

Review: computer vision transfer learning

This is a subset of lesson 1 of <https://course.fast.ai> (<https://course.fast.ai>).

```
In [1]: %reload_ext autoreload
        %autoreload 2
        %matplotlib inline

        from fastai.vision import *
        from fastai.metrics import error_rate
```

```
In [2]: bs = 64
        # bs = 16  # uncomment this line if you run out of memory even after clicking
        # Kernel->Restart
```

We are going to use the [Oxford-IIIT Pet Dataset](http://www.robots.ox.ac.uk/~vgg/data/pets/) (<http://www.robots.ox.ac.uk/~vgg/data/pets/>) by [O. M. Parkhi et al., 2012](http://www.robots.ox.ac.uk/~vgg/publications/2012/parkhi12a/parkhi12a.pdf) (<http://www.robots.ox.ac.uk/~vgg/publications/2012/parkhi12a/parkhi12a.pdf>) which features 12 cat breeds and 25 dogs breeds. Our model will need to learn to differentiate between these 37 distinct categories. According to their paper, the best accuracy they could get in 2012 was 59.21%.

```
In [5]: path = untar_data(URLs.PETS)
        path_anno = path/'annotations'
        path_img = path/'images'
        np.random.seed(2)
        fnames = get_image_files(path_img)
        fnames[0]
```

```
Out[5]: PosixPath('/home/jhoward/.fastai/data/oxford-iiit-pet/images/great_pyrenees_173.jpg')
```

```
In [6]: pat = r'/(^[^/]+)_\d+.jpg$'
data = ImageDataBunch.from_name_re(path_img, fnames, pat, ds_tfms=get_transforms(), size=224, bs=bs)
data.show_batch(rows=3, figsize=(7,6))
```

english_cocker_spaniel



basset_hound



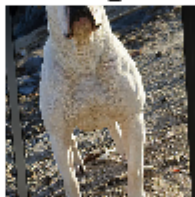
basset_hound



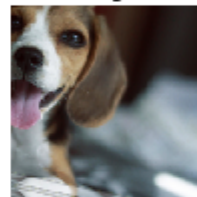
Birman



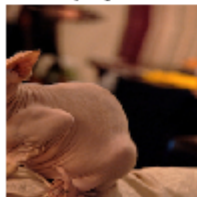
american_bulldog



beagle



Sphynx



saint_bernard



keeshond



Training

```
In [9]: learn = cnn_learner(data, models.resnet34, metrics=error_rate)
```

```
In [10]: learn.fit_one_cycle(4)
```

epoch	train_loss	valid_loss	error_rate	time
0	1.411342	0.298996	0.086604	00:15
1	0.543773	0.225010	0.078484	00:15
2	0.332864	0.194363	0.070365	00:14
3	0.242706	0.188766	0.067659	00:14

```
In [11]: learn.save('stage-1')
```

```
In [12]: learn.unfreeze()
learn.fit_one_cycle(2, max_lr=slice(1e-6,1e-4))
```

epoch	train_loss	valid_loss	error_rate	time
0	0.231939	0.180866	0.062246	00:18
1	0.207379	0.175878	0.062246	00:17

```
In [13]: interp = ClassificationInterpretation.from_learner(learn)
interp.most_confused(min_val=2)
```

```
Out[13]: [('Egyptian_Mau', 'Bengal', 8),
('Ragdoll', 'Birman', 6),
('american_pit_bull_terrier', 'staffordshire_bull_terrier', 6),
('beagle', 'basset_hound', 5),
('american_bulldog', 'staffordshire_bull_terrier', 4),
('american_bulldog', 'american_pit_bull_terrier', 3),
('chihuahua', 'miniature_pinscher', 3),
('english_setter', 'english_cocker_spaniel', 3),
('samoyed', 'great_pyrenees', 3),
('Russian_Blue', 'British_Shorthair', 2),
('Siamese', 'Birman', 2),
('american_pit_bull_terrier', 'american_bulldog', 2),
('chihuahua', 'staffordshire_bull_terrier', 2),
('saint_bernard', 'american_bulldog', 2),
('yorkshire_terrier', 'havanese', 2)]
```

```
In [ ]:
```