words.txt` and `data/negative-words.txt`.

Next we define how to read these files, and read them in as the `pos_words` and `neg_words` variables:

```
%%bash
cd data/
wget http://www.cs.uic.edu/~liub/FBS/opinion-lexicon-English.rar
unrar pros-cons.rar

--2017-10-05 22:12:34--  http://www.cs.uic.edu/~liub/FBS/pros-cons.rar
Resolving www.cs.uic.edu... 131.193.32.29
Connecting to www.cs.uic.edu|131.193.32.29|:80... connected.
HTTP request sent, awaiting response... 301 Moved Permanently
Location: https://www.cs.uic.edu/~liub/FBS/pros-cons.rar [following]
--2017-10-05 22:12:34--  https://www.cs.uic.edu/~liub/FBS/pros-cons.rar
Connecting to www.cs.uic.edu|131.193.32.29|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: unspecified [text/plain]
Saving to: 'pros-cons.rar.1'

OK ..... 1.15M
50K ..... 2.25M
100K ..... 181M
150K ..... 2.33M
200K ..... 15.7M
250K ..... 295M
300K ..... 327M
350K ..... 2.69M
400K ..... 97.8M
450K ..... 23.2M
500K ..... 194M
550K ..... 39.6M
600K ..... 109M=0.1s

2017-10-05 22:12:34 (5.43 MB/s) - 'pros-cons.rar.1' saved [632640]

bash: line 3: unrar: command not found

def load_lexicon(filename):
    """
    Load a file from Bing Liu's sentiment lexicon
    (https://www.cs.uic.edu/~liub/FBS/sentiment-analysis.html), containing
    English words in Latin-1 encoding.

    One file contains a list of positive words, and the other contains
    a list of negative words. The files contain comment lines starting
    with ';' and blank lines, which should be skipped.
    """
    lexicon = []
    with open(filename, encoding='latin-1') as infile:
        for line in infile:
            line = line.rstrip()
            if line and not line.startswith(';'):
                lexicon.append(line)
    return lexicon

pos_words = load_lexicon('data/positive-words.txt')
neg_words = load_lexicon('data/negative-words.txt')
```

## 13.5 Step 3: Train a model to predict word sentiments

Our data points here are the embeddings of these positive and negative words. We use the Pandas `.loc[]` operation to look up the embeddings of all the words.

Some of these words are not in the GloVe vocabulary, particularly the misspellings such as “fancinating”. Those words end up with rows full of `NaN` to indicate their missing embeddings, so we use `.dropna()` to remove them.

```
pos_vectors = embeddings.loc[pos_words].dropna()
neg_vectors = embeddings.loc[neg_words].dropna()
```

Now we make arrays of the desired inputs and outputs. The inputs are the embeddings, and the outputs are 1 for positive words and -1 for negative words. We also make sure to keep track of the words they’re labeled with, so we can interpret the results.

```
vectors = pd.concat([pos_vectors, neg_vectors])
targets = np.array([1 for entry in pos_vectors.index] + [-1 for entry in neg_vectors.index])
labels = list(pos_vectors.index) + list(neg_vectors.index)
```

**Hold on. Some words are neither positive nor negative, they’re neutral. Shouldn’t there be a third class for neutral words?**

I think that having examples of neutral words would be quite beneficial, especially because the problems we’re going to see come from assigning sentiment to words that shouldn’t have sentiment. If we could reliably identify when words should be neutral, it would be worth the slight extra complexity of a 3-class classifier. It requires finding a source of examples of neutral words, because Liu’s data only lists positive and negative words.

So I tried a version of this notebook where I put in 800 examples of neutral words, and put a strong weight on predicting words to be neutral. But the end results were not much different from what you’re about to see.

**How is this list drawing the line between positive and negative anyway? Doesn’t that depend on context?**

Good question. Domain-general sentiment analysis isn’t as straightforward as it sounds. The decision boundary we’re trying to find is fairly arbitrary in places. In this list, “audacious” is marked as “bad” while “ambitious” is “good”. “Comical” is bad, “humorous” is good. “Refund” is good, even though it’s typically in bad situations that you have to request one or pay one.

I think everyone knows that sentiment requires context, but when implementing an easy approach to sentiment analysis, you just have to kind of hope that you can ignore context and the sentiments will average out to the right trend.

Using the scikit-learn `train_test_split` function, we simultaneously separate the input vectors, output values, and labels into training and test data, with 10% of the data used for testing.

```
train_vectors, test_vectors, train_targets, test_targets, train_labels, test_labels =
    train_test_split(vectors, targets, labels, test_size=0.1, random_state=0)
```

Now we make our classifier, and train it by running the training vectors through it for 100 iterations. We use a logistic function as the loss, so that the resulting classifier can output the probability that a word is positive or negative.

```
model = SGDClassifier(loss='log', random_state=0, n_iter=100)
model.fit(train_vectors, train_targets)
```

```
SGDClassifier(alpha=0.0001, average=False, class_weight=None, epsilon=0.1,
              eta0=0.0, fit_intercept=True, l1_ratio=0.15,
```

```
learning_rate='optimal', loss='log', n_iter=100, n_jobs=1,
penalty='l2', power_t=0.5, random_state=0, shuffle=True, verbose=0,
warm_start=False)
```

We evaluate the classifier on the test vectors. It predicts the correct sentiment for sentiment words outside of its training data 95% of the time. Not bad.

```
accuracy_score(model.predict(test_vectors), test_targets)
```

0.95619335347432022

Let's define a function that we can use to see the sentiment that this classifier predicts for particular words, then use it to see some examples of its predictions on the test data.

```
def vecs_to_sentiment(vecs):
    # predict_log_proba gives the log probability for each class
    predictions = model.predict_log_proba(vecs)

    # To see an overall positive vs. negative classification in one number,
    # we take the log probability of positive sentiment minus the log
    # probability of negative sentiment.
    return predictions[:, 1] - predictions[:, 0]

def words_to_sentiment(words):
    vecs = embeddings.loc[words].dropna()
    log_odds = vecs_to_sentiment(vecs)
    return pd.DataFrame({'sentiment': log_odds}, index=vecs.index)

# Show 20 examples from the test set
words_to_sentiment(test_labels).ix[:20]

<tr style="text-align: right;">
    <th></th>
    <th>sentiment</th>
</tr>

<tr>
    <th>fidget</th>
    <td>-9.931679</td>
</tr>
<tr>
    <th>interrupt</th>
    <td>-9.634706</td>
</tr>
<tr>
    <th>staunchly</th>
    <td>1.466919</td>
</tr>
<tr>
    <th>imaginary</th>
    <td>-2.989215</td>
</tr>
<tr>
    <th>taxing</th>
    <td>0.468522</td>
```

```
</tr>
<tr>
    <th>world-famous</th>
    <td>6.908561</td>
</tr>
<tr>
    <th>low-cost</th>
    <td>9.237223</td>
</tr>
<tr>
    <th>disappointment</th>
    <td>-8.737182</td>
</tr>
<tr>
    <th>totalitarian</th>
    <td>-10.851580</td>
</tr>
<tr>
    <th>bellicose</th>
    <td>-8.328674</td>
</tr>
<tr>
    <th>freezes</th>
    <td>-8.456981</td>
</tr>
<tr>
    <th>sin</th>
    <td>-7.839670</td>
</tr>
<tr>
    <th>fragile</th>
    <td>-4.018289</td>
</tr>
<tr>
    <th>fooled</th>
    <td>-4.309344</td>
</tr>
<tr>
    <th>undecided</th>
    <td>-2.816172</td>
</tr>
<tr>
    <th>handily</th>
    <td>2.339609</td>
</tr>
<tr>
    <th>demonizes</th>
    <td>-2.102152</td>
</tr>
<tr>
    <th>easygoing</th>
    <td>8.747150</td>
</tr>
<tr>
```

```

<th>unpopular</th>
<td>-7.887475</td>
</tr>
<tr>
    <th>commiserate</th>
    <td>1.790899</td>
</tr>

```

More than the accuracy number, this convinces us that the classifier is working. We can see that the classifier has learned to generalize sentiment to words outside of its training data.

## 13.6 Step 4: Get a sentiment score for text

There are many ways to combine sentiments for word vectors into an overall sentiment score. Again, because we're following the path of least resistance, we're just going to average them.

```

import re
TOKEN_RE = re.compile(r"\w.*?\b")
# The regex above finds tokens that start with a word-like character (\w), and continues
# matching characters (.+?) until the next word break (\b). It's a relatively simple
# expression that manages to extract something very much like words from text.

def text_to_sentiment(text):
    tokens = [token.casfold() for token in TOKEN_RE.findall(text)]
    sentiments = words_to_sentiment(tokens)
    return sentiments['sentiment'].mean()

```

There are many things we could have done better:

- Weight words by their inverse frequency, so that words like “the” and “I” don’t cause big changes in sentiment
- Adjust the averaging so that short sentences don’t end up with the most extreme sentiment values
- Take phrases into account
- Use a more robust word-segmentation algorithm that isn’t confused by apostrophes
- Account for negations such as “not happy”

But all of those would require extra code and wouldn’t fundamentally change the results we’re about to see. At least now we can roughly compare the relative positivity of different sentences:

```
text_to_sentiment("this example is pretty cool")
```

```
3.889968926086298
```

```
text_to_sentiment("this example is okay")
```

```
2.7997773492425186
```

```
text_to_sentiment("meh, this example sucks")
```

```
-1.1774475917460698
```

## 13.7 Step 5: Behold the monstrosity that we have created

Not every sentence is going to contain obvious sentiment words. Let's see what it does with a few variations on a neutral sentence:

```
text_to_sentiment("Let's go get Italian food")
```

2.0429166109408983

```
text_to_sentiment("Let's go get Chinese food")
```

1.4094033658140972

```
text_to_sentiment("Let's go get Mexican food")
```

0.38801985560121732

This is analogous to what I saw when I experimented with analyzing restaurant reviews using word embeddings, and found out that all the Mexican restaurants were ending up with lower sentiment for no good reason.

Word vectors are capable of representing subtle distinctions of meaning just by reading words in context. So they're also capable of representing less-subtle things like the biases of our society.

Here are some other neutral statements:

```
text_to_sentiment("My name is Emily")
```

2.2286179364745311

```
text_to_sentiment("My name is Heather")
```

1.3976291151079159

```
text_to_sentiment("My name is Yvette")
```

0.98463802132985556

```
text_to_sentiment("My name is Shaniqua")
```

-0.47048131775890656

Well, dang.

The system has associated wildly different sentiments with people's names. You can look at these examples and many others and see that the sentiment is generally more positive for stereotypically-white names, and more negative for stereotypically-black names.

This is the test that Caliskan, Bryson, and Narayanan used to conclude that semantics derived automatically from language corpora contain human-like biases, a paper published in *Science* in April 2017, and we'll be using more of it shortly.

## 13.8 Step 6: Measure the problem

We want to learn how to not make something like this again. So let's put more data through it, and statistically measure how bad its bias is.

Here we have four lists of names that tend to reflect different ethnic backgrounds, mostly from a United States perspective. The first two are lists of predominantly “white” and “black” names adapted from Caliskan et al.'s article. I also added typically Hispanic names, as well as Muslim names that come from Arabic or Urdu; these are two more distinct groupings of given names that tend to represent your background.

This data is currently used as a bias-check in the ConceptNet build process, and can be found in the `conceptnet5.vectors.evaluation.bias` module. I'm interested in expanding this to more ethnic backgrounds, which may require looking at surnames and not just given names.

Here are the lists:

```
NAMES_BY_ETHNICITY = {
    # The first two lists are from the Caliskan et al. appendix describing the
    # Word Embedding Association Test.
    'White': [
        'Adam', 'Chip', 'Harry', 'Josh', 'Roger', 'Alan', 'Frank', 'Ian', 'Justin',
        'Ryan', 'Andrew', 'Fred', 'Jack', 'Matthew', 'Stephen', 'Brad', 'Greg', 'Jed',
        'Paul', 'Todd', 'Brandon', 'Hank', 'Jonathan', 'Peter', 'Wilbur', 'Amanda',
        'Courtney', 'Heather', 'Melanie', 'Sara', 'Amber', 'Crystal', 'Katie',
        'Meredith', 'Shannon', 'Betsy', 'Donna', 'Kristin', 'Nancy', 'Stephanie',
        'Bobbie-Sue', 'Ellen', 'Lauren', 'Peggy', 'Sue-Ellen', 'Colleen', 'Emily',
        'Megan', 'Rachel', 'Wendy'
    ],
    'Black': [
        'Alonzo', 'Jamel', 'Lerone', 'Percell', 'Theo', 'Alphonse', 'Jerome',
        'Leroy', 'Rasaan', 'Torrance', 'Darnell', 'Lamar', 'Lionel', 'Rashaun',
        'Tyree', 'Deion', 'Lamont', 'Malik', 'Terrence', 'Tyrone', 'Everol',
        'Lavon', 'Marcellus', 'Terryl', 'Wardell', 'Aiesha', 'Lashelle', 'Nichelle',
        'Shereen', 'Temeka', 'Ebony', 'Latisha', 'Shaniqua', 'Tameisha', 'Teretha',
        'Jasmine', 'Latonya', 'Shanise', 'Tanisha', 'Tia', 'Lakisha', 'Latoya',
        'Sharise', 'Tashika', 'Yolanda', 'Lashandra', 'Malika', 'Shavonn',
        'Tawanda', 'Yvette'
    ],
    # This list comes from statistics about common Hispanic-origin names in the US.
    'Hispanic': [
        'Juan', 'José', 'Miguel', 'Luís', 'Jorge', 'Santiago', 'Matías', 'Sebastián',
        'Mateo', 'Nicolás', 'Alejandro', 'Samuel', 'Diego', 'Daniel', 'Tomás',
        'Juana', 'Ana', 'Luisa', 'María', 'Elena', 'Sofía', 'Isabella', 'Valentina',
        'Camila', 'Valeria', 'Ximena', 'Luciana', 'Mariana', 'Victoria', 'Martina'
    ],
    # The following list conflates religion and ethnicity, I'm aware. So do given names.
    #
    # This list was cobbled together from searching baby-name sites for common Muslim names,
    # as spelled in English. I did not ultimately distinguish whether the origin of the name
    # is Arabic or Urdu or another language.
    #
    # I'd be happy to replace it with something more authoritative, given a source.
    'Arab/Muslim': [
        'Mohammed', 'Omar', 'Ahmed', 'Ali', 'Youssef', 'Abdullah', 'Yasin', 'Hamza',
        'Ayaan', 'Syed', 'Rishaan', 'Samar', 'Ahmad', 'Zikri', 'Rayyan', 'Mariam',
        'Jana', 'Malak', 'Salma', 'Nour', 'Lian', 'Fatima', 'Ayesha', 'Zahra', 'Sana',
        'Zara', 'Alya', 'Shaista', 'Zoya', 'Yasmin'
    ]
}
```

Now we'll use Pandas to make a table of these names, their predominant ethnic background, and the sentiment score we get for them:

```
def name_sentiment_table():
    frames = []
    for group, name_list in sorted(NAMES_BY_ETHNICITY.items()):
        lower_names = [name.lower() for name in name_list]
        sentiments = words_to_sentiment(lower_names)
        sentiments['group'] = group
        frames.append(sentiments)

    # Put together the data we got from each ethnic group into one big table
    return pd.concat(frames)

name_sentiments = name_sentiment_table()
```

A sample of the data:

```
name_sentiments.ix[::25]
```

```
<tr style="text-align: right;">
    <th></th>
    <th>sentiment</th>
    <th>group</th>
</tr>

<tr>
    <th>mohammed</th>
    <td>0.834974</td>
    <td>Arab/Muslim</td>
</tr>
<tr>
    <th>alya</th>
    <td>3.916803</td>
    <td>Arab/Muslim</td>
</tr>
<tr>
    <th>terryl</th>
    <td>-2.858010</td>
    <td>Black</td>
</tr>
<tr>
    <th>josé</th>
    <td>0.432956</td>
    <td>Hispanic</td>
</tr>
<tr>
    <th>luciana</th>
    <td>1.086073</td>
    <td>Hispanic</td>
</tr>
<tr>
    <th>hank</th>
    <td>0.391858</td>
    <td>White</td>
</tr>
<tr>
    <th>megan</th>
```

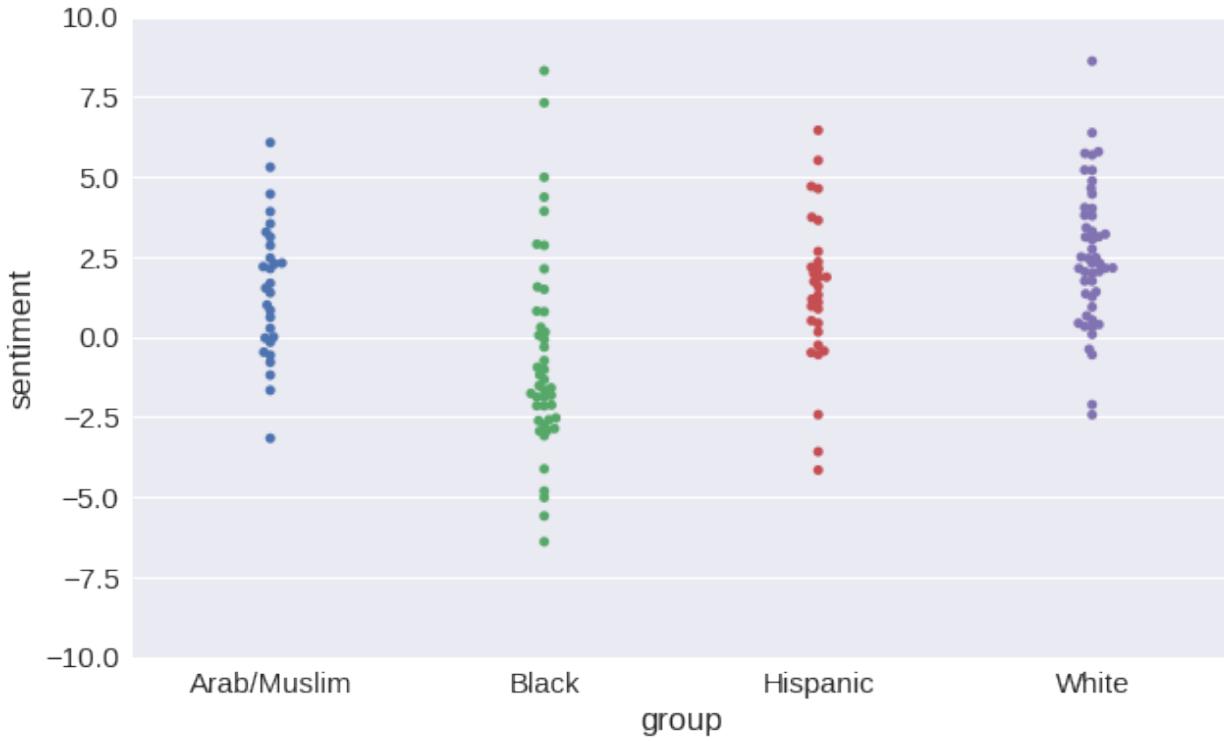


Figure 13.1: png

```
<td>2.158679</td>
<td>White</td>
</tr>
```

Now we can visualize the distribution of sentiment we get for each kind of name:

```
plot = seaborn.swarmplot(x='group', y='sentiment', data=name_sentiments)
plot.set_ylim([-10, 10])
```

```
(-10, 10)
```

We can see that as a bar-plot, too, showing the 95% confidence intervals of the means.

```
plot = seaborn.barplot(x='group', y='sentiment', data=name_sentiments, capsize=.1)
```

And finally we can break out the serious statistical machinery, using the statsmodels package, to tell us how big of an effect this is (along with a bunch of other statistics).

```
ols_model = statsmodels.formula.api.ols('sentiment ~ group', data=name_sentiments).fit()
ols_model.summary().tables[0]
```

OLS Regression Results

Dep. Variable:

```
<td>sentiment</td>      <th> R-squared:           </th> <td> 0.208</td>
```

Model:

```
<td>OLS</td>          <th> Adj. R-squared:    </th> <td> 0.192</td>
```

Method:

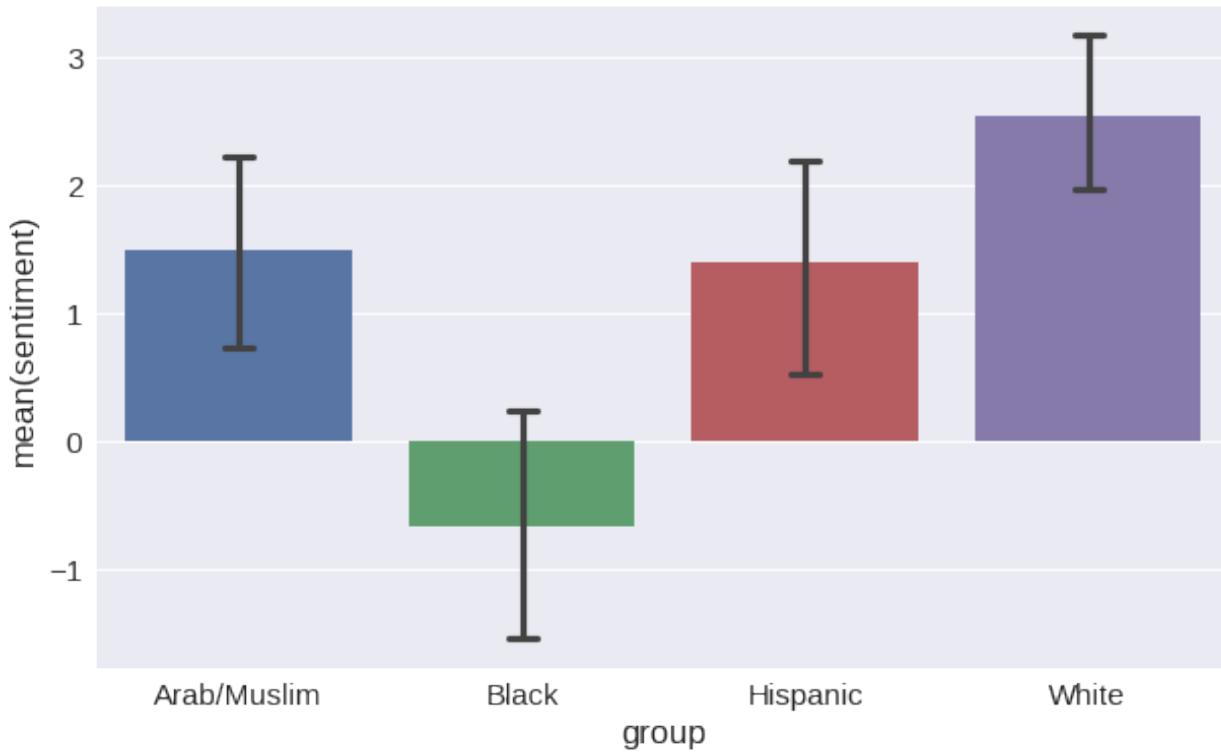


Figure 13.2: png

<td>Least Squares</td> <th> F-statistic: </th> <td> 13.04</td>

Date:

<td>Thu, 13 Jul 2017</td> <th> Prob (F-statistic):</th> <td>1.31e-07</td>

Time:

<td>11:31:17</td> <th> Log-Likelihood: </th> <td> -356.78</td>

No. Observations:

<td> 153</td> <th> AIC: </th> <td> 721.6</td>

Df Residuals:

<td> 149</td> <th> BIC: </th> <td> 733.7</td>

Df Model:

<td> 3</td> <th> </th> <td> </td>

Covariance Type:

<td>nonrobust</td> <th> </th> <td> </td>

The F-statistic is the ratio of the variation between groups to the variation within groups, which we can take as a measure of overall ethnic bias.

The probability, right below that, is the probability that we would see this high of an F-statistic given the null hypothesis: that is, given data where there was no difference between ethnicities. The probability is very, very low. If this were a paper, we'd get to call the result "highly statistically significant".

Out of all these numbers, the F-value is the one we really want to improve. A lower F-value is better.

```
ols_model.fvalue
13.041597745167659
```

## 13.9 Step 7: Trying different data

Now that we have the ability to measure prejudicial badness in our word vectors, let's try to improve it. To do so, we'll want to repeat a bunch of things that so far we just ran as individual steps in this Python notebook.

If I were writing good, maintainable code, I wouldn't have been using global variables like `model` and `embeddings`. But writing ad-hoc spaghetti research code let us look at what we were doing at every step and learn from it, so there's something to be said for that. Let's re-use what we can, and at least define a function for redoing some of these steps:

```
def retrain_model(new_embs):
    """
    Repeat the steps above with a new set of word embeddings.
    """
    global model, embeddings, name_sentiments
    embeddings = new_embs
    pos_vectors = embeddings.loc[pos_words].dropna()
    neg_vectors = embeddings.loc[neg_words].dropna()
    vectors = pd.concat([pos_vectors, neg_vectors])
    targets = np.array([1 for entry in pos_vectors.index] + [-1 for entry in neg_vectors.index])
    labels = list(pos_vectors.index) + list(neg_vectors.index)

    train_vectors, test_vectors, train_targets, test_targets, train_labels, test_labels = \
        train_test_split(vectors, targets, labels, test_size=0.1, random_state=0)

    model = SGDClassifier(loss='log', random_state=0, n_iter=100)
    model.fit(train_vectors, train_targets)

    accuracy = accuracy_score(model.predict(test_vectors), test_targets)
    print("Accuracy of sentiment: {:.2%}".format(accuracy))

    name_sentiments = name_sentiment_table()
    ols_model = statsmodels.formula.api.ols('sentiment ~ group', data=name_sentiments).fit()
    print("F-value of bias: {:.3f}".format(ols_model.fvalue))
    print("Probability given null hypothesis: {:.3f}".format(ols_model.f_pvalue))

    # Show the results on a swarm plot, with a consistent Y-axis
    plot = seaborn.swarmplot(x='group', y='sentiment', data=name_sentiments)
    plot.set_ylim([-10, 10])
```

### 13.9.1 Trying word2vec

You may think this is a problem that only GloVe has. If the system weren't trained on all of the Common Crawl (which contains lots of unsavory sites and like 20 copies of Urban Dictionary), maybe it wouldn't have gone bad. What about good old word2vec, trained on Google News?

The most authoritative source for the word2vec data seems to be this file on Google Drive. Download it and save it as `data/word2vec-google-news-300.bin.gz`.

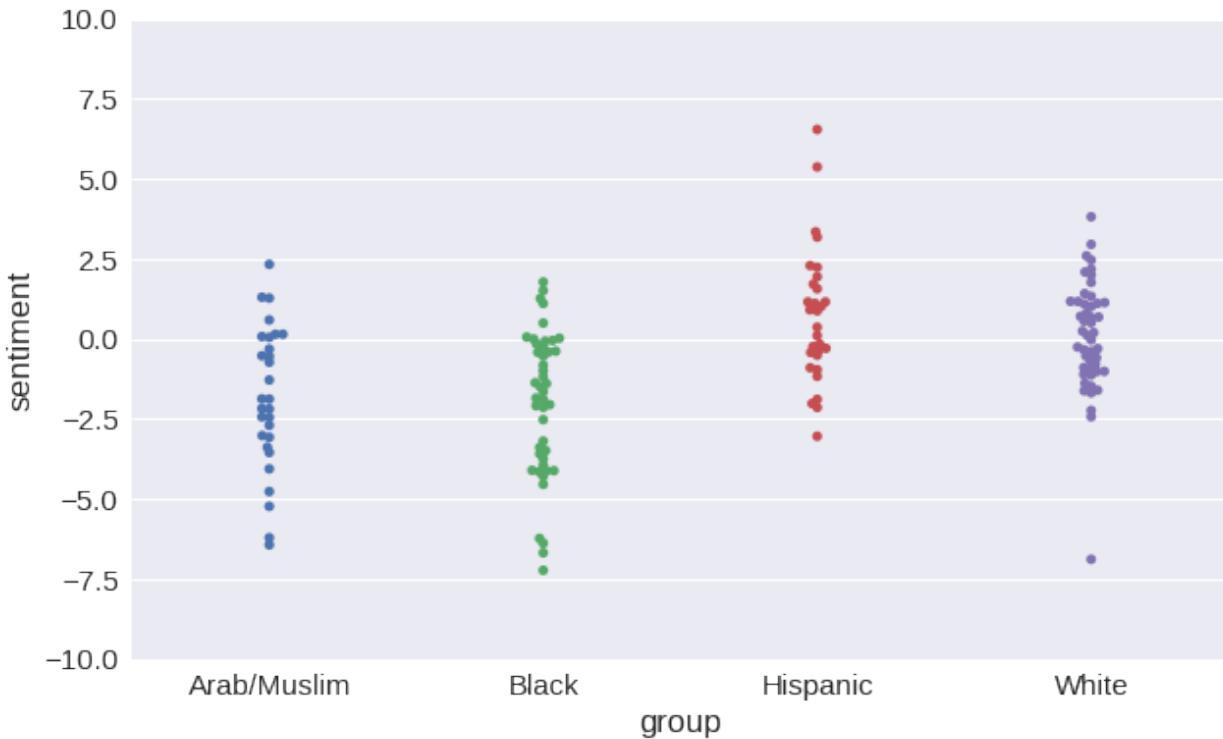


Figure 13.3: png

```
# Use a ConceptNet function to load word2vec into a Pandas frame from its binary format
from conceptnet5.vectors.formats import load_word2vec_bin
w2v = load_word2vec_bin('data/word2vec-googlenews-300.bin.gz', nrows=2000000)

# word2vec is case-sensitive, so case-fold its labels
w2v.index = [label.casefold() for label in w2v.index]

# Now we have duplicate labels, so drop the later (lower-frequency) occurrences of the same label
w2v = w2v.reset_index().drop_duplicates(subset='index', keep='first').set_index('index')
retrain_model(w2v)
```

Accuracy of sentiment: 94.30%

F-value of bias: 15.573

Probability given null hypothesis: 7.43e-09

So: word2vec is even worse. With an F-value over 15, it has even larger differences in sentiment between groups.

In retrospect, expecting *news* to be safe from algorithmic bias was rather a lot to hope for.

### 13.9.2 Trying ConceptNet Numberbatch

Now I can finally get to discussing my own word-embedding project.

ConceptNet, the knowledge graph I work on with word-embedding features built in, has a training step that adjusts the embeddings to identify and remove some sources of algorithmic racism and sexism. This step

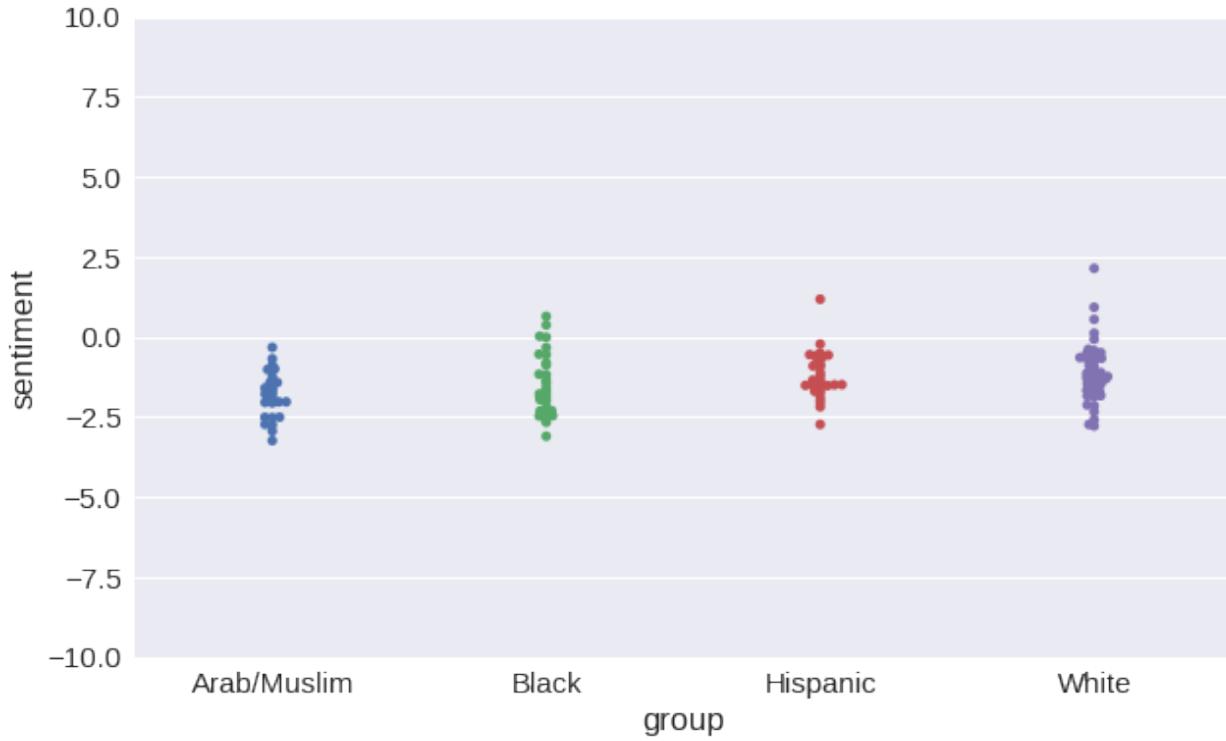


Figure 13.4: png

is based on Bolukbasi et al.’s “Debiasing Word Embeddings”, and generalized to address multiple forms of prejudice at once. As far as I know, we’re the only semantic system that has anything of the sort built in.

From time to time, we export pre-computed vectors from ConceptNet, a release we give the name ConceptNet Numberbatch. The April 2017 release was the first to include this de-biasing step, so let’s load its English vectors and retrain our sentiment model with them.

Download `numberbatch-en-17.04b.txt.gz`, save it in the `data/` directory, and retrain the model:

```
retrain_model(load_embeddings('data/numberbatch-en-17.04b.txt'))
```

```
Accuracy of sentiment: 97.46%
F-value of bias: 3.805
Probability given null hypothesis: 0.0118
```

So have we entirely fixed the problem by switching to ConceptNet Numberbatch? Can we stop worrying about algorithmic racism? **No**.

Have we made the problem a lot smaller? **Definitely**.

The ranges of sentiments overlap a lot more than they did in the word vectors that came directly from GloVe or word2vec. The F-value is less than a third of what it was for GloVe, and a quarter of what it was for word2vec. And in general, we see much smaller differences in sentiment that come from comparing different given names, which is what we’d hope for, because names really shouldn’t matter to the task of sentiment analysis.

But there is still a small correlation. Maybe I could have picked some data or training parameters that made the problem look completely solved. That would have been a bad move, because the problem *isn’t* completely solved. There are more causes of algorithmic racism than the ones we have identified and compensated for in ConceptNet. But this is a good start.

### 13.9.3 There is no trade-off

Note that the accuracy of sentiment prediction went *up* when we switched to ConceptNet Numberbatch.

Some people expect that fighting algorithmic racism is going to come with some sort of trade-off. There's no trade-off here. You can have data that's better and less racist. You can have data that's better *because* it's less racist. There was never anything "accurate" about the overt racism that word2vec and GloVe learned.

## 13.10 Other approaches

This is of course only one way to do sentiment analysis. All the steps we used are common, but you probably object that you wouldn't do it that way. But if you have your own process, I urge you to see if your process is encoding prejudices and biases in the model it learns.

Instead of or in addition to changing your source of word vectors, you could try to fix this problem in the output directly. It may help, for example, to build a stronger model of whether sentiment should be assigned to words at all, designed to specifically exclude names and groups of people.

You could abandon the idea of inferring sentiment for words, and only count the sentiment of words that appear exactly in the list. This is perhaps the most common form of sentiment analysis – the kind that includes no machine learning at all. Its results will be no more biased than whoever made the list. But the lack of machine learning means that this approach has low recall, and the only way to adapt it to your data set is to edit the list manually.

As a hybrid approach, you could produce a large number of inferred sentiments for words, and have a human annotator patiently look through them, making a list of exceptions whose sentiment should be set to 0. The downside of this is that it's extra work; the upside is that you take the time to actually see what your data is doing. And that's something that I think should happen more often in machine learning anyway.



# Bibliography