Fatt ke flower ho jai

August 31, 2019

[1]:
```
# This Python 3 environment comes with many helpful analytics libraries␣
 ↪installed
# It is defined by the kaggle/python docker image: https://github.com/kaggle/
 ↪docker-python
# For example, here's several helpful packages to load in

import numpy as np # linear algebra
import pandas as pd # data processing, CSV file I/O (e.g. pd.read_csv)

# Input data files are available in the "../input/" directory.
# For example, running this (by clicking run or pressing Shift+Enter) will list␣
 ↪all files under the input directory
!mkdir /kaggle/files/
!cp -r /kaggle/input/gardennerddatasciencecompetition/data/ /kaggle/files/
import os
for dirname, _, filenames in os.walk('/kaggle/files'):
    for filename in filenames:
        print(os.path.join(dirname, filename))

# Any results you write to the current directory are saved as output.
```

```
/kaggle/files/data/train.csv
/kaggle/files/data/sample_submission.csv
/kaggle/files/data/test.csv
/kaggle/files/data/test/19373.jpg
/kaggle/files/data/test/20286.jpg
/kaggle/files/data/test/18840.jpg
/kaggle/files/data/test/19989.jpg
/kaggle/files/data/test/20434.jpg
/kaggle/files/data/test/19994.jpg
/kaggle/files/data/test/18590.jpg
/kaggle/files/data/test/18668.jpg
/kaggle/files/data/test/20036.jpg
/kaggle/files/data/test/20072.jpg
/kaggle/files/data/test/20027.jpg
/kaggle/files/data/test/18798.jpg
/kaggle/files/data/test/19844.jpg
/kaggle/files/data/test/20486.jpg
```

```
/kaggle/files/data/train/12211.jpg
/kaggle/files/data/train/11263.jpg
/kaggle/files/data/train/17674.jpg
/kaggle/files/data/train/6351.jpg
/kaggle/files/data/train/6744.jpg
/kaggle/files/data/train/4283.jpg
/kaggle/files/data/train/16150.jpg
/kaggle/files/data/train/7194.jpg
/kaggle/files/data/train/7115.jpg
/kaggle/files/data/train/16436.jpg
/kaggle/files/data/train/13003.jpg
/kaggle/files/data/train/7150.jpg
/kaggle/files/data/train/17182.jpg
/kaggle/files/data/train/158.jpg
/kaggle/files/data/train/1640.jpg
/kaggle/files/data/train/17419.jpg
/kaggle/files/data/train/489.jpg
/kaggle/files/data/train/14964.jpg
/kaggle/files/data/train/10755.jpg
/kaggle/files/data/train/14536.jpg
/kaggle/files/data/train/1338.jpg
/kaggle/files/data/train/1237.jpg
/kaggle/files/data/train/8573.jpg
/kaggle/files/data/train/968.jpg
/kaggle/files/data/train/14317.jpg
/kaggle/files/data/train/15193.jpg
/kaggle/files/data/train/10829.jpg
/kaggle/files/data/train/7011.jpg
/kaggle/files/data/train/11195.jpg
/kaggle/files/data/train/15877.jpg
/kaggle/files/data/train/7172.jpg
/kaggle/files/data/train/4113.jpg
/kaggle/files/data/train/18335.jpg
/kaggle/files/data/train/14978.jpg
/kaggle/files/data/train/1652.jpg
/kaggle/files/data/train/15217.jpg
/kaggle/files/data/train/3826.jpg
/kaggle/files/data/train/8679.jpg
/kaggle/files/data/train/42.jpg
```

[2]:
```
from pathlib import Path
tn_path = Path('/kaggle/files/data/train/')
ts_path = Path('/kaggle/files/data/test/')
```

[6]:
```
pd.read_csv('/kaggle/files/data/train/train.csv').tail(10)
```

[6]:

	image_id	category
18530	18530	90
18531	18531	37
18532	18532	16
18533	18533	40
18534	18534	74
18535	18535	22
18536	18536	91
18537	18537	78
18538	18538	74
18539	18539	29

[5]:
```
!mv /kaggle/files/data/train.csv /kaggle/files/data/train/
```

[7]:
```
from fastai.vision import *
import matplotlib.pyplot as plt
tfms = get_transforms(do_flip=True, flip_vert=True, max_rotate=.0, max_zoom=.1,
                      max_lighting=0.05, max_warp=0.)
train_lbl=f'{tn_path}/train.csv'
```

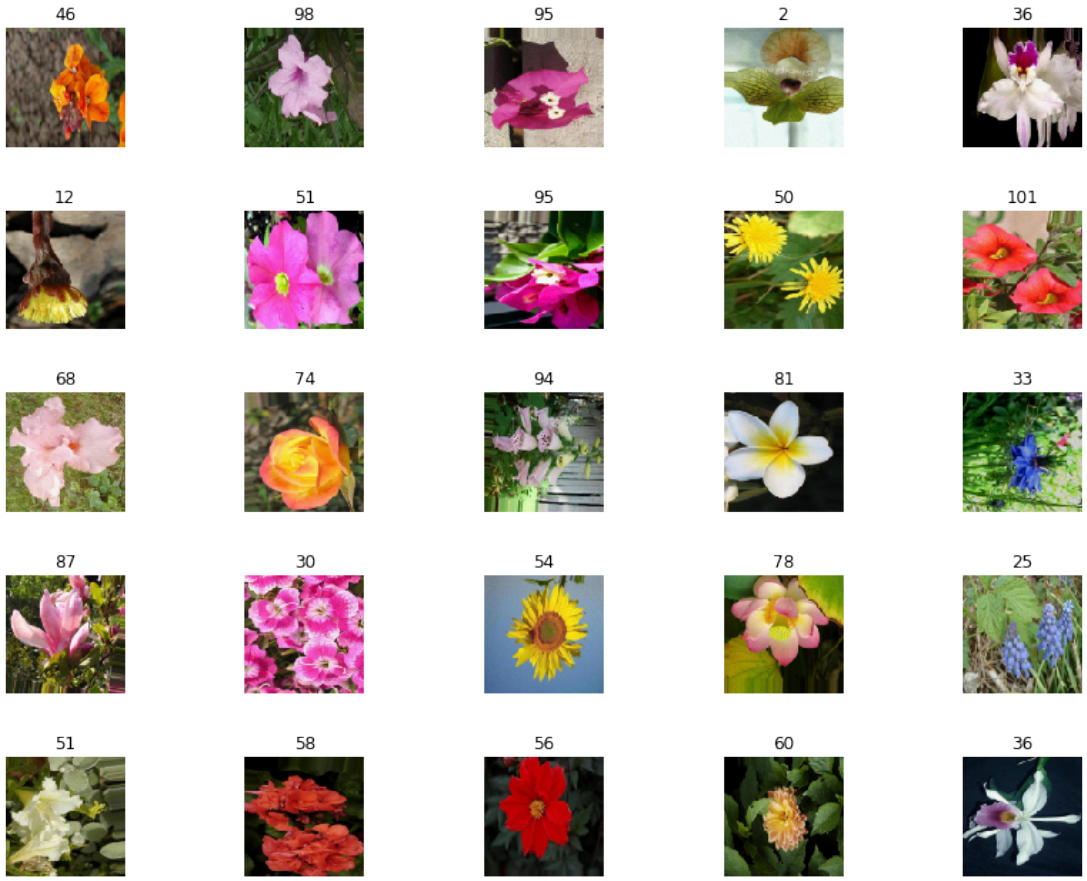
[8]:
```
data = ImageDataBunch.from_csv('/kaggle/files/data/
 ↪',csv_labels=train_lbl,suffix='.jpg',folder=
                               'train',ds_tfms=tfms, size=96,bs=64);
stats=data.batch_stats()
data.normalize(stats)
```

[8]:
```
ImageDataBunch;

Train: LabelList (14832 items)
x: ImageList
Image (3, 96, 96),Image (3, 96, 96),Image (3, 96, 96),Image (3, 96, 96),Image
(3, 96, 96)
y: CategoryList
77,52,58,75,51
Path: /kaggle/files/data;

Valid: LabelList (3708 items)
x: ImageList
Image (3, 96, 96),Image (3, 96, 96),Image (3, 96, 96),Image (3, 96, 96),Image
(3, 96, 96)
y: CategoryList
20,94,35,60,68
Path: /kaggle/files/data;

Test: None
```

[10]:
```
from torchvision.models import *
arch = densenet121
acc_02 = partial(accuracy_thresh, thresh=0.2)
acc_03 = partial(accuracy_thresh, thresh=0.3)
acc_04 = partial(accuracy_thresh, thresh=0.4)
acc_05 = partial(accuracy_thresh, thresh=0.5)
f_score = partial(fbeta, thresh=0.2)
learn = cnn_learner(data, arch, metrics=[accuracy, FBeta('macro')])
```

```
Downloading: "https://download.pytorch.org/models/densenet121-a639ec97.pth" to
/tmp/.cache/torch/checkpoints/densenet121-a639ec97.pth
100%|      | 30.8M/30.8M [00:00<00:00, 44.6MB/s]
```

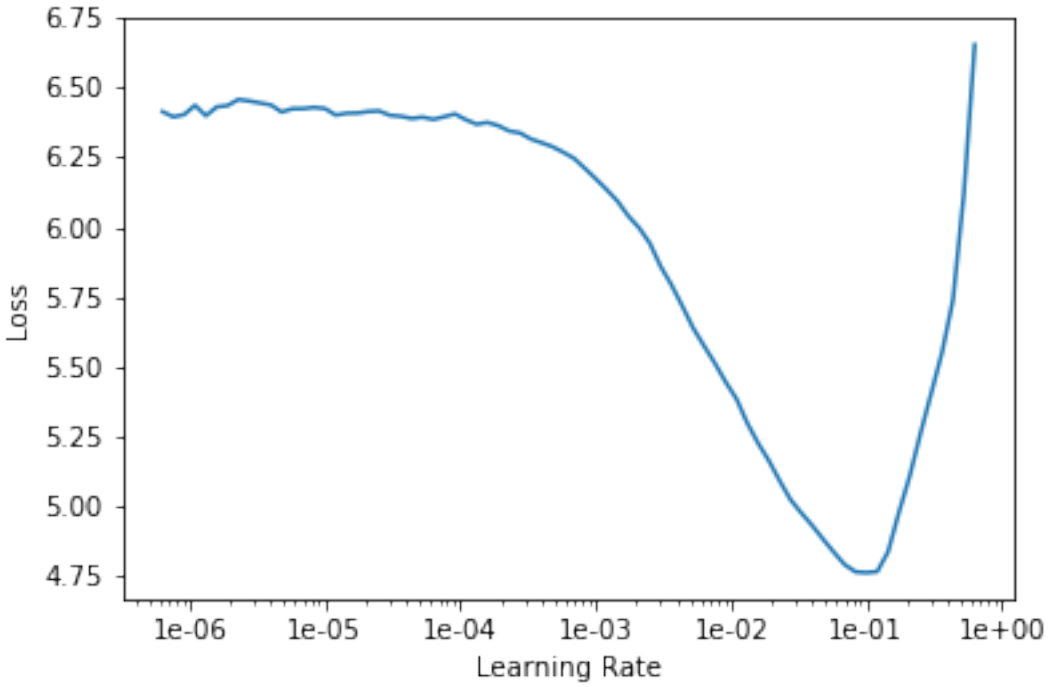
[11]:
```
test_imgs = ts_path.ls()
test_imgs.sort(key=lambda x: x.stem)
data.add_test(test_imgs)
learn.data = data
preds = learn.get_preds(ds_type=DatasetType.Test)
data.show_batch(rows=5, figsize=(12,9))
```



[13]:
```
learn.lr_find()
learn.recorder.plot()
```

```
<IPython.core.display.HTML object>
```

```
LR Finder is complete, type {learner_name}.recorder.plot() to see the graph.
```



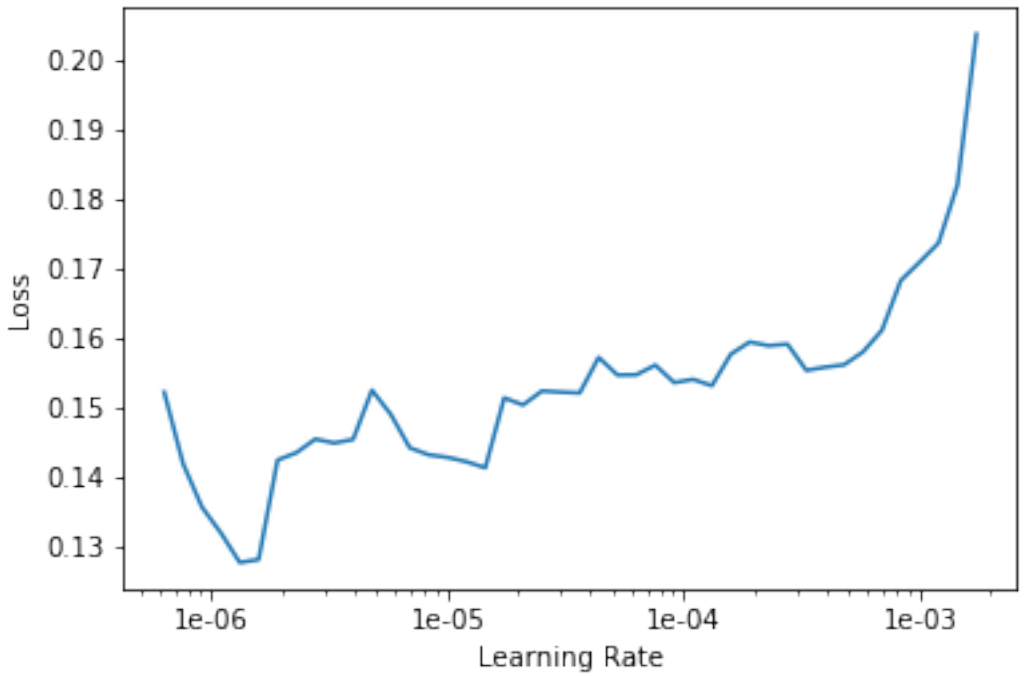
[14]:
```
lr = 7e-3
learn.fit_one_cycle(4, slice(lr))
```

```
<IPython.core.display.HTML object>
```

[15]:
```
learn.save('stage1')
learn.recorder.plot_losses()
learn.unfreeze()
learn.lr_find()
learn.recorder.plot()
```

```
<IPython.core.display.HTML object>
```

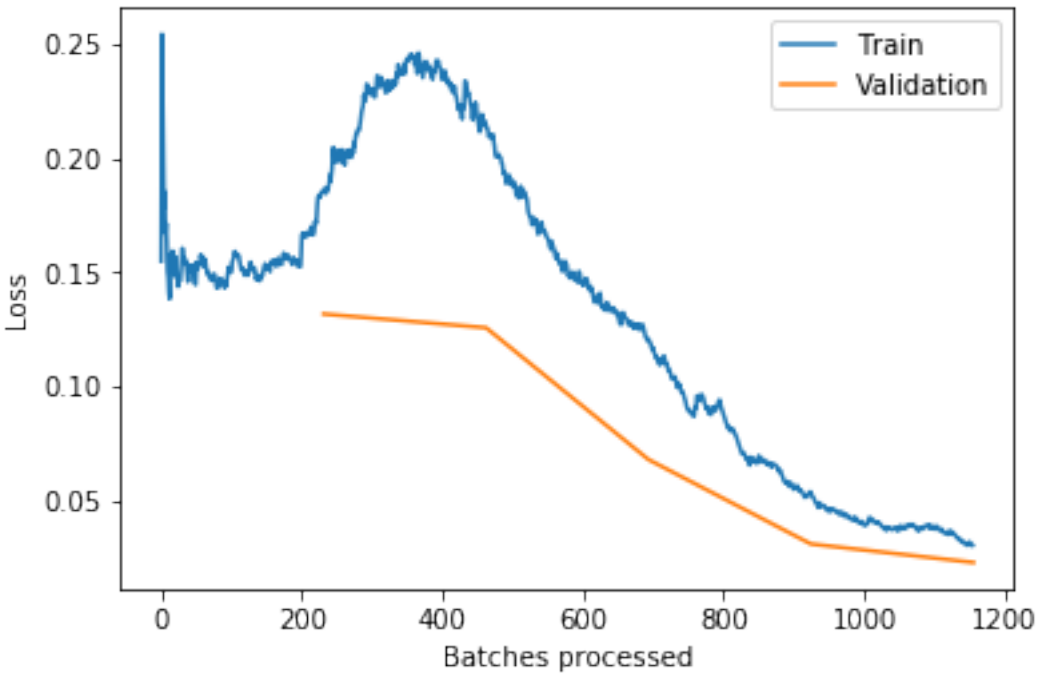
```
LR Finder is complete, type {learner_name}.recorder.plot() to see the graph.
```



[17]:
```
learn.fit_one_cycle(5, slice(5e-5, lr/5))
```

```
<IPython.core.display.HTML object>
```

[18]:
```
learn.save('stage2')
learn.recorder.plot_losses()
```



[19]:
```
pred_test,y_test = learn.get_preds(DatasetType.Test)
pred_score = accuracy(pred_test,y_test)
pred_test_tta,y_test_tta = learn.TTA(ds_type=DatasetType.Test)
pred_score_tta = accuracy(pred_test_tta,y_test_tta)
```

```
<IPython.core.display.HTML object>
```

[20]:
```
pred_test_tta.shape , y_test_tta.shape
```

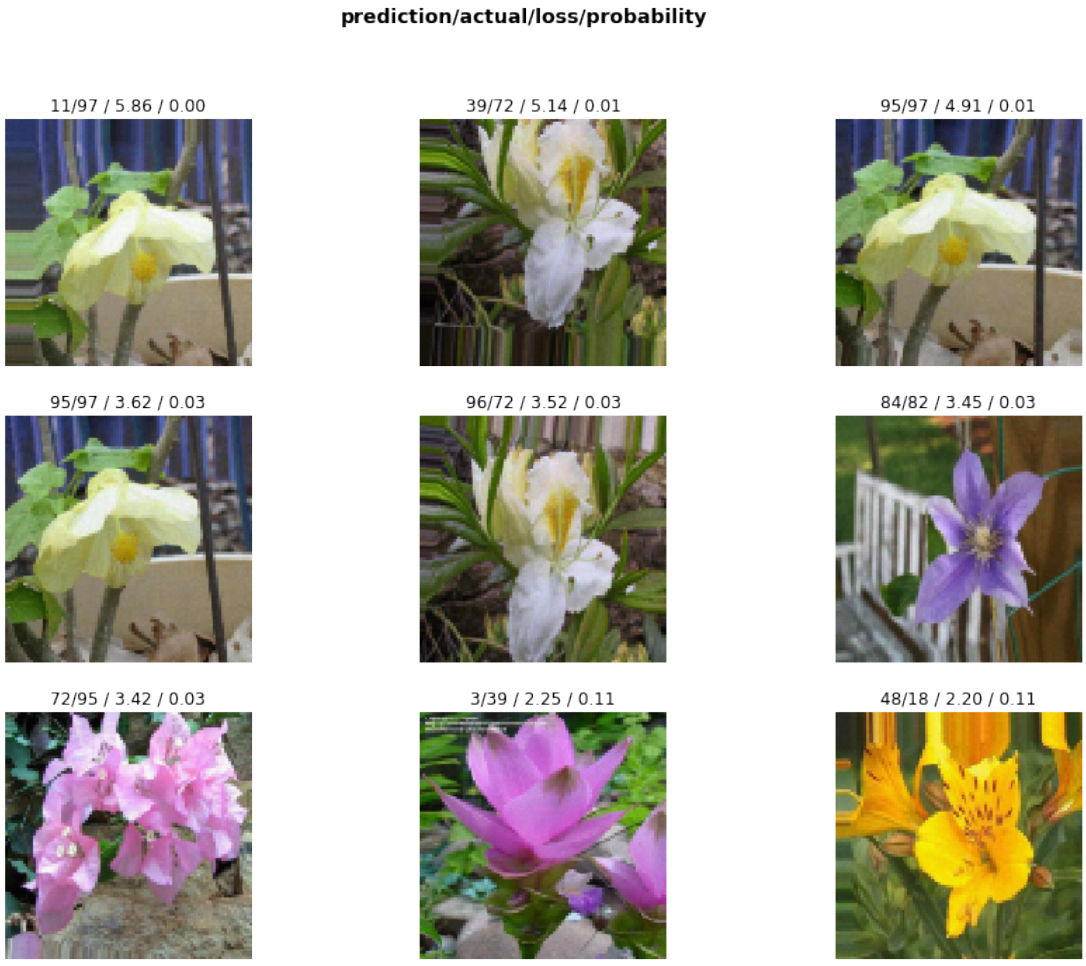
[20]:
```
(torch.Size([2009, 102]), torch.Size([2009]))
```

[21]:
```
data
```

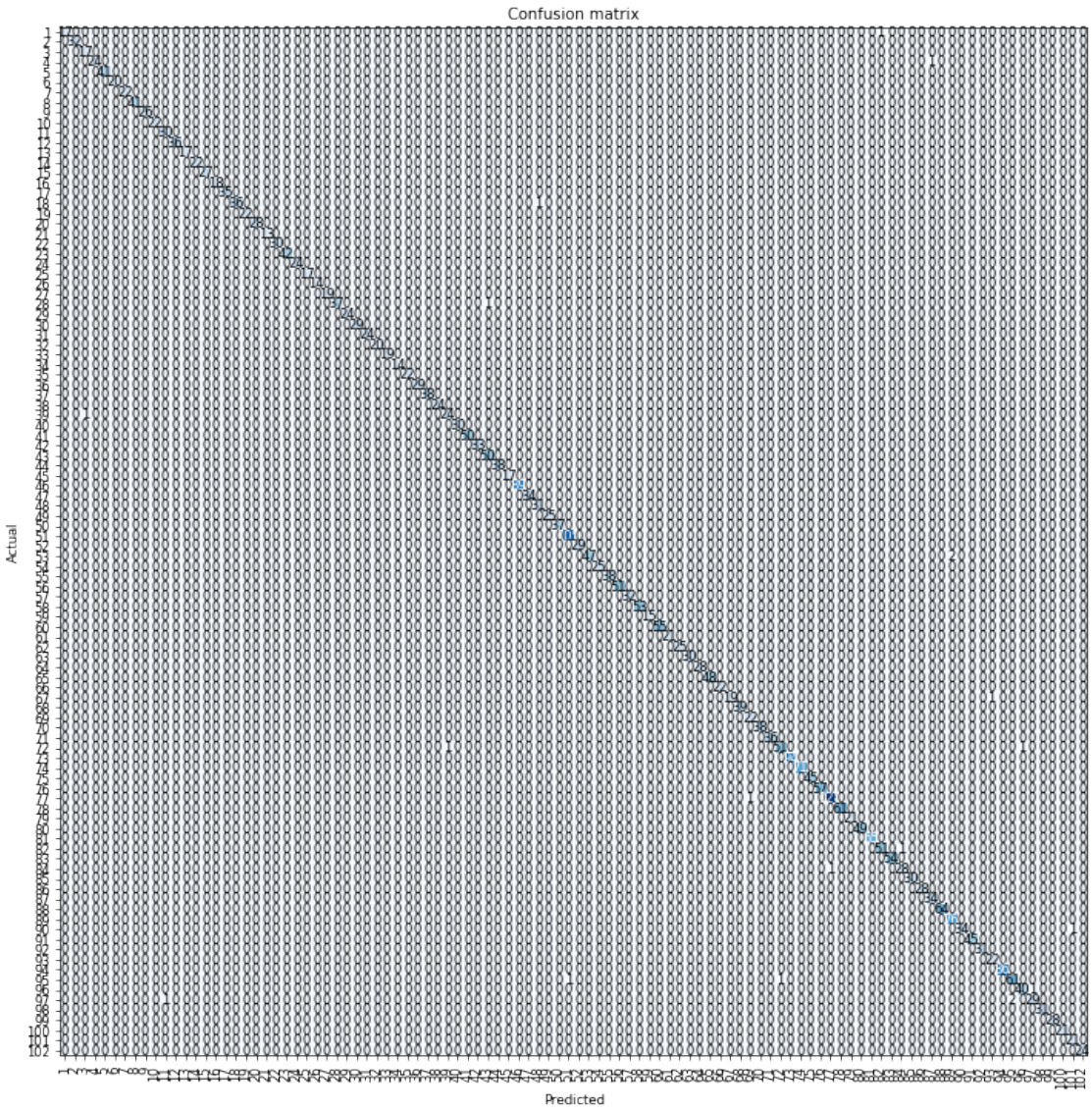
[21]:
```
ImageDataBunch;

Train: LabelList (14832 items)
x: ImageList
Image (3, 96, 96),Image (3, 96, 96),Image (3, 96, 96),Image (3, 96, 96),Image
(3, 96, 96)
y: CategoryList
77,52,58,75,51
Path: /kaggle/files/data;

Valid: LabelList (3708 items)
```

```
x: ImageList
Image (3, 96, 96),Image (3, 96, 96),Image (3, 96, 96),Image (3, 96, 96),Image
(3, 96, 96)
y: CategoryList
20,94,35,60,68
Path: /kaggle/files/data;

Test: LabelList (2009 items)
x: ImageList
Image (3, 96, 96),Image (3, 96, 96),Image (3, 96, 96),Image (3, 96, 96),Image
(3, 96, 96)
y: EmptyLabelList
,,,,
Path: /kaggle/files/data
```

[22]:
```
interp = ClassificationInterpretation.from_learner(learn)
interp.plot_top_losses(9, figsize=(15,11))
```



[23]:
```
interp.plot_confusion_matrix(figsize=(12,12), dpi=60)
```



[24]:
```
interp.most_confused(min_val=2)
```

[24]:
```
[(53, 89, 2), (97, 95, 2)]
```

[ ]:
```

```