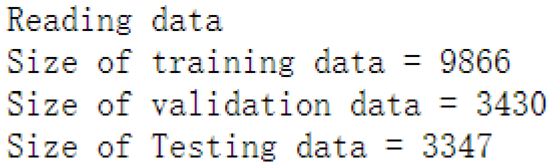
CNN –Report

Data

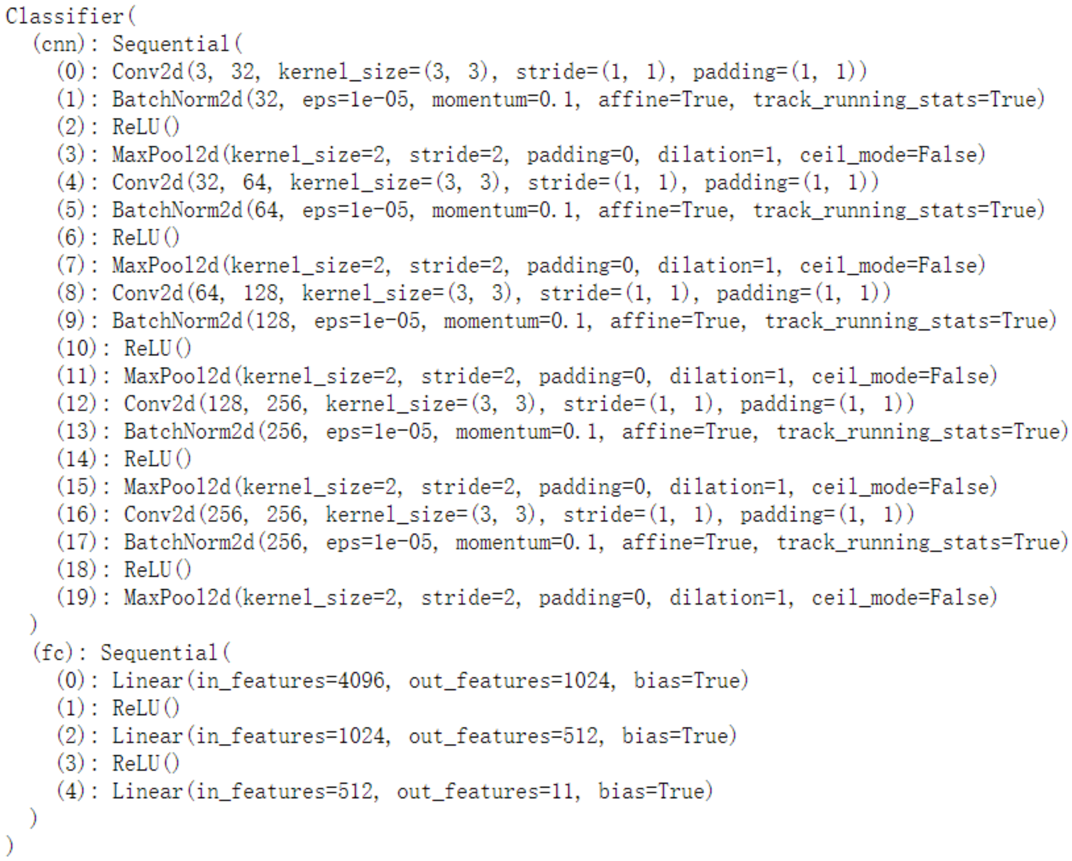
Professor Hongyi Li's Machine Learning Course
https://pan.baidu.com/s/1xWVKnm4P6bBawASzLYskaw Code： akti
Read pictures in to 128*128*3 numpy using cv2



```
Reading data
Size of training data = 9866
Size of validation data = 3430
Size of Testing data = 3347
```

Above is the number of pictures in the training, validation and testing set(no label). Because the testing label is not at hand, we use the validation set to validate the performance of out sample.

CNN Model, Parameter Number, Accuracy



```
Classifier(
  (cnn): Sequential(
    (0): Conv2d(3, 32, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
    (1): BatchNorm2d(32, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
    (2): ReLU()
    (3): MaxPool2d(kernel_size=2, stride=2, padding=0, dilation=1, ceil_mode=False)
    (4): Conv2d(32, 64, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
    (5): BatchNorm2d(64, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
    (6): ReLU()
    (7): MaxPool2d(kernel_size=2, stride=2, padding=0, dilation=1, ceil_mode=False)
    (8): Conv2d(64, 128, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
    (9): BatchNorm2d(128, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
    (10): ReLU()
    (11): MaxPool2d(kernel_size=2, stride=2, padding=0, dilation=1, ceil_mode=False)
    (12): Conv2d(128, 256, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
    (13): BatchNorm2d(256, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
    (14): ReLU()
    (15): MaxPool2d(kernel_size=2, stride=2, padding=0, dilation=1, ceil_mode=False)
    (16): Conv2d(256, 256, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
    (17): BatchNorm2d(256, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
    (18): ReLU()
    (19): MaxPool2d(kernel_size=2, stride=2, padding=0, dilation=1, ceil_mode=False)
  )
  (fc): Sequential(
    (0): Linear(in_features=4096, out_features=1024, bias=True)
    (1): ReLU()
    (2): Linear(in_features=1024, out_features=512, bias=True)
    (3): ReLU()
    (4): Linear(in_features=512, out_features=11, bias=True)
  )
)
```

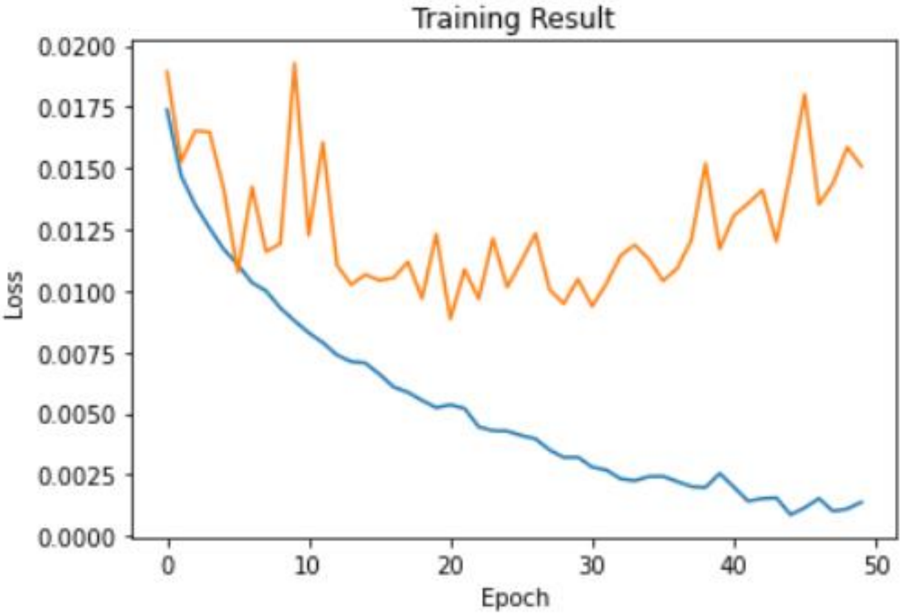
Total parameters: 5705329

(3*3*(3*32+32*64+64*128+128*256+256*256)+4096*1024+1024*512+512*11)

Training Accuaray: 93.9895%

Testing Accuracy: 66.0933%

Compare to the random result 9%, this is a good performance.



Keep the same parameters while cut the CNN depth half

Total parameters: 5914635

(3*3*(3*256+256*256+256*256)+4096*1024+1024*512+512*11)

Training Accuaray: 91.2875%

Testing Accuracy: 63.2465%

The result is a little bit worse than the previous