hand-gesture-recognition

September 4, 2023

0.1 Libraries

[16]:
```
import fastai
from fastai.vision.all import *
import numpy as np
import matplotlib.pyplot as plt
import tensorflow as tf
import pandas as pd
```

0.2 Load files

[17]:
```
PATH = "/kaggle/input/leapgestrecog/leapGestRecog"
RANDOM_STATE = 42
TEST_SIZE = 0.3
IMG_SIZE = 128
```

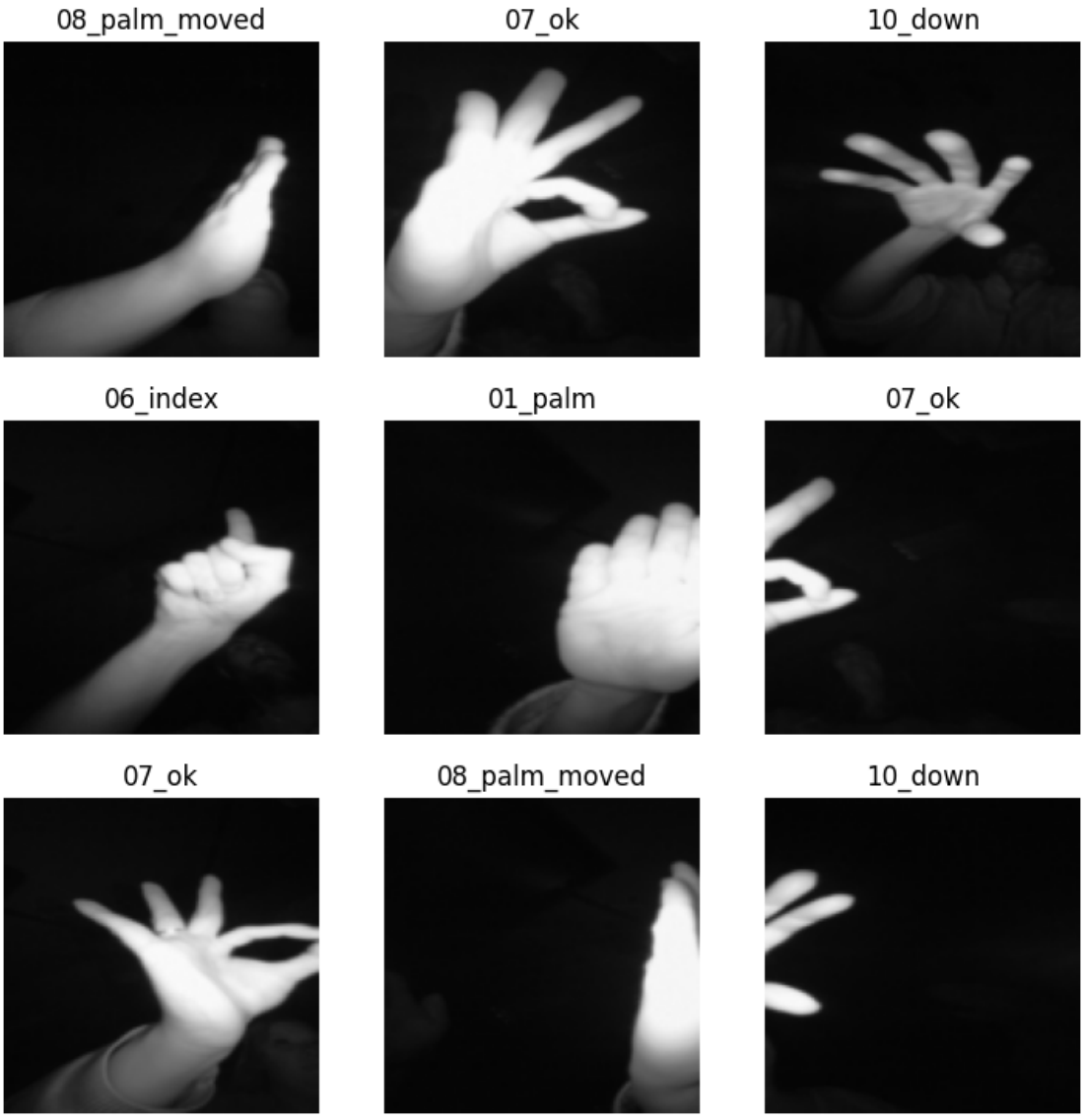
0.2.1 Create Datablock

[18]:
```
data = DataBlock(
                blocks=(ImageBlock, CategoryBlock),
                get_items = get_image_files,
                splitter=RandomSplitter(valid_pct=TEST_SIZE, seed=RANDOM_STATE),
                get_y = parent_label,
                item_tfms = Resize(IMG_SIZE)
)
```

[19]:
```
dataloaders = data.dataloaders(PATH, bs=64)
```

0.2.2 Sample from data files

[20]:
```
dataloaders.show_batch()
```



[21]:
```
learn = vision_learner(dataloaders, resnet34, metrics = error_rate)
```

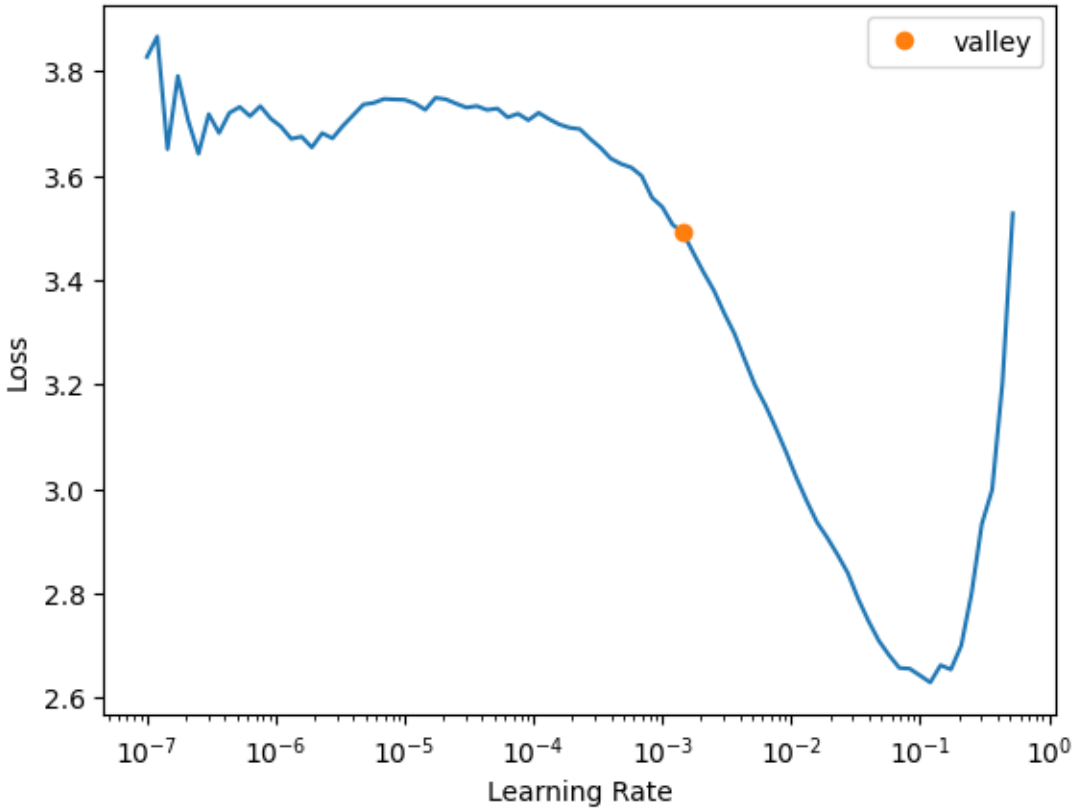
```
/opt/conda/lib/python3.10/site-packages/torchvision/models/_utils.py:208:
UserWarning: The parameter 'pretrained' is deprecated since 0.13 and may be
removed in the future, please use 'weights' instead.
  warnings.warn(
/opt/conda/lib/python3.10/site-packages/torchvision/models/_utils.py:223:
UserWarning: Arguments other than a weight enum or `None` for 'weights' are
deprecated since 0.13 and may be removed in the future. The current behavior is
equivalent to passing `weights=ResNet34_Weights.IMAGENET1K_V1`. You can also use
`weights=ResNet34_Weights.DEFAULT` to get the most up-to-date weights.
  warnings.warn(msg)
```

[22]:
```
learn.lr_find()
```

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

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

[22]:
```
SuggestedLRs(valley=0.0014454397605732083)
```



[23]:
```
learn.fine_tune(4, 3e-2)
```

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

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

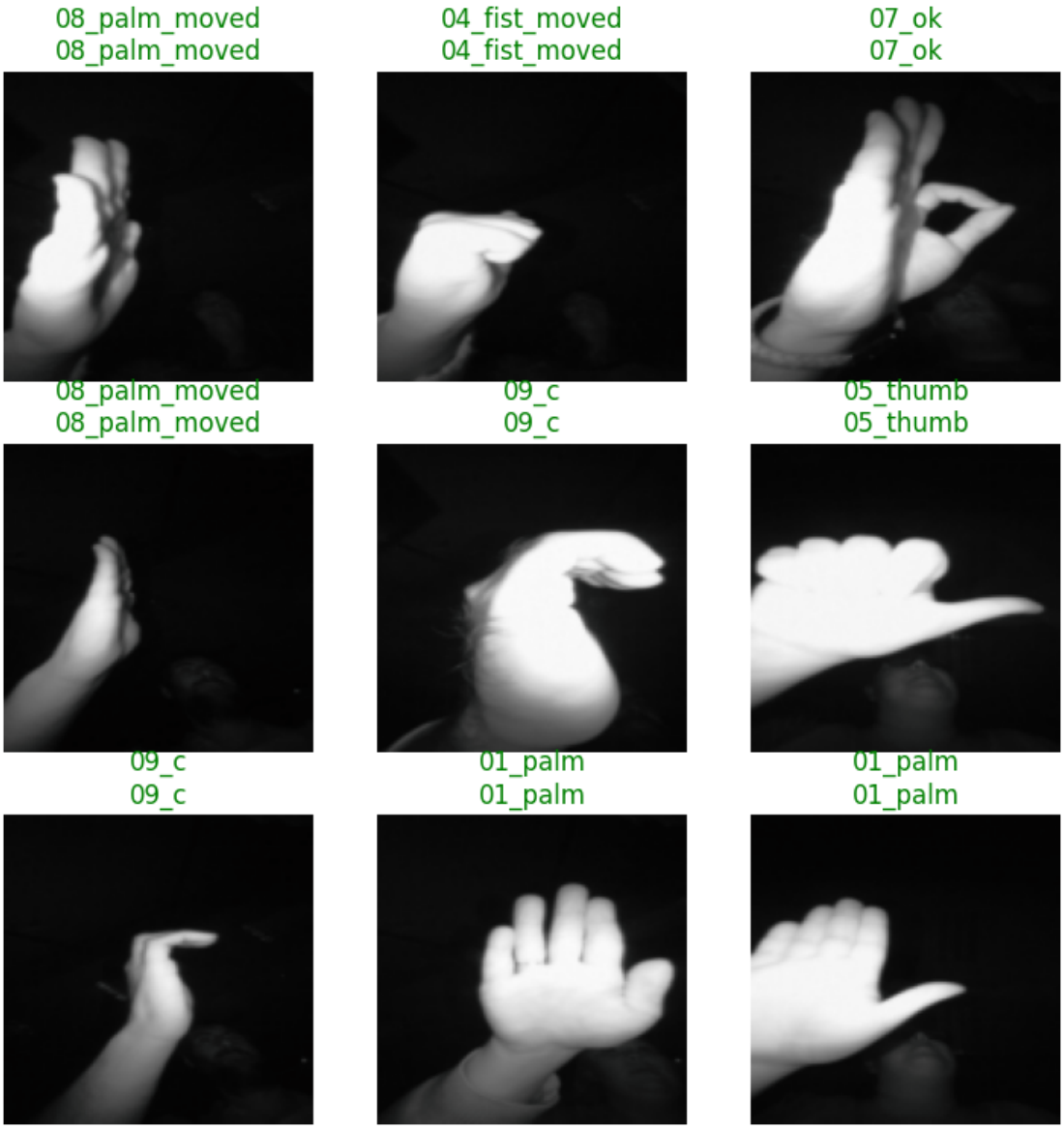
```
<IPython.core.display.HTML object>
```

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

[24]:
```
learn.show_results()
```

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

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



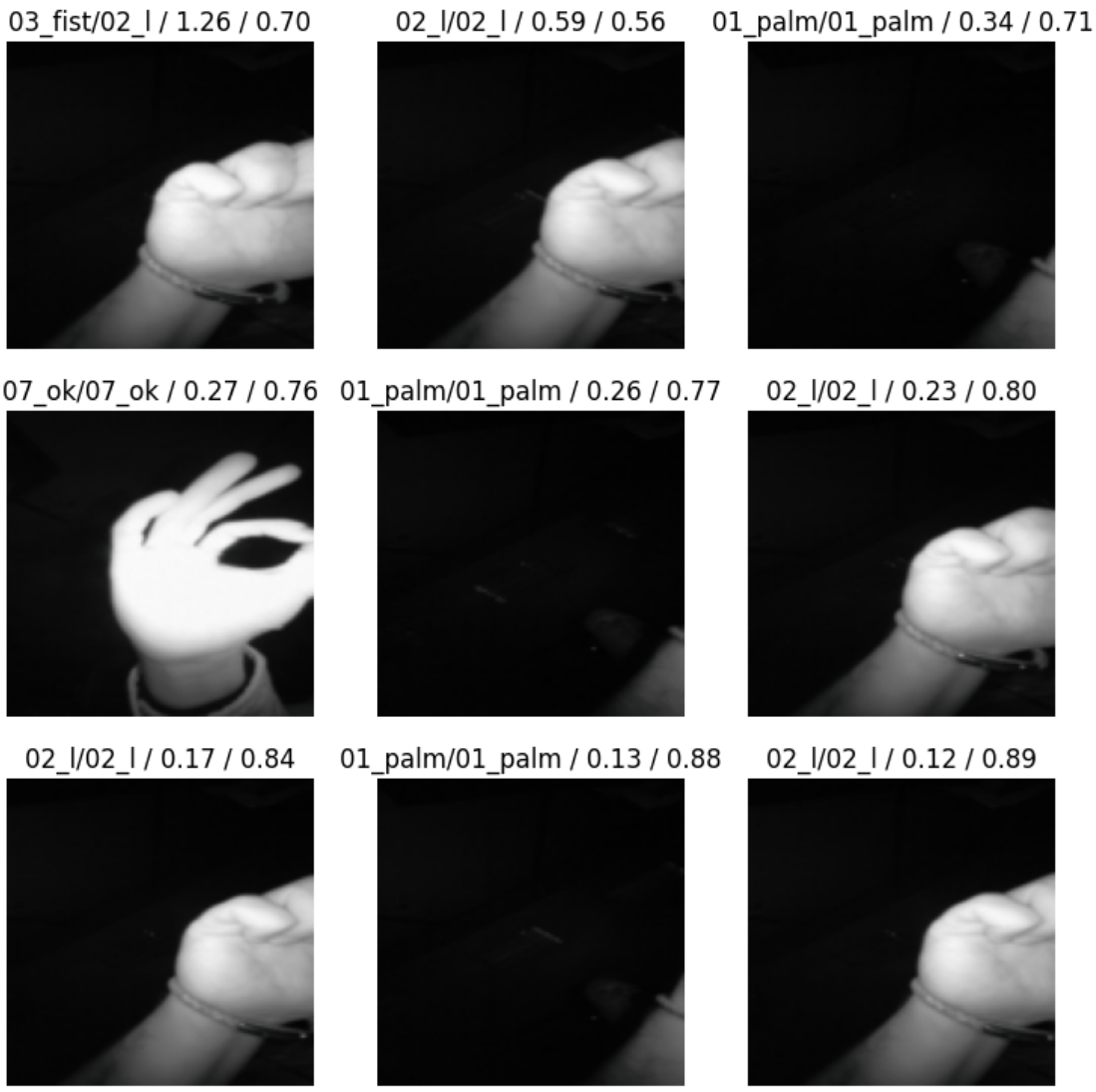
[25]:
```
interp = Interpretation.from_learner(learn)
interp.plot_top_losses(9)
```

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

<IPython.core.display.HTML object>

<IPython.core.display.HTML object>

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



[26]:
```
learn.summary()
```

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

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

[26]:
```
Sequential (Input shape: 64 x 3 x 128 x 128)
============================================================================
Layer (type)         Output Shape         Param #    Trainable
============================================================================
                     64 x 64 x 64 x 64
```

```
Conv2d                                  9408        True
BatchNorm2d                             128         True
ReLU
--------------------------------------------------------------------------
                    64 x 64 x 32 x 32
MaxPool2d
Conv2d                                  36864       True
BatchNorm2d                             128         True
ReLU
Conv2d                                  36864       True
BatchNorm2d                             128         True
Conv2d                                  36864       True
BatchNorm2d                             128         True
ReLU
Conv2d                                  36864       True
BatchNorm2d                             128         True
Conv2d                                  36864       True
BatchNorm2d                             128         True
ReLU
Conv2d                                  36864       True
BatchNorm2d                             128         True
--------------------------------------------------------------------------
                    64 x 128 x 16 x 16
Conv2d                                  73728       True
BatchNorm2d                             256         True
ReLU
Conv2d                                  147456      True
BatchNorm2d                             256         True
Conv2d                                  8192        True
BatchNorm2d                             256         True
Conv2d                                  147456      True
BatchNorm2d                             256         True
ReLU
Conv2d                                  147456      True
BatchNorm2d                             256         True
Conv2d                                  147456      True
BatchNorm2d                             256         True
ReLU
Conv2d                                  147456      True
BatchNorm2d                             256         True
Conv2d                                  147456      True
BatchNorm2d                             256         True
ReLU
Conv2d                                  147456      True
BatchNorm2d                             256         True
--------------------------------------------------------------------------
                    64 x 256 x 8 x 8
```

```
Conv2d                                   294912     True
BatchNorm2d                              512        True
ReLU
Conv2d                                   589824     True
BatchNorm2d                              512        True
Conv2d                                   32768      True
BatchNorm2d                              512        True
Conv2d                                   589824     True
BatchNorm2d                              512        True
ReLU
Conv2d                                   589824     True
BatchNorm2d                              512        True
Conv2d                                   589824     True
BatchNorm2d                              512        True
ReLU
Conv2d                                   589824     True
BatchNorm2d                              512        True
Conv2d                                   589824     True
BatchNorm2d                              512        True
ReLU
Conv2d                                   589824     True
BatchNorm2d                              512        True
Conv2d                                   589824     True
BatchNorm2d                              512        True
ReLU
Conv2d                                   589824     True
BatchNorm2d                              512        True
Conv2d                                   589824     True
BatchNorm2d                              512        True
ReLU
Conv2d                                   589824     True
BatchNorm2d                              512        True
--------------------------------------------------------------------------------
                    64 x 512 x 4 x 4
Conv2d                                   1179648    True
BatchNorm2d                              1024       True
ReLU
Conv2d                                   2359296    True
BatchNorm2d                              1024       True
Conv2d                                   131072     True
BatchNorm2d                              1024       True
Conv2d                                   2359296    True
BatchNorm2d                              1024       True
ReLU
Conv2d                                   2359296    True
BatchNorm2d                              1024       True
Conv2d                                   2359296    True
```

```
BatchNorm2d                             1024       True
ReLU
Conv2d                                  2359296    True
BatchNorm2d                             1024       True
------------------------------------------------------------------------------
                    64 x 512 x 1 x 1
AdaptiveAvgPool2d
AdaptiveMaxPool2d
------------------------------------------------------------------------------
                    64 x 1024
Flatten
BatchNorm1d                             2048       True
Dropout
------------------------------------------------------------------------------
                    64 x 512
Linear                                  524288     True
ReLU
BatchNorm1d                             1024       True
Dropout
------------------------------------------------------------------------------
                    64 x 10
Linear                                  5120       True
------------------------------------------------------------------------------

Total params: 21,817,152
Total trainable params: 21,817,152
Total non-trainable params: 0

Optimizer used: <function Adam at 0x7a0ed796c3a0>
Loss function: FlattenedLoss of CrossEntropyLoss()

Model unfrozen

Callbacks:
  - TrainEvalCallback
  - CastToTensor
  - Recorder
  - ProgressCallback
```

0.2.3 Exported model

[27]:
```
learn.export("model-r34")
```