

```
In [1]: import torch
import torch.nn as nn
import torch.nn.functional as F
import torch.optim as optim
import torchvision
import torchvision.models as models

import os
import torch
import librosa

import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline

from datasets import AudioDataset
```

```
/home/wew016/.local/lib/python3.7/site-packages/librosa/util/decorators.py:9: NumbaDeprecationWarning: An import was requested from a module that has moved location.
Import requested from: 'numba.decorators', please update to use 'numba.core.decorators' or pin to Numba version 0.48.0. This alias will not be present in Numba version 0.50.0.
    from numba.decorators import jit as optional_jit
/home/wew016/.local/lib/python3.7/site-packages/librosa/util/decorators.py:9: NumbaDeprecationWarning: An import was requested from a module that has moved location.
Import of 'jit' requested from: 'numba.decorators', please update to use 'numba.core.decorators' or pin to Numba version 0.48.0. This alias will not be present in Numba version 0.50.0.
    from numba.decorators import jit as optional_jit
```

```
In [2]: # path to urban sound 8k
data_root = "/home/wew016/UrbanSound8K/"
# path to label
label_path = "/home/wew016/UrbanSound8K/metadata/UrbanSound8K.csv"
```

```
In [3]: def lr_schedule(epoch, init_lr):
    if epoch < 20:
        return init_lr
    elif epoch >= 20 and epoch < 40:
        return init_lr/10
    elif epoch >= 40 and epoch < 80:
        return init_lr/100
    else:
        return init_lr/1000
```

```
In [4]: def train(MAX_EPOCH = 100):

    eval_interval = 5

    # initialize dataset (feature can be "mfcc", "spec", "mel_raw")
    audio_dataset = AudioDataset(1, DataRoot=data_root, LabelPath=label_path, feature="mfcc", mode="train")

    # define lstm model
    cnn_model = models.vgg11(num_classes=10)
```

```

# to gpu
cnn_model = cnn_model.cuda()
#print(cnn_model)
# initialize dataloader
data_loader = torch.utils.data.DataLoader(audio_dataset, batch_size=
32, shuffle=True, num_workers=1)

# loss function
loss_fn = nn.CrossEntropyLoss().cuda()

# lr
learning_rate = 1e-4

# initialize optimizer
optimizer = torch.optim.Adam(cnn_model.parameters(), lr=learning_rate)

# initialize logger
train_acc = []
test_acc = []

train_loss = []
test_loss = []

for epoch in range(MAX_EPOCH):
    # iterate through dataset
    for param_group in optimizer.param_groups:
        param_group['lr'] = lr_schedule(epoch, learning_rate)

    # initialize epoch stat
    correct_num = 0
    total_num = 0
    loss_sum = 0

    for idx, data in enumerate(data_loader):
        #print(idx)
        train_data, labels = data

        #train_data = train_data.type(torch.float32)/255

        # data to gpu
        train_data = train_data.cuda()
        labels = labels.cuda()

        prob = cnn_model(train_data)
        loss = loss_fn(prob, labels)

        output = prob.argmax(1)

        loss_sum += loss.item()*float(labels.shape[0])
        correct_num += (output==labels).sum().double()
        total_num += float(labels.shape[0])

        optimizer.zero_grad()

        loss.backward()

        optimizer.step()

    train_acc.append(correct_num/total_num)

```

```

        train_loss.append(loss_sum/total_num)

        print("epoch: {} acc: {:.4} avg loss: {:.4f}".format(epoch, correct_num/total_num, loss_sum/total_num))

    #         if epoch%5 == 4:

            a,b = test(cnn_model)
            test_acc.append(a)
            test_loss.append(b)

    plt.figure()
    plt.plot(np.arange(MAX_EPOCH), train_acc)
    #     plt.plot(np.arange(eval_interval-1, MAX_EPOCH, eval_interval), test_acc)
    plt.plot(np.arange(MAX_EPOCH), test_acc)
    plt.title("accuracy")
    plt.legend(["train", "val"])

    plt.figure()
    plt.plot(np.arange(MAX_EPOCH), train_loss)
    #     plt.plot(np.arange(eval_interval-1, MAX_EPOCH, eval_interval), test_loss)
    plt.plot(np.arange(MAX_EPOCH), test_loss)
    plt.title("loss")
    plt.legend(["train", "val"])

```

```

In [5]: def test(model, ):
        test_dataset = AudioDataset(1, DataRoot=data_root, LabelPath=label_path, feature="mfcc", mode="test")
        test_loader = torch.utils.data.DataLoader(test_dataset, batch_size=32, shuffle=True, num_workers=1)

        model.eval()

        loss_fn = nn.CrossEntropyLoss().cuda()

        correct_num = 0
        total_num = 0
        loss_sum = 0

        for idx, data in enumerate(test_loader):
            test_data, labels = data
            test_data = test_data.cuda()
            labels = labels.cuda()

            test_data = test_data.cuda()

            prob = model(test_data)
            loss = loss_fn(prob, labels)

            output = prob.argmax(1)

            correct_num += (output==labels).sum().double()
            loss_sum += loss.item()*float(labels.shape[0])
            total_num += float(labels.shape[0])

        model.train()

```

```
print("##Testing## epoch acc: {:.4}".format(correct_num/total_num))
return correct_num/total_num, loss_sum/total_num
```

```
In [6]: train(100)
# vgg11 fold1 spec
```

```
verify spec feature success
epoch: 0 acc: 0.2972 avg loss: 2.1459
verify spec feature success
##Testing## epoch acc: 0.4502
epoch: 1 acc: 0.5633 avg loss: 1.2184
verify spec feature success
##Testing## epoch acc: 0.6254
epoch: 2 acc: 0.6665 avg loss: 0.9462
verify spec feature success
##Testing## epoch acc: 0.6495
epoch: 3 acc: 0.7311 avg loss: 0.7624
verify spec feature success
##Testing## epoch acc: 0.6586
epoch: 4 acc: 0.7691 avg loss: 0.7021
verify spec feature success
##Testing## epoch acc: 0.6575
epoch: 5 acc: 0.7917 avg loss: 0.6131
verify spec feature success
##Testing## epoch acc: 0.6403
epoch: 6 acc: 0.8158 avg loss: 0.5455
verify spec feature success
##Testing## epoch acc: 0.6976
epoch: 7 acc: 0.8261 avg loss: 0.5088
verify spec feature success
##Testing## epoch acc: 0.6644
epoch: 8 acc: 0.8506 avg loss: 0.4447
verify spec feature success
##Testing## epoch acc: 0.7102
epoch: 9 acc: 0.8635 avg loss: 0.4143
verify spec feature success
##Testing## epoch acc: 0.7182
epoch: 10 acc: 0.8635 avg loss: 0.4026
verify spec feature success
##Testing## epoch acc: 0.6942
epoch: 11 acc: 0.871 avg loss: 0.3846
verify spec feature success
##Testing## epoch acc: 0.7068
epoch: 12 acc: 0.8832 avg loss: 0.3470
verify spec feature success
##Testing## epoch acc: 0.6609
epoch: 13 acc: 0.884 avg loss: 0.3492
verify spec feature success
##Testing## epoch acc: 0.6369
epoch: 14 acc: 0.8916 avg loss: 0.3351
verify spec feature success
##Testing## epoch acc: 0.6942
epoch: 15 acc: 0.9 avg loss: 0.3077
verify spec feature success
##Testing## epoch acc: 0.63
epoch: 16 acc: 0.8994 avg loss: 0.2994
verify spec feature success
##Testing## epoch acc: 0.6506
epoch: 17 acc: 0.9093 avg loss: 0.2836
verify spec feature success
##Testing## epoch acc: 0.6495
```

```
epoch: 18 acc: 0.9214 avg loss: 0.2359
verify spec feature success
##Testing## epoch acc: 0.701
epoch: 19 acc: 0.9116 avg loss: 0.2739
verify spec feature success
##Testing## epoch acc: 0.6323
epoch: 20 acc: 0.9529 avg loss: 0.1510
verify spec feature success
##Testing## epoch acc: 0.6884
epoch: 21 acc: 0.9622 avg loss: 0.1084
verify spec feature success
##Testing## epoch acc: 0.7068
epoch: 22 acc: 0.9656 avg loss: 0.1027
verify spec feature success
##Testing## epoch acc: 0.6838
epoch: 23 acc: 0.9692 avg loss: 0.0914
verify spec feature success
##Testing## epoch acc: 0.6873
epoch: 24 acc: 0.9688 avg loss: 0.0903
verify spec feature success
##Testing## epoch acc: 0.693
epoch: 25 acc: 0.9785 avg loss: 0.0666
verify spec feature success
##Testing## epoch acc: 0.7045
epoch: 26 acc: 0.9776 avg loss: 0.0681
verify spec feature success
##Testing## epoch acc: 0.6942
epoch: 27 acc: 0.9799 avg loss: 0.0610
verify spec feature success
##Testing## epoch acc: 0.6964
epoch: 28 acc: 0.9793 avg loss: 0.0607
verify spec feature success
##Testing## epoch acc: 0.6976
epoch: 29 acc: 0.9815 avg loss: 0.0528
verify spec feature success
##Testing## epoch acc: 0.6953
epoch: 30 acc: 0.9828 avg loss: 0.0488
verify spec feature success
##Testing## epoch acc: 0.7113
epoch: 31 acc: 0.9808 avg loss: 0.0531
verify spec feature success
##Testing## epoch acc: 0.6896
epoch: 32 acc: 0.9814 avg loss: 0.0523
verify spec feature success
##Testing## epoch acc: 0.701
epoch: 33 acc: 0.9818 avg loss: 0.0508
verify spec feature success
##Testing## epoch acc: 0.7113
epoch: 34 acc: 0.986 avg loss: 0.0456
verify spec feature success
##Testing## epoch acc: 0.7079
epoch: 35 acc: 0.9856 avg loss: 0.0417
verify spec feature success
##Testing## epoch acc: 0.7068
epoch: 36 acc: 0.9863 avg loss: 0.0418
verify spec feature success
##Testing## epoch acc: 0.7182
epoch: 37 acc: 0.9873 avg loss: 0.0365
verify spec feature success
##Testing## epoch acc: 0.6873
epoch: 38 acc: 0.9854 avg loss: 0.0427
```

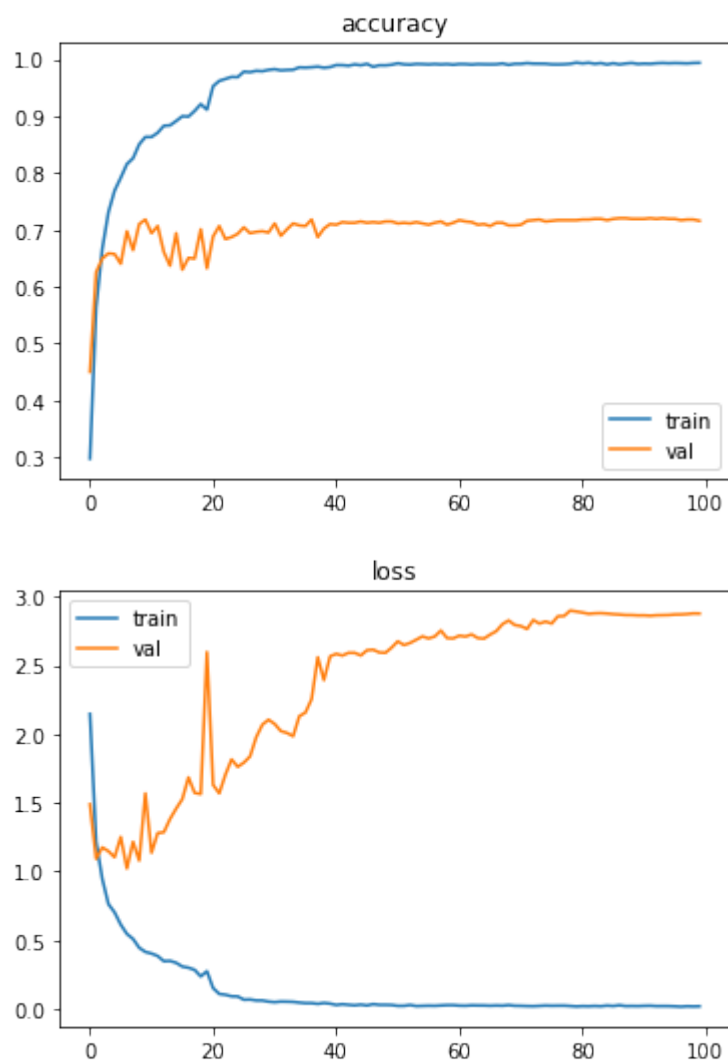
```
verify spec feature success
##Testing## epoch acc: 0.7022
epoch: 39 acc: 0.9865 avg loss: 0.0380
verify spec feature success
##Testing## epoch acc: 0.7102
epoch: 40 acc: 0.9901 avg loss: 0.0282
verify spec feature success
##Testing## epoch acc: 0.709
epoch: 41 acc: 0.9899 avg loss: 0.0335
verify spec feature success
##Testing## epoch acc: 0.7136
epoch: 42 acc: 0.9889 avg loss: 0.0293
verify spec feature success
##Testing## epoch acc: 0.7125
epoch: 43 acc: 0.9912 avg loss: 0.0258
verify spec feature success
##Testing## epoch acc: 0.7125
epoch: 44 acc: 0.9898 avg loss: 0.0306
verify spec feature success
##Testing## epoch acc: 0.7148
epoch: 45 acc: 0.9921 avg loss: 0.0248
verify spec feature success
##Testing## epoch acc: 0.7125
epoch: 46 acc: 0.987 avg loss: 0.0342
verify spec feature success
##Testing## epoch acc: 0.7136
epoch: 47 acc: 0.9897 avg loss: 0.0291
verify spec feature success
##Testing## epoch acc: 0.7125
epoch: 48 acc: 0.9896 avg loss: 0.0290
verify spec feature success
##Testing## epoch acc: 0.7148
epoch: 49 acc: 0.9907 avg loss: 0.0279
verify spec feature success
##Testing## epoch acc: 0.7148
epoch: 50 acc: 0.9931 avg loss: 0.0218
verify spec feature success
##Testing## epoch acc: 0.7113
epoch: 51 acc: 0.9913 avg loss: 0.0220
verify spec feature success
##Testing## epoch acc: 0.7125
epoch: 52 acc: 0.9908 avg loss: 0.0280
verify spec feature success
##Testing## epoch acc: 0.7113
epoch: 53 acc: 0.992 avg loss: 0.0203
verify spec feature success
##Testing## epoch acc: 0.7136
epoch: 54 acc: 0.9917 avg loss: 0.0217
verify spec feature success
##Testing## epoch acc: 0.7113
epoch: 55 acc: 0.9912 avg loss: 0.0230
verify spec feature success
##Testing## epoch acc: 0.709
epoch: 56 acc: 0.9919 avg loss: 0.0221
verify spec feature success
##Testing## epoch acc: 0.7125
epoch: 57 acc: 0.9912 avg loss: 0.0248
verify spec feature success
##Testing## epoch acc: 0.7148
epoch: 58 acc: 0.9917 avg loss: 0.0270
verify spec feature success
```

```
##Testing## epoch acc: 0.709
epoch: 59 acc: 0.9907 avg loss: 0.0270
verify spec feature success
##Testing## epoch acc: 0.7125
epoch: 60 acc: 0.9919 avg loss: 0.0235
verify spec feature success
##Testing## epoch acc: 0.7171
epoch: 61 acc: 0.9917 avg loss: 0.0226
verify spec feature success
##Testing## epoch acc: 0.7148
epoch: 62 acc: 0.991 avg loss: 0.0258
verify spec feature success
##Testing## epoch acc: 0.7136
epoch: 63 acc: 0.9917 avg loss: 0.0248
verify spec feature success
##Testing## epoch acc: 0.709
epoch: 64 acc: 0.9915 avg loss: 0.0246
verify spec feature success
##Testing## epoch acc: 0.7102
epoch: 65 acc: 0.9913 avg loss: 0.0228
verify spec feature success
##Testing## epoch acc: 0.7068
epoch: 66 acc: 0.9915 avg loss: 0.0245
verify spec feature success
##Testing## epoch acc: 0.7125
epoch: 67 acc: 0.9929 avg loss: 0.0231
verify spec feature success
##Testing## epoch acc: 0.7125
epoch: 68 acc: 0.9905 avg loss: 0.0273
verify spec feature success
##Testing## epoch acc: 0.7079
epoch: 69 acc: 0.9922 avg loss: 0.0225
verify spec feature success
##Testing## epoch acc: 0.7079
epoch: 70 acc: 0.9922 avg loss: 0.0218
verify spec feature success
##Testing## epoch acc: 0.709
epoch: 71 acc: 0.9935 avg loss: 0.0203
verify spec feature success
##Testing## epoch acc: 0.7159
epoch: 72 acc: 0.9926 avg loss: 0.0194
verify spec feature success
##Testing## epoch acc: 0.7171
epoch: 73 acc: 0.9925 avg loss: 0.0215
verify spec feature success
##Testing## epoch acc: 0.7182
epoch: 74 acc: 0.9924 avg loss: 0.0239
verify spec feature success
##Testing## epoch acc: 0.7148
epoch: 75 acc: 0.9913 avg loss: 0.0226
verify spec feature success
##Testing## epoch acc: 0.7159
epoch: 76 acc: 0.9912 avg loss: 0.0231
verify spec feature success
##Testing## epoch acc: 0.7171
epoch: 77 acc: 0.9915 avg loss: 0.0234
verify spec feature success
##Testing## epoch acc: 0.7171
epoch: 78 acc: 0.9922 avg loss: 0.0206
verify spec feature success
##Testing## epoch acc: 0.7171
```

```
epoch: 79 acc: 0.9944 avg loss: 0.0176
verify spec feature success
##Testing## epoch acc: 0.7171
epoch: 80 acc: 0.993 avg loss: 0.0198
verify spec feature success
##Testing## epoch acc: 0.7182
epoch: 81 acc: 0.9941 avg loss: 0.0189
verify spec feature success
##Testing## epoch acc: 0.7182
epoch: 82 acc: 0.9922 avg loss: 0.0208
verify spec feature success
##Testing## epoch acc: 0.7194
epoch: 83 acc: 0.9935 avg loss: 0.0189
verify spec feature success
##Testing## epoch acc: 0.7194
epoch: 84 acc: 0.9911 avg loss: 0.0238
verify spec feature success
##Testing## epoch acc: 0.7171
epoch: 85 acc: 0.9933 avg loss: 0.0207
verify spec feature success
##Testing## epoch acc: 0.7194
epoch: 86 acc: 0.9912 avg loss: 0.0264
verify spec feature success
##Testing## epoch acc: 0.7205
epoch: 87 acc: 0.9927 avg loss: 0.0200
verify spec feature success
##Testing## epoch acc: 0.7205
epoch: 88 acc: 0.9938 avg loss: 0.0207
verify spec feature success
##Testing## epoch acc: 0.7194
epoch: 89 acc: 0.992 avg loss: 0.0200
verify spec feature success
##Testing## epoch acc: 0.7194
epoch: 90 acc: 0.9926 avg loss: 0.0218
verify spec feature success
##Testing## epoch acc: 0.7194
epoch: 91 acc: 0.9922 avg loss: 0.0226
verify spec feature success
##Testing## epoch acc: 0.7205
epoch: 92 acc: 0.9933 avg loss: 0.0198
verify spec feature success
##Testing## epoch acc: 0.7194
epoch: 93 acc: 0.9938 avg loss: 0.0201
verify spec feature success
##Testing## epoch acc: 0.7205
epoch: 94 acc: 0.9933 avg loss: 0.0198
verify spec feature success
##Testing## epoch acc: 0.7194
epoch: 95 acc: 0.9936 avg loss: 0.0182
verify spec feature success
##Testing## epoch acc: 0.7194
epoch: 96 acc: 0.9934 avg loss: 0.0157
verify spec feature success
##Testing## epoch acc: 0.7171
epoch: 97 acc: 0.993 avg loss: 0.0188
verify spec feature success
##Testing## epoch acc: 0.7182
epoch: 98 acc: 0.9938 avg loss: 0.0173
verify spec feature success
##Testing## epoch acc: 0.7182
epoch: 99 acc: 0.994 avg loss: 0.0187
```



```
verify spec feature success
##Testing## epoch acc: 0.7159
```



```
In [6]: train(100)
# vgg11 fold1 mfcc
```

```
verify mfcc feature success
epoch: 0 acc: 0.1414 avg loss: 2.8256
verify mfcc feature success
##Testing## epoch acc: 0.1649
epoch: 1 acc: 0.176 avg loss: 2.1812
verify mfcc feature success
##Testing## epoch acc: 0.2658
epoch: 2 acc: 0.2337 avg loss: 2.0691
verify mfcc feature success
##Testing## epoch acc: 0.3127
epoch: 3 acc: 0.3182 avg loss: 1.8913
verify mfcc feature success
##Testing## epoch acc: 0.2978
epoch: 4 acc: 0.3626 avg loss: 1.7478
verify mfcc feature success
##Testing## epoch acc: 0.4364
epoch: 5 acc: 0.4056 avg loss: 1.6505
verify mfcc feature success
##Testing## epoch acc: 0.4376
epoch: 6 acc: 0.43 avg loss: 1.5889
verify mfcc feature success
##Testing## epoch acc: 0.4044
```

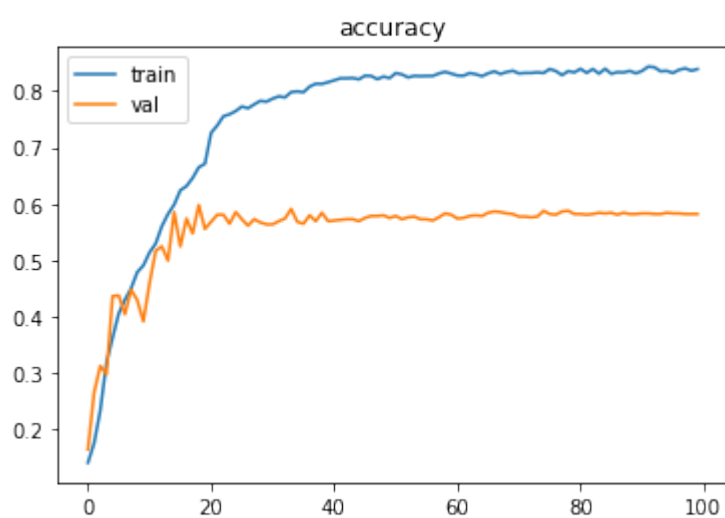
```
epoch: 7 acc: 0.4501 avg loss: 1.5542
verify mfcc feature success
##Testing## epoch acc: 0.4479
epoch: 8 acc: 0.4788 avg loss: 1.4807
verify mfcc feature success
##Testing## epoch acc: 0.4296
epoch: 9 acc: 0.4908 avg loss: 1.4455
verify mfcc feature success
##Testing## epoch acc: 0.3918
epoch: 10 acc: 0.5138 avg loss: 1.3871
verify mfcc feature success
##Testing## epoch acc: 0.4593
epoch: 11 acc: 0.5296 avg loss: 1.3357
verify mfcc feature success
##Testing## epoch acc: 0.5166
epoch: 12 acc: 0.5602 avg loss: 1.2648
verify mfcc feature success
##Testing## epoch acc: 0.5246
epoch: 13 acc: 0.582 avg loss: 1.2008
verify mfcc feature success
##Testing## epoch acc: 0.4994
epoch: 14 acc: 0.5985 avg loss: 1.1424
verify mfcc feature success
##Testing## epoch acc: 0.5853
epoch: 15 acc: 0.6239 avg loss: 1.0938
verify mfcc feature success
##Testing## epoch acc: 0.5246
epoch: 16 acc: 0.6314 avg loss: 1.0541
verify mfcc feature success
##Testing## epoch acc: 0.5739
epoch: 17 acc: 0.6458 avg loss: 1.0130
verify mfcc feature success
##Testing## epoch acc: 0.5475
epoch: 18 acc: 0.6647 avg loss: 0.9693
verify mfcc feature success
##Testing## epoch acc: 0.5979
epoch: 19 acc: 0.6711 avg loss: 0.9447
verify mfcc feature success
##Testing## epoch acc: 0.5556
epoch: 20 acc: 0.7258 avg loss: 0.7866
verify mfcc feature success
##Testing## epoch acc: 0.5682
epoch: 21 acc: 0.7388 avg loss: 0.7449
verify mfcc feature success
##Testing## epoch acc: 0.5808
epoch: 22 acc: 0.7552 avg loss: 0.7148
verify mfcc feature success
##Testing## epoch acc: 0.5808
epoch: 23 acc: 0.7586 avg loss: 0.6961
verify mfcc feature success
##Testing## epoch acc: 0.5647
epoch: 24 acc: 0.7643 avg loss: 0.6827
verify mfcc feature success
##Testing## epoch acc: 0.5853
epoch: 25 acc: 0.7724 avg loss: 0.6666
verify mfcc feature success
##Testing## epoch acc: 0.5727
epoch: 26 acc: 0.7693 avg loss: 0.6463
verify mfcc feature success
##Testing## epoch acc: 0.5613
epoch: 27 acc: 0.7762 avg loss: 0.6449
```

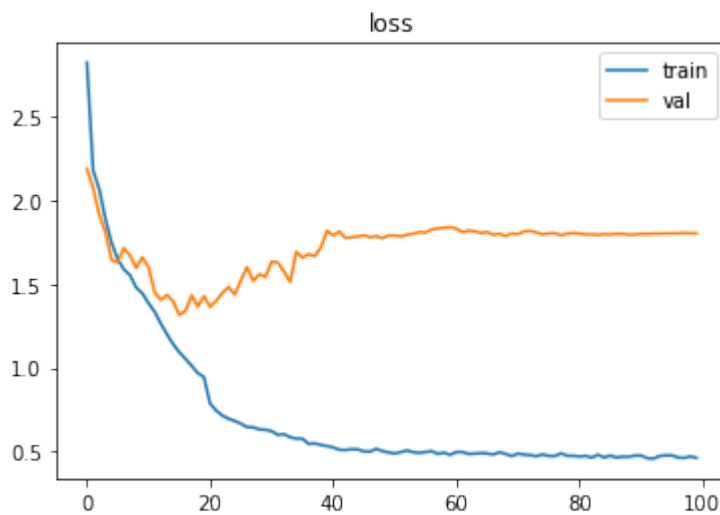
```
verify mfcc feature success
##Testing## epoch acc: 0.5727
epoch: 28 acc: 0.7824 avg loss: 0.6319
verify mfcc feature success
##Testing## epoch acc: 0.567
epoch: 29 acc: 0.781 avg loss: 0.6302
verify mfcc feature success
##Testing## epoch acc: 0.5636
epoch: 30 acc: 0.7864 avg loss: 0.6218
verify mfcc feature success
##Testing## epoch acc: 0.5636
epoch: 31 acc: 0.7904 avg loss: 0.5998
verify mfcc feature success
##Testing## epoch acc: 0.5693
epoch: 32 acc: 0.7885 avg loss: 0.6038
verify mfcc feature success
##Testing## epoch acc: 0.5739
epoch: 33 acc: 0.7979 avg loss: 0.5855
verify mfcc feature success
##Testing## epoch acc: 0.5911
epoch: 34 acc: 0.7992 avg loss: 0.5769
verify mfcc feature success
##Testing## epoch acc: 0.5682
epoch: 35 acc: 0.7977 avg loss: 0.5767
verify mfcc feature success
##Testing## epoch acc: 0.5647
epoch: 36 acc: 0.8077 avg loss: 0.5450
verify mfcc feature success
##Testing## epoch acc: 0.5796
epoch: 37 acc: 0.8127 avg loss: 0.5486
verify mfcc feature success
##Testing## epoch acc: 0.5693
epoch: 38 acc: 0.8124 avg loss: 0.5393
verify mfcc feature success
##Testing## epoch acc: 0.5842
epoch: 39 acc: 0.8155 avg loss: 0.5327
verify mfcc feature success
##Testing## epoch acc: 0.5693
epoch: 40 acc: 0.8188 avg loss: 0.5246
verify mfcc feature success
##Testing## epoch acc: 0.5704
epoch: 41 acc: 0.8224 avg loss: 0.5107
verify mfcc feature success
##Testing## epoch acc: 0.5716
epoch: 42 acc: 0.8224 avg loss: 0.5092
verify mfcc feature success
##Testing## epoch acc: 0.5727
epoch: 43 acc: 0.8229 avg loss: 0.5139
verify mfcc feature success
##Testing## epoch acc: 0.5727
epoch: 44 acc: 0.8206 avg loss: 0.5126
verify mfcc feature success
##Testing## epoch acc: 0.5693
epoch: 45 acc: 0.8269 avg loss: 0.5002
verify mfcc feature success
##Testing## epoch acc: 0.575
epoch: 46 acc: 0.8266 avg loss: 0.5001
verify mfcc feature success
##Testing## epoch acc: 0.5785
epoch: 47 acc: 0.8208 avg loss: 0.5157
verify mfcc feature success
```

```
##Testing## epoch acc: 0.5785
epoch: 48 acc: 0.8254 avg loss: 0.5026
verify mfcc feature success
##Testing## epoch acc: 0.5796
epoch: 49 acc: 0.8228 avg loss: 0.4937
verify mfcc feature success
##Testing## epoch acc: 0.575
epoch: 50 acc: 0.8317 avg loss: 0.4885
verify mfcc feature success
##Testing## epoch acc: 0.5785
epoch: 51 acc: 0.8292 avg loss: 0.4964
verify mfcc feature success
##Testing## epoch acc: 0.5727
epoch: 52 acc: 0.824 avg loss: 0.5064
verify mfcc feature success
##Testing## epoch acc: 0.5762
epoch: 53 acc: 0.8267 avg loss: 0.4955
verify mfcc feature success
##Testing## epoch acc: 0.5773
epoch: 54 acc: 0.8262 avg loss: 0.4918
verify mfcc feature success
##Testing## epoch acc: 0.5727
epoch: 55 acc: 0.8266 avg loss: 0.4971
verify mfcc feature success
##Testing## epoch acc: 0.5727
epoch: 56 acc: 0.8266 avg loss: 0.5020
verify mfcc feature success
##Testing## epoch acc: 0.5704
epoch: 57 acc: 0.8309 avg loss: 0.4864
verify mfcc feature success
##Testing## epoch acc: 0.5762
epoch: 58 acc: 0.8338 avg loss: 0.4927
verify mfcc feature success
##Testing## epoch acc: 0.583
epoch: 59 acc: 0.8308 avg loss: 0.4802
verify mfcc feature success
##Testing## epoch acc: 0.5808
epoch: 60 acc: 0.8273 avg loss: 0.4973
verify mfcc feature success
##Testing## epoch acc: 0.5739
epoch: 61 acc: 0.8269 avg loss: 0.4970
verify mfcc feature success
##Testing## epoch acc: 0.575
epoch: 62 acc: 0.8317 avg loss: 0.4854
verify mfcc feature success
##Testing## epoch acc: 0.5785
epoch: 63 acc: 0.8295 avg loss: 0.4874
verify mfcc feature success
##Testing## epoch acc: 0.5796
epoch: 64 acc: 0.8262 avg loss: 0.4908
verify mfcc feature success
##Testing## epoch acc: 0.5785
epoch: 65 acc: 0.8311 avg loss: 0.4880
verify mfcc feature success
##Testing## epoch acc: 0.5842
epoch: 66 acc: 0.8347 avg loss: 0.4823
verify mfcc feature success
##Testing## epoch acc: 0.5865
epoch: 67 acc: 0.83 avg loss: 0.4957
verify mfcc feature success
##Testing## epoch acc: 0.5853
```

```
epoch: 68 acc: 0.8336 avg loss: 0.4856
verify mfcc feature success
##Testing## epoch acc: 0.583
epoch: 69 acc: 0.8357 avg loss: 0.4727
verify mfcc feature success
##Testing## epoch acc: 0.5819
epoch: 70 acc: 0.831 avg loss: 0.4876
verify mfcc feature success
##Testing## epoch acc: 0.5773
epoch: 71 acc: 0.8319 avg loss: 0.4813
verify mfcc feature success
##Testing## epoch acc: 0.5773
epoch: 72 acc: 0.8319 avg loss: 0.4787
verify mfcc feature success
##Testing## epoch acc: 0.5762
epoch: 73 acc: 0.8329 avg loss: 0.4720
verify mfcc feature success
##Testing## epoch acc: 0.5773
epoch: 74 acc: 0.8318 avg loss: 0.4828
verify mfcc feature success
##Testing## epoch acc: 0.5876
epoch: 75 acc: 0.8388 avg loss: 0.4736
verify mfcc feature success
##Testing## epoch acc: 0.5819
epoch: 76 acc: 0.8352 avg loss: 0.4730
verify mfcc feature success
##Testing## epoch acc: 0.5808
epoch: 77 acc: 0.828 avg loss: 0.4890
verify mfcc feature success
##Testing## epoch acc: 0.5865
epoch: 78 acc: 0.8351 avg loss: 0.4744
verify mfcc feature success
##Testing## epoch acc: 0.5876
epoch: 79 acc: 0.8328 avg loss: 0.4745
verify mfcc feature success
##Testing## epoch acc: 0.5819
epoch: 80 acc: 0.8392 avg loss: 0.4700
verify mfcc feature success
##Testing## epoch acc: 0.5819
epoch: 81 acc: 0.832 avg loss: 0.4742
verify mfcc feature success
##Testing## epoch acc: 0.5808
epoch: 82 acc: 0.8388 avg loss: 0.4633
verify mfcc feature success
##Testing## epoch acc: 0.5819
epoch: 83 acc: 0.8306 avg loss: 0.4809
verify mfcc feature success
##Testing## epoch acc: 0.5842
epoch: 84 acc: 0.8393 avg loss: 0.4639
verify mfcc feature success
##Testing## epoch acc: 0.583
epoch: 85 acc: 0.8304 avg loss: 0.4760
verify mfcc feature success
##Testing## epoch acc: 0.5842
epoch: 86 acc: 0.8333 avg loss: 0.4641
verify mfcc feature success
##Testing## epoch acc: 0.5808
epoch: 87 acc: 0.8328 avg loss: 0.4693
verify mfcc feature success
##Testing## epoch acc: 0.5842
epoch: 88 acc: 0.8355 avg loss: 0.4686
```

```
verify mfcc feature success
##Testing## epoch acc: 0.5819
epoch: 89 acc: 0.8313 avg loss: 0.4758
verify mfcc feature success
##Testing## epoch acc: 0.5819
epoch: 90 acc: 0.8355 avg loss: 0.4758
verify mfcc feature success
##Testing## epoch acc: 0.583
epoch: 91 acc: 0.8431 avg loss: 0.4605
verify mfcc feature success
##Testing## epoch acc: 0.583
epoch: 92 acc: 0.842 avg loss: 0.4571
verify mfcc feature success
##Testing## epoch acc: 0.5819
epoch: 93 acc: 0.8348 avg loss: 0.4733
verify mfcc feature success
##Testing## epoch acc: 0.5819
epoch: 94 acc: 0.8356 avg loss: 0.4770
verify mfcc feature success
##Testing## epoch acc: 0.5842
epoch: 95 acc: 0.8318 avg loss: 0.4770
verify mfcc feature success
##Testing## epoch acc: 0.583
epoch: 96 acc: 0.8374 avg loss: 0.4641
verify mfcc feature success
##Testing## epoch acc: 0.583
epoch: 97 acc: 0.8401 avg loss: 0.4618
verify mfcc feature success
##Testing## epoch acc: 0.5819
epoch: 98 acc: 0.8359 avg loss: 0.4707
verify mfcc feature success
##Testing## epoch acc: 0.5819
epoch: 99 acc: 0.8387 avg loss: 0.4617
verify mfcc feature success
##Testing## epoch acc: 0.5819
```





```
In [6]: train(100)
        # vgg11 fold1 mfcc better results

verify mfcc feature success
epoch: 0 acc: 0.1836 avg loss: 2.1592
verify mfcc feature success
##Testing## epoch acc: 0.2944
epoch: 1 acc: 0.3269 avg loss: 1.8652
verify mfcc feature success
##Testing## epoch acc: 0.3792
epoch: 2 acc: 0.4732 avg loss: 1.5234
verify mfcc feature success
##Testing## epoch acc: 0.4559
epoch: 3 acc: 0.5728 avg loss: 1.2714
verify mfcc feature success
##Testing## epoch acc: 0.5063
epoch: 4 acc: 0.6472 avg loss: 1.0698
verify mfcc feature success
##Testing## epoch acc: 0.5246
epoch: 5 acc: 0.7096 avg loss: 0.8779
verify mfcc feature success
##Testing## epoch acc: 0.5533
epoch: 6 acc: 0.7525 avg loss: 0.7373
verify mfcc feature success
##Testing## epoch acc: 0.5487
epoch: 7 acc: 0.7908 avg loss: 0.6235
verify mfcc feature success
##Testing## epoch acc: 0.5911
epoch: 8 acc: 0.8219 avg loss: 0.5213
verify mfcc feature success
##Testing## epoch acc: 0.5876
epoch: 9 acc: 0.8534 avg loss: 0.4445
verify mfcc feature success
##Testing## epoch acc: 0.5349
epoch: 10 acc: 0.8655 avg loss: 0.3929
verify mfcc feature success
##Testing## epoch acc: 0.5132
epoch: 11 acc: 0.882 avg loss: 0.3487
verify mfcc feature success
##Testing## epoch acc: 0.5808
epoch: 12 acc: 0.8959 avg loss: 0.3080
verify mfcc feature success
##Testing## epoch acc: 0.5601
epoch: 13 acc: 0.9105 avg loss: 0.2646
```

```
verify mfcc feature success
##Testing## epoch acc: 0.5441
epoch: 14 acc: 0.9173 avg loss: 0.2384
verify mfcc feature success
##Testing## epoch acc: 0.5212
epoch: 15 acc: 0.9298 avg loss: 0.2145
verify mfcc feature success
##Testing## epoch acc: 0.5304
epoch: 16 acc: 0.9342 avg loss: 0.1944
verify mfcc feature success
##Testing## epoch acc: 0.5086
epoch: 17 acc: 0.9354 avg loss: 0.1950
verify mfcc feature success
##Testing## epoch acc: 0.5418
epoch: 18 acc: 0.945 avg loss: 0.1684
verify mfcc feature success
##Testing## epoch acc: 0.5601
epoch: 19 acc: 0.9513 avg loss: 0.1473
verify mfcc feature success
##Testing## epoch acc: 0.5601
epoch: 20 acc: 0.9729 avg loss: 0.0824
verify mfcc feature success
##Testing## epoch acc: 0.5624
epoch: 21 acc: 0.9838 avg loss: 0.0508
verify mfcc feature success
##Testing## epoch acc: 0.5578
epoch: 22 acc: 0.9865 avg loss: 0.0427
verify mfcc feature success
##Testing## epoch acc: 0.5716
epoch: 23 acc: 0.9861 avg loss: 0.0405
verify mfcc feature success
##Testing## epoch acc: 0.5613
epoch: 24 acc: 0.988 avg loss: 0.0347
verify mfcc feature success
##Testing## epoch acc: 0.5682
epoch: 25 acc: 0.9884 avg loss: 0.0360
verify mfcc feature success
##Testing## epoch acc: 0.5556
epoch: 26 acc: 0.9898 avg loss: 0.0316
verify mfcc feature success
##Testing## epoch acc: 0.567
epoch: 27 acc: 0.9899 avg loss: 0.0316
verify mfcc feature success
##Testing## epoch acc: 0.5716
epoch: 28 acc: 0.9893 avg loss: 0.0313
verify mfcc feature success
##Testing## epoch acc: 0.5682
epoch: 29 acc: 0.9916 avg loss: 0.0245
verify mfcc feature success
##Testing## epoch acc: 0.5704
epoch: 30 acc: 0.9915 avg loss: 0.0246
verify mfcc feature success
##Testing## epoch acc: 0.5533
epoch: 31 acc: 0.9915 avg loss: 0.0254
verify mfcc feature success
##Testing## epoch acc: 0.5601
epoch: 32 acc: 0.9911 avg loss: 0.0267
verify mfcc feature success
##Testing## epoch acc: 0.5613
epoch: 33 acc: 0.9935 avg loss: 0.0206
verify mfcc feature success
```



```
##Testing## epoch acc: 0.559
epoch: 34 acc: 0.9936 avg loss: 0.0201
verify mfcc feature success
##Testing## epoch acc: 0.5578
epoch: 35 acc: 0.9938 avg loss: 0.0175
verify mfcc feature success
##Testing## epoch acc: 0.5659
epoch: 36 acc: 0.9945 avg loss: 0.0169
verify mfcc feature success
##Testing## epoch acc: 0.5647
epoch: 37 acc: 0.9943 avg loss: 0.0159
verify mfcc feature success
##Testing## epoch acc: 0.5739
epoch: 38 acc: 0.9944 avg loss: 0.0152
verify mfcc feature success
##Testing## epoch acc: 0.5716
epoch: 39 acc: 0.9938 avg loss: 0.0168
verify mfcc feature success
##Testing## epoch acc: 0.5716
epoch: 40 acc: 0.9957 avg loss: 0.0133
verify mfcc feature success
##Testing## epoch acc: 0.5727
epoch: 41 acc: 0.9943 avg loss: 0.0176
verify mfcc feature success
##Testing## epoch acc: 0.5704
epoch: 42 acc: 0.9954 avg loss: 0.0132
verify mfcc feature success
##Testing## epoch acc: 0.5739
epoch: 43 acc: 0.9959 avg loss: 0.0113
verify mfcc feature success
##Testing## epoch acc: 0.5716
epoch: 44 acc: 0.9961 avg loss: 0.0131
verify mfcc feature success
##Testing## epoch acc: 0.5704
epoch: 45 acc: 0.9967 avg loss: 0.0114
verify mfcc feature success
##Testing## epoch acc: 0.5727
epoch: 46 acc: 0.9962 avg loss: 0.0114
verify mfcc feature success
##Testing## epoch acc: 0.5727
epoch: 47 acc: 0.9959 avg loss: 0.0112
verify mfcc feature success
##Testing## epoch acc: 0.5704
epoch: 48 acc: 0.9953 avg loss: 0.0134
verify mfcc feature success
##Testing## epoch acc: 0.5739
epoch: 49 acc: 0.9958 avg loss: 0.0104
verify mfcc feature success
##Testing## epoch acc: 0.575
epoch: 50 acc: 0.9957 avg loss: 0.0102
verify mfcc feature success
##Testing## epoch acc: 0.5716
epoch: 51 acc: 0.9967 avg loss: 0.0096
verify mfcc feature success
##Testing## epoch acc: 0.575
epoch: 52 acc: 0.9962 avg loss: 0.0101
verify mfcc feature success
##Testing## epoch acc: 0.5716
epoch: 53 acc: 0.9958 avg loss: 0.0108
verify mfcc feature success
##Testing## epoch acc: 0.5716
```

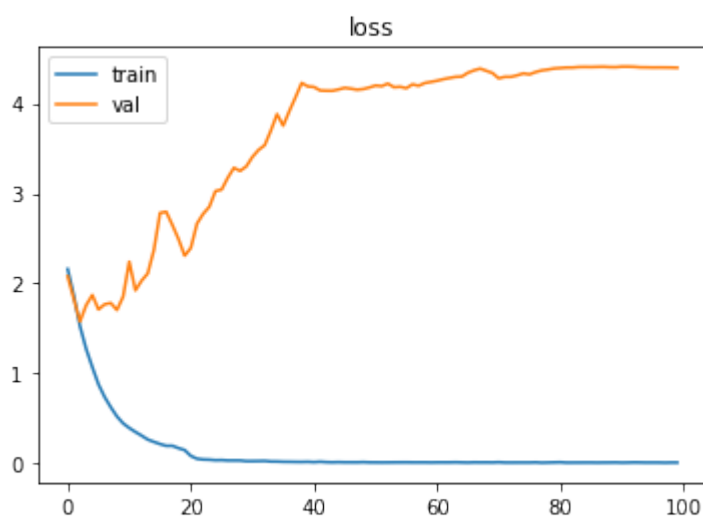
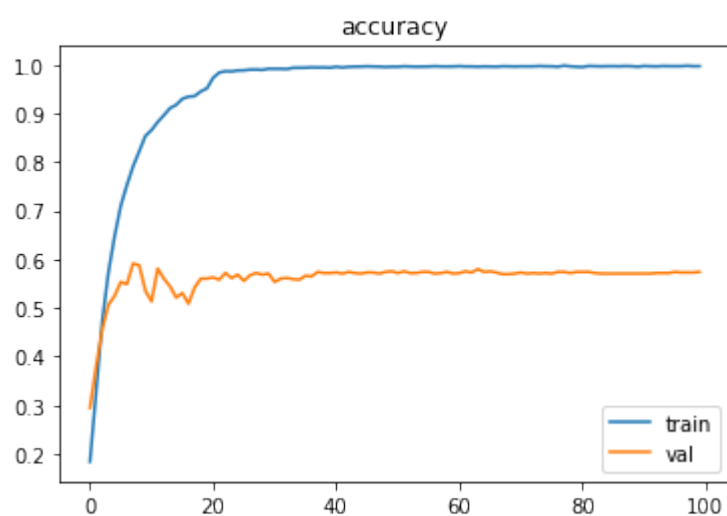
```
epoch: 54 acc: 0.9959 avg loss: 0.0110
verify mfcc feature success
##Testing## epoch acc: 0.5739
epoch: 55 acc: 0.9962 avg loss: 0.0113
verify mfcc feature success
##Testing## epoch acc: 0.5739
epoch: 56 acc: 0.9968 avg loss: 0.0104
verify mfcc feature success
##Testing## epoch acc: 0.5704
epoch: 57 acc: 0.9963 avg loss: 0.0104
verify mfcc feature success
##Testing## epoch acc: 0.5716
epoch: 58 acc: 0.9962 avg loss: 0.0106
verify mfcc feature success
##Testing## epoch acc: 0.5739
epoch: 59 acc: 0.9963 avg loss: 0.0094
verify mfcc feature success
##Testing## epoch acc: 0.5704
epoch: 60 acc: 0.9969 avg loss: 0.0106
verify mfcc feature success
##Testing## epoch acc: 0.5716
epoch: 61 acc: 0.9963 avg loss: 0.0107
verify mfcc feature success
##Testing## epoch acc: 0.575
epoch: 62 acc: 0.9963 avg loss: 0.0105
verify mfcc feature success
##Testing## epoch acc: 0.5727
epoch: 63 acc: 0.9958 avg loss: 0.0119
verify mfcc feature success
##Testing## epoch acc: 0.5796
epoch: 64 acc: 0.9963 avg loss: 0.0101
verify mfcc feature success
##Testing## epoch acc: 0.5739
epoch: 65 acc: 0.9961 avg loss: 0.0086
verify mfcc feature success
##Testing## epoch acc: 0.575
epoch: 66 acc: 0.9958 avg loss: 0.0110
verify mfcc feature success
##Testing## epoch acc: 0.5727
epoch: 67 acc: 0.9967 avg loss: 0.0102
verify mfcc feature success
##Testing## epoch acc: 0.5693
epoch: 68 acc: 0.9966 avg loss: 0.0107
verify mfcc feature success
##Testing## epoch acc: 0.5693
epoch: 69 acc: 0.9962 avg loss: 0.0097
verify mfcc feature success
##Testing## epoch acc: 0.5704
epoch: 70 acc: 0.9966 avg loss: 0.0124
verify mfcc feature success
##Testing## epoch acc: 0.5727
epoch: 71 acc: 0.9964 avg loss: 0.0087
verify mfcc feature success
##Testing## epoch acc: 0.5704
epoch: 72 acc: 0.9966 avg loss: 0.0086
verify mfcc feature success
##Testing## epoch acc: 0.5716
epoch: 73 acc: 0.9972 avg loss: 0.0090
verify mfcc feature success
##Testing## epoch acc: 0.5704
epoch: 74 acc: 0.9967 avg loss: 0.0090
```

```
verify mfcc feature success
##Testing## epoch acc: 0.5716
epoch: 75 acc: 0.9966 avg loss: 0.0090
verify mfcc feature success
##Testing## epoch acc: 0.5704
epoch: 76 acc: 0.9958 avg loss: 0.0108
verify mfcc feature success
##Testing## epoch acc: 0.5739
epoch: 77 acc: 0.9981 avg loss: 0.0070
verify mfcc feature success
##Testing## epoch acc: 0.5739
epoch: 78 acc: 0.9966 avg loss: 0.0087
verify mfcc feature success
##Testing## epoch acc: 0.5716
epoch: 79 acc: 0.9957 avg loss: 0.0105
verify mfcc feature success
##Testing## epoch acc: 0.5739
epoch: 80 acc: 0.9952 avg loss: 0.0121
verify mfcc feature success
##Testing## epoch acc: 0.5739
epoch: 81 acc: 0.9973 avg loss: 0.0078
verify mfcc feature success
##Testing## epoch acc: 0.5739
epoch: 82 acc: 0.9969 avg loss: 0.0081
verify mfcc feature success
##Testing## epoch acc: 0.5716
epoch: 83 acc: 0.9966 avg loss: 0.0083
verify mfcc feature success
##Testing## epoch acc: 0.5704
epoch: 84 acc: 0.9969 avg loss: 0.0087
verify mfcc feature success
##Testing## epoch acc: 0.5704
epoch: 85 acc: 0.9969 avg loss: 0.0087
verify mfcc feature success
##Testing## epoch acc: 0.5704
epoch: 86 acc: 0.9967 avg loss: 0.0078
verify mfcc feature success
##Testing## epoch acc: 0.5704
epoch: 87 acc: 0.9972 avg loss: 0.0086
verify mfcc feature success
##Testing## epoch acc: 0.5704
epoch: 88 acc: 0.9968 avg loss: 0.0088
verify mfcc feature success
##Testing## epoch acc: 0.5704
epoch: 89 acc: 0.9958 avg loss: 0.0097
verify mfcc feature success
##Testing## epoch acc: 0.5704
epoch: 90 acc: 0.9973 avg loss: 0.0076
verify mfcc feature success
##Testing## epoch acc: 0.5704
epoch: 91 acc: 0.9968 avg loss: 0.0087
verify mfcc feature success
##Testing## epoch acc: 0.5704
epoch: 92 acc: 0.9964 avg loss: 0.0105
verify mfcc feature success
##Testing## epoch acc: 0.5716
epoch: 93 acc: 0.9972 avg loss: 0.0096
verify mfcc feature success
##Testing## epoch acc: 0.5716
epoch: 94 acc: 0.9969 avg loss: 0.0084
verify mfcc feature success
```

```

##Testing## epoch acc: 0.5716
epoch: 95 acc: 0.9969 avg loss: 0.0087
verify mfcc feature success
##Testing## epoch acc: 0.5739
epoch: 96 acc: 0.9969 avg loss: 0.0086
verify mfcc feature success
##Testing## epoch acc: 0.5727
epoch: 97 acc: 0.9977 avg loss: 0.0071
verify mfcc feature success
##Testing## epoch acc: 0.5727
epoch: 98 acc: 0.9969 avg loss: 0.0086
verify mfcc feature success
##Testing## epoch acc: 0.5727
epoch: 99 acc: 0.9969 avg loss: 0.0084
verify mfcc feature success
##Testing## epoch acc: 0.5739

```



```

In [6]: train(100)
        # vgg11 fold2 spec

```

```

verify spec feature success
epoch: 0 acc: 0.2833 avg loss: 2.0155
verify spec feature success
##Testing## epoch acc: 0.3975
epoch: 1 acc: 0.5492 avg loss: 1.2425
verify spec feature success
##Testing## epoch acc: 0.598
epoch: 2 acc: 0.6566 avg loss: 0.9800

```

```
verify spec feature success
##Testing## epoch acc: 0.6486
epoch: 3 acc: 0.7039 avg loss: 0.8540
verify spec feature success
##Testing## epoch acc: 0.6295
epoch: 4 acc: 0.7568 avg loss: 0.7256
verify spec feature success
##Testing## epoch acc: 0.6678
epoch: 5 acc: 0.7723 avg loss: 0.6679
verify spec feature success
##Testing## epoch acc: 0.6644
epoch: 6 acc: 0.7926 avg loss: 0.6031
verify spec feature success
##Testing## epoch acc: 0.6149
epoch: 7 acc: 0.818 avg loss: 0.5363
verify spec feature success
##Testing## epoch acc: 0.6385
epoch: 8 acc: 0.8157 avg loss: 0.5461
verify spec feature success
##Testing## epoch acc: 0.643
epoch: 9 acc: 0.8451 avg loss: 0.4594
verify spec feature success
##Testing## epoch acc: 0.6723
epoch: 10 acc: 0.8531 avg loss: 0.4326
verify spec feature success
##Testing## epoch acc: 0.625
epoch: 11 acc: 0.8622 avg loss: 0.4084
verify spec feature success
##Testing## epoch acc: 0.6385
epoch: 12 acc: 0.8732 avg loss: 0.3794
verify spec feature success
##Testing## epoch acc: 0.6194
epoch: 13 acc: 0.8739 avg loss: 0.3941
verify spec feature success
##Testing## epoch acc: 0.6622
epoch: 14 acc: 0.8916 avg loss: 0.3313
verify spec feature success
##Testing## epoch acc: 0.6509
epoch: 15 acc: 0.8937 avg loss: 0.3087
verify spec feature success
##Testing## epoch acc: 0.6475
epoch: 16 acc: 0.9006 avg loss: 0.3004
verify spec feature success
##Testing## epoch acc: 0.6318
epoch: 17 acc: 0.8952 avg loss: 0.3208
verify spec feature success
##Testing## epoch acc: 0.6194
epoch: 18 acc: 0.9094 avg loss: 0.2687
verify spec feature success
##Testing## epoch acc: 0.6532
epoch: 19 acc: 0.9124 avg loss: 0.2628
verify spec feature success
##Testing## epoch acc: 0.7286
epoch: 20 acc: 0.9443 avg loss: 0.1592
verify spec feature success
##Testing## epoch acc: 0.7354
epoch: 21 acc: 0.9586 avg loss: 0.1215
verify spec feature success
##Testing## epoch acc: 0.7083
epoch: 22 acc: 0.9637 avg loss: 0.1111
verify spec feature success
```

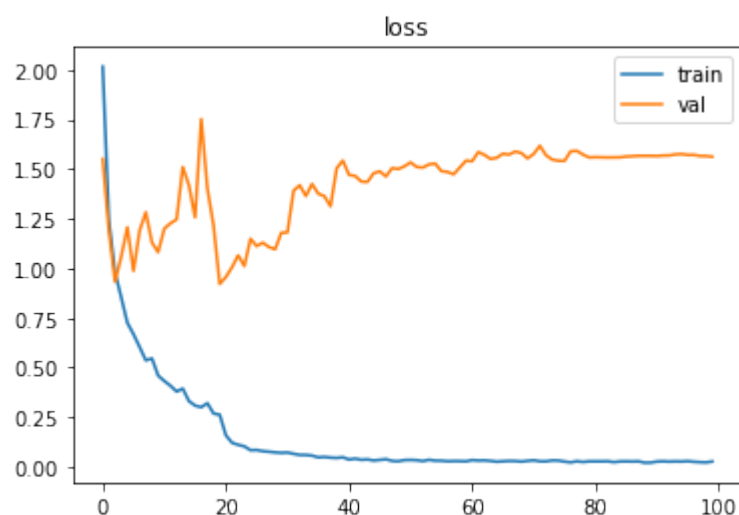
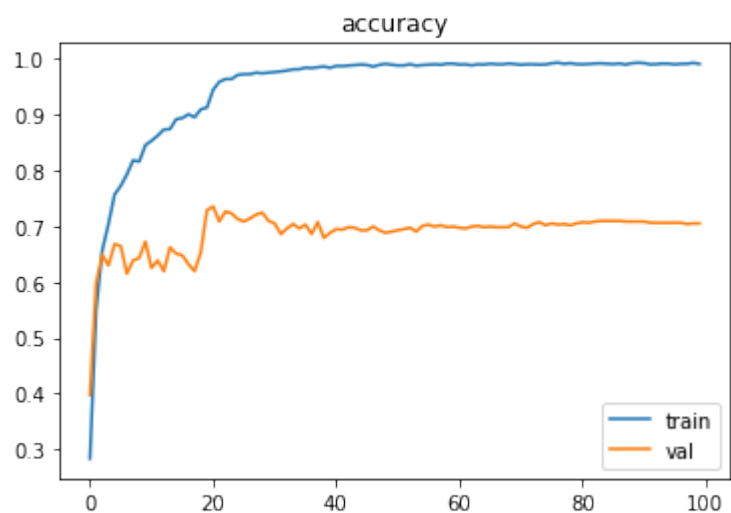
```
##Testing## epoch acc: 0.7264
epoch: 23 acc: 0.9637 avg loss: 0.1034
verify spec feature success
##Testing## epoch acc: 0.723
epoch: 24 acc: 0.9711 avg loss: 0.0841
verify spec feature success
##Testing## epoch acc: 0.7128
epoch: 25 acc: 0.9723 avg loss: 0.0851
verify spec feature success
##Testing## epoch acc: 0.7083
epoch: 26 acc: 0.9725 avg loss: 0.0791
verify spec feature success
##Testing## epoch acc: 0.714
epoch: 27 acc: 0.975 avg loss: 0.0763
verify spec feature success
##Testing## epoch acc: 0.7207
epoch: 28 acc: 0.974 avg loss: 0.0731
verify spec feature success
##Testing## epoch acc: 0.7241
epoch: 29 acc: 0.9751 avg loss: 0.0707
verify spec feature success
##Testing## epoch acc: 0.7095
epoch: 30 acc: 0.9762 avg loss: 0.0723
verify spec feature success
##Testing## epoch acc: 0.705
epoch: 31 acc: 0.9774 avg loss: 0.0658
verify spec feature success
##Testing## epoch acc: 0.6858
epoch: 32 acc: 0.9788 avg loss: 0.0603
verify spec feature success
##Testing## epoch acc: 0.6959
epoch: 33 acc: 0.981 avg loss: 0.0601
verify spec feature success
##Testing## epoch acc: 0.7038
epoch: 34 acc: 0.9813 avg loss: 0.0567
verify spec feature success
##Testing## epoch acc: 0.6959
epoch: 35 acc: 0.9841 avg loss: 0.0480
verify spec feature success
##Testing## epoch acc: 0.7027
epoch: 36 acc: 0.9833 avg loss: 0.0499
verify spec feature success
##Testing## epoch acc: 0.6858
epoch: 37 acc: 0.9848 avg loss: 0.0467
verify spec feature success
##Testing## epoch acc: 0.7072
epoch: 38 acc: 0.9861 avg loss: 0.0451
verify spec feature success
##Testing## epoch acc: 0.6791
epoch: 39 acc: 0.9838 avg loss: 0.0483
verify spec feature success
##Testing## epoch acc: 0.6881
epoch: 40 acc: 0.9871 avg loss: 0.0372
verify spec feature success
##Testing## epoch acc: 0.6948
epoch: 41 acc: 0.9869 avg loss: 0.0415
verify spec feature success
##Testing## epoch acc: 0.6937
epoch: 42 acc: 0.9879 avg loss: 0.0359
verify spec feature success
##Testing## epoch acc: 0.6982
```

```
epoch: 43 acc: 0.9887 avg loss: 0.0377
verify spec feature success
##Testing## epoch acc: 0.6971
epoch: 44 acc: 0.9897 avg loss: 0.0322
verify spec feature success
##Testing## epoch acc: 0.6926
epoch: 45 acc: 0.9889 avg loss: 0.0352
verify spec feature success
##Testing## epoch acc: 0.6926
epoch: 46 acc: 0.986 avg loss: 0.0386
verify spec feature success
##Testing## epoch acc: 0.6993
epoch: 47 acc: 0.9892 avg loss: 0.0301
verify spec feature success
##Testing## epoch acc: 0.6926
epoch: 48 acc: 0.9908 avg loss: 0.0284
verify spec feature success
##Testing## epoch acc: 0.6881
epoch: 49 acc: 0.9894 avg loss: 0.0342
verify spec feature success
##Testing## epoch acc: 0.6903
epoch: 50 acc: 0.988 avg loss: 0.0350
verify spec feature success
##Testing## epoch acc: 0.6926
epoch: 51 acc: 0.9881 avg loss: 0.0337
verify spec feature success
##Testing## epoch acc: 0.6948
epoch: 52 acc: 0.9902 avg loss: 0.0293
verify spec feature success
##Testing## epoch acc: 0.6971
epoch: 53 acc: 0.9876 avg loss: 0.0357
verify spec feature success
##Testing## epoch acc: 0.6903
epoch: 54 acc: 0.9888 avg loss: 0.0313
verify spec feature success
##Testing## epoch acc: 0.7005
epoch: 55 acc: 0.9894 avg loss: 0.0311
verify spec feature success
##Testing## epoch acc: 0.7027
epoch: 56 acc: 0.9901 avg loss: 0.0284
verify spec feature success
##Testing## epoch acc: 0.6993
epoch: 57 acc: 0.9893 avg loss: 0.0293
verify spec feature success
##Testing## epoch acc: 0.7016
epoch: 58 acc: 0.9912 avg loss: 0.0291
verify spec feature success
##Testing## epoch acc: 0.6982
epoch: 59 acc: 0.9912 avg loss: 0.0279
verify spec feature success
##Testing## epoch acc: 0.6993
epoch: 60 acc: 0.9897 avg loss: 0.0342
verify spec feature success
##Testing## epoch acc: 0.6971
epoch: 61 acc: 0.9899 avg loss: 0.0318
verify spec feature success
##Testing## epoch acc: 0.6959
epoch: 62 acc: 0.9883 avg loss: 0.0327
verify spec feature success
##Testing## epoch acc: 0.6993
epoch: 63 acc: 0.9901 avg loss: 0.0301
```

```
verify spec feature success
##Testing## epoch acc: 0.7005
epoch: 64 acc: 0.9897 avg loss: 0.0263
verify spec feature success
##Testing## epoch acc: 0.6982
epoch: 65 acc: 0.9911 avg loss: 0.0282
verify spec feature success
##Testing## epoch acc: 0.6993
epoch: 66 acc: 0.9902 avg loss: 0.0300
verify spec feature success
##Testing## epoch acc: 0.6982
epoch: 67 acc: 0.9901 avg loss: 0.0294
verify spec feature success
##Testing## epoch acc: 0.6982
epoch: 68 acc: 0.9915 avg loss: 0.0268
verify spec feature success
##Testing## epoch acc: 0.6982
epoch: 69 acc: 0.9904 avg loss: 0.0302
verify spec feature success
##Testing## epoch acc: 0.705
epoch: 70 acc: 0.9893 avg loss: 0.0333
verify spec feature success
##Testing## epoch acc: 0.6993
epoch: 71 acc: 0.9901 avg loss: 0.0281
verify spec feature success
##Testing## epoch acc: 0.6971
epoch: 72 acc: 0.9901 avg loss: 0.0279
verify spec feature success
##Testing## epoch acc: 0.7038
epoch: 73 acc: 0.9895 avg loss: 0.0326
verify spec feature success
##Testing## epoch acc: 0.7072
epoch: 74 acc: 0.9898 avg loss: 0.0318
verify spec feature success
##Testing## epoch acc: 0.7016
epoch: 75 acc: 0.9918 avg loss: 0.0268
verify spec feature success
##Testing## epoch acc: 0.705
epoch: 76 acc: 0.9931 avg loss: 0.0227
verify spec feature success
##Testing## epoch acc: 0.7027
epoch: 77 acc: 0.9908 avg loss: 0.0285
verify spec feature success
##Testing## epoch acc: 0.7038
epoch: 78 acc: 0.9921 avg loss: 0.0249
verify spec feature success
##Testing## epoch acc: 0.7016
epoch: 79 acc: 0.9904 avg loss: 0.0278
verify spec feature success
##Testing## epoch acc: 0.705
epoch: 80 acc: 0.9901 avg loss: 0.0280
verify spec feature success
##Testing## epoch acc: 0.7072
epoch: 81 acc: 0.9906 avg loss: 0.0278
verify spec feature success
##Testing## epoch acc: 0.7061
epoch: 82 acc: 0.9915 avg loss: 0.0285
verify spec feature success
##Testing## epoch acc: 0.7083
epoch: 83 acc: 0.9918 avg loss: 0.0241
verify spec feature success
```



```
##Testing## epoch acc: 0.7095
epoch: 84 acc: 0.9911 avg loss: 0.0274
verify spec feature success
##Testing## epoch acc: 0.7095
epoch: 85 acc: 0.9904 avg loss: 0.0281
verify spec feature success
##Testing## epoch acc: 0.7095
epoch: 86 acc: 0.9915 avg loss: 0.0271
verify spec feature success
##Testing## epoch acc: 0.7095
epoch: 87 acc: 0.9895 avg loss: 0.0281
verify spec feature success
##Testing## epoch acc: 0.7083
epoch: 88 acc: 0.992 avg loss: 0.0211
verify spec feature success
##Testing## epoch acc: 0.7083
epoch: 89 acc: 0.9929 avg loss: 0.0215
verify spec feature success
##Testing## epoch acc: 0.7083
epoch: 90 acc: 0.9922 avg loss: 0.0270
verify spec feature success
##Testing## epoch acc: 0.7083
epoch: 91 acc: 0.9899 avg loss: 0.0282
verify spec feature success
##Testing## epoch acc: 0.7061
epoch: 92 acc: 0.9903 avg loss: 0.0267
verify spec feature success
##Testing## epoch acc: 0.7061
epoch: 93 acc: 0.9915 avg loss: 0.0277
verify spec feature success
##Testing## epoch acc: 0.7061
epoch: 94 acc: 0.9911 avg loss: 0.0270
verify spec feature success
##Testing## epoch acc: 0.7061
epoch: 95 acc: 0.9899 avg loss: 0.0290
verify spec feature success
##Testing## epoch acc: 0.7061
epoch: 96 acc: 0.9908 avg loss: 0.0259
verify spec feature success
##Testing## epoch acc: 0.7061
epoch: 97 acc: 0.9911 avg loss: 0.0238
verify spec feature success
##Testing## epoch acc: 0.7038
epoch: 98 acc: 0.9927 avg loss: 0.0226
verify spec feature success
##Testing## epoch acc: 0.705
epoch: 99 acc: 0.9907 avg loss: 0.0272
verify spec feature success
##Testing## epoch acc: 0.705
```



```
In [6]: train(100)
# vgg11 fold2 mfcc
```

```
verify mfcc feature success
epoch: 0 acc: 0.1994 avg loss: 2.1462
verify mfcc feature success
##Testing## epoch acc: 0.1757
epoch: 1 acc: 0.3344 avg loss: 1.8530
verify mfcc feature success
##Testing## epoch acc: 0.4313
epoch: 2 acc: 0.5033 avg loss: 1.4611
verify mfcc feature success
##Testing## epoch acc: 0.455
epoch: 3 acc: 0.61 avg loss: 1.1863
verify mfcc feature success
##Testing## epoch acc: 0.3874
epoch: 4 acc: 0.6708 avg loss: 1.0038
verify mfcc feature success
##Testing## epoch acc: 0.4268
epoch: 5 acc: 0.717 avg loss: 0.8353
verify mfcc feature success
##Testing## epoch acc: 0.464
epoch: 6 acc: 0.7635 avg loss: 0.7051
verify mfcc feature success
##Testing## epoch acc: 0.4842
epoch: 7 acc: 0.807 avg loss: 0.5848
verify mfcc feature success
##Testing## epoch acc: 0.4459
```

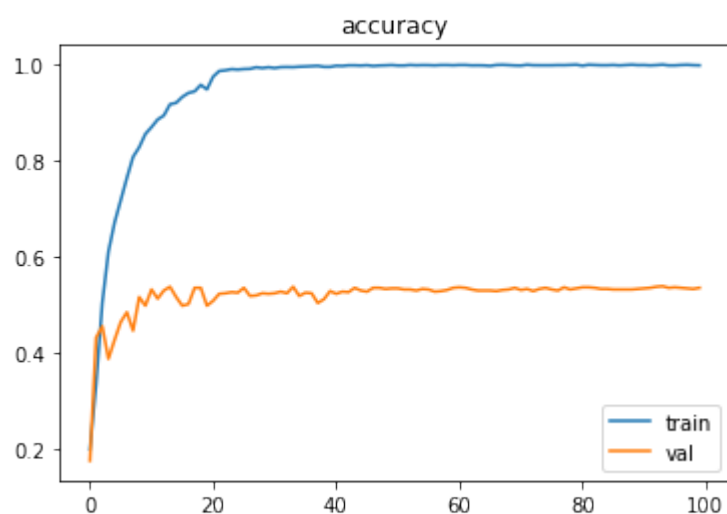
```
epoch: 8 acc: 0.8271 avg loss: 0.5157
verify mfcc feature success
##Testing## epoch acc: 0.5158
epoch: 9 acc: 0.8547 avg loss: 0.4297
verify mfcc feature success
##Testing## epoch acc: 0.4977
epoch: 10 acc: 0.8689 avg loss: 0.3819
verify mfcc feature success
##Testing## epoch acc: 0.5315
epoch: 11 acc: 0.8848 avg loss: 0.3277
verify mfcc feature success
##Testing## epoch acc: 0.5124
epoch: 12 acc: 0.893 avg loss: 0.3084
verify mfcc feature success
##Testing## epoch acc: 0.5293
epoch: 13 acc: 0.9164 avg loss: 0.2426
verify mfcc feature success
##Testing## epoch acc: 0.5372
epoch: 14 acc: 0.9194 avg loss: 0.2316
verify mfcc feature success
##Testing## epoch acc: 0.5158
epoch: 15 acc: 0.9317 avg loss: 0.2186
verify mfcc feature success
##Testing## epoch acc: 0.4977
epoch: 16 acc: 0.94 avg loss: 0.1841
verify mfcc feature success
##Testing## epoch acc: 0.5011
epoch: 17 acc: 0.9433 avg loss: 0.1663
verify mfcc feature success
##Testing## epoch acc: 0.5349
epoch: 18 acc: 0.9568 avg loss: 0.1304
verify mfcc feature success
##Testing## epoch acc: 0.5349
epoch: 19 acc: 0.9473 avg loss: 0.1537
verify mfcc feature success
##Testing## epoch acc: 0.4977
epoch: 20 acc: 0.9737 avg loss: 0.0799
verify mfcc feature success
##Testing## epoch acc: 0.5079
epoch: 21 acc: 0.9856 avg loss: 0.0513
verify mfcc feature success
##Testing## epoch acc: 0.5225
epoch: 22 acc: 0.987 avg loss: 0.0396
verify mfcc feature success
##Testing## epoch acc: 0.5236
epoch: 23 acc: 0.9894 avg loss: 0.0348
verify mfcc feature success
##Testing## epoch acc: 0.5259
epoch: 24 acc: 0.9885 avg loss: 0.0338
verify mfcc feature success
##Testing## epoch acc: 0.5248
epoch: 25 acc: 0.9897 avg loss: 0.0305
verify mfcc feature success
##Testing## epoch acc: 0.5349
epoch: 26 acc: 0.9901 avg loss: 0.0293
verify mfcc feature success
##Testing## epoch acc: 0.518
epoch: 27 acc: 0.9932 avg loss: 0.0234
verify mfcc feature success
##Testing## epoch acc: 0.5191
epoch: 28 acc: 0.9917 avg loss: 0.0255
```

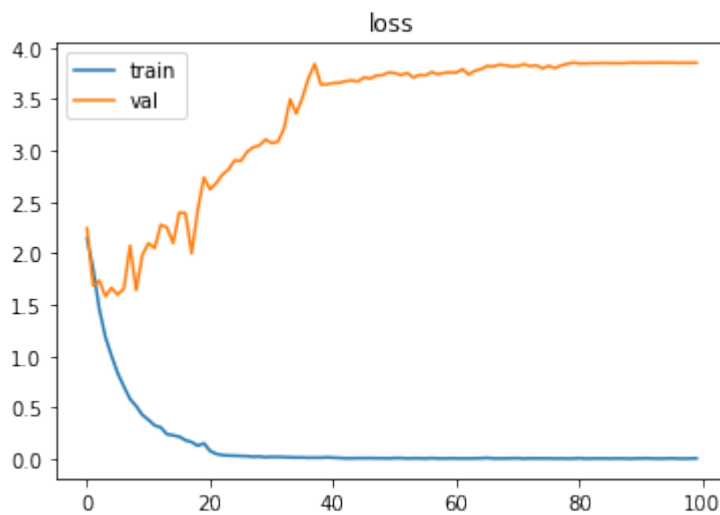
```
verify mfcc feature success
##Testing## epoch acc: 0.5236
epoch: 29 acc: 0.9934 avg loss: 0.0192
verify mfcc feature success
##Testing## epoch acc: 0.5225
epoch: 30 acc: 0.9917 avg loss: 0.0226
verify mfcc feature success
##Testing## epoch acc: 0.5236
epoch: 31 acc: 0.9936 avg loss: 0.0218
verify mfcc feature success
##Testing## epoch acc: 0.527
epoch: 32 acc: 0.9939 avg loss: 0.0199
verify mfcc feature success
##Testing## epoch acc: 0.5236
epoch: 33 acc: 0.9936 avg loss: 0.0179
verify mfcc feature success
##Testing## epoch acc: 0.5372
epoch: 34 acc: 0.9945 avg loss: 0.0157
verify mfcc feature success
##Testing## epoch acc: 0.518
epoch: 35 acc: 0.995 avg loss: 0.0166
verify mfcc feature success
##Testing## epoch acc: 0.5248
epoch: 36 acc: 0.9957 avg loss: 0.0138
verify mfcc feature success
##Testing## epoch acc: 0.5236
epoch: 37 acc: 0.9963 avg loss: 0.0146
verify mfcc feature success
##Testing## epoch acc: 0.5034
epoch: 38 acc: 0.9943 avg loss: 0.0147
verify mfcc feature success
##Testing## epoch acc: 0.5113
epoch: 39 acc: 0.9941 avg loss: 0.0174
verify mfcc feature success
##Testing## epoch acc: 0.5282
epoch: 40 acc: 0.9964 avg loss: 0.0145
verify mfcc feature success
##Testing## epoch acc: 0.5225
epoch: 41 acc: 0.996 avg loss: 0.0122
verify mfcc feature success
##Testing## epoch acc: 0.527
epoch: 42 acc: 0.9973 avg loss: 0.0085
verify mfcc feature success
##Testing## epoch acc: 0.5259
epoch: 43 acc: 0.9973 avg loss: 0.0087
verify mfcc feature success
##Testing## epoch acc: 0.5349
epoch: 44 acc: 0.9968 avg loss: 0.0096
verify mfcc feature success
##Testing## epoch acc: 0.5293
epoch: 45 acc: 0.9976 avg loss: 0.0096
verify mfcc feature success
##Testing## epoch acc: 0.527
epoch: 46 acc: 0.996 avg loss: 0.0106
verify mfcc feature success
##Testing## epoch acc: 0.5349
epoch: 47 acc: 0.9969 avg loss: 0.0089
verify mfcc feature success
##Testing## epoch acc: 0.5349
epoch: 48 acc: 0.9973 avg loss: 0.0088
verify mfcc feature success
```

```
##Testing## epoch acc: 0.5327
epoch: 49 acc: 0.998 avg loss: 0.0073
verify mfcc feature success
##Testing## epoch acc: 0.5338
epoch: 50 acc: 0.9969 avg loss: 0.0106
verify mfcc feature success
##Testing## epoch acc: 0.5338
epoch: 51 acc: 0.9969 avg loss: 0.0109
verify mfcc feature success
##Testing## epoch acc: 0.5315
epoch: 52 acc: 0.9981 avg loss: 0.0070
verify mfcc feature success
##Testing## epoch acc: 0.5315
epoch: 53 acc: 0.9975 avg loss: 0.0091
verify mfcc feature success
##Testing## epoch acc: 0.5293
epoch: 54 acc: 0.9978 avg loss: 0.0085
verify mfcc feature success
##Testing## epoch acc: 0.5327
epoch: 55 acc: 0.9977 avg loss: 0.0067
verify mfcc feature success
##Testing## epoch acc: 0.5315
epoch: 56 acc: 0.9972 avg loss: 0.0105
verify mfcc feature success
##Testing## epoch acc: 0.527
epoch: 57 acc: 0.998 avg loss: 0.0070
verify mfcc feature success
##Testing## epoch acc: 0.5282
epoch: 58 acc: 0.998 avg loss: 0.0066
verify mfcc feature success
##Testing## epoch acc: 0.5304
epoch: 59 acc: 0.9975 avg loss: 0.0085
verify mfcc feature success
##Testing## epoch acc: 0.5349
epoch: 60 acc: 0.9981 avg loss: 0.0077
verify mfcc feature success
##Testing## epoch acc: 0.536
epoch: 61 acc: 0.9981 avg loss: 0.0068
verify mfcc feature success
##Testing## epoch acc: 0.5349
epoch: 62 acc: 0.9972 avg loss: 0.0076
verify mfcc feature success
##Testing## epoch acc: 0.5315
epoch: 63 acc: 0.9973 avg loss: 0.0079
verify mfcc feature success
##Testing## epoch acc: 0.5293
epoch: 64 acc: 0.9971 avg loss: 0.0093
verify mfcc feature success
##Testing## epoch acc: 0.5293
epoch: 65 acc: 0.9962 avg loss: 0.0122
verify mfcc feature success
##Testing## epoch acc: 0.5293
epoch: 66 acc: 0.9981 avg loss: 0.0073
verify mfcc feature success
##Testing## epoch acc: 0.5282
epoch: 67 acc: 0.9985 avg loss: 0.0066
verify mfcc feature success
##Testing## epoch acc: 0.5304
epoch: 68 acc: 0.9978 avg loss: 0.0073
verify mfcc feature success
##Testing## epoch acc: 0.5315
```

```
epoch: 69 acc: 0.9971 avg loss: 0.0090
verify mfcc feature success
##Testing## epoch acc: 0.5349
epoch: 70 acc: 0.9968 avg loss: 0.0095
verify mfcc feature success
##Testing## epoch acc: 0.5304
epoch: 71 acc: 0.9986 avg loss: 0.0053
verify mfcc feature success
##Testing## epoch acc: 0.5327
epoch: 72 acc: 0.9976 avg loss: 0.0086
verify mfcc feature success
##Testing## epoch acc: 0.5282
epoch: 73 acc: 0.9975 avg loss: 0.0073
verify mfcc feature success
##Testing## epoch acc: 0.5327
epoch: 74 acc: 0.9975 avg loss: 0.0076
verify mfcc feature success
##Testing## epoch acc: 0.5349
epoch: 75 acc: 0.9975 avg loss: 0.0076
verify mfcc feature success
##Testing## epoch acc: 0.5315
epoch: 76 acc: 0.9978 avg loss: 0.0063
verify mfcc feature success
##Testing## epoch acc: 0.5293
epoch: 77 acc: 0.9977 avg loss: 0.0067
verify mfcc feature success
##Testing## epoch acc: 0.536
epoch: 78 acc: 0.9982 avg loss: 0.0057
verify mfcc feature success
##Testing## epoch acc: 0.5315
epoch: 79 acc: 0.9987 avg loss: 0.0057
verify mfcc feature success
##Testing## epoch acc: 0.5338
epoch: 80 acc: 0.9966 avg loss: 0.0099
verify mfcc feature success
##Testing## epoch acc: 0.536
epoch: 81 acc: 0.9986 avg loss: 0.0053
verify mfcc feature success
##Testing## epoch acc: 0.536
epoch: 82 acc: 0.9981 avg loss: 0.0064
verify mfcc feature success
##Testing## epoch acc: 0.5349
epoch: 83 acc: 0.9976 avg loss: 0.0074
verify mfcc feature success
##Testing## epoch acc: 0.5327
epoch: 84 acc: 0.9976 avg loss: 0.0074
verify mfcc feature success
##Testing## epoch acc: 0.5327
epoch: 85 acc: 0.9981 avg loss: 0.0059
verify mfcc feature success
##Testing## epoch acc: 0.5315
epoch: 86 acc: 0.9972 avg loss: 0.0074
verify mfcc feature success
##Testing## epoch acc: 0.5315
epoch: 87 acc: 0.998 avg loss: 0.0075
verify mfcc feature success
##Testing## epoch acc: 0.5315
epoch: 88 acc: 0.9987 avg loss: 0.0046
verify mfcc feature success
##Testing## epoch acc: 0.5315
epoch: 89 acc: 0.9978 avg loss: 0.0069
```

```
verify mfcc feature success
##Testing## epoch acc: 0.5327
epoch: 90 acc: 0.998 avg loss: 0.0077
verify mfcc feature success
##Testing## epoch acc: 0.5338
epoch: 91 acc: 0.9972 avg loss: 0.0090
verify mfcc feature success
##Testing## epoch acc: 0.5349
epoch: 92 acc: 0.9978 avg loss: 0.0065
verify mfcc feature success
##Testing## epoch acc: 0.5372
epoch: 93 acc: 0.9989 avg loss: 0.0053
verify mfcc feature success
##Testing## epoch acc: 0.5383
epoch: 94 acc: 0.9972 avg loss: 0.0070
verify mfcc feature success
##Testing## epoch acc: 0.5349
epoch: 95 acc: 0.9972 avg loss: 0.0083
verify mfcc feature success
##Testing## epoch acc: 0.536
epoch: 96 acc: 0.9981 avg loss: 0.0059
verify mfcc feature success
##Testing## epoch acc: 0.5349
epoch: 97 acc: 0.9985 avg loss: 0.0053
verify mfcc feature success
##Testing## epoch acc: 0.5338
epoch: 98 acc: 0.9977 avg loss: 0.0067
verify mfcc feature success
##Testing## epoch acc: 0.5327
epoch: 99 acc: 0.9973 avg loss: 0.0077
verify mfcc feature success
##Testing## epoch acc: 0.5349
```





```
In [6]: train(100)
        # vgg11 fold3 spec

verify spec feature success
epoch: 0 acc: 0.1554 avg loss: 2.4584
verify spec feature success
##Testing## epoch acc: 0.2973
epoch: 1 acc: 0.4239 avg loss: 1.5844
verify spec feature success
##Testing## epoch acc: 0.5405
epoch: 2 acc: 0.5788 avg loss: 1.1913
verify spec feature success
##Testing## epoch acc: 0.5719
epoch: 3 acc: 0.6312 avg loss: 1.0254
verify spec feature success
##Testing## epoch acc: 0.6076
epoch: 4 acc: 0.6907 avg loss: 0.8888
verify spec feature success
##Testing## epoch acc: 0.587
epoch: 5 acc: 0.7192 avg loss: 0.8046
verify spec feature success
##Testing## epoch acc: 0.5535
epoch: 6 acc: 0.7527 avg loss: 0.7249
verify spec feature success
##Testing## epoch acc: 0.6011
epoch: 7 acc: 0.7751 avg loss: 0.6579
verify spec feature success
##Testing## epoch acc: 0.6227
epoch: 8 acc: 0.7917 avg loss: 0.6126
verify spec feature success
##Testing## epoch acc: 0.6216
epoch: 9 acc: 0.8104 avg loss: 0.5595
verify spec feature success
##Testing## epoch acc: 0.6238
epoch: 10 acc: 0.8113 avg loss: 0.5522
verify spec feature success
##Testing## epoch acc: 0.6249
epoch: 11 acc: 0.834 avg loss: 0.4944
verify spec feature success
##Testing## epoch acc: 0.6443
epoch: 12 acc: 0.841 avg loss: 0.4728
verify spec feature success
##Testing## epoch acc: 0.6238
epoch: 13 acc: 0.8455 avg loss: 0.4421
```



```
verify spec feature success
##Testing## epoch acc: 0.6432
epoch: 14 acc: 0.8549 avg loss: 0.4398
verify spec feature success
##Testing## epoch acc: 0.6314
epoch: 15 acc: 0.8688 avg loss: 0.3846
verify spec feature success
##Testing## epoch acc: 0.587
epoch: 16 acc: 0.8656 avg loss: 0.4066
verify spec feature success
##Testing## epoch acc: 0.613
epoch: 17 acc: 0.8701 avg loss: 0.3921
verify spec feature success
##Testing## epoch acc: 0.6
epoch: 18 acc: 0.8627 avg loss: 0.4150
verify spec feature success
##Testing## epoch acc: 0.6303
epoch: 19 acc: 0.8829 avg loss: 0.3440
verify spec feature success
##Testing## epoch acc: 0.6508
epoch: 20 acc: 0.9207 avg loss: 0.2243
verify spec feature success
##Testing## epoch acc: 0.6605
epoch: 21 acc: 0.9434 avg loss: 0.1776
verify spec feature success
##Testing## epoch acc: 0.6659
epoch: 22 acc: 0.9422 avg loss: 0.1745
verify spec feature success
##Testing## epoch acc: 0.6465
epoch: 23 acc: 0.9457 avg loss: 0.1587
verify spec feature success
##Testing## epoch acc: 0.6476
epoch: 24 acc: 0.9509 avg loss: 0.1452
verify spec feature success
##Testing## epoch acc: 0.6595
epoch: 25 acc: 0.9504 avg loss: 0.1434
verify spec feature success
##Testing## epoch acc: 0.6508
epoch: 26 acc: 0.957 avg loss: 0.1334
verify spec feature success
##Testing## epoch acc: 0.6422
epoch: 27 acc: 0.9577 avg loss: 0.1235
verify spec feature success
##Testing## epoch acc: 0.6476
epoch: 28 acc: 0.9561 avg loss: 0.1281
verify spec feature success
##Testing## epoch acc: 0.6389
epoch: 29 acc: 0.96 avg loss: 0.1243
verify spec feature success
##Testing## epoch acc: 0.6357
epoch: 30 acc: 0.9604 avg loss: 0.1187
verify spec feature success
##Testing## epoch acc: 0.653
epoch: 31 acc: 0.9631 avg loss: 0.1078
verify spec feature success
##Testing## epoch acc: 0.6443
epoch: 32 acc: 0.9657 avg loss: 0.1094
verify spec feature success
##Testing## epoch acc: 0.6411
epoch: 33 acc: 0.9641 avg loss: 0.1019
verify spec feature success
```

```
##Testing## epoch acc: 0.6335
epoch: 34 acc: 0.9693 avg loss: 0.0978
verify spec feature success
##Testing## epoch acc: 0.6389
epoch: 35 acc: 0.9695 avg loss: 0.0931
verify spec feature success
##Testing## epoch acc: 0.6551
epoch: 36 acc: 0.9668 avg loss: 0.0962
verify spec feature success
##Testing## epoch acc: 0.6627
epoch: 37 acc: 0.9695 avg loss: 0.0936
verify spec feature success
##Testing## epoch acc: 0.6443
epoch: 38 acc: 0.9686 avg loss: 0.0902
verify spec feature success
##Testing## epoch acc: 0.6292
epoch: 39 acc: 0.9727 avg loss: 0.0804
verify spec feature success
##Testing## epoch acc: 0.6368
epoch: 40 acc: 0.9746 avg loss: 0.0775
verify spec feature success
##Testing## epoch acc: 0.6411
epoch: 41 acc: 0.9725 avg loss: 0.0795
verify spec feature success
##Testing## epoch acc: 0.6368
epoch: 42 acc: 0.9749 avg loss: 0.0745
verify spec feature success
##Testing## epoch acc: 0.6368
epoch: 43 acc: 0.9736 avg loss: 0.0734
verify spec feature success
##Testing## epoch acc: 0.6357
epoch: 44 acc: 0.9766 avg loss: 0.0735
verify spec feature success
##Testing## epoch acc: 0.6324
epoch: 45 acc: 0.9764 avg loss: 0.0679
verify spec feature success
##Testing## epoch acc: 0.6335
epoch: 46 acc: 0.9759 avg loss: 0.0709
verify spec feature success
##Testing## epoch acc: 0.6411
epoch: 47 acc: 0.9749 avg loss: 0.0721
verify spec feature success
##Testing## epoch acc: 0.6357
epoch: 48 acc: 0.9781 avg loss: 0.0692
verify spec feature success
##Testing## epoch acc: 0.6346
epoch: 49 acc: 0.9784 avg loss: 0.0651
verify spec feature success
##Testing## epoch acc: 0.6303
epoch: 50 acc: 0.9778 avg loss: 0.0663
verify spec feature success
##Testing## epoch acc: 0.6335
epoch: 51 acc: 0.9759 avg loss: 0.0701
verify spec feature success
##Testing## epoch acc: 0.6346
epoch: 52 acc: 0.9764 avg loss: 0.0701
verify spec feature success
##Testing## epoch acc: 0.6292
epoch: 53 acc: 0.9758 avg loss: 0.0681
verify spec feature success
##Testing## epoch acc: 0.6378
```

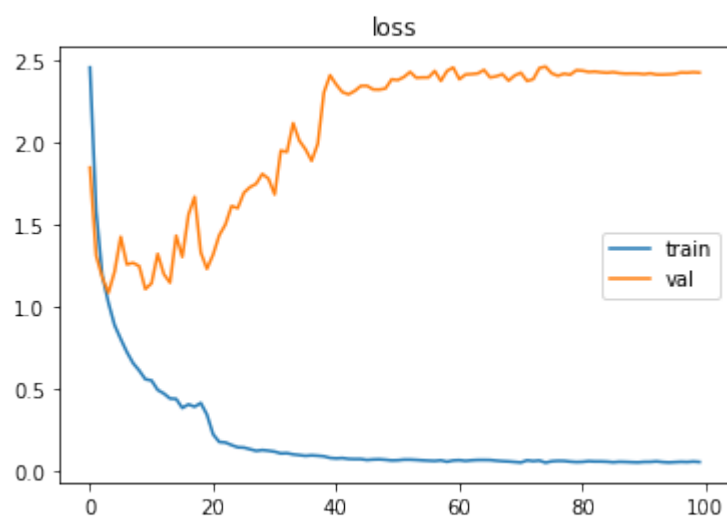
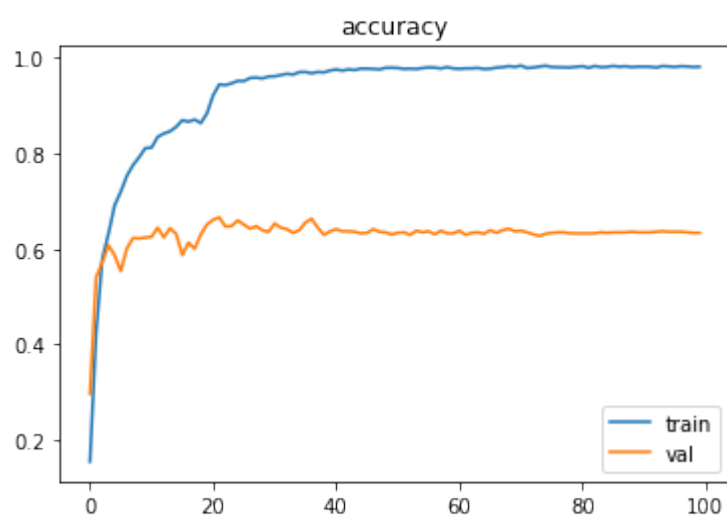
```
epoch: 54 acc: 0.9777 avg loss: 0.0657
verify spec feature success
##Testing## epoch acc: 0.6346
epoch: 55 acc: 0.979 avg loss: 0.0637
verify spec feature success
##Testing## epoch acc: 0.6368
epoch: 56 acc: 0.9786 avg loss: 0.0622
verify spec feature success
##Testing## epoch acc: 0.6303
epoch: 57 acc: 0.9768 avg loss: 0.0658
verify spec feature success
##Testing## epoch acc: 0.6378
epoch: 58 acc: 0.9796 avg loss: 0.0573
verify spec feature success
##Testing## epoch acc: 0.6324
epoch: 59 acc: 0.9769 avg loss: 0.0649
verify spec feature success
##Testing## epoch acc: 0.6324
epoch: 60 acc: 0.9762 avg loss: 0.0668
verify spec feature success
##Testing## epoch acc: 0.6378
epoch: 61 acc: 0.9769 avg loss: 0.0624
verify spec feature success
##Testing## epoch acc: 0.6292
epoch: 62 acc: 0.9771 avg loss: 0.0659
verify spec feature success
##Testing## epoch acc: 0.6335
epoch: 63 acc: 0.978 avg loss: 0.0680
verify spec feature success
##Testing## epoch acc: 0.6346
epoch: 64 acc: 0.9757 avg loss: 0.0679
verify spec feature success
##Testing## epoch acc: 0.6314
epoch: 65 acc: 0.9763 avg loss: 0.0675
verify spec feature success
##Testing## epoch acc: 0.6389
epoch: 66 acc: 0.9786 avg loss: 0.0636
verify spec feature success
##Testing## epoch acc: 0.6335
epoch: 67 acc: 0.9795 avg loss: 0.0608
verify spec feature success
##Testing## epoch acc: 0.6389
epoch: 68 acc: 0.9817 avg loss: 0.0589
verify spec feature success
##Testing## epoch acc: 0.6422
epoch: 69 acc: 0.98 avg loss: 0.0559
verify spec feature success
##Testing## epoch acc: 0.6368
epoch: 70 acc: 0.9828 avg loss: 0.0526
verify spec feature success
##Testing## epoch acc: 0.6378
epoch: 71 acc: 0.9777 avg loss: 0.0658
verify spec feature success
##Testing## epoch acc: 0.6346
epoch: 72 acc: 0.9789 avg loss: 0.0612
verify spec feature success
##Testing## epoch acc: 0.6303
epoch: 73 acc: 0.9808 avg loss: 0.0647
verify spec feature success
##Testing## epoch acc: 0.627
epoch: 74 acc: 0.9826 avg loss: 0.0514
```

```
verify spec feature success
##Testing## epoch acc: 0.6314
epoch: 75 acc: 0.9799 avg loss: 0.0602
verify spec feature success
##Testing## epoch acc: 0.6335
epoch: 76 acc: 0.9795 avg loss: 0.0625
verify spec feature success
##Testing## epoch acc: 0.6346
epoch: 77 acc: 0.9791 avg loss: 0.0620
verify spec feature success
##Testing## epoch acc: 0.6346
epoch: 78 acc: 0.979 avg loss: 0.0579
verify spec feature success
##Testing## epoch acc: 0.6324
epoch: 79 acc: 0.9803 avg loss: 0.0553
verify spec feature success
##Testing## epoch acc: 0.6324
epoch: 80 acc: 0.9816 avg loss: 0.0566
verify spec feature success
##Testing## epoch acc: 0.6324
epoch: 81 acc: 0.9782 avg loss: 0.0607
verify spec feature success
##Testing## epoch acc: 0.6324
epoch: 82 acc: 0.9819 avg loss: 0.0589
verify spec feature success
##Testing## epoch acc: 0.6324
epoch: 83 acc: 0.9795 avg loss: 0.0589
verify spec feature success
##Testing## epoch acc: 0.6346
epoch: 84 acc: 0.9801 avg loss: 0.0574
verify spec feature success
##Testing## epoch acc: 0.6335
epoch: 85 acc: 0.9821 avg loss: 0.0540
verify spec feature success
##Testing## epoch acc: 0.6346
epoch: 86 acc: 0.9805 avg loss: 0.0571
verify spec feature success
##Testing## epoch acc: 0.6346
epoch: 87 acc: 0.9814 avg loss: 0.0561
verify spec feature success
##Testing## epoch acc: 0.6346
epoch: 88 acc: 0.9796 avg loss: 0.0544
verify spec feature success
##Testing## epoch acc: 0.6357
epoch: 89 acc: 0.9807 avg loss: 0.0533
verify spec feature success
##Testing## epoch acc: 0.6346
epoch: 90 acc: 0.9805 avg loss: 0.0562
verify spec feature success
##Testing## epoch acc: 0.6346
epoch: 91 acc: 0.9804 avg loss: 0.0564
verify spec feature success
##Testing## epoch acc: 0.6346
epoch: 92 acc: 0.9787 avg loss: 0.0594
verify spec feature success
##Testing## epoch acc: 0.6357
epoch: 93 acc: 0.9819 avg loss: 0.0552
verify spec feature success
##Testing## epoch acc: 0.6368
epoch: 94 acc: 0.981 avg loss: 0.0529
verify spec feature success
```

```

##Testing## epoch acc: 0.6357
epoch: 95 acc: 0.98 avg loss: 0.0548
verify spec feature success
##Testing## epoch acc: 0.6357
epoch: 96 acc: 0.9816 avg loss: 0.0568
verify spec feature success
##Testing## epoch acc: 0.6357
epoch: 97 acc: 0.9809 avg loss: 0.0555
verify spec feature success
##Testing## epoch acc: 0.6346
epoch: 98 acc: 0.9799 avg loss: 0.0584
verify spec feature success
##Testing## epoch acc: 0.6335
epoch: 99 acc: 0.9804 avg loss: 0.0557
verify spec feature success
##Testing## epoch acc: 0.6335

```



```

In [7]: train(100)
        # vgg11 fold3 mfcc

```

```

verify mfcc feature success
epoch: 0 acc: 0.1395 avg loss: 2.4378
verify mfcc feature success
##Testing## epoch acc: 0.2519
epoch: 1 acc: 0.203 avg loss: 2.1291
verify mfcc feature success
##Testing## epoch acc: 0.1903
epoch: 2 acc: 0.2545 avg loss: 2.0097

```

```
verify mfcc feature success
##Testing## epoch acc: 0.1935
epoch: 3 acc: 0.3074 avg loss: 1.9061
verify mfcc feature success
##Testing## epoch acc: 0.3611
epoch: 4 acc: 0.3615 avg loss: 1.7855
verify mfcc feature success
##Testing## epoch acc: 0.2908
epoch: 5 acc: 0.4008 avg loss: 1.6779
verify mfcc feature success
##Testing## epoch acc: 0.2908
epoch: 6 acc: 0.4478 avg loss: 1.5716
verify mfcc feature success
##Testing## epoch acc: 0.3654
epoch: 7 acc: 0.4898 avg loss: 1.4794
verify mfcc feature success
##Testing## epoch acc: 0.4216
epoch: 8 acc: 0.5158 avg loss: 1.3974
verify mfcc feature success
##Testing## epoch acc: 0.3762
epoch: 9 acc: 0.5576 avg loss: 1.2951
verify mfcc feature success
##Testing## epoch acc: 0.3784
epoch: 10 acc: 0.5859 avg loss: 1.2099
verify mfcc feature success
##Testing## epoch acc: 0.4908
epoch: 11 acc: 0.6265 avg loss: 1.1030
verify mfcc feature success
##Testing## epoch acc: 0.4065
epoch: 12 acc: 0.6527 avg loss: 1.0271
verify mfcc feature success
##Testing## epoch acc: 0.44
epoch: 13 acc: 0.6731 avg loss: 0.9576
verify mfcc feature success
##Testing## epoch acc: 0.5005
epoch: 14 acc: 0.6936 avg loss: 0.8954
verify mfcc feature success
##Testing## epoch acc: 0.4876
epoch: 15 acc: 0.7064 avg loss: 0.8532
verify mfcc feature success
##Testing## epoch acc: 0.48
epoch: 16 acc: 0.7323 avg loss: 0.8068
verify mfcc feature success
##Testing## epoch acc: 0.5438
epoch: 17 acc: 0.7226 avg loss: 0.7995
verify mfcc feature success
##Testing## epoch acc: 0.4995
epoch: 18 acc: 0.7479 avg loss: 0.7558
verify mfcc feature success
##Testing## epoch acc: 0.5546
epoch: 19 acc: 0.7614 avg loss: 0.7131
verify mfcc feature success
##Testing## epoch acc: 0.5492
epoch: 20 acc: 0.8111 avg loss: 0.5657
verify mfcc feature success
##Testing## epoch acc: 0.5405
epoch: 21 acc: 0.8282 avg loss: 0.5093
verify mfcc feature success
##Testing## epoch acc: 0.5578
epoch: 22 acc: 0.8344 avg loss: 0.4818
verify mfcc feature success
```

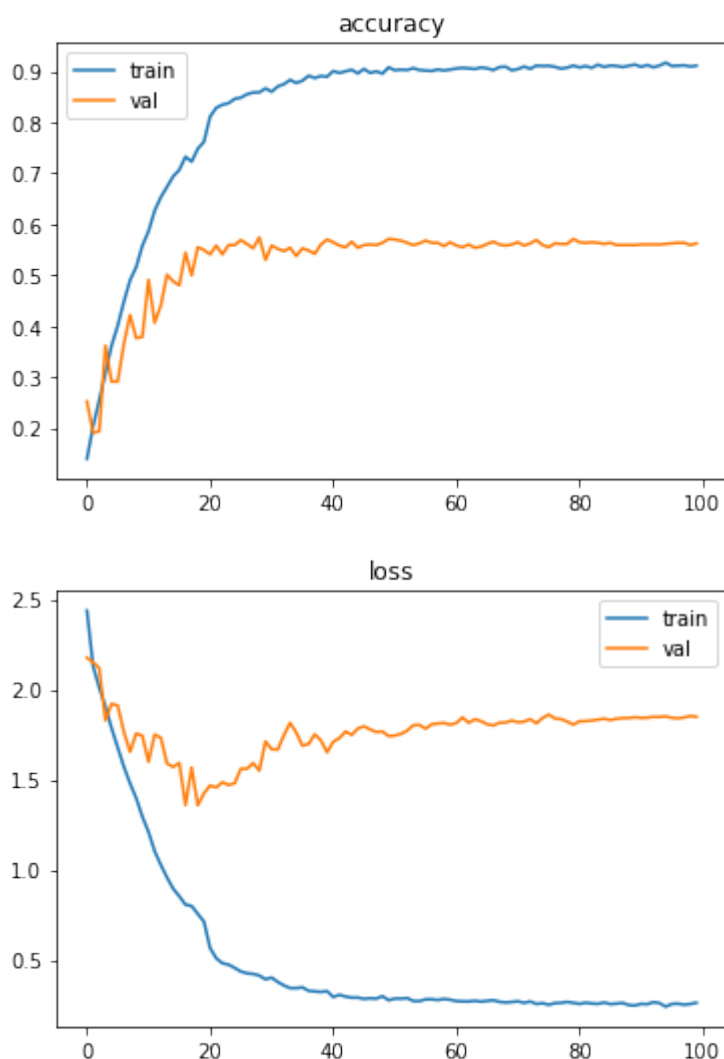
```
##Testing## epoch acc: 0.5405
epoch: 23 acc: 0.8373 avg loss: 0.4741
verify mfcc feature success
##Testing## epoch acc: 0.5589
epoch: 24 acc: 0.8458 avg loss: 0.4556
verify mfcc feature success
##Testing## epoch acc: 0.5589
epoch: 25 acc: 0.8482 avg loss: 0.4360
verify mfcc feature success
##Testing## epoch acc: 0.5686
epoch: 26 acc: 0.8549 avg loss: 0.4259
verify mfcc feature success
##Testing## epoch acc: 0.5611
epoch: 27 acc: 0.8583 avg loss: 0.4225
verify mfcc feature success
##Testing## epoch acc: 0.5524
epoch: 28 acc: 0.8586 avg loss: 0.4134
verify mfcc feature success
##Testing## epoch acc: 0.5741
epoch: 29 acc: 0.8664 avg loss: 0.3925
verify mfcc feature success
##Testing## epoch acc: 0.5297
epoch: 30 acc: 0.8599 avg loss: 0.4022
verify mfcc feature success
##Testing## epoch acc: 0.5578
epoch: 31 acc: 0.8702 avg loss: 0.3777
verify mfcc feature success
##Testing## epoch acc: 0.5514
epoch: 32 acc: 0.8747 avg loss: 0.3585
verify mfcc feature success
##Testing## epoch acc: 0.547
epoch: 33 acc: 0.8831 avg loss: 0.3438
verify mfcc feature success
##Testing## epoch acc: 0.5535
epoch: 34 acc: 0.877 avg loss: 0.3437
verify mfcc feature success
##Testing## epoch acc: 0.5373
epoch: 35 acc: 0.8815 avg loss: 0.3480
verify mfcc feature success
##Testing## epoch acc: 0.5524
epoch: 36 acc: 0.8911 avg loss: 0.3287
verify mfcc feature success
##Testing## epoch acc: 0.5481
epoch: 37 acc: 0.8869 avg loss: 0.3256
verify mfcc feature success
##Testing## epoch acc: 0.5416
epoch: 38 acc: 0.8906 avg loss: 0.3227
verify mfcc feature success
##Testing## epoch acc: 0.56
epoch: 39 acc: 0.8892 avg loss: 0.3268
verify mfcc feature success
##Testing## epoch acc: 0.5697
epoch: 40 acc: 0.9005 avg loss: 0.2946
verify mfcc feature success
##Testing## epoch acc: 0.5643
epoch: 41 acc: 0.8966 avg loss: 0.3062
verify mfcc feature success
##Testing## epoch acc: 0.5578
epoch: 42 acc: 0.9 avg loss: 0.2969
verify mfcc feature success
##Testing## epoch acc: 0.5546
```

```
epoch: 43 acc: 0.9028 avg loss: 0.2910
verify mfcc feature success
##Testing## epoch acc: 0.5654
epoch: 44 acc: 0.8959 avg loss: 0.2911
verify mfcc feature success
##Testing## epoch acc: 0.5535
epoch: 45 acc: 0.9046 avg loss: 0.2838
verify mfcc feature success
##Testing## epoch acc: 0.5589
epoch: 46 acc: 0.8968 avg loss: 0.2878
verify mfcc feature success
##Testing## epoch acc: 0.56
epoch: 47 acc: 0.8998 avg loss: 0.2855
verify mfcc feature success
##Testing## epoch acc: 0.5589
epoch: 48 acc: 0.8954 avg loss: 0.2988
verify mfcc feature success
##Testing## epoch acc: 0.5632
epoch: 49 acc: 0.9076 avg loss: 0.2765
verify mfcc feature success
##Testing## epoch acc: 0.5708
epoch: 50 acc: 0.902 avg loss: 0.2857
verify mfcc feature success
##Testing## epoch acc: 0.5697
epoch: 51 acc: 0.9032 avg loss: 0.2852
verify mfcc feature success
##Testing## epoch acc: 0.5676
epoch: 52 acc: 0.9024 avg loss: 0.2886
verify mfcc feature success
##Testing## epoch acc: 0.5632
epoch: 53 acc: 0.906 avg loss: 0.2725
verify mfcc feature success
##Testing## epoch acc: 0.5589
epoch: 54 acc: 0.9024 avg loss: 0.2716
verify mfcc feature success
##Testing## epoch acc: 0.5622
epoch: 55 acc: 0.9014 avg loss: 0.2814
verify mfcc feature success
##Testing## epoch acc: 0.5676
epoch: 56 acc: 0.9006 avg loss: 0.2816
verify mfcc feature success
##Testing## epoch acc: 0.5632
epoch: 57 acc: 0.9035 avg loss: 0.2778
verify mfcc feature success
##Testing## epoch acc: 0.5632
epoch: 58 acc: 0.9015 avg loss: 0.2836
verify mfcc feature success
##Testing## epoch acc: 0.5568
epoch: 59 acc: 0.9034 avg loss: 0.2792
verify mfcc feature success
##Testing## epoch acc: 0.5643
epoch: 60 acc: 0.9053 avg loss: 0.2719
verify mfcc feature success
##Testing## epoch acc: 0.5578
epoch: 61 acc: 0.9066 avg loss: 0.2703
verify mfcc feature success
##Testing## epoch acc: 0.5546
epoch: 62 acc: 0.9057 avg loss: 0.2695
verify mfcc feature success
##Testing## epoch acc: 0.56
epoch: 63 acc: 0.9044 avg loss: 0.2734
```



```
verify mfcc feature success
##Testing## epoch acc: 0.5535
epoch: 64 acc: 0.9074 avg loss: 0.2689
verify mfcc feature success
##Testing## epoch acc: 0.5557
epoch: 65 acc: 0.9057 avg loss: 0.2732
verify mfcc feature success
##Testing## epoch acc: 0.5611
epoch: 66 acc: 0.9024 avg loss: 0.2765
verify mfcc feature success
##Testing## epoch acc: 0.5654
epoch: 67 acc: 0.9082 avg loss: 0.2676
verify mfcc feature success
##Testing## epoch acc: 0.56
epoch: 68 acc: 0.9089 avg loss: 0.2640
verify mfcc feature success
##Testing## epoch acc: 0.5578
epoch: 69 acc: 0.9019 avg loss: 0.2667
verify mfcc feature success
##Testing## epoch acc: 0.56
epoch: 70 acc: 0.9043 avg loss: 0.2708
verify mfcc feature success
##Testing## epoch acc: 0.5643
epoch: 71 acc: 0.9092 avg loss: 0.2618
verify mfcc feature success
##Testing## epoch acc: 0.5578
epoch: 72 acc: 0.9048 avg loss: 0.2696
verify mfcc feature success
##Testing## epoch acc: 0.5622
epoch: 73 acc: 0.9111 avg loss: 0.2560
verify mfcc feature success
##Testing## epoch acc: 0.5686
epoch: 74 acc: 0.9103 avg loss: 0.2599
verify mfcc feature success
##Testing## epoch acc: 0.5589
epoch: 75 acc: 0.9107 avg loss: 0.2516
verify mfcc feature success
##Testing## epoch acc: 0.5546
epoch: 76 acc: 0.9087 avg loss: 0.2605
verify mfcc feature success
##Testing## epoch acc: 0.5622
epoch: 77 acc: 0.9051 avg loss: 0.2620
verify mfcc feature success
##Testing## epoch acc: 0.5611
epoch: 78 acc: 0.9071 avg loss: 0.2671
verify mfcc feature success
##Testing## epoch acc: 0.5611
epoch: 79 acc: 0.9111 avg loss: 0.2621
verify mfcc feature success
##Testing## epoch acc: 0.5708
epoch: 80 acc: 0.9075 avg loss: 0.2563
verify mfcc feature success
##Testing## epoch acc: 0.5643
epoch: 81 acc: 0.9101 avg loss: 0.2628
verify mfcc feature success
##Testing## epoch acc: 0.5632
epoch: 82 acc: 0.9068 avg loss: 0.2585
verify mfcc feature success
##Testing## epoch acc: 0.5643
epoch: 83 acc: 0.9129 avg loss: 0.2565
verify mfcc feature success
```

```
##Testing## epoch acc: 0.5632
epoch: 84 acc: 0.9084 avg loss: 0.2637
verify mfcc feature success
##Testing## epoch acc: 0.5611
epoch: 85 acc: 0.9112 avg loss: 0.2552
verify mfcc feature success
##Testing## epoch acc: 0.5632
epoch: 86 acc: 0.9105 avg loss: 0.2578
verify mfcc feature success
##Testing## epoch acc: 0.5589
epoch: 87 acc: 0.9083 avg loss: 0.2615
verify mfcc feature success
##Testing## epoch acc: 0.5589
epoch: 88 acc: 0.9107 avg loss: 0.2496
verify mfcc feature success
##Testing## epoch acc: 0.5589
epoch: 89 acc: 0.9132 avg loss: 0.2470
verify mfcc feature success
##Testing## epoch acc: 0.5589
epoch: 90 acc: 0.9085 avg loss: 0.2566
verify mfcc feature success
##Testing## epoch acc: 0.56
epoch: 91 acc: 0.9123 avg loss: 0.2545
verify mfcc feature success
##Testing## epoch acc: 0.56
epoch: 92 acc: 0.9078 avg loss: 0.2659
verify mfcc feature success
##Testing## epoch acc: 0.56
epoch: 93 acc: 0.9111 avg loss: 0.2605
verify mfcc feature success
##Testing## epoch acc: 0.56
epoch: 94 acc: 0.917 avg loss: 0.2407
verify mfcc feature success
##Testing## epoch acc: 0.5611
epoch: 95 acc: 0.9103 avg loss: 0.2560
verify mfcc feature success
##Testing## epoch acc: 0.5622
epoch: 96 acc: 0.911 avg loss: 0.2574
verify mfcc feature success
##Testing## epoch acc: 0.5632
epoch: 97 acc: 0.9116 avg loss: 0.2518
verify mfcc feature success
##Testing## epoch acc: 0.5632
epoch: 98 acc: 0.9093 avg loss: 0.2557
verify mfcc feature success
##Testing## epoch acc: 0.5589
epoch: 99 acc: 0.911 avg loss: 0.2624
verify mfcc feature success
##Testing## epoch acc: 0.5622
```



```
In [6]: train(100)
# vgg11 fold4 spec
```

```
verify spec feature success
epoch: 0 acc: 0.3517 avg loss: 1.7661
verify spec feature success
##Testing## epoch acc: 0.4293
epoch: 1 acc: 0.6234 avg loss: 1.0709
verify spec feature success
##Testing## epoch acc: 0.4899
epoch: 2 acc: 0.7423 avg loss: 0.7614
verify spec feature success
##Testing## epoch acc: 0.6495
epoch: 3 acc: 0.806 avg loss: 0.5673
verify spec feature success
##Testing## epoch acc: 0.6434
epoch: 4 acc: 0.8458 avg loss: 0.4566
verify spec feature success
##Testing## epoch acc: 0.6626
epoch: 5 acc: 0.8686 avg loss: 0.3827
verify spec feature success
##Testing## epoch acc: 0.6606
epoch: 6 acc: 0.8987 avg loss: 0.3083
verify spec feature success
##Testing## epoch acc: 0.6475
epoch: 7 acc: 0.916 avg loss: 0.2488
verify spec feature success
##Testing## epoch acc: 0.6566
```

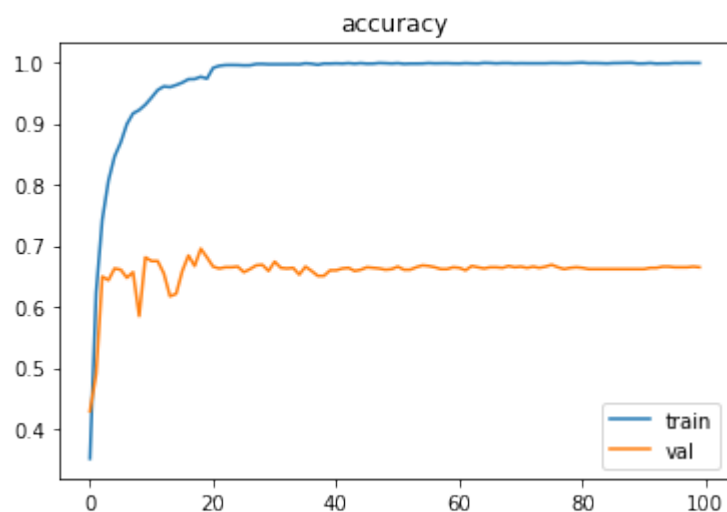
```
epoch: 8 acc: 0.9216 avg loss: 0.2195
verify spec feature success
##Testing## epoch acc: 0.5848
epoch: 9 acc: 0.9304 avg loss: 0.2045
verify spec feature success
##Testing## epoch acc: 0.6808
epoch: 10 acc: 0.9419 avg loss: 0.1746
verify spec feature success
##Testing## epoch acc: 0.6747
epoch: 11 acc: 0.9543 avg loss: 0.1319
verify spec feature success
##Testing## epoch acc: 0.6747
epoch: 12 acc: 0.9602 avg loss: 0.1229
verify spec feature success
##Testing## epoch acc: 0.6545
epoch: 13 acc: 0.9591 avg loss: 0.1198
verify spec feature success
##Testing## epoch acc: 0.6172
epoch: 14 acc: 0.9624 avg loss: 0.1179
verify spec feature success
##Testing## epoch acc: 0.6212
epoch: 15 acc: 0.9664 avg loss: 0.1108
verify spec feature success
##Testing## epoch acc: 0.6586
epoch: 16 acc: 0.972 avg loss: 0.0883
verify spec feature success
##Testing## epoch acc: 0.6838
epoch: 17 acc: 0.9722 avg loss: 0.0858
verify spec feature success
##Testing## epoch acc: 0.6667
epoch: 18 acc: 0.976 avg loss: 0.0721
verify spec feature success
##Testing## epoch acc: 0.6949
epoch: 19 acc: 0.9729 avg loss: 0.0794
verify spec feature success
##Testing## epoch acc: 0.6808
epoch: 20 acc: 0.9904 avg loss: 0.0316
verify spec feature success
##Testing## epoch acc: 0.6657
epoch: 21 acc: 0.9938 avg loss: 0.0200
verify spec feature success
##Testing## epoch acc: 0.6626
epoch: 22 acc: 0.9951 avg loss: 0.0157
verify spec feature success
##Testing## epoch acc: 0.6646
epoch: 23 acc: 0.9952 avg loss: 0.0125
verify spec feature success
##Testing## epoch acc: 0.6646
epoch: 24 acc: 0.9951 avg loss: 0.0129
verify spec feature success
##Testing## epoch acc: 0.6657
epoch: 25 acc: 0.9946 avg loss: 0.0148
verify spec feature success
##Testing## epoch acc: 0.6566
epoch: 26 acc: 0.9947 avg loss: 0.0140
verify spec feature success
##Testing## epoch acc: 0.6616
epoch: 27 acc: 0.9968 avg loss: 0.0101
verify spec feature success
##Testing## epoch acc: 0.6677
epoch: 28 acc: 0.9969 avg loss: 0.0096
```

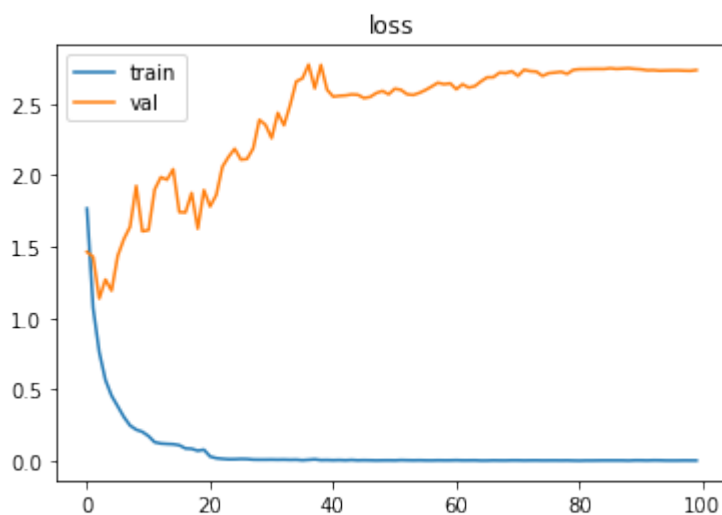
```
verify spec feature success
##Testing## epoch acc: 0.6687
epoch: 29 acc: 0.9964 avg loss: 0.0096
verify spec feature success
##Testing## epoch acc: 0.6586
epoch: 30 acc: 0.9964 avg loss: 0.0102
verify spec feature success
##Testing## epoch acc: 0.6737
epoch: 31 acc: 0.9964 avg loss: 0.0093
verify spec feature success
##Testing## epoch acc: 0.6636
epoch: 32 acc: 0.9964 avg loss: 0.0100
verify spec feature success
##Testing## epoch acc: 0.6626
epoch: 33 acc: 0.9965 avg loss: 0.0085
verify spec feature success
##Testing## epoch acc: 0.6636
epoch: 34 acc: 0.9963 avg loss: 0.0094
verify spec feature success
##Testing## epoch acc: 0.6525
epoch: 35 acc: 0.9979 avg loss: 0.0057
verify spec feature success
##Testing## epoch acc: 0.6657
epoch: 36 acc: 0.9972 avg loss: 0.0088
verify spec feature success
##Testing## epoch acc: 0.6586
epoch: 37 acc: 0.9956 avg loss: 0.0121
verify spec feature success
##Testing## epoch acc: 0.6505
epoch: 38 acc: 0.9975 avg loss: 0.0064
verify spec feature success
##Testing## epoch acc: 0.6505
epoch: 39 acc: 0.9974 avg loss: 0.0071
verify spec feature success
##Testing## epoch acc: 0.6596
epoch: 40 acc: 0.9978 avg loss: 0.0057
verify spec feature success
##Testing## epoch acc: 0.6596
epoch: 41 acc: 0.9974 avg loss: 0.0070
verify spec feature success
##Testing## epoch acc: 0.6626
epoch: 42 acc: 0.9982 avg loss: 0.0052
verify spec feature success
##Testing## epoch acc: 0.6636
epoch: 43 acc: 0.9973 avg loss: 0.0076
verify spec feature success
##Testing## epoch acc: 0.6586
epoch: 44 acc: 0.9982 avg loss: 0.0049
verify spec feature success
##Testing## epoch acc: 0.6606
epoch: 45 acc: 0.9973 avg loss: 0.0059
verify spec feature success
##Testing## epoch acc: 0.6646
epoch: 46 acc: 0.9974 avg loss: 0.0052
verify spec feature success
##Testing## epoch acc: 0.6636
epoch: 47 acc: 0.9985 avg loss: 0.0041
verify spec feature success
##Testing## epoch acc: 0.6626
epoch: 48 acc: 0.9981 avg loss: 0.0049
verify spec feature success
```

```
##Testing## epoch acc: 0.6606
epoch: 49 acc: 0.9975 avg loss: 0.0051
verify spec feature success
##Testing## epoch acc: 0.6616
epoch: 50 acc: 0.9982 avg loss: 0.0044
verify spec feature success
##Testing## epoch acc: 0.6657
epoch: 51 acc: 0.997 avg loss: 0.0066
verify spec feature success
##Testing## epoch acc: 0.6606
epoch: 52 acc: 0.9974 avg loss: 0.0055
verify spec feature success
##Testing## epoch acc: 0.6606
epoch: 53 acc: 0.9974 avg loss: 0.0048
verify spec feature success
##Testing## epoch acc: 0.6646
epoch: 54 acc: 0.9975 avg loss: 0.0056
verify spec feature success
##Testing## epoch acc: 0.6677
epoch: 55 acc: 0.9983 avg loss: 0.0045
verify spec feature success
##Testing## epoch acc: 0.6667
epoch: 56 acc: 0.9978 avg loss: 0.0042
verify spec feature success
##Testing## epoch acc: 0.6646
epoch: 57 acc: 0.9979 avg loss: 0.0052
verify spec feature success
##Testing## epoch acc: 0.6616
epoch: 58 acc: 0.9981 avg loss: 0.0047
verify spec feature success
##Testing## epoch acc: 0.6616
epoch: 59 acc: 0.9977 avg loss: 0.0049
verify spec feature success
##Testing## epoch acc: 0.6646
epoch: 60 acc: 0.9975 avg loss: 0.0059
verify spec feature success
##Testing## epoch acc: 0.6636
epoch: 61 acc: 0.9982 avg loss: 0.0045
verify spec feature success
##Testing## epoch acc: 0.6596
epoch: 62 acc: 0.9978 avg loss: 0.0048
verify spec feature success
##Testing## epoch acc: 0.6667
epoch: 63 acc: 0.9975 avg loss: 0.0051
verify spec feature success
##Testing## epoch acc: 0.6646
epoch: 64 acc: 0.9987 avg loss: 0.0033
verify spec feature success
##Testing## epoch acc: 0.6626
epoch: 65 acc: 0.9985 avg loss: 0.0035
verify spec feature success
##Testing## epoch acc: 0.6646
epoch: 66 acc: 0.9978 avg loss: 0.0048
verify spec feature success
##Testing## epoch acc: 0.6646
epoch: 67 acc: 0.9983 avg loss: 0.0041
verify spec feature success
##Testing## epoch acc: 0.6636
epoch: 68 acc: 0.9983 avg loss: 0.0040
verify spec feature success
##Testing## epoch acc: 0.6667
```

```
epoch: 69 acc: 0.9978 avg loss: 0.0050
verify spec feature success
##Testing## epoch acc: 0.6646
epoch: 70 acc: 0.9981 avg loss: 0.0049
verify spec feature success
##Testing## epoch acc: 0.6657
epoch: 71 acc: 0.9979 avg loss: 0.0040
verify spec feature success
##Testing## epoch acc: 0.6636
epoch: 72 acc: 0.9979 avg loss: 0.0046
verify spec feature success
##Testing## epoch acc: 0.6657
epoch: 73 acc: 0.9979 avg loss: 0.0047
verify spec feature success
##Testing## epoch acc: 0.6636
epoch: 74 acc: 0.9979 avg loss: 0.0040
verify spec feature success
##Testing## epoch acc: 0.6657
epoch: 75 acc: 0.9985 avg loss: 0.0042
verify spec feature success
##Testing## epoch acc: 0.6687
epoch: 76 acc: 0.9983 avg loss: 0.0044
verify spec feature success
##Testing## epoch acc: 0.6646
epoch: 77 acc: 0.9981 avg loss: 0.0040
verify spec feature success
##Testing## epoch acc: 0.6616
epoch: 78 acc: 0.9982 avg loss: 0.0044
verify spec feature success
##Testing## epoch acc: 0.6636
epoch: 79 acc: 0.9987 avg loss: 0.0033
verify spec feature success
##Testing## epoch acc: 0.6646
epoch: 80 acc: 0.9991 avg loss: 0.0025
verify spec feature success
##Testing## epoch acc: 0.6636
epoch: 81 acc: 0.9982 avg loss: 0.0037
verify spec feature success
##Testing## epoch acc: 0.6616
epoch: 82 acc: 0.9983 avg loss: 0.0036
verify spec feature success
##Testing## epoch acc: 0.6616
epoch: 83 acc: 0.9981 avg loss: 0.0041
verify spec feature success
##Testing## epoch acc: 0.6616
epoch: 84 acc: 0.9977 avg loss: 0.0044
verify spec feature success
##Testing## epoch acc: 0.6616
epoch: 85 acc: 0.9983 avg loss: 0.0043
verify spec feature success
##Testing## epoch acc: 0.6616
epoch: 86 acc: 0.9985 avg loss: 0.0043
verify spec feature success
##Testing## epoch acc: 0.6616
epoch: 87 acc: 0.9987 avg loss: 0.0042
verify spec feature success
##Testing## epoch acc: 0.6616
epoch: 88 acc: 0.9988 avg loss: 0.0031
verify spec feature success
##Testing## epoch acc: 0.6616
epoch: 89 acc: 0.9975 avg loss: 0.0052
```

```
verify spec feature success
##Testing## epoch acc: 0.6616
epoch: 90 acc: 0.9977 avg loss: 0.0050
verify spec feature success
##Testing## epoch acc: 0.6616
epoch: 91 acc: 0.9985 avg loss: 0.0040
verify spec feature success
##Testing## epoch acc: 0.6636
epoch: 92 acc: 0.9974 avg loss: 0.0053
verify spec feature success
##Testing## epoch acc: 0.6636
epoch: 93 acc: 0.9977 avg loss: 0.0050
verify spec feature success
##Testing## epoch acc: 0.6657
epoch: 94 acc: 0.9977 avg loss: 0.0038
verify spec feature success
##Testing## epoch acc: 0.6657
epoch: 95 acc: 0.9986 avg loss: 0.0036
verify spec feature success
##Testing## epoch acc: 0.6646
epoch: 96 acc: 0.9983 avg loss: 0.0037
verify spec feature success
##Testing## epoch acc: 0.6646
epoch: 97 acc: 0.9986 avg loss: 0.0042
verify spec feature success
##Testing## epoch acc: 0.6646
epoch: 98 acc: 0.9985 avg loss: 0.0039
verify spec feature success
##Testing## epoch acc: 0.6657
epoch: 99 acc: 0.9985 avg loss: 0.0038
verify spec feature success
##Testing## epoch acc: 0.6646
```





```
In [6]: train(100)
        # vgg11 fold4 mfcc

verify mfcc feature success
epoch: 0 acc: 0.1799 avg loss: 2.1664
verify mfcc feature success
##Testing## epoch acc: 0.2808
epoch: 1 acc: 0.3232 avg loss: 1.8766
verify mfcc feature success
##Testing## epoch acc: 0.2929
epoch: 2 acc: 0.4681 avg loss: 1.5230
verify mfcc feature success
##Testing## epoch acc: 0.4182
epoch: 3 acc: 0.5841 avg loss: 1.2120
verify mfcc feature success
##Testing## epoch acc: 0.4566
epoch: 4 acc: 0.67 avg loss: 0.9853
verify mfcc feature success
##Testing## epoch acc: 0.4758
epoch: 5 acc: 0.7205 avg loss: 0.8347
verify mfcc feature success
##Testing## epoch acc: 0.5232
epoch: 6 acc: 0.7632 avg loss: 0.7067
verify mfcc feature success
##Testing## epoch acc: 0.5465
epoch: 7 acc: 0.8016 avg loss: 0.5920
verify mfcc feature success
##Testing## epoch acc: 0.5192
epoch: 8 acc: 0.8295 avg loss: 0.5068
verify mfcc feature success
##Testing## epoch acc: 0.5212
epoch: 9 acc: 0.8509 avg loss: 0.4261
verify mfcc feature success
##Testing## epoch acc: 0.5111
epoch: 10 acc: 0.8733 avg loss: 0.3630
verify mfcc feature success
##Testing## epoch acc: 0.5869
epoch: 11 acc: 0.8932 avg loss: 0.3174
verify mfcc feature success
##Testing## epoch acc: 0.5323
epoch: 12 acc: 0.912 avg loss: 0.2685
verify mfcc feature success
##Testing## epoch acc: 0.5465
epoch: 13 acc: 0.9163 avg loss: 0.2454
```

```
verify mfcc feature success
##Testing## epoch acc: 0.5283
epoch: 14 acc: 0.925 avg loss: 0.2169
verify mfcc feature success
##Testing## epoch acc: 0.5313
epoch: 15 acc: 0.9293 avg loss: 0.2042
verify mfcc feature success
##Testing## epoch acc: 0.5354
epoch: 16 acc: 0.9386 avg loss: 0.1803
verify mfcc feature success
##Testing## epoch acc: 0.5081
epoch: 17 acc: 0.9503 avg loss: 0.1587
verify mfcc feature success
##Testing## epoch acc: 0.503
epoch: 18 acc: 0.95 avg loss: 0.1459
verify mfcc feature success
##Testing## epoch acc: 0.4949
epoch: 19 acc: 0.9543 avg loss: 0.1359
verify mfcc feature success
##Testing## epoch acc: 0.5152
epoch: 20 acc: 0.98 avg loss: 0.0684
verify mfcc feature success
##Testing## epoch acc: 0.5313
epoch: 21 acc: 0.9857 avg loss: 0.0413
verify mfcc feature success
##Testing## epoch acc: 0.5364
epoch: 22 acc: 0.9853 avg loss: 0.0430
verify mfcc feature success
##Testing## epoch acc: 0.5242
epoch: 23 acc: 0.9877 avg loss: 0.0370
verify mfcc feature success
##Testing## epoch acc: 0.5273
epoch: 24 acc: 0.9886 avg loss: 0.0314
verify mfcc feature success
##Testing## epoch acc: 0.5263
epoch: 25 acc: 0.9894 avg loss: 0.0268
verify mfcc feature success
##Testing## epoch acc: 0.5424
epoch: 26 acc: 0.9908 avg loss: 0.0275
verify mfcc feature success
##Testing## epoch acc: 0.5414
epoch: 27 acc: 0.9929 avg loss: 0.0216
verify mfcc feature success
##Testing## epoch acc: 0.5303
epoch: 28 acc: 0.9934 avg loss: 0.0213
verify mfcc feature success
##Testing## epoch acc: 0.5313
epoch: 29 acc: 0.993 avg loss: 0.0203
verify mfcc feature success
##Testing## epoch acc: 0.5333
epoch: 30 acc: 0.9925 avg loss: 0.0218
verify mfcc feature success
##Testing## epoch acc: 0.5465
epoch: 31 acc: 0.9928 avg loss: 0.0167
verify mfcc feature success
##Testing## epoch acc: 0.5303
epoch: 32 acc: 0.9941 avg loss: 0.0173
verify mfcc feature success
##Testing## epoch acc: 0.5374
epoch: 33 acc: 0.9943 avg loss: 0.0161
verify mfcc feature success
```

```
##Testing## epoch acc: 0.5283
epoch: 34 acc: 0.9934 avg loss: 0.0195
verify mfcc feature success
##Testing## epoch acc: 0.5465
epoch: 35 acc: 0.9937 avg loss: 0.0191
verify mfcc feature success
##Testing## epoch acc: 0.5364
epoch: 36 acc: 0.9944 avg loss: 0.0143
verify mfcc feature success
##Testing## epoch acc: 0.5475
epoch: 37 acc: 0.9941 avg loss: 0.0169
verify mfcc feature success
##Testing## epoch acc: 0.5343
epoch: 38 acc: 0.9943 avg loss: 0.0157
verify mfcc feature success
##Testing## epoch acc: 0.5212
epoch: 39 acc: 0.9952 avg loss: 0.0136
verify mfcc feature success
##Testing## epoch acc: 0.5455
epoch: 40 acc: 0.9955 avg loss: 0.0130
verify mfcc feature success
##Testing## epoch acc: 0.5414
epoch: 41 acc: 0.9961 avg loss: 0.0120
verify mfcc feature success
##Testing## epoch acc: 0.5444
epoch: 42 acc: 0.9964 avg loss: 0.0108
verify mfcc feature success
##Testing## epoch acc: 0.5485
epoch: 43 acc: 0.9964 avg loss: 0.0110
verify mfcc feature success
##Testing## epoch acc: 0.5444
epoch: 44 acc: 0.9964 avg loss: 0.0106
verify mfcc feature success
##Testing## epoch acc: 0.5444
epoch: 45 acc: 0.9973 avg loss: 0.0097
verify mfcc feature success
##Testing## epoch acc: 0.5404
epoch: 46 acc: 0.996 avg loss: 0.0101
verify mfcc feature success
##Testing## epoch acc: 0.5384
epoch: 47 acc: 0.9964 avg loss: 0.0094
verify mfcc feature success
##Testing## epoch acc: 0.5384
epoch: 48 acc: 0.9961 avg loss: 0.0094
verify mfcc feature success
##Testing## epoch acc: 0.5364
epoch: 49 acc: 0.9959 avg loss: 0.0106
verify mfcc feature success
##Testing## epoch acc: 0.5374
epoch: 50 acc: 0.9957 avg loss: 0.0092
verify mfcc feature success
##Testing## epoch acc: 0.5414
epoch: 51 acc: 0.9966 avg loss: 0.0086
verify mfcc feature success
##Testing## epoch acc: 0.5384
epoch: 52 acc: 0.9957 avg loss: 0.0108
verify mfcc feature success
##Testing## epoch acc: 0.5374
epoch: 53 acc: 0.9956 avg loss: 0.0099
verify mfcc feature success
##Testing## epoch acc: 0.5374
```

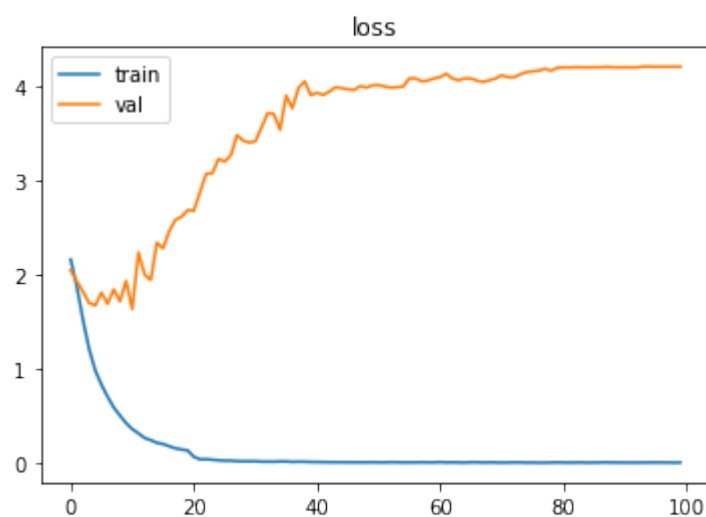
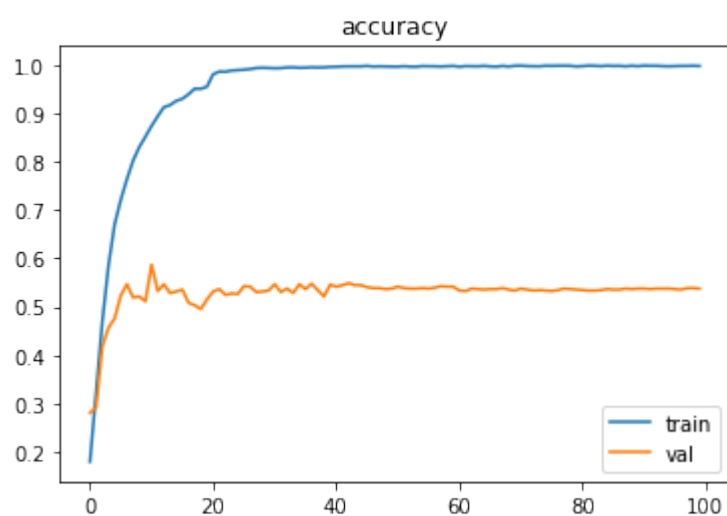
```
epoch: 54 acc: 0.9969 avg loss: 0.0082
verify mfcc feature success
##Testing## epoch acc: 0.5384
epoch: 55 acc: 0.9966 avg loss: 0.0085
verify mfcc feature success
##Testing## epoch acc: 0.5374
epoch: 56 acc: 0.9965 avg loss: 0.0091
verify mfcc feature success
##Testing## epoch acc: 0.5394
epoch: 57 acc: 0.996 avg loss: 0.0102
verify mfcc feature success
##Testing## epoch acc: 0.5424
epoch: 58 acc: 0.9966 avg loss: 0.0089
verify mfcc feature success
##Testing## epoch acc: 0.5414
epoch: 59 acc: 0.9973 avg loss: 0.0090
verify mfcc feature success
##Testing## epoch acc: 0.5414
epoch: 60 acc: 0.9956 avg loss: 0.0117
verify mfcc feature success
##Testing## epoch acc: 0.5333
epoch: 61 acc: 0.9969 avg loss: 0.0084
verify mfcc feature success
##Testing## epoch acc: 0.5323
epoch: 62 acc: 0.9966 avg loss: 0.0096
verify mfcc feature success
##Testing## epoch acc: 0.5374
epoch: 63 acc: 0.9965 avg loss: 0.0083
verify mfcc feature success
##Testing## epoch acc: 0.5364
epoch: 64 acc: 0.9974 avg loss: 0.0068
verify mfcc feature success
##Testing## epoch acc: 0.5354
epoch: 65 acc: 0.9963 avg loss: 0.0103
verify mfcc feature success
##Testing## epoch acc: 0.5364
epoch: 66 acc: 0.9957 avg loss: 0.0105
verify mfcc feature success
##Testing## epoch acc: 0.5364
epoch: 67 acc: 0.9973 avg loss: 0.0073
verify mfcc feature success
##Testing## epoch acc: 0.5384
epoch: 68 acc: 0.996 avg loss: 0.0095
verify mfcc feature success
##Testing## epoch acc: 0.5354
epoch: 69 acc: 0.9975 avg loss: 0.0079
verify mfcc feature success
##Testing## epoch acc: 0.5333
epoch: 70 acc: 0.9978 avg loss: 0.0063
verify mfcc feature success
##Testing## epoch acc: 0.5374
epoch: 71 acc: 0.997 avg loss: 0.0075
verify mfcc feature success
##Testing## epoch acc: 0.5354
epoch: 72 acc: 0.9966 avg loss: 0.0089
verify mfcc feature success
##Testing## epoch acc: 0.5333
epoch: 73 acc: 0.9965 avg loss: 0.0091
verify mfcc feature success
##Testing## epoch acc: 0.5343
epoch: 74 acc: 0.9977 avg loss: 0.0061
```

```
verify mfcc feature success
##Testing## epoch acc: 0.5333
epoch: 75 acc: 0.9974 avg loss: 0.0070
verify mfcc feature success
##Testing## epoch acc: 0.5323
epoch: 76 acc: 0.9977 avg loss: 0.0058
verify mfcc feature success
##Testing## epoch acc: 0.5343
epoch: 77 acc: 0.9978 avg loss: 0.0056
verify mfcc feature success
##Testing## epoch acc: 0.5374
epoch: 78 acc: 0.9975 avg loss: 0.0074
verify mfcc feature success
##Testing## epoch acc: 0.5364
epoch: 79 acc: 0.9963 avg loss: 0.0089
verify mfcc feature success
##Testing## epoch acc: 0.5354
epoch: 80 acc: 0.9969 avg loss: 0.0078
verify mfcc feature success
##Testing## epoch acc: 0.5343
epoch: 81 acc: 0.9979 avg loss: 0.0066
verify mfcc feature success
##Testing## epoch acc: 0.5333
epoch: 82 acc: 0.9975 avg loss: 0.0072
verify mfcc feature success
##Testing## epoch acc: 0.5333
epoch: 83 acc: 0.9969 avg loss: 0.0091
verify mfcc feature success
##Testing## epoch acc: 0.5343
epoch: 84 acc: 0.9978 avg loss: 0.0059
verify mfcc feature success
##Testing## epoch acc: 0.5364
epoch: 85 acc: 0.9973 avg loss: 0.0071
verify mfcc feature success
##Testing## epoch acc: 0.5354
epoch: 86 acc: 0.9974 avg loss: 0.0079
verify mfcc feature success
##Testing## epoch acc: 0.5354
epoch: 87 acc: 0.9965 avg loss: 0.0098
verify mfcc feature success
##Testing## epoch acc: 0.5374
epoch: 88 acc: 0.9977 avg loss: 0.0079
verify mfcc feature success
##Testing## epoch acc: 0.5364
epoch: 89 acc: 0.9968 avg loss: 0.0080
verify mfcc feature success
##Testing## epoch acc: 0.5374
epoch: 90 acc: 0.9979 avg loss: 0.0066
verify mfcc feature success
##Testing## epoch acc: 0.5374
epoch: 91 acc: 0.9975 avg loss: 0.0066
verify mfcc feature success
##Testing## epoch acc: 0.5364
epoch: 92 acc: 0.9975 avg loss: 0.0069
verify mfcc feature success
##Testing## epoch acc: 0.5374
epoch: 93 acc: 0.9969 avg loss: 0.0072
verify mfcc feature success
##Testing## epoch acc: 0.5374
epoch: 94 acc: 0.9965 avg loss: 0.0085
verify mfcc feature success
```

```

##Testing## epoch acc: 0.5374
epoch: 95 acc: 0.9969 avg loss: 0.0077
verify mfcc feature success
##Testing## epoch acc: 0.5364
epoch: 96 acc: 0.9973 avg loss: 0.0079
verify mfcc feature success
##Testing## epoch acc: 0.5354
epoch: 97 acc: 0.9973 avg loss: 0.0076
verify mfcc feature success
##Testing## epoch acc: 0.5384
epoch: 98 acc: 0.9977 avg loss: 0.0058
verify mfcc feature success
##Testing## epoch acc: 0.5384
epoch: 99 acc: 0.9972 avg loss: 0.0076
verify mfcc feature success
##Testing## epoch acc: 0.5374

```



```

In [6]: train(100)
        # vgg11 fold5 spec

```

```

verify spec feature success
epoch: 0 acc: 0.2664 avg loss: 2.2803
verify spec feature success
##Testing## epoch acc: 0.4701
epoch: 1 acc: 0.5332 avg loss: 1.2875
verify spec feature success
##Testing## epoch acc: 0.6368
epoch: 2 acc: 0.6381 avg loss: 1.0082

```

```
verify spec feature success
##Testing## epoch acc: 0.7254
epoch: 3 acc: 0.6977 avg loss: 0.8707
verify spec feature success
##Testing## epoch acc: 0.7158
epoch: 4 acc: 0.7423 avg loss: 0.7491
verify spec feature success
##Testing## epoch acc: 0.7511
epoch: 5 acc: 0.77 avg loss: 0.6889
verify spec feature success
##Testing## epoch acc: 0.7949
epoch: 6 acc: 0.7943 avg loss: 0.6022
verify spec feature success
##Testing## epoch acc: 0.7415
epoch: 7 acc: 0.8113 avg loss: 0.5501
verify spec feature success
##Testing## epoch acc: 0.6859
epoch: 8 acc: 0.8276 avg loss: 0.5091
verify spec feature success
##Testing## epoch acc: 0.7628
epoch: 9 acc: 0.8349 avg loss: 0.4795
verify spec feature success
##Testing## epoch acc: 0.7254
epoch: 10 acc: 0.8448 avg loss: 0.4626
verify spec feature success
##Testing## epoch acc: 0.7692
epoch: 11 acc: 0.8509 avg loss: 0.4436
verify spec feature success
##Testing## epoch acc: 0.75
epoch: 12 acc: 0.8481 avg loss: 0.4279
verify spec feature success
##Testing## epoch acc: 0.8024
epoch: 13 acc: 0.8715 avg loss: 0.3908
verify spec feature success
##Testing## epoch acc: 0.7361
epoch: 14 acc: 0.8674 avg loss: 0.3835
verify spec feature success
##Testing## epoch acc: 0.7639
epoch: 15 acc: 0.879 avg loss: 0.3638
verify spec feature success
##Testing## epoch acc: 0.7532
epoch: 16 acc: 0.8843 avg loss: 0.3324
verify spec feature success
##Testing## epoch acc: 0.7767
epoch: 17 acc: 0.8834 avg loss: 0.3468
verify spec feature success
##Testing## epoch acc: 0.812
epoch: 18 acc: 0.8905 avg loss: 0.3340
verify spec feature success
##Testing## epoch acc: 0.7991
epoch: 19 acc: 0.9076 avg loss: 0.2800
verify spec feature success
##Testing## epoch acc: 0.8173
epoch: 20 acc: 0.9402 avg loss: 0.1711
verify spec feature success
##Testing## epoch acc: 0.8301
epoch: 21 acc: 0.9501 avg loss: 0.1440
verify spec feature success
##Testing## epoch acc: 0.8248
epoch: 22 acc: 0.9561 avg loss: 0.1311
verify spec feature success
```

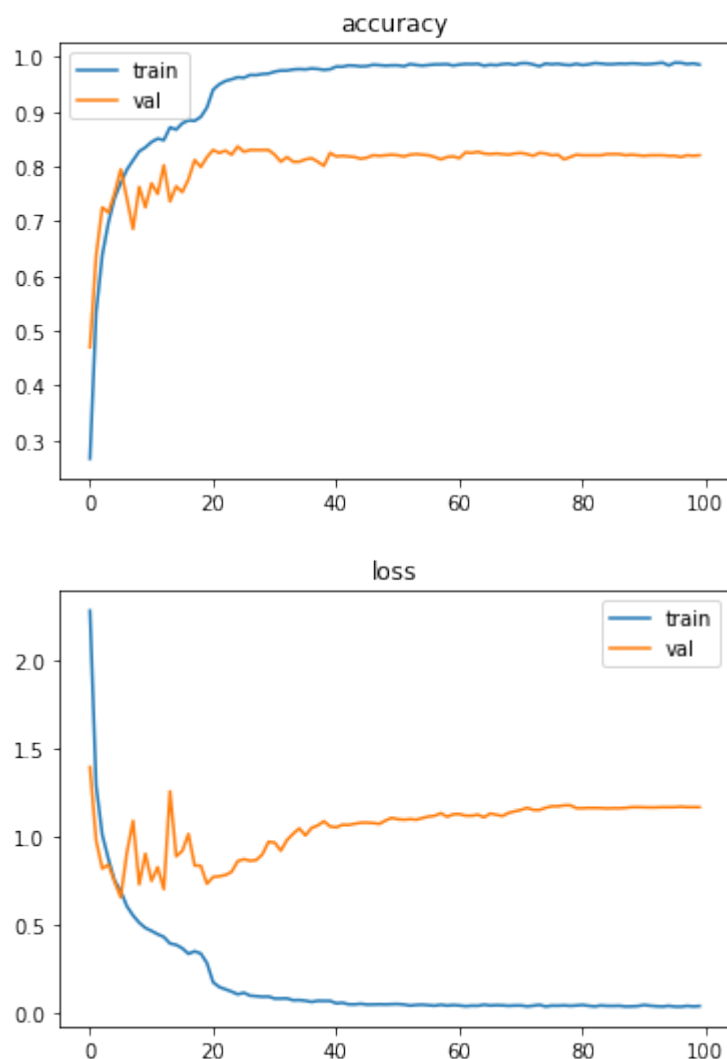
```
##Testing## epoch acc: 0.8291
epoch: 23 acc: 0.9592 avg loss: 0.1181
verify spec feature success
##Testing## epoch acc: 0.8216
epoch: 24 acc: 0.9631 avg loss: 0.1025
verify spec feature success
##Testing## epoch acc: 0.8365
epoch: 25 acc: 0.962 avg loss: 0.1116
verify spec feature success
##Testing## epoch acc: 0.8269
epoch: 26 acc: 0.9672 avg loss: 0.0949
verify spec feature success
##Testing## epoch acc: 0.8301
epoch: 27 acc: 0.9669 avg loss: 0.0920
verify spec feature success
##Testing## epoch acc: 0.8301
epoch: 28 acc: 0.9688 avg loss: 0.0887
verify spec feature success
##Testing## epoch acc: 0.8301
epoch: 29 acc: 0.9696 avg loss: 0.0897
verify spec feature success
##Testing## epoch acc: 0.8301
epoch: 30 acc: 0.9732 avg loss: 0.0785
verify spec feature success
##Testing## epoch acc: 0.8216
epoch: 31 acc: 0.9752 avg loss: 0.0783
verify spec feature success
##Testing## epoch acc: 0.8088
epoch: 32 acc: 0.9752 avg loss: 0.0794
verify spec feature success
##Testing## epoch acc: 0.8173
epoch: 33 acc: 0.9772 avg loss: 0.0688
verify spec feature success
##Testing## epoch acc: 0.8088
epoch: 34 acc: 0.9779 avg loss: 0.0699
verify spec feature success
##Testing## epoch acc: 0.8088
epoch: 35 acc: 0.9773 avg loss: 0.0661
verify spec feature success
##Testing## epoch acc: 0.813
epoch: 36 acc: 0.979 avg loss: 0.0597
verify spec feature success
##Testing## epoch acc: 0.8152
epoch: 37 acc: 0.9782 avg loss: 0.0657
verify spec feature success
##Testing## epoch acc: 0.8088
epoch: 38 acc: 0.9765 avg loss: 0.0651
verify spec feature success
##Testing## epoch acc: 0.8013
epoch: 39 acc: 0.9776 avg loss: 0.0652
verify spec feature success
##Testing## epoch acc: 0.8248
epoch: 40 acc: 0.9824 avg loss: 0.0515
verify spec feature success
##Testing## epoch acc: 0.8184
epoch: 41 acc: 0.9822 avg loss: 0.0545
verify spec feature success
##Testing## epoch acc: 0.8194
epoch: 42 acc: 0.9846 avg loss: 0.0459
verify spec feature success
##Testing## epoch acc: 0.8184
```



```
epoch: 43 acc: 0.9841 avg loss: 0.0455
verify spec feature success
##Testing## epoch acc: 0.8173
epoch: 44 acc: 0.9828 avg loss: 0.0488
verify spec feature success
##Testing## epoch acc: 0.8141
epoch: 45 acc: 0.9833 avg loss: 0.0444
verify spec feature success
##Testing## epoch acc: 0.8162
epoch: 46 acc: 0.9859 avg loss: 0.0447
verify spec feature success
##Testing## epoch acc: 0.8205
epoch: 47 acc: 0.9851 avg loss: 0.0459
verify spec feature success
##Testing## epoch acc: 0.8194
epoch: 48 acc: 0.9841 avg loss: 0.0451
verify spec feature success
##Testing## epoch acc: 0.8205
epoch: 49 acc: 0.9847 avg loss: 0.0467
verify spec feature success
##Testing## epoch acc: 0.8216
epoch: 50 acc: 0.9847 avg loss: 0.0474
verify spec feature success
##Testing## epoch acc: 0.8205
epoch: 51 acc: 0.9831 avg loss: 0.0444
verify spec feature success
##Testing## epoch acc: 0.8184
epoch: 52 acc: 0.987 avg loss: 0.0387
verify spec feature success
##Testing## epoch acc: 0.8216
epoch: 53 acc: 0.9854 avg loss: 0.0422
verify spec feature success
##Testing## epoch acc: 0.8226
epoch: 54 acc: 0.9842 avg loss: 0.0437
verify spec feature success
##Testing## epoch acc: 0.8216
epoch: 55 acc: 0.9854 avg loss: 0.0406
verify spec feature success
##Testing## epoch acc: 0.8205
epoch: 56 acc: 0.9864 avg loss: 0.0383
verify spec feature success
##Testing## epoch acc: 0.8173
epoch: 57 acc: 0.9865 avg loss: 0.0432
verify spec feature success
##Testing## epoch acc: 0.813
epoch: 58 acc: 0.9869 avg loss: 0.0386
verify spec feature success
##Testing## epoch acc: 0.8173
epoch: 59 acc: 0.9844 avg loss: 0.0416
verify spec feature success
##Testing## epoch acc: 0.8184
epoch: 60 acc: 0.9861 avg loss: 0.0393
verify spec feature success
##Testing## epoch acc: 0.8152
epoch: 61 acc: 0.9872 avg loss: 0.0352
verify spec feature success
##Testing## epoch acc: 0.8259
epoch: 62 acc: 0.9869 avg loss: 0.0381
verify spec feature success
##Testing## epoch acc: 0.8248
epoch: 63 acc: 0.9876 avg loss: 0.0375
```

```
verify spec feature success
##Testing## epoch acc: 0.8269
epoch: 64 acc: 0.984 avg loss: 0.0436
verify spec feature success
##Testing## epoch acc: 0.8237
epoch: 65 acc: 0.9859 avg loss: 0.0391
verify spec feature success
##Testing## epoch acc: 0.8226
epoch: 66 acc: 0.985 avg loss: 0.0411
verify spec feature success
##Testing## epoch acc: 0.8237
epoch: 67 acc: 0.9869 avg loss: 0.0400
verify spec feature success
##Testing## epoch acc: 0.8226
epoch: 68 acc: 0.9877 avg loss: 0.0372
verify spec feature success
##Testing## epoch acc: 0.8216
epoch: 69 acc: 0.9856 avg loss: 0.0392
verify spec feature success
##Testing## epoch acc: 0.8237
epoch: 70 acc: 0.9886 avg loss: 0.0394
verify spec feature success
##Testing## epoch acc: 0.8248
epoch: 71 acc: 0.9887 avg loss: 0.0341
verify spec feature success
##Testing## epoch acc: 0.8226
epoch: 72 acc: 0.9863 avg loss: 0.0380
verify spec feature success
##Testing## epoch acc: 0.8194
epoch: 73 acc: 0.9831 avg loss: 0.0431
verify spec feature success
##Testing## epoch acc: 0.8248
epoch: 74 acc: 0.9879 avg loss: 0.0334
verify spec feature success
##Testing## epoch acc: 0.8237
epoch: 75 acc: 0.9867 avg loss: 0.0384
verify spec feature success
##Testing## epoch acc: 0.8205
epoch: 76 acc: 0.9876 avg loss: 0.0380
verify spec feature success
##Testing## epoch acc: 0.8216
epoch: 77 acc: 0.9859 avg loss: 0.0398
verify spec feature success
##Testing## epoch acc: 0.813
epoch: 78 acc: 0.9851 avg loss: 0.0371
verify spec feature success
##Testing## epoch acc: 0.8173
epoch: 79 acc: 0.9874 avg loss: 0.0393
verify spec feature success
##Testing## epoch acc: 0.8216
epoch: 80 acc: 0.9852 avg loss: 0.0423
verify spec feature success
##Testing## epoch acc: 0.8205
epoch: 81 acc: 0.9865 avg loss: 0.0373
verify spec feature success
##Testing## epoch acc: 0.8205
epoch: 82 acc: 0.9888 avg loss: 0.0338
verify spec feature success
##Testing## epoch acc: 0.8205
epoch: 83 acc: 0.9879 avg loss: 0.0394
verify spec feature success
```

```
##Testing## epoch acc: 0.8205
epoch: 84 acc: 0.9868 avg loss: 0.0368
verify spec feature success
##Testing## epoch acc: 0.8226
epoch: 85 acc: 0.9869 avg loss: 0.0366
verify spec feature success
##Testing## epoch acc: 0.8226
epoch: 86 acc: 0.9878 avg loss: 0.0375
verify spec feature success
##Testing## epoch acc: 0.8226
epoch: 87 acc: 0.9874 avg loss: 0.0332
verify spec feature success
##Testing## epoch acc: 0.8205
epoch: 88 acc: 0.9883 avg loss: 0.0341
verify spec feature success
##Testing## epoch acc: 0.8216
epoch: 89 acc: 0.9878 avg loss: 0.0358
verify spec feature success
##Testing## epoch acc: 0.8205
epoch: 90 acc: 0.9868 avg loss: 0.0423
verify spec feature success
##Testing## epoch acc: 0.8194
epoch: 91 acc: 0.9872 avg loss: 0.0377
verify spec feature success
##Testing## epoch acc: 0.8205
epoch: 92 acc: 0.9883 avg loss: 0.0348
verify spec feature success
##Testing## epoch acc: 0.8205
epoch: 93 acc: 0.9896 avg loss: 0.0331
verify spec feature success
##Testing## epoch acc: 0.8205
epoch: 94 acc: 0.9846 avg loss: 0.0373
verify spec feature success
##Testing## epoch acc: 0.8194
epoch: 95 acc: 0.9897 avg loss: 0.0328
verify spec feature success
##Testing## epoch acc: 0.8194
epoch: 96 acc: 0.9894 avg loss: 0.0323
verify spec feature success
##Testing## epoch acc: 0.8173
epoch: 97 acc: 0.987 avg loss: 0.0367
verify spec feature success
##Testing## epoch acc: 0.8205
epoch: 98 acc: 0.9882 avg loss: 0.0335
verify spec feature success
##Testing## epoch acc: 0.8194
epoch: 99 acc: 0.986 avg loss: 0.0359
verify spec feature success
##Testing## epoch acc: 0.8205
```



```
In [6]: train(100)
# vgg11 fold5 mfcc
```

```
verify mfcc feature success
epoch: 0 acc: 0.2005 avg loss: 2.1597
verify mfcc feature success
##Testing## epoch acc: 0.2094
epoch: 1 acc: 0.3168 avg loss: 1.8996
verify mfcc feature success
##Testing## epoch acc: 0.3216
epoch: 2 acc: 0.4732 avg loss: 1.5204
verify mfcc feature success
##Testing## epoch acc: 0.4423
epoch: 3 acc: 0.5741 avg loss: 1.2495
verify mfcc feature success
##Testing## epoch acc: 0.4434
epoch: 4 acc: 0.6551 avg loss: 1.0281
verify mfcc feature success
##Testing## epoch acc: 0.5256
epoch: 5 acc: 0.7161 avg loss: 0.8359
verify mfcc feature success
##Testing## epoch acc: 0.5246
epoch: 6 acc: 0.7703 avg loss: 0.7028
verify mfcc feature success
##Testing## epoch acc: 0.5919
epoch: 7 acc: 0.8073 avg loss: 0.5740
verify mfcc feature success
##Testing## epoch acc: 0.5972
```

```
epoch: 8 acc: 0.8313 avg loss: 0.5019
verify mfcc feature success
##Testing## epoch acc: 0.625
epoch: 9 acc: 0.8601 avg loss: 0.4136
verify mfcc feature success
##Testing## epoch acc: 0.5876
epoch: 10 acc: 0.8812 avg loss: 0.3547
verify mfcc feature success
##Testing## epoch acc: 0.6132
epoch: 11 acc: 0.8916 avg loss: 0.3167
verify mfcc feature success
##Testing## epoch acc: 0.5759
epoch: 12 acc: 0.9037 avg loss: 0.2787
verify mfcc feature success
##Testing## epoch acc: 0.563
epoch: 13 acc: 0.9128 avg loss: 0.2478
verify mfcc feature success
##Testing## epoch acc: 0.6442
epoch: 14 acc: 0.9248 avg loss: 0.2273
verify mfcc feature success
##Testing## epoch acc: 0.5983
epoch: 15 acc: 0.9343 avg loss: 0.1865
verify mfcc feature success
##Testing## epoch acc: 0.516
epoch: 16 acc: 0.9447 avg loss: 0.1659
verify mfcc feature success
##Testing## epoch acc: 0.5748
epoch: 17 acc: 0.9442 avg loss: 0.1690
verify mfcc feature success
##Testing## epoch acc: 0.5694
epoch: 18 acc: 0.9577 avg loss: 0.1310
verify mfcc feature success
##Testing## epoch acc: 0.5865
epoch: 19 acc: 0.9583 avg loss: 0.1270
verify mfcc feature success
##Testing## epoch acc: 0.5726
epoch: 20 acc: 0.976 avg loss: 0.0694
verify mfcc feature success
##Testing## epoch acc: 0.5769
epoch: 21 acc: 0.9846 avg loss: 0.0506
verify mfcc feature success
##Testing## epoch acc: 0.5748
epoch: 22 acc: 0.987 avg loss: 0.0394
verify mfcc feature success
##Testing## epoch acc: 0.594
epoch: 23 acc: 0.9881 avg loss: 0.0339
verify mfcc feature success
##Testing## epoch acc: 0.5908
epoch: 24 acc: 0.9897 avg loss: 0.0319
verify mfcc feature success
##Testing## epoch acc: 0.6111
epoch: 25 acc: 0.9883 avg loss: 0.0308
verify mfcc feature success
##Testing## epoch acc: 0.6026
epoch: 26 acc: 0.9901 avg loss: 0.0292
verify mfcc feature success
##Testing## epoch acc: 0.6079
epoch: 27 acc: 0.991 avg loss: 0.0289
verify mfcc feature success
##Testing## epoch acc: 0.6047
epoch: 28 acc: 0.9922 avg loss: 0.0229
```

```
verify mfcc feature success
##Testing## epoch acc: 0.5919
epoch: 29 acc: 0.9913 avg loss: 0.0251
verify mfcc feature success
##Testing## epoch acc: 0.6068
epoch: 32 acc: 0.9938 avg loss: 0.0161
verify mfcc feature success
##Testing## epoch acc: 0.5962
epoch: 33 acc: 0.9928 avg loss: 0.0219
verify mfcc feature success
##Testing## epoch acc: 0.6047
epoch: 34 acc: 0.9945 avg loss: 0.0152
verify mfcc feature success
##Testing## epoch acc: 0.5983
epoch: 35 acc: 0.992 avg loss: 0.0234
verify mfcc feature success
##Testing## epoch acc: 0.6111
epoch: 36 acc: 0.9924 avg loss: 0.0217
verify mfcc feature success
##Testing## epoch acc: 0.6015
epoch: 37 acc: 0.9938 avg loss: 0.0192
verify mfcc feature success
##Testing## epoch acc: 0.594
epoch: 38 acc: 0.9955 avg loss: 0.0152
verify mfcc feature success
##Testing## epoch acc: 0.6132
epoch: 39 acc: 0.9955 avg loss: 0.0128
verify mfcc feature success
##Testing## epoch acc: 0.6068
epoch: 40 acc: 0.9951 avg loss: 0.0147
verify mfcc feature success
##Testing## epoch acc: 0.6079
epoch: 41 acc: 0.9944 avg loss: 0.0139
verify mfcc feature success
##Testing## epoch acc: 0.6132
epoch: 42 acc: 0.9964 avg loss: 0.0108
verify mfcc feature success
##Testing## epoch acc: 0.6068
epoch: 43 acc: 0.9954 avg loss: 0.0127
verify mfcc feature success
##Testing## epoch acc: 0.6132
epoch: 44 acc: 0.9964 avg loss: 0.0116
verify mfcc feature success
##Testing## epoch acc: 0.6132
epoch: 45 acc: 0.996 avg loss: 0.0114
verify mfcc feature success
##Testing## epoch acc: 0.6122
epoch: 46 acc: 0.9954 avg loss: 0.0105
verify mfcc feature success
##Testing## epoch acc: 0.6122
epoch: 47 acc: 0.9963 avg loss: 0.0125
verify mfcc feature success
##Testing## epoch acc: 0.6122
epoch: 48 acc: 0.9968 avg loss: 0.0089
verify mfcc feature success
##Testing## epoch acc: 0.6079
epoch: 49 acc: 0.9968 avg loss: 0.0101
verify mfcc feature success
##Testing## epoch acc: 0.6143
epoch: 50 acc: 0.9959 avg loss: 0.0115
verify mfcc feature success
```

```
##Testing## epoch acc: 0.6111
epoch: 51 acc: 0.9958 avg loss: 0.0113
verify mfcc feature success
##Testing## epoch acc: 0.6122
epoch: 52 acc: 0.9973 avg loss: 0.0074
verify mfcc feature success
##Testing## epoch acc: 0.6111
epoch: 53 acc: 0.9962 avg loss: 0.0098
verify mfcc feature success
##Testing## epoch acc: 0.6079
epoch: 54 acc: 0.9956 avg loss: 0.0126
verify mfcc feature success
##Testing## epoch acc: 0.6132
epoch: 55 acc: 0.9963 avg loss: 0.0109
verify mfcc feature success
##Testing## epoch acc: 0.609
epoch: 56 acc: 0.9959 avg loss: 0.0100
verify mfcc feature success
##Testing## epoch acc: 0.61
epoch: 57 acc: 0.9954 avg loss: 0.0124
verify mfcc feature success
##Testing## epoch acc: 0.6111
epoch: 58 acc: 0.9964 avg loss: 0.0103
verify mfcc feature success
##Testing## epoch acc: 0.6111
epoch: 59 acc: 0.9949 avg loss: 0.0116
verify mfcc feature success
##Testing## epoch acc: 0.6079
epoch: 60 acc: 0.9965 avg loss: 0.0087
verify mfcc feature success
##Testing## epoch acc: 0.61
epoch: 61 acc: 0.9962 avg loss: 0.0096
verify mfcc feature success
##Testing## epoch acc: 0.6068
epoch: 62 acc: 0.9965 avg loss: 0.0099
verify mfcc feature success
##Testing## epoch acc: 0.6079
epoch: 63 acc: 0.9963 avg loss: 0.0105
verify mfcc feature success
##Testing## epoch acc: 0.61
epoch: 64 acc: 0.9953 avg loss: 0.0109
verify mfcc feature success
##Testing## epoch acc: 0.6154
epoch: 65 acc: 0.9962 avg loss: 0.0108
verify mfcc feature success
##Testing## epoch acc: 0.6122
epoch: 66 acc: 0.9973 avg loss: 0.0074
verify mfcc feature success
##Testing## epoch acc: 0.6132
epoch: 67 acc: 0.9962 avg loss: 0.0087
verify mfcc feature success
##Testing## epoch acc: 0.6154
epoch: 68 acc: 0.9969 avg loss: 0.0095
verify mfcc feature success
##Testing## epoch acc: 0.6154
epoch: 69 acc: 0.9969 avg loss: 0.0073
verify mfcc feature success
##Testing## epoch acc: 0.6132
epoch: 70 acc: 0.9954 avg loss: 0.0116
verify mfcc feature success
##Testing## epoch acc: 0.6132
```

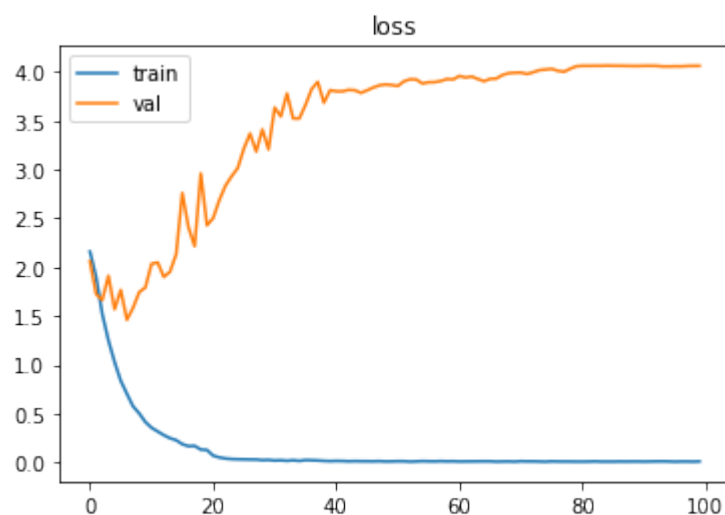
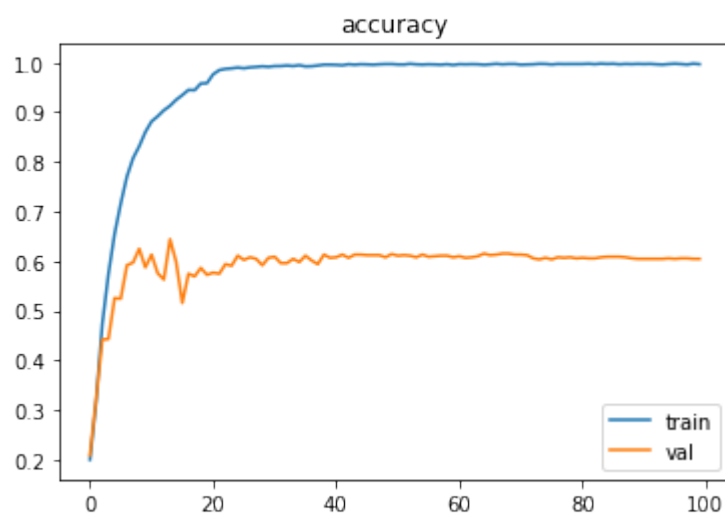
```
epoch: 71 acc: 0.9959 avg loss: 0.0101
verify mfcc feature success
##Testing## epoch acc: 0.6122
epoch: 72 acc: 0.9963 avg loss: 0.0101
verify mfcc feature success
##Testing## epoch acc: 0.6058
epoch: 73 acc: 0.9973 avg loss: 0.0086
verify mfcc feature success
##Testing## epoch acc: 0.6036
epoch: 74 acc: 0.997 avg loss: 0.0068
verify mfcc feature success
##Testing## epoch acc: 0.6068
epoch: 75 acc: 0.9959 avg loss: 0.0107
verify mfcc feature success
##Testing## epoch acc: 0.6036
epoch: 76 acc: 0.997 avg loss: 0.0087
verify mfcc feature success
##Testing## epoch acc: 0.6079
epoch: 77 acc: 0.9968 avg loss: 0.0087
verify mfcc feature success
##Testing## epoch acc: 0.6068
epoch: 78 acc: 0.9969 avg loss: 0.0083
verify mfcc feature success
##Testing## epoch acc: 0.6079
epoch: 79 acc: 0.9969 avg loss: 0.0076
verify mfcc feature success
##Testing## epoch acc: 0.6058
epoch: 80 acc: 0.9969 avg loss: 0.0074
verify mfcc feature success
##Testing## epoch acc: 0.6068
epoch: 81 acc: 0.9974 avg loss: 0.0081
verify mfcc feature success
##Testing## epoch acc: 0.6058
epoch: 82 acc: 0.9965 avg loss: 0.0103
verify mfcc feature success
##Testing## epoch acc: 0.6058
epoch: 83 acc: 0.9977 avg loss: 0.0078
verify mfcc feature success
##Testing## epoch acc: 0.6079
epoch: 84 acc: 0.997 avg loss: 0.0079
verify mfcc feature success
##Testing## epoch acc: 0.609
epoch: 85 acc: 0.9974 avg loss: 0.0074
verify mfcc feature success
##Testing## epoch acc: 0.609
epoch: 86 acc: 0.9963 avg loss: 0.0091
verify mfcc feature success
##Testing## epoch acc: 0.609
epoch: 87 acc: 0.997 avg loss: 0.0083
verify mfcc feature success
##Testing## epoch acc: 0.6079
epoch: 88 acc: 0.9967 avg loss: 0.0089
verify mfcc feature success
##Testing## epoch acc: 0.6058
epoch: 89 acc: 0.9972 avg loss: 0.0089
verify mfcc feature success
##Testing## epoch acc: 0.6047
epoch: 90 acc: 0.9968 avg loss: 0.0078
verify mfcc feature success
##Testing## epoch acc: 0.6047
epoch: 91 acc: 0.9972 avg loss: 0.0090
```



```

verify mfcc feature success
##Testing## epoch acc: 0.6047
epoch: 92 acc: 0.9963 avg loss: 0.0100
verify mfcc feature success
##Testing## epoch acc: 0.6047
epoch: 93 acc: 0.9956 avg loss: 0.0104
verify mfcc feature success
##Testing## epoch acc: 0.6047
epoch: 94 acc: 0.9968 avg loss: 0.0093
verify mfcc feature success
##Testing## epoch acc: 0.6058
epoch: 95 acc: 0.9976 avg loss: 0.0068
verify mfcc feature success
##Testing## epoch acc: 0.6047
epoch: 96 acc: 0.9968 avg loss: 0.0087
verify mfcc feature success
##Testing## epoch acc: 0.6058
epoch: 97 acc: 0.9958 avg loss: 0.0086
verify mfcc feature success
##Testing## epoch acc: 0.6058
epoch: 98 acc: 0.9977 avg loss: 0.0071
verify mfcc feature success
##Testing## epoch acc: 0.6047
epoch: 99 acc: 0.9965 avg loss: 0.0097
verify mfcc feature success
##Testing## epoch acc: 0.6047

```



```
In [6]: train(100)
```

vgg11 fold6 spec

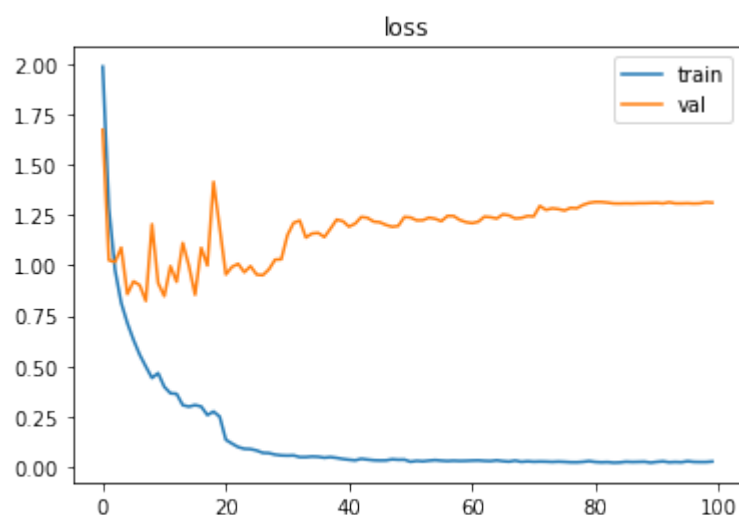
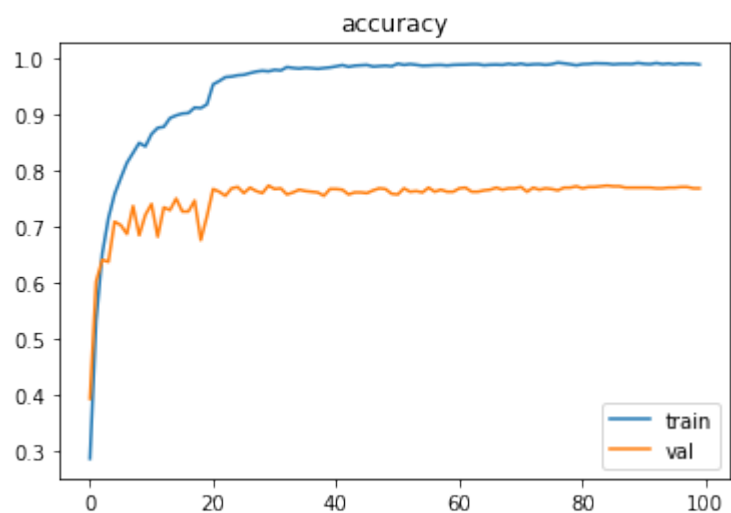
```
verify spec feature success
epoch: 0 acc: 0.2868 avg loss: 1.9855
verify spec feature success
##Testing## epoch acc: 0.3937
epoch: 1 acc: 0.5323 avg loss: 1.2844
verify spec feature success
##Testing## epoch acc: 0.6027
epoch: 2 acc: 0.6527 avg loss: 0.9769
verify spec feature success
##Testing## epoch acc: 0.6416
epoch: 3 acc: 0.716 avg loss: 0.8142
verify spec feature success
##Testing## epoch acc: 0.6379
epoch: 4 acc: 0.7589 avg loss: 0.7136
verify spec feature success
##Testing## epoch acc: 0.7096
epoch: 5 acc: 0.7873 avg loss: 0.6303
verify spec feature success
##Testing## epoch acc: 0.7035
epoch: 6 acc: 0.8146 avg loss: 0.5571
verify spec feature success
##Testing## epoch acc: 0.6877
epoch: 7 acc: 0.8323 avg loss: 0.4980
verify spec feature success
##Testing## epoch acc: 0.7375
epoch: 8 acc: 0.8502 avg loss: 0.4416
verify spec feature success
##Testing## epoch acc: 0.6853
epoch: 9 acc: 0.844 avg loss: 0.4654
verify spec feature success
##Testing## epoch acc: 0.7217
epoch: 10 acc: 0.866 avg loss: 0.3975
verify spec feature success
##Testing## epoch acc: 0.7412
epoch: 11 acc: 0.877 avg loss: 0.3656
verify spec feature success
##Testing## epoch acc: 0.6829
epoch: 12 acc: 0.8789 avg loss: 0.3628
verify spec feature success
##Testing## epoch acc: 0.7351
epoch: 13 acc: 0.8944 avg loss: 0.3067
verify spec feature success
##Testing## epoch acc: 0.7303
epoch: 14 acc: 0.8992 avg loss: 0.2992
verify spec feature success
##Testing## epoch acc: 0.7509
epoch: 15 acc: 0.9025 avg loss: 0.3069
verify spec feature success
##Testing## epoch acc: 0.7278
epoch: 16 acc: 0.9035 avg loss: 0.2999
verify spec feature success
##Testing## epoch acc: 0.7278
epoch: 17 acc: 0.9133 avg loss: 0.2574
verify spec feature success
##Testing## epoch acc: 0.7473
epoch: 18 acc: 0.9123 avg loss: 0.2748
verify spec feature success
##Testing## epoch acc: 0.6768
epoch: 19 acc: 0.9188 avg loss: 0.2495
```

```
verify spec feature success
##Testing## epoch acc: 0.7193
epoch: 20 acc: 0.9546 avg loss: 0.1348
verify spec feature success
##Testing## epoch acc: 0.7679
epoch: 21 acc: 0.9606 avg loss: 0.1160
verify spec feature success
##Testing## epoch acc: 0.7631
epoch: 22 acc: 0.9675 avg loss: 0.0987
verify spec feature success
##Testing## epoch acc: 0.7558
epoch: 23 acc: 0.9685 avg loss: 0.0901
verify spec feature success
##Testing## epoch acc: 0.7691
epoch: 24 acc: 0.9708 avg loss: 0.0888
verify spec feature success
##Testing## epoch acc: 0.7716
epoch: 25 acc: 0.9717 avg loss: 0.0818
verify spec feature success
##Testing## epoch acc: 0.7606
epoch: 26 acc: 0.9747 avg loss: 0.0701
verify spec feature success
##Testing## epoch acc: 0.7704
epoch: 27 acc: 0.9774 avg loss: 0.0689
verify spec feature success
##Testing## epoch acc: 0.7643
epoch: 28 acc: 0.9789 avg loss: 0.0613
verify spec feature success
##Testing## epoch acc: 0.7606
epoch: 29 acc: 0.9779 avg loss: 0.0576
verify spec feature success
##Testing## epoch acc: 0.774
epoch: 30 acc: 0.9805 avg loss: 0.0564
verify spec feature success
##Testing## epoch acc: 0.7679
epoch: 31 acc: 0.9794 avg loss: 0.0574
verify spec feature success
##Testing## epoch acc: 0.7691
epoch: 32 acc: 0.9855 avg loss: 0.0490
verify spec feature success
##Testing## epoch acc: 0.7582
epoch: 33 acc: 0.9838 avg loss: 0.0491
verify spec feature success
##Testing## epoch acc: 0.7618
epoch: 34 acc: 0.9828 avg loss: 0.0518
verify spec feature success
##Testing## epoch acc: 0.7667
epoch: 35 acc: 0.9842 avg loss: 0.0505
verify spec feature success
##Testing## epoch acc: 0.7643
epoch: 36 acc: 0.9834 avg loss: 0.0461
verify spec feature success
##Testing## epoch acc: 0.7631
epoch: 37 acc: 0.9824 avg loss: 0.0491
verify spec feature success
##Testing## epoch acc: 0.7618
epoch: 38 acc: 0.9837 avg loss: 0.0450
verify spec feature success
##Testing## epoch acc: 0.7558
epoch: 39 acc: 0.9848 avg loss: 0.0397
verify spec feature success
```

```
##Testing## epoch acc: 0.7679
epoch: 40 acc: 0.9867 avg loss: 0.0359
verify spec feature success
##Testing## epoch acc: 0.7679
epoch: 41 acc: 0.989 avg loss: 0.0328
verify spec feature success
##Testing## epoch acc: 0.7667
epoch: 42 acc: 0.986 avg loss: 0.0406
verify spec feature success
##Testing## epoch acc: 0.7582
epoch: 43 acc: 0.9879 avg loss: 0.0368
verify spec feature success
##Testing## epoch acc: 0.7618
epoch: 44 acc: 0.9886 avg loss: 0.0334
verify spec feature success
##Testing## epoch acc: 0.7618
epoch: 45 acc: 0.9893 avg loss: 0.0322
verify spec feature success
##Testing## epoch acc: 0.7606
epoch: 46 acc: 0.9863 avg loss: 0.0326
verify spec feature success
##Testing## epoch acc: 0.7655
epoch: 47 acc: 0.9872 avg loss: 0.0381
verify spec feature success
##Testing## epoch acc: 0.7691
epoch: 48 acc: 0.988 avg loss: 0.0360
verify spec feature success
##Testing## epoch acc: 0.7679
epoch: 49 acc: 0.9869 avg loss: 0.0363
verify spec feature success
##Testing## epoch acc: 0.7594
epoch: 50 acc: 0.9915 avg loss: 0.0260
verify spec feature success
##Testing## epoch acc: 0.7582
epoch: 51 acc: 0.9894 avg loss: 0.0304
verify spec feature success
##Testing## epoch acc: 0.7691
epoch: 52 acc: 0.9908 avg loss: 0.0283
verify spec feature success
##Testing## epoch acc: 0.7631
epoch: 53 acc: 0.9895 avg loss: 0.0315
verify spec feature success
##Testing## epoch acc: 0.7643
epoch: 54 acc: 0.9879 avg loss: 0.0341
verify spec feature success
##Testing## epoch acc: 0.7618
epoch: 55 acc: 0.9882 avg loss: 0.0313
verify spec feature success
##Testing## epoch acc: 0.7704
epoch: 56 acc: 0.989 avg loss: 0.0296
verify spec feature success
##Testing## epoch acc: 0.7631
epoch: 57 acc: 0.9893 avg loss: 0.0311
verify spec feature success
##Testing## epoch acc: 0.7667
epoch: 58 acc: 0.9882 avg loss: 0.0299
verify spec feature success
##Testing## epoch acc: 0.7631
epoch: 59 acc: 0.9894 avg loss: 0.0305
verify spec feature success
##Testing## epoch acc: 0.7631
```

```
epoch: 60 acc: 0.9898 avg loss: 0.0318
verify spec feature success
##Testing## epoch acc: 0.7691
epoch: 61 acc: 0.9899 avg loss: 0.0325
verify spec feature success
##Testing## epoch acc: 0.7704
epoch: 62 acc: 0.9905 avg loss: 0.0304
verify spec feature success
##Testing## epoch acc: 0.7631
epoch: 63 acc: 0.9905 avg loss: 0.0293
verify spec feature success
##Testing## epoch acc: 0.7631
epoch: 64 acc: 0.9887 avg loss: 0.0329
verify spec feature success
##Testing## epoch acc: 0.7655
epoch: 65 acc: 0.9896 avg loss: 0.0290
verify spec feature success
##Testing## epoch acc: 0.7667
epoch: 66 acc: 0.9899 avg loss: 0.0267
verify spec feature success
##Testing## epoch acc: 0.7704
epoch: 67 acc: 0.9894 avg loss: 0.0317
verify spec feature success
##Testing## epoch acc: 0.7667
epoch: 68 acc: 0.9913 avg loss: 0.0256
verify spec feature success
##Testing## epoch acc: 0.7691
epoch: 69 acc: 0.9898 avg loss: 0.0284
verify spec feature success
##Testing## epoch acc: 0.7691
epoch: 70 acc: 0.9915 avg loss: 0.0262
verify spec feature success
##Testing## epoch acc: 0.7716
epoch: 71 acc: 0.9894 avg loss: 0.0272
verify spec feature success
##Testing## epoch acc: 0.7631
epoch: 72 acc: 0.9904 avg loss: 0.0267
verify spec feature success
##Testing## epoch acc: 0.7704
epoch: 73 acc: 0.9906 avg loss: 0.0252
verify spec feature success
##Testing## epoch acc: 0.7667
epoch: 74 acc: 0.9894 avg loss: 0.0267
verify spec feature success
##Testing## epoch acc: 0.7691
epoch: 75 acc: 0.9906 avg loss: 0.0254
verify spec feature success
##Testing## epoch acc: 0.7679
epoch: 76 acc: 0.9934 avg loss: 0.0235
verify spec feature success
##Testing## epoch acc: 0.7655
epoch: 77 acc: 0.992 avg loss: 0.0233
verify spec feature success
##Testing## epoch acc: 0.7704
epoch: 78 acc: 0.9905 avg loss: 0.0255
verify spec feature success
##Testing## epoch acc: 0.7704
epoch: 79 acc: 0.9886 avg loss: 0.0293
verify spec feature success
##Testing## epoch acc: 0.7728
epoch: 80 acc: 0.9906 avg loss: 0.0249
```

```
verify spec feature success
##Testing## epoch acc: 0.7691
epoch: 81 acc: 0.991 avg loss: 0.0231
verify spec feature success
##Testing## epoch acc: 0.7716
epoch: 82 acc: 0.9922 avg loss: 0.0242
verify spec feature success
##Testing## epoch acc: 0.7716
epoch: 83 acc: 0.9919 avg loss: 0.0213
verify spec feature success
##Testing## epoch acc: 0.7728
epoch: 84 acc: 0.9917 avg loss: 0.0225
verify spec feature success
##Testing## epoch acc: 0.774
epoch: 85 acc: 0.9903 avg loss: 0.0261
verify spec feature success
##Testing## epoch acc: 0.7728
epoch: 86 acc: 0.991 avg loss: 0.0246
verify spec feature success
##Testing## epoch acc: 0.7728
epoch: 87 acc: 0.9911 avg loss: 0.0254
verify spec feature success
##Testing## epoch acc: 0.7704
epoch: 88 acc: 0.9909 avg loss: 0.0261
verify spec feature success
##Testing## epoch acc: 0.7704
epoch: 89 acc: 0.9928 avg loss: 0.0214
verify spec feature success
##Testing## epoch acc: 0.7704
epoch: 90 acc: 0.9913 avg loss: 0.0253
verify spec feature success
##Testing## epoch acc: 0.7704
epoch: 91 acc: 0.9906 avg loss: 0.0281
verify spec feature success
##Testing## epoch acc: 0.7704
epoch: 92 acc: 0.9927 avg loss: 0.0233
verify spec feature success
##Testing## epoch acc: 0.7691
epoch: 93 acc: 0.9906 avg loss: 0.0248
verify spec feature success
##Testing## epoch acc: 0.7691
epoch: 94 acc: 0.9918 avg loss: 0.0235
verify spec feature success
##Testing## epoch acc: 0.7704
epoch: 95 acc: 0.9901 avg loss: 0.0288
verify spec feature success
##Testing## epoch acc: 0.7704
epoch: 96 acc: 0.9918 avg loss: 0.0252
verify spec feature success
##Testing## epoch acc: 0.7716
epoch: 97 acc: 0.9911 avg loss: 0.0245
verify spec feature success
##Testing## epoch acc: 0.7716
epoch: 98 acc: 0.9915 avg loss: 0.0246
verify spec feature success
##Testing## epoch acc: 0.7691
epoch: 99 acc: 0.99 avg loss: 0.0271
verify spec feature success
##Testing## epoch acc: 0.7691
```



```
In [6]: train(100)
# vgg11 fold6 mfcc
```

```
verify mfcc feature success
epoch: 0 acc: 0.1983 avg loss: 2.1488
verify mfcc feature success
##Testing## epoch acc: 0.2211
epoch: 1 acc: 0.3387 avg loss: 1.8443
verify mfcc feature success
##Testing## epoch acc: 0.3645
epoch: 2 acc: 0.4848 avg loss: 1.4730
verify mfcc feature success
##Testing## epoch acc: 0.4241
epoch: 3 acc: 0.5922 avg loss: 1.2091
verify mfcc feature success
##Testing## epoch acc: 0.469
epoch: 4 acc: 0.6661 avg loss: 1.0163
verify mfcc feature success
##Testing## epoch acc: 0.5286
epoch: 5 acc: 0.7221 avg loss: 0.8541
verify mfcc feature success
##Testing## epoch acc: 0.5043
epoch: 6 acc: 0.7665 avg loss: 0.7019
verify mfcc feature success
##Testing## epoch acc: 0.5614
epoch: 7 acc: 0.7998 avg loss: 0.5909
verify mfcc feature success
##Testing## epoch acc: 0.5407
```

```
epoch: 8 acc: 0.8274 avg loss: 0.5099
verify mfcc feature success
##Testing## epoch acc: 0.6063
epoch: 9 acc: 0.8502 avg loss: 0.4386
verify mfcc feature success
##Testing## epoch acc: 0.5784
epoch: 10 acc: 0.8731 avg loss: 0.3746
verify mfcc feature success
##Testing## epoch acc: 0.5237
epoch: 11 acc: 0.8919 avg loss: 0.3249
verify mfcc feature success
##Testing## epoch acc: 0.5492
epoch: 12 acc: 0.9078 avg loss: 0.2741
verify mfcc feature success
##Testing## epoch acc: 0.5735
epoch: 13 acc: 0.9201 avg loss: 0.2432
verify mfcc feature success
##Testing## epoch acc: 0.6015
epoch: 14 acc: 0.9202 avg loss: 0.2367
verify mfcc feature success
##Testing## epoch acc: 0.5808
epoch: 15 acc: 0.9313 avg loss: 0.2029
verify mfcc feature success
##Testing## epoch acc: 0.5917
epoch: 16 acc: 0.9396 avg loss: 0.1740
verify mfcc feature success
##Testing## epoch acc: 0.5529
epoch: 17 acc: 0.948 avg loss: 0.1567
verify mfcc feature success
##Testing## epoch acc: 0.5966
epoch: 18 acc: 0.9522 avg loss: 0.1493
verify mfcc feature success
##Testing## epoch acc: 0.5565
epoch: 19 acc: 0.9556 avg loss: 0.1346
verify mfcc feature success
##Testing## epoch acc: 0.5492
epoch: 20 acc: 0.9781 avg loss: 0.0735
verify mfcc feature success
##Testing## epoch acc: 0.599
epoch: 21 acc: 0.9839 avg loss: 0.0497
verify mfcc feature success
##Testing## epoch acc: 0.5881
epoch: 22 acc: 0.9877 avg loss: 0.0380
verify mfcc feature success
##Testing## epoch acc: 0.6027
epoch: 23 acc: 0.9861 avg loss: 0.0413
verify mfcc feature success
##Testing## epoch acc: 0.5978
epoch: 24 acc: 0.9877 avg loss: 0.0358
verify mfcc feature success
##Testing## epoch acc: 0.5954
epoch: 25 acc: 0.9879 avg loss: 0.0346
verify mfcc feature success
##Testing## epoch acc: 0.5869
epoch: 26 acc: 0.9896 avg loss: 0.0333
verify mfcc feature success
##Testing## epoch acc: 0.5784
epoch: 27 acc: 0.9908 avg loss: 0.0290
verify mfcc feature success
##Testing## epoch acc: 0.5784
epoch: 28 acc: 0.9911 avg loss: 0.0243
```

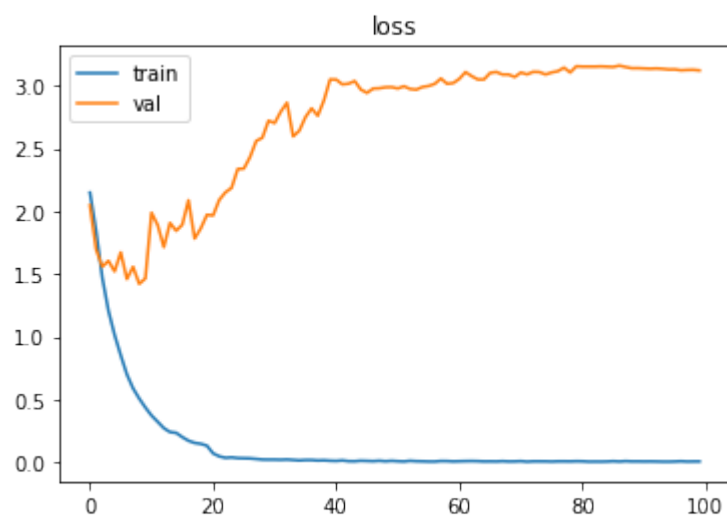
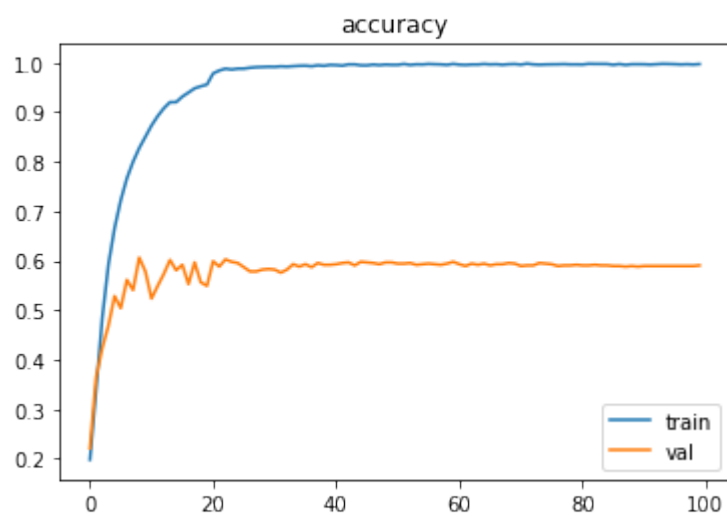


```
verify mfcc feature success
##Testing## epoch acc: 0.582
epoch: 29 acc: 0.9917 avg loss: 0.0235
verify mfcc feature success
##Testing## epoch acc: 0.5832
epoch: 30 acc: 0.9914 avg loss: 0.0237
verify mfcc feature success
##Testing## epoch acc: 0.582
epoch: 31 acc: 0.9924 avg loss: 0.0224
verify mfcc feature success
##Testing## epoch acc: 0.5759
epoch: 32 acc: 0.9919 avg loss: 0.0243
verify mfcc feature success
##Testing## epoch acc: 0.582
epoch: 33 acc: 0.9928 avg loss: 0.0210
verify mfcc feature success
##Testing## epoch acc: 0.593
epoch: 34 acc: 0.9936 avg loss: 0.0175
verify mfcc feature success
##Testing## epoch acc: 0.5881
epoch: 35 acc: 0.9938 avg loss: 0.0202
verify mfcc feature success
##Testing## epoch acc: 0.593
epoch: 36 acc: 0.9927 avg loss: 0.0203
verify mfcc feature success
##Testing## epoch acc: 0.5869
epoch: 37 acc: 0.9946 avg loss: 0.0167
verify mfcc feature success
##Testing## epoch acc: 0.5954
epoch: 38 acc: 0.9936 avg loss: 0.0183
verify mfcc feature success
##Testing## epoch acc: 0.5917
epoch: 39 acc: 0.9953 avg loss: 0.0149
verify mfcc feature success
##Testing## epoch acc: 0.5917
epoch: 40 acc: 0.9949 avg loss: 0.0134
verify mfcc feature success
##Testing## epoch acc: 0.593
epoch: 41 acc: 0.9939 avg loss: 0.0174
verify mfcc feature success
##Testing## epoch acc: 0.5954
epoch: 42 acc: 0.9963 avg loss: 0.0113
verify mfcc feature success
##Testing## epoch acc: 0.5966
epoch: 43 acc: 0.9963 avg loss: 0.0108
verify mfcc feature success
##Testing## epoch acc: 0.5905
epoch: 44 acc: 0.9946 avg loss: 0.0149
verify mfcc feature success
##Testing## epoch acc: 0.5978
epoch: 45 acc: 0.9944 avg loss: 0.0134
verify mfcc feature success
##Testing## epoch acc: 0.5966
epoch: 46 acc: 0.996 avg loss: 0.0114
verify mfcc feature success
##Testing## epoch acc: 0.5954
epoch: 47 acc: 0.9949 avg loss: 0.0147
verify mfcc feature success
##Testing## epoch acc: 0.593
epoch: 48 acc: 0.996 avg loss: 0.0106
verify mfcc feature success
```

```
##Testing## epoch acc: 0.5966
epoch: 49 acc: 0.9954 avg loss: 0.0141
verify mfcc feature success
##Testing## epoch acc: 0.5966
##Testing## epoch acc: 0.5942
epoch: 52 acc: 0.9953 avg loss: 0.0141
verify mfcc feature success
##Testing## epoch acc: 0.5954
epoch: 53 acc: 0.9965 avg loss: 0.0110
verify mfcc feature success
##Testing## epoch acc: 0.5917
epoch: 54 acc: 0.9962 avg loss: 0.0100
verify mfcc feature success
##Testing## epoch acc: 0.593
epoch: 55 acc: 0.9972 avg loss: 0.0083
verify mfcc feature success
##Testing## epoch acc: 0.5942
epoch: 56 acc: 0.9967 avg loss: 0.0083
verify mfcc feature success
##Testing## epoch acc: 0.593
epoch: 57 acc: 0.9963 avg loss: 0.0124
verify mfcc feature success
##Testing## epoch acc: 0.5917
epoch: 58 acc: 0.9954 avg loss: 0.0119
verify mfcc feature success
##Testing## epoch acc: 0.5942
epoch: 59 acc: 0.9973 avg loss: 0.0092
verify mfcc feature success
##Testing## epoch acc: 0.5978
epoch: 60 acc: 0.9958 avg loss: 0.0106
verify mfcc feature success
##Testing## epoch acc: 0.593
epoch: 61 acc: 0.9953 avg loss: 0.0118
verify mfcc feature success
##Testing## epoch acc: 0.5893
epoch: 62 acc: 0.9961 avg loss: 0.0125
verify mfcc feature success
##Testing## epoch acc: 0.5942
epoch: 63 acc: 0.9961 avg loss: 0.0114
verify mfcc feature success
##Testing## epoch acc: 0.5917
epoch: 64 acc: 0.9972 avg loss: 0.0091
verify mfcc feature success
##Testing## epoch acc: 0.5942
epoch: 65 acc: 0.9963 avg loss: 0.0097
verify mfcc feature success
##Testing## epoch acc: 0.5905
epoch: 66 acc: 0.9967 avg loss: 0.0089
verify mfcc feature success
##Testing## epoch acc: 0.593
epoch: 67 acc: 0.9956 avg loss: 0.0113
verify mfcc feature success
##Testing## epoch acc: 0.593
epoch: 68 acc: 0.9967 avg loss: 0.0088
verify mfcc feature success
##Testing## epoch acc: 0.5954
epoch: 69 acc: 0.9971 avg loss: 0.0094
verify mfcc feature success
##Testing## epoch acc: 0.5942
epoch: 70 acc: 0.9958 avg loss: 0.0114
verify mfcc feature success
```

```
##Testing## epoch acc: 0.5893
epoch: 71 acc: 0.998 avg loss: 0.0072
verify mfcc feature success
##Testing## epoch acc: 0.5905
epoch: 72 acc: 0.9963 avg loss: 0.0100
verify mfcc feature success
##Testing## epoch acc: 0.5905
epoch: 73 acc: 0.9957 avg loss: 0.0099
verify mfcc feature success
##Testing## epoch acc: 0.5954
epoch: 74 acc: 0.9962 avg loss: 0.0097
verify mfcc feature success
##Testing## epoch acc: 0.5942
epoch: 75 acc: 0.9965 avg loss: 0.0082
verify mfcc feature success
##Testing## epoch acc: 0.593
epoch: 76 acc: 0.9966 avg loss: 0.0100
verify mfcc feature success
##Testing## epoch acc: 0.5893
epoch: 77 acc: 0.997 avg loss: 0.0102
verify mfcc feature success
##Testing## epoch acc: 0.5905
epoch: 78 acc: 0.9963 avg loss: 0.0095
verify mfcc feature success
##Testing## epoch acc: 0.5905
epoch: 79 acc: 0.9963 avg loss: 0.0110
verify mfcc feature success
##Testing## epoch acc: 0.5917
epoch: 80 acc: 0.9961 avg loss: 0.0103
verify mfcc feature success
##Testing## epoch acc: 0.5905
epoch: 81 acc: 0.9976 avg loss: 0.0074
verify mfcc feature success
##Testing## epoch acc: 0.5905
epoch: 82 acc: 0.9973 avg loss: 0.0078
verify mfcc feature success
##Testing## epoch acc: 0.5917
epoch: 83 acc: 0.9973 avg loss: 0.0075
verify mfcc feature success
##Testing## epoch acc: 0.5905
epoch: 84 acc: 0.9972 avg loss: 0.0086
verify mfcc feature success
##Testing## epoch acc: 0.5905
epoch: 85 acc: 0.9954 avg loss: 0.0111
verify mfcc feature success
##Testing## epoch acc: 0.5893
epoch: 86 acc: 0.9971 avg loss: 0.0084
verify mfcc feature success
##Testing## epoch acc: 0.5893
epoch: 87 acc: 0.9953 avg loss: 0.0117
verify mfcc feature success
##Testing## epoch acc: 0.5881
epoch: 88 acc: 0.9967 avg loss: 0.0094
verify mfcc feature success
##Testing## epoch acc: 0.5893
epoch: 89 acc: 0.9967 avg loss: 0.0095
verify mfcc feature success
##Testing## epoch acc: 0.5881
epoch: 90 acc: 0.9966 avg loss: 0.0088
verify mfcc feature success
##Testing## epoch acc: 0.5893
```

```
epoch: 91 acc: 0.996 avg loss: 0.0092
verify mfcc feature success
##Testing## epoch acc: 0.5893
epoch: 92 acc: 0.9967 avg loss: 0.0086
verify mfcc feature success
##Testing## epoch acc: 0.5893
epoch: 93 acc: 0.9975 avg loss: 0.0074
verify mfcc feature success
##Testing## epoch acc: 0.5893
epoch: 94 acc: 0.9972 avg loss: 0.0072
verify mfcc feature success
##Testing## epoch acc: 0.5893
epoch: 95 acc: 0.9968 avg loss: 0.0085
verify mfcc feature success
##Testing## epoch acc: 0.5893
epoch: 96 acc: 0.9962 avg loss: 0.0108
verify mfcc feature success
##Testing## epoch acc: 0.5893
epoch: 97 acc: 0.9967 avg loss: 0.0082
verify mfcc feature success
##Testing## epoch acc: 0.5893
epoch: 98 acc: 0.9961 avg loss: 0.0089
verify mfcc feature success
##Testing## epoch acc: 0.5893
epoch: 99 acc: 0.997 avg loss: 0.0091
verify mfcc feature success
##Testing## epoch acc: 0.5905
```



```
In [6]: train(100)
        # vgg11 fold7 spec

verify spec feature success
epoch: 0 acc: 0.2545 avg loss: 2.1669
verify spec feature success
##Testing## epoch acc: 0.3473
epoch: 1 acc: 0.5027 avg loss: 1.3727
verify spec feature success
##Testing## epoch acc: 0.5286
epoch: 2 acc: 0.6072 avg loss: 1.0872
verify spec feature success
##Testing## epoch acc: 0.5835
epoch: 3 acc: 0.6882 avg loss: 0.8951
verify spec feature success
##Testing## epoch acc: 0.5835
epoch: 4 acc: 0.7223 avg loss: 0.7904
verify spec feature success
##Testing## epoch acc: 0.6158
epoch: 5 acc: 0.7692 avg loss: 0.6869
verify spec feature success
##Testing## epoch acc: 0.6205
epoch: 6 acc: 0.7925 avg loss: 0.5967
verify spec feature success
##Testing## epoch acc: 0.685
epoch: 7 acc: 0.8082 avg loss: 0.5478
verify spec feature success
##Testing## epoch acc: 0.6718
epoch: 8 acc: 0.8173 avg loss: 0.5266
verify spec feature success
##Testing## epoch acc: 0.6575
epoch: 9 acc: 0.8405 avg loss: 0.4750
verify spec feature success
##Testing## epoch acc: 0.7291
epoch: 10 acc: 0.8466 avg loss: 0.4502
verify spec feature success
##Testing## epoch acc: 0.7029
epoch: 11 acc: 0.8555 avg loss: 0.4269
verify spec feature success
##Testing## epoch acc: 0.6432
epoch: 12 acc: 0.8712 avg loss: 0.3842
verify spec feature success
##Testing## epoch acc: 0.6957
epoch: 13 acc: 0.8756 avg loss: 0.3698
verify spec feature success
##Testing## epoch acc: 0.7124
epoch: 14 acc: 0.8767 avg loss: 0.3642
verify spec feature success
##Testing## epoch acc: 0.7136
epoch: 15 acc: 0.8894 avg loss: 0.3284
verify spec feature success
##Testing## epoch acc: 0.7005
epoch: 16 acc: 0.8918 avg loss: 0.3278
verify spec feature success
##Testing## epoch acc: 0.6921
epoch: 17 acc: 0.9006 avg loss: 0.2982
verify spec feature success
##Testing## epoch acc: 0.7124
epoch: 18 acc: 0.8983 avg loss: 0.3035
verify spec feature success
##Testing## epoch acc: 0.7053
```

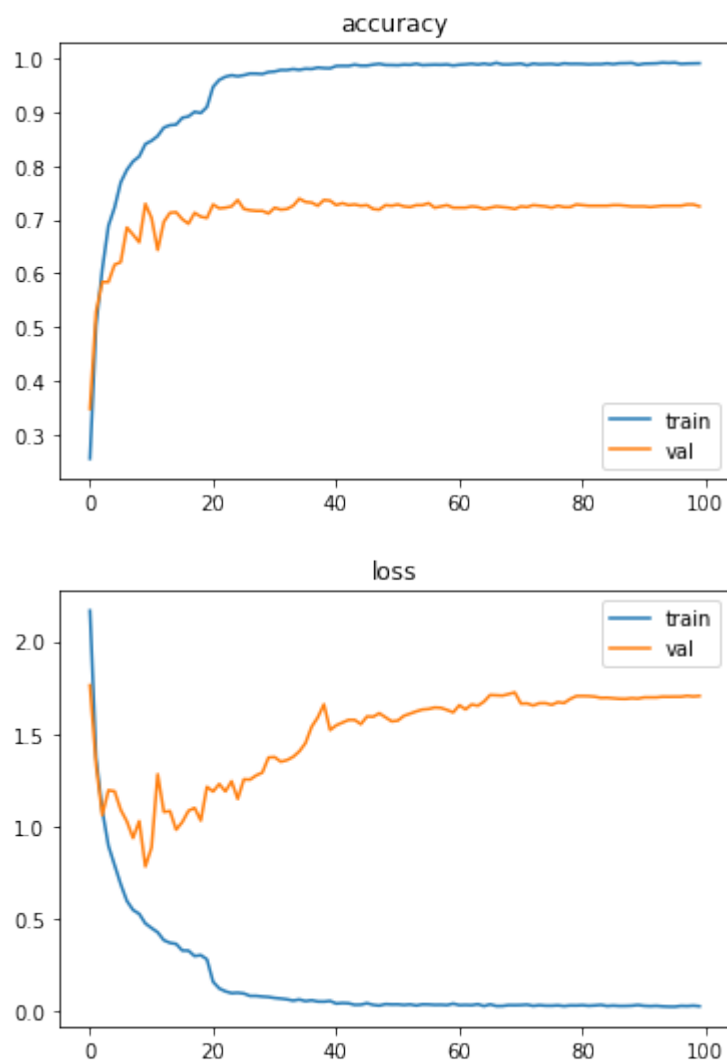
```
epoch: 19 acc: 0.9094 avg loss: 0.2808
verify spec feature success
##Testing## epoch acc: 0.7029
epoch: 20 acc: 0.947 avg loss: 0.1589
verify spec feature success
##Testing## epoch acc: 0.7279
epoch: 21 acc: 0.96 avg loss: 0.1233
verify spec feature success
##Testing## epoch acc: 0.7208
epoch: 22 acc: 0.9658 avg loss: 0.1076
verify spec feature success
##Testing## epoch acc: 0.722
epoch: 23 acc: 0.9686 avg loss: 0.0979
verify spec feature success
##Testing## epoch acc: 0.7243
epoch: 24 acc: 0.9667 avg loss: 0.0999
verify spec feature success
##Testing## epoch acc: 0.7363
epoch: 25 acc: 0.9687 avg loss: 0.0960
verify spec feature success
##Testing## epoch acc: 0.7196
epoch: 26 acc: 0.9718 avg loss: 0.0828
verify spec feature success
##Testing## epoch acc: 0.7172
epoch: 27 acc: 0.9716 avg loss: 0.0828
verify spec feature success
##Testing## epoch acc: 0.716
epoch: 28 acc: 0.9709 avg loss: 0.0793
verify spec feature success
##Testing## epoch acc: 0.716
epoch: 29 acc: 0.9745 avg loss: 0.0770
verify spec feature success
##Testing## epoch acc: 0.7112
epoch: 30 acc: 0.9756 avg loss: 0.0717
verify spec feature success
##Testing## epoch acc: 0.722
epoch: 31 acc: 0.9783 avg loss: 0.0685
verify spec feature success
##Testing## epoch acc: 0.7184
epoch: 32 acc: 0.9782 avg loss: 0.0644
verify spec feature success
##Testing## epoch acc: 0.7196
epoch: 33 acc: 0.9801 avg loss: 0.0574
verify spec feature success
##Testing## epoch acc: 0.7255
epoch: 34 acc: 0.9786 avg loss: 0.0635
verify spec feature success
##Testing## epoch acc: 0.7387
epoch: 35 acc: 0.9807 avg loss: 0.0548
verify spec feature success
##Testing## epoch acc: 0.7327
epoch: 36 acc: 0.9802 avg loss: 0.0593
verify spec feature success
##Testing## epoch acc: 0.7315
epoch: 37 acc: 0.9829 avg loss: 0.0527
verify spec feature success
##Testing## epoch acc: 0.7255
epoch: 38 acc: 0.9819 avg loss: 0.0520
verify spec feature success
##Testing## epoch acc: 0.7363
epoch: 39 acc: 0.9815 avg loss: 0.0558
```

```
verify spec feature success
##Testing## epoch acc: 0.7351
epoch: 40 acc: 0.9858 avg loss: 0.0415
verify spec feature success
##Testing## epoch acc: 0.7267
epoch: 41 acc: 0.9861 avg loss: 0.0444
verify spec feature success
##Testing## epoch acc: 0.7303
epoch: 42 acc: 0.9859 avg loss: 0.0430
verify spec feature success
##Testing## epoch acc: 0.7267
epoch: 43 acc: 0.9883 avg loss: 0.0345
verify spec feature success
##Testing## epoch acc: 0.7279
epoch: 44 acc: 0.9864 avg loss: 0.0354
verify spec feature success
##Testing## epoch acc: 0.7255
epoch: 45 acc: 0.9864 avg loss: 0.0433
verify spec feature success
##Testing## epoch acc: 0.7267
epoch: 46 acc: 0.9885 avg loss: 0.0343
verify spec feature success
##Testing## epoch acc: 0.7196
epoch: 47 acc: 0.9899 avg loss: 0.0306
verify spec feature success
##Testing## epoch acc: 0.7184
epoch: 48 acc: 0.9877 avg loss: 0.0385
verify spec feature success
##Testing## epoch acc: 0.7267
epoch: 49 acc: 0.9876 avg loss: 0.0367
verify spec feature success
##Testing## epoch acc: 0.7255
epoch: 50 acc: 0.9872 avg loss: 0.0372
verify spec feature success
##Testing## epoch acc: 0.7279
epoch: 51 acc: 0.9885 avg loss: 0.0339
verify spec feature success
##Testing## epoch acc: 0.7243
epoch: 52 acc: 0.988 avg loss: 0.0370
verify spec feature success
##Testing## epoch acc: 0.7232
epoch: 53 acc: 0.99 avg loss: 0.0310
verify spec feature success
##Testing## epoch acc: 0.7267
epoch: 54 acc: 0.9875 avg loss: 0.0372
verify spec feature success
##Testing## epoch acc: 0.7267
epoch: 55 acc: 0.988 avg loss: 0.0365
verify spec feature success
##Testing## epoch acc: 0.7303
epoch: 56 acc: 0.9883 avg loss: 0.0345
verify spec feature success
##Testing## epoch acc: 0.722
epoch: 57 acc: 0.9881 avg loss: 0.0350
verify spec feature success
##Testing## epoch acc: 0.7243
epoch: 58 acc: 0.9887 avg loss: 0.0332
verify spec feature success
##Testing## epoch acc: 0.7267
epoch: 59 acc: 0.9867 avg loss: 0.0410
verify spec feature success
```

```
##Testing## epoch acc: 0.722
epoch: 60 acc: 0.9882 avg loss: 0.0330
verify spec feature success
##Testing## epoch acc: 0.722
epoch: 61 acc: 0.9889 avg loss: 0.0341
verify spec feature success
##Testing## epoch acc: 0.722
epoch: 62 acc: 0.99 avg loss: 0.0328
verify spec feature success
##Testing## epoch acc: 0.7243
epoch: 63 acc: 0.9885 avg loss: 0.0381
verify spec feature success
##Testing## epoch acc: 0.7232
epoch: 64 acc: 0.9902 avg loss: 0.0280
verify spec feature success
##Testing## epoch acc: 0.7196
epoch: 65 acc: 0.9885 avg loss: 0.0373
verify spec feature success
##Testing## epoch acc: 0.722
epoch: 66 acc: 0.9918 avg loss: 0.0282
verify spec feature success
##Testing## epoch acc: 0.7243
epoch: 67 acc: 0.9887 avg loss: 0.0285
verify spec feature success
##Testing## epoch acc: 0.7232
epoch: 68 acc: 0.9887 avg loss: 0.0332
verify spec feature success
##Testing## epoch acc: 0.722
epoch: 69 acc: 0.9895 avg loss: 0.0327
verify spec feature success
##Testing## epoch acc: 0.7196
epoch: 70 acc: 0.9902 avg loss: 0.0335
verify spec feature success
##Testing## epoch acc: 0.7243
epoch: 71 acc: 0.9871 avg loss: 0.0356
verify spec feature success
##Testing## epoch acc: 0.7232
epoch: 72 acc: 0.9902 avg loss: 0.0290
verify spec feature success
##Testing## epoch acc: 0.7267
epoch: 73 acc: 0.989 avg loss: 0.0330
verify spec feature success
##Testing## epoch acc: 0.7255
epoch: 74 acc: 0.9894 avg loss: 0.0302
verify spec feature success
##Testing## epoch acc: 0.7243
epoch: 75 acc: 0.9896 avg loss: 0.0300
verify spec feature success
##Testing## epoch acc: 0.722
epoch: 76 acc: 0.9882 avg loss: 0.0321
verify spec feature success
##Testing## epoch acc: 0.7255
epoch: 77 acc: 0.9908 avg loss: 0.0278
verify spec feature success
##Testing## epoch acc: 0.7232
epoch: 78 acc: 0.9897 avg loss: 0.0315
verify spec feature success
##Testing## epoch acc: 0.7232
epoch: 79 acc: 0.9899 avg loss: 0.0311
verify spec feature success
##Testing## epoch acc: 0.7279
```



```
epoch: 80 acc: 0.9896 avg loss: 0.0328
verify spec feature success
##Testing## epoch acc: 0.7267
epoch: 81 acc: 0.9889 avg loss: 0.0296
verify spec feature success
##Testing## epoch acc: 0.7255
epoch: 82 acc: 0.9894 avg loss: 0.0315
verify spec feature success
##Testing## epoch acc: 0.7255
epoch: 83 acc: 0.9892 avg loss: 0.0344
verify spec feature success
##Testing## epoch acc: 0.7255
epoch: 84 acc: 0.9906 avg loss: 0.0282
verify spec feature success
##Testing## epoch acc: 0.7255
epoch: 85 acc: 0.9892 avg loss: 0.0307
verify spec feature success
##Testing## epoch acc: 0.7267
epoch: 86 acc: 0.9909 avg loss: 0.0285
verify spec feature success
##Testing## epoch acc: 0.7267
epoch: 87 acc: 0.991 avg loss: 0.0288
verify spec feature success
##Testing## epoch acc: 0.7255
epoch: 88 acc: 0.9915 avg loss: 0.0300
verify spec feature success
##Testing## epoch acc: 0.7243
epoch: 89 acc: 0.9881 avg loss: 0.0339
verify spec feature success
##Testing## epoch acc: 0.7243
epoch: 90 acc: 0.9901 avg loss: 0.0292
verify spec feature success
##Testing## epoch acc: 0.7243
epoch: 91 acc: 0.9904 avg loss: 0.0276
verify spec feature success
##Testing## epoch acc: 0.7232
epoch: 92 acc: 0.9908 avg loss: 0.0293
verify spec feature success
##Testing## epoch acc: 0.7243
epoch: 93 acc: 0.9921 avg loss: 0.0263
verify spec feature success
##Testing## epoch acc: 0.7255
epoch: 94 acc: 0.9915 avg loss: 0.0249
verify spec feature success
##Testing## epoch acc: 0.7255
epoch: 95 acc: 0.9921 avg loss: 0.0246
verify spec feature success
##Testing## epoch acc: 0.7255
epoch: 96 acc: 0.9897 avg loss: 0.0289
verify spec feature success
##Testing## epoch acc: 0.7255
epoch: 97 acc: 0.9904 avg loss: 0.0278
verify spec feature success
##Testing## epoch acc: 0.7279
epoch: 98 acc: 0.9906 avg loss: 0.0302
verify spec feature success
##Testing## epoch acc: 0.7279
epoch: 99 acc: 0.9909 avg loss: 0.0270
verify spec feature success
##Testing## epoch acc: 0.7243
```



```
In [6]: train(100)
# vgg11 fold7 mfcc
```

```
verify mfcc feature success
epoch: 0 acc: 0.1966 avg loss: 2.1456
verify mfcc feature success
##Testing## epoch acc: 0.2578
epoch: 1 acc: 0.3285 avg loss: 1.8557
verify mfcc feature success
##Testing## epoch acc: 0.4415
epoch: 2 acc: 0.4777 avg loss: 1.5068
verify mfcc feature success
##Testing## epoch acc: 0.5167
epoch: 3 acc: 0.5773 avg loss: 1.2422
verify mfcc feature success
##Testing## epoch acc: 0.531
epoch: 4 acc: 0.6542 avg loss: 1.0307
verify mfcc feature success
##Testing## epoch acc: 0.4976
epoch: 5 acc: 0.7132 avg loss: 0.8662
verify mfcc feature success
##Testing## epoch acc: 0.469
epoch: 6 acc: 0.7613 avg loss: 0.7299
verify mfcc feature success
##Testing## epoch acc: 0.5573
epoch: 7 acc: 0.7938 avg loss: 0.6067
verify mfcc feature success
##Testing## epoch acc: 0.5764
```

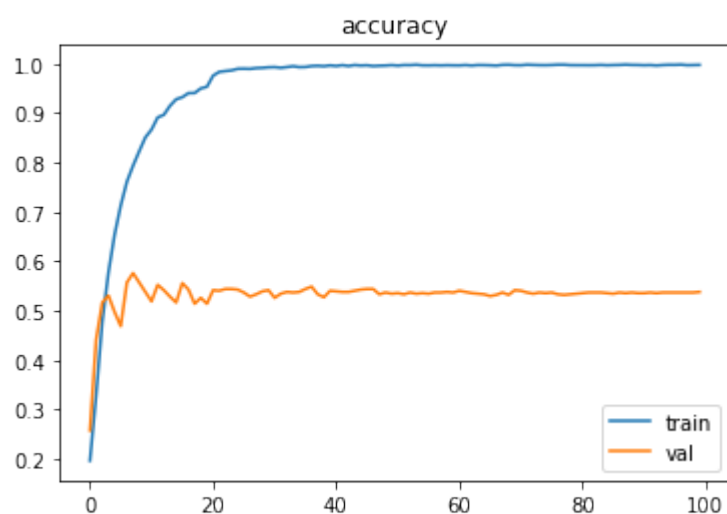
```
epoch: 8 acc: 0.8229 avg loss: 0.5220
verify mfcc feature success
##Testing## epoch acc: 0.5573
epoch: 9 acc: 0.851 avg loss: 0.4397
verify mfcc feature success
##Testing## epoch acc: 0.5382
epoch: 10 acc: 0.8669 avg loss: 0.3895
verify mfcc feature success
##Testing## epoch acc: 0.5191
epoch: 11 acc: 0.8914 avg loss: 0.3253
verify mfcc feature success
##Testing## epoch acc: 0.5525
epoch: 12 acc: 0.8968 avg loss: 0.3007
verify mfcc feature success
##Testing## epoch acc: 0.5418
epoch: 13 acc: 0.915 avg loss: 0.2551
verify mfcc feature success
##Testing## epoch acc: 0.5286
epoch: 14 acc: 0.9282 avg loss: 0.2186
verify mfcc feature success
##Testing## epoch acc: 0.5167
epoch: 15 acc: 0.9324 avg loss: 0.2075
verify mfcc feature success
##Testing## epoch acc: 0.5561
epoch: 16 acc: 0.9406 avg loss: 0.1817
verify mfcc feature success
##Testing## epoch acc: 0.543
epoch: 17 acc: 0.9408 avg loss: 0.1728
verify mfcc feature success
##Testing## epoch acc: 0.5143
epoch: 18 acc: 0.9501 avg loss: 0.1474
verify mfcc feature success
##Testing## epoch acc: 0.5263
epoch: 19 acc: 0.9535 avg loss: 0.1458
verify mfcc feature success
##Testing## epoch acc: 0.5143
epoch: 20 acc: 0.9759 avg loss: 0.0735
verify mfcc feature success
##Testing## epoch acc: 0.5418
epoch: 21 acc: 0.9837 avg loss: 0.0517
verify mfcc feature success
##Testing## epoch acc: 0.5406
epoch: 22 acc: 0.9853 avg loss: 0.0468
verify mfcc feature success
##Testing## epoch acc: 0.5442
epoch: 23 acc: 0.9867 avg loss: 0.0411
verify mfcc feature success
##Testing## epoch acc: 0.5442
epoch: 24 acc: 0.9899 avg loss: 0.0372
verify mfcc feature success
##Testing## epoch acc: 0.543
epoch: 25 acc: 0.9901 avg loss: 0.0318
verify mfcc feature success
##Testing## epoch acc: 0.537
epoch: 26 acc: 0.9897 avg loss: 0.0297
verify mfcc feature success
##Testing## epoch acc: 0.5286
epoch: 27 acc: 0.9913 avg loss: 0.0276
verify mfcc feature success
##Testing## epoch acc: 0.5334
epoch: 28 acc: 0.9918 avg loss: 0.0265
```

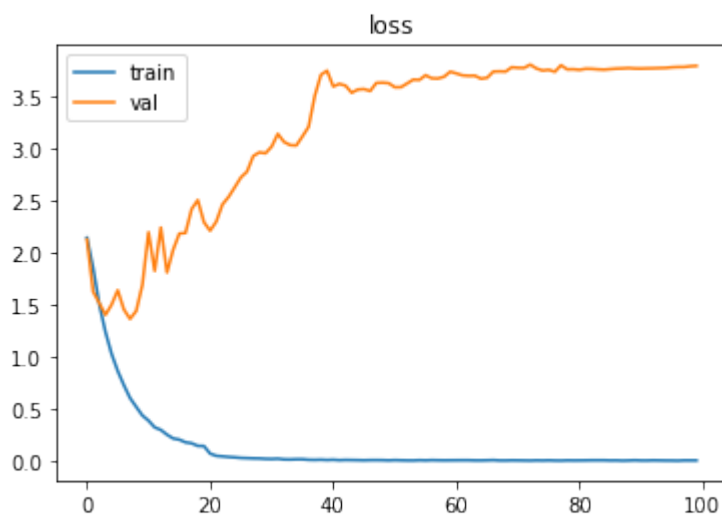
```
verify mfcc feature success
##Testing## epoch acc: 0.5394
epoch: 29 acc: 0.9929 avg loss: 0.0229
verify mfcc feature success
##Testing## epoch acc: 0.5418
epoch: 30 acc: 0.9933 avg loss: 0.0217
verify mfcc feature success
##Testing## epoch acc: 0.5263
epoch: 31 acc: 0.9919 avg loss: 0.0242
verify mfcc feature success
##Testing## epoch acc: 0.5346
epoch: 32 acc: 0.9934 avg loss: 0.0177
verify mfcc feature success
##Testing## epoch acc: 0.5382
epoch: 33 acc: 0.9951 avg loss: 0.0166
verify mfcc feature success
##Testing## epoch acc: 0.537
epoch: 34 acc: 0.9933 avg loss: 0.0189
verify mfcc feature success
##Testing## epoch acc: 0.5382
epoch: 35 acc: 0.9935 avg loss: 0.0191
verify mfcc feature success
##Testing## epoch acc: 0.5442
epoch: 36 acc: 0.9954 avg loss: 0.0142
verify mfcc feature success
##Testing## epoch acc: 0.5489
epoch: 37 acc: 0.9959 avg loss: 0.0131
verify mfcc feature success
##Testing## epoch acc: 0.5334
epoch: 38 acc: 0.9952 avg loss: 0.0148
verify mfcc feature success
##Testing## epoch acc: 0.5274
epoch: 39 acc: 0.9967 avg loss: 0.0119
verify mfcc feature success
##Testing## epoch acc: 0.5406
epoch: 40 acc: 0.9956 avg loss: 0.0142
verify mfcc feature success
##Testing## epoch acc: 0.5394
epoch: 41 acc: 0.9972 avg loss: 0.0101
verify mfcc feature success
##Testing## epoch acc: 0.5382
epoch: 42 acc: 0.9956 avg loss: 0.0123
verify mfcc feature success
##Testing## epoch acc: 0.5382
epoch: 43 acc: 0.9975 avg loss: 0.0115
verify mfcc feature success
##Testing## epoch acc: 0.5406
epoch: 44 acc: 0.9965 avg loss: 0.0105
verify mfcc feature success
##Testing## epoch acc: 0.543
epoch: 45 acc: 0.997 avg loss: 0.0089
verify mfcc feature success
##Testing## epoch acc: 0.5442
epoch: 46 acc: 0.9954 avg loss: 0.0106
verify mfcc feature success
##Testing## epoch acc: 0.5442
epoch: 47 acc: 0.9961 avg loss: 0.0107
verify mfcc feature success
##Testing## epoch acc: 0.5334
epoch: 48 acc: 0.9965 avg loss: 0.0101
verify mfcc feature success
```

```
##Testing## epoch acc: 0.537
epoch: 49 acc: 0.9973 avg loss: 0.0080
verify mfcc feature success
##Testing## epoch acc: 0.5346
epoch: 50 acc: 0.9963 avg loss: 0.0105
verify mfcc feature success
##Testing## epoch acc: 0.5358
epoch: 51 acc: 0.9975 avg loss: 0.0088
verify mfcc feature success
##Testing## epoch acc: 0.5334
epoch: 52 acc: 0.9973 avg loss: 0.0076
verify mfcc feature success
##Testing## epoch acc: 0.537
epoch: 53 acc: 0.9981 avg loss: 0.0072
verify mfcc feature success
##Testing## epoch acc: 0.5346
epoch: 54 acc: 0.9968 avg loss: 0.0099
verify mfcc feature success
##Testing## epoch acc: 0.5358
epoch: 55 acc: 0.9967 avg loss: 0.0080
verify mfcc feature success
##Testing## epoch acc: 0.5346
epoch: 56 acc: 0.9971 avg loss: 0.0104
verify mfcc feature success
##Testing## epoch acc: 0.537
epoch: 57 acc: 0.9967 avg loss: 0.0092
verify mfcc feature success
##Testing## epoch acc: 0.537
epoch: 58 acc: 0.9971 avg loss: 0.0084
verify mfcc feature success
##Testing## epoch acc: 0.5382
epoch: 59 acc: 0.9968 avg loss: 0.0090
verify mfcc feature success
##Testing## epoch acc: 0.537
epoch: 60 acc: 0.9967 avg loss: 0.0094
verify mfcc feature success
##Testing## epoch acc: 0.5406
epoch: 61 acc: 0.9975 avg loss: 0.0097
verify mfcc feature success
##Testing## epoch acc: 0.5382
epoch: 62 acc: 0.9965 avg loss: 0.0096
verify mfcc feature success
##Testing## epoch acc: 0.5358
epoch: 63 acc: 0.9975 avg loss: 0.0079
verify mfcc feature success
##Testing## epoch acc: 0.5346
epoch: 64 acc: 0.9973 avg loss: 0.0077
verify mfcc feature success
##Testing## epoch acc: 0.5334
epoch: 65 acc: 0.997 avg loss: 0.0090
verify mfcc feature success
##Testing## epoch acc: 0.5298
epoch: 66 acc: 0.9963 avg loss: 0.0108
verify mfcc feature success
##Testing## epoch acc: 0.5322
epoch: 67 acc: 0.9978 avg loss: 0.0073
verify mfcc feature success
##Testing## epoch acc: 0.537
epoch: 68 acc: 0.9981 avg loss: 0.0070
verify mfcc feature success
##Testing## epoch acc: 0.5322
```

```
epoch: 69 acc: 0.9972 avg loss: 0.0086
verify mfcc feature success
##Testing## epoch acc: 0.5418
epoch: 70 acc: 0.9971 avg loss: 0.0080
verify mfcc feature success
##Testing## epoch acc: 0.5406
epoch: 71 acc: 0.9982 avg loss: 0.0072
verify mfcc feature success
##Testing## epoch acc: 0.537
epoch: 72 acc: 0.9977 avg loss: 0.0062
verify mfcc feature success
##Testing## epoch acc: 0.5346
epoch: 73 acc: 0.9973 avg loss: 0.0082
verify mfcc feature success
##Testing## epoch acc: 0.537
epoch: 74 acc: 0.9972 avg loss: 0.0070
verify mfcc feature success
##Testing## epoch acc: 0.5358
epoch: 75 acc: 0.9976 avg loss: 0.0086
verify mfcc feature success
##Testing## epoch acc: 0.537
epoch: 76 acc: 0.9982 avg loss: 0.0067
verify mfcc feature success
##Testing## epoch acc: 0.5334
epoch: 77 acc: 0.9982 avg loss: 0.0060
verify mfcc feature success
##Testing## epoch acc: 0.5322
epoch: 78 acc: 0.9973 avg loss: 0.0082
verify mfcc feature success
##Testing## epoch acc: 0.5334
epoch: 79 acc: 0.9972 avg loss: 0.0074
verify mfcc feature success
##Testing## epoch acc: 0.5346
epoch: 80 acc: 0.9972 avg loss: 0.0077
verify mfcc feature success
##Testing## epoch acc: 0.5358
epoch: 81 acc: 0.9971 avg loss: 0.0083
verify mfcc feature success
##Testing## epoch acc: 0.537
epoch: 82 acc: 0.9972 avg loss: 0.0092
verify mfcc feature success
##Testing## epoch acc: 0.537
epoch: 83 acc: 0.9977 avg loss: 0.0092
verify mfcc feature success
##Testing## epoch acc: 0.537
epoch: 84 acc: 0.9971 avg loss: 0.0092
verify mfcc feature success
##Testing## epoch acc: 0.5358
epoch: 85 acc: 0.9975 avg loss: 0.0073
verify mfcc feature success
##Testing## epoch acc: 0.5346
epoch: 86 acc: 0.9977 avg loss: 0.0078
verify mfcc feature success
##Testing## epoch acc: 0.537
epoch: 87 acc: 0.9984 avg loss: 0.0056
verify mfcc feature success
##Testing## epoch acc: 0.5358
epoch: 88 acc: 0.9977 avg loss: 0.0072
verify mfcc feature success
##Testing## epoch acc: 0.537
epoch: 89 acc: 0.9976 avg loss: 0.0094
```

```
verify mfcc feature success
##Testing## epoch acc: 0.5358
epoch: 90 acc: 0.9971 avg loss: 0.0071
verify mfcc feature success
##Testing## epoch acc: 0.5358
epoch: 91 acc: 0.9975 avg loss: 0.0070
verify mfcc feature success
##Testing## epoch acc: 0.537
epoch: 92 acc: 0.9966 avg loss: 0.0087
verify mfcc feature success
##Testing## epoch acc: 0.5358
epoch: 93 acc: 0.9975 avg loss: 0.0077
verify mfcc feature success
##Testing## epoch acc: 0.537
epoch: 94 acc: 0.998 avg loss: 0.0067
verify mfcc feature success
##Testing## epoch acc: 0.537
epoch: 95 acc: 0.9978 avg loss: 0.0063
verify mfcc feature success
##Testing## epoch acc: 0.537
epoch: 96 acc: 0.9984 avg loss: 0.0052
verify mfcc feature success
##Testing## epoch acc: 0.537
epoch: 97 acc: 0.9972 avg loss: 0.0081
verify mfcc feature success
##Testing## epoch acc: 0.537
epoch: 98 acc: 0.9975 avg loss: 0.0077
verify mfcc feature success
##Testing## epoch acc: 0.537
epoch: 99 acc: 0.9977 avg loss: 0.0077
verify mfcc feature success
##Testing## epoch acc: 0.5382
```





```
In [6]: train(100)
        # vgg11 fold8 spec

verify spec feature success
epoch: 0 acc: 0.2512 avg loss: 2.4020
verify spec feature success
##Testing## epoch acc: 0.4777
epoch: 1 acc: 0.524 avg loss: 1.3409
verify spec feature success
##Testing## epoch acc: 0.4702
epoch: 2 acc: 0.6244 avg loss: 1.0498
verify spec feature success
##Testing## epoch acc: 0.5893
epoch: 3 acc: 0.6852 avg loss: 0.8867
verify spec feature success
##Testing## epoch acc: 0.6129
epoch: 4 acc: 0.7255 avg loss: 0.7739
verify spec feature success
##Testing## epoch acc: 0.598
epoch: 5 acc: 0.7677 avg loss: 0.6725
verify spec feature success
##Testing## epoch acc: 0.6253
epoch: 6 acc: 0.7904 avg loss: 0.6123
verify spec feature success
##Testing## epoch acc: 0.5806
epoch: 7 acc: 0.8058 avg loss: 0.5579
verify spec feature success
##Testing## epoch acc: 0.5496
epoch: 8 acc: 0.8159 avg loss: 0.5162
verify spec feature success
##Testing## epoch acc: 0.6514
epoch: 9 acc: 0.8385 avg loss: 0.4823
verify spec feature success
##Testing## epoch acc: 0.6663
epoch: 10 acc: 0.8526 avg loss: 0.4305
verify spec feature success
##Testing## epoch acc: 0.5794
epoch: 11 acc: 0.8576 avg loss: 0.4272
verify spec feature success
##Testing## epoch acc: 0.6873
epoch: 12 acc: 0.8712 avg loss: 0.3918
verify spec feature success
##Testing## epoch acc: 0.6253
epoch: 13 acc: 0.8803 avg loss: 0.3512
```



```
verify spec feature success
##Testing## epoch acc: 0.6377
epoch: 14 acc: 0.862 avg loss: 0.4010
verify spec feature success
##Testing## epoch acc: 0.5744
epoch: 15 acc: 0.9002 avg loss: 0.3073
verify spec feature success
##Testing## epoch acc: 0.6079
epoch: 16 acc: 0.8902 avg loss: 0.3216
verify spec feature success
##Testing## epoch acc: 0.5906
epoch: 17 acc: 0.8978 avg loss: 0.2967
verify spec feature success
##Testing## epoch acc: 0.6278
epoch: 18 acc: 0.906 avg loss: 0.2732
verify spec feature success
##Testing## epoch acc: 0.6439
epoch: 19 acc: 0.9013 avg loss: 0.2962
verify spec feature success
##Testing## epoch acc: 0.6352
epoch: 20 acc: 0.9464 avg loss: 0.1639
verify spec feature success
##Testing## epoch acc: 0.6402
epoch: 21 acc: 0.9555 avg loss: 0.1330
verify spec feature success
##Testing## epoch acc: 0.6414
epoch: 22 acc: 0.9586 avg loss: 0.1199
verify spec feature success
##Testing## epoch acc: 0.6464
epoch: 23 acc: 0.9661 avg loss: 0.1059
verify spec feature success
##Testing## epoch acc: 0.6464
epoch: 24 acc: 0.9658 avg loss: 0.1010
verify spec feature success
##Testing## epoch acc: 0.6377
epoch: 25 acc: 0.9668 avg loss: 0.0905
verify spec feature success
##Testing## epoch acc: 0.6365
epoch: 26 acc: 0.9712 avg loss: 0.0881
verify spec feature success
##Testing## epoch acc: 0.6452
epoch: 27 acc: 0.9688 avg loss: 0.0902
verify spec feature success
##Testing## epoch acc: 0.6303
epoch: 28 acc: 0.9687 avg loss: 0.0872
verify spec feature success
##Testing## epoch acc: 0.6365
epoch: 29 acc: 0.9716 avg loss: 0.0796
verify spec feature success
##Testing## epoch acc: 0.639
epoch: 30 acc: 0.9749 avg loss: 0.0716
verify spec feature success
##Testing## epoch acc: 0.6551
epoch: 31 acc: 0.9744 avg loss: 0.0707
verify spec feature success
##Testing## epoch acc: 0.6663
epoch: 32 acc: 0.9758 avg loss: 0.0708
verify spec feature success
##Testing## epoch acc: 0.6464
epoch: 33 acc: 0.9784 avg loss: 0.0596
verify spec feature success
```

```
##Testing## epoch acc: 0.6414
epoch: 34 acc: 0.9753 avg loss: 0.0666
verify spec feature success
##Testing## epoch acc: 0.6464
epoch: 35 acc: 0.9774 avg loss: 0.0662
verify spec feature success
##Testing## epoch acc: 0.6439
epoch: 36 acc: 0.9812 avg loss: 0.0541
verify spec feature success
##Testing## epoch acc: 0.6476
epoch: 37 acc: 0.9798 avg loss: 0.0571
verify spec feature success
##Testing## epoch acc: 0.67
epoch: 38 acc: 0.9802 avg loss: 0.0602
verify spec feature success
##Testing## epoch acc: 0.6526
epoch: 39 acc: 0.9793 avg loss: 0.0599
verify spec feature success
##Testing## epoch acc: 0.6377
epoch: 40 acc: 0.9826 avg loss: 0.0481
verify spec feature success
##Testing## epoch acc: 0.665
epoch: 41 acc: 0.9832 avg loss: 0.0436
verify spec feature success
##Testing## epoch acc: 0.6737
epoch: 42 acc: 0.9846 avg loss: 0.0437
verify spec feature success
##Testing## epoch acc: 0.67
epoch: 43 acc: 0.9851 avg loss: 0.0451
verify spec feature success
##Testing## epoch acc: 0.6687
epoch: 44 acc: 0.9854 avg loss: 0.0412
verify spec feature success
##Testing## epoch acc: 0.6638
epoch: 45 acc: 0.9851 avg loss: 0.0439
verify spec feature success
##Testing## epoch acc: 0.6613
epoch: 46 acc: 0.9857 avg loss: 0.0421
verify spec feature success
##Testing## epoch acc: 0.6638
epoch: 47 acc: 0.9859 avg loss: 0.0416
verify spec feature success
##Testing## epoch acc: 0.665
epoch: 48 acc: 0.987 avg loss: 0.0379
verify spec feature success
##Testing## epoch acc: 0.6638
epoch: 49 acc: 0.9856 avg loss: 0.0412
verify spec feature success
##Testing## epoch acc: 0.6588
epoch: 50 acc: 0.9845 avg loss: 0.0411
verify spec feature success
##Testing## epoch acc: 0.6625
epoch: 51 acc: 0.9884 avg loss: 0.0364
verify spec feature success
##Testing## epoch acc: 0.665
epoch: 52 acc: 0.9875 avg loss: 0.0376
verify spec feature success
##Testing## epoch acc: 0.6625
epoch: 53 acc: 0.986 avg loss: 0.0401
verify spec feature success
##Testing## epoch acc: 0.6576
```

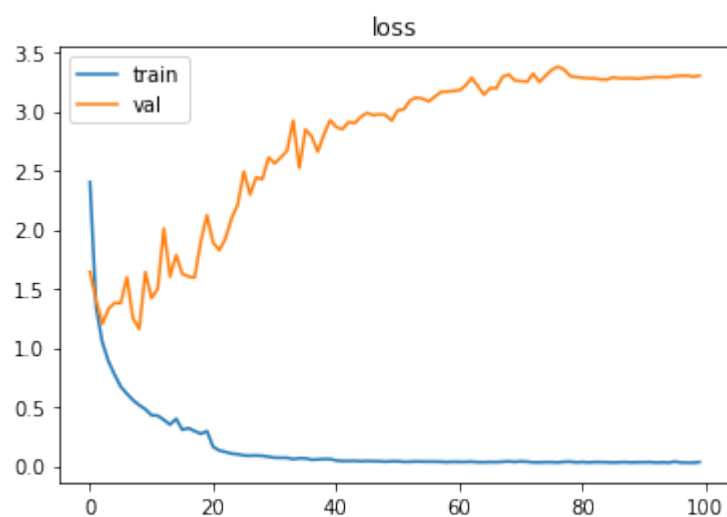
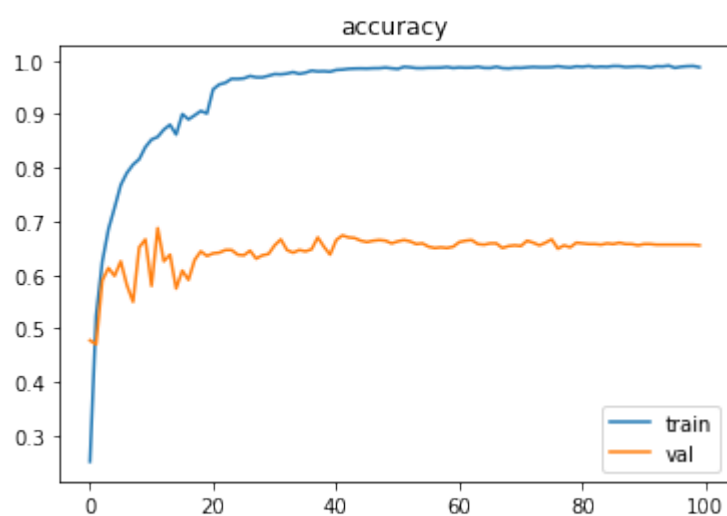
```
epoch: 54 acc: 0.9859 avg loss: 0.0384
verify spec feature success
##Testing## epoch acc: 0.6588
epoch: 55 acc: 0.9866 avg loss: 0.0386
verify spec feature success
##Testing## epoch acc: 0.6526
epoch: 56 acc: 0.9866 avg loss: 0.0387
verify spec feature success
##Testing## epoch acc: 0.6501
epoch: 57 acc: 0.9869 avg loss: 0.0369
verify spec feature success
##Testing## epoch acc: 0.6514
epoch: 58 acc: 0.988 avg loss: 0.0347
verify spec feature success
##Testing## epoch acc: 0.6501
epoch: 59 acc: 0.9862 avg loss: 0.0370
verify spec feature success
##Testing## epoch acc: 0.6526
epoch: 60 acc: 0.9873 avg loss: 0.0360
verify spec feature success
##Testing## epoch acc: 0.6613
epoch: 61 acc: 0.9868 avg loss: 0.0359
verify spec feature success
##Testing## epoch acc: 0.6638
epoch: 62 acc: 0.987 avg loss: 0.0378
verify spec feature success
##Testing## epoch acc: 0.665
epoch: 63 acc: 0.9885 avg loss: 0.0338
verify spec feature success
##Testing## epoch acc: 0.6576
epoch: 64 acc: 0.9865 avg loss: 0.0332
verify spec feature success
##Testing## epoch acc: 0.6563
epoch: 65 acc: 0.9862 avg loss: 0.0355
verify spec feature success
##Testing## epoch acc: 0.6588
epoch: 66 acc: 0.9885 avg loss: 0.0341
verify spec feature success
##Testing## epoch acc: 0.6588
epoch: 67 acc: 0.986 avg loss: 0.0371
verify spec feature success
##Testing## epoch acc: 0.6501
epoch: 68 acc: 0.9854 avg loss: 0.0403
verify spec feature success
##Testing## epoch acc: 0.6538
epoch: 69 acc: 0.9866 avg loss: 0.0358
verify spec feature success
##Testing## epoch acc: 0.6551
epoch: 70 acc: 0.9864 avg loss: 0.0402
verify spec feature success
##Testing## epoch acc: 0.6538
epoch: 71 acc: 0.9874 avg loss: 0.0374
verify spec feature success
##Testing## epoch acc: 0.6638
epoch: 72 acc: 0.9881 avg loss: 0.0320
verify spec feature success
##Testing## epoch acc: 0.66
epoch: 73 acc: 0.9876 avg loss: 0.0325
verify spec feature success
##Testing## epoch acc: 0.6551
epoch: 74 acc: 0.9876 avg loss: 0.0340
```

```
verify spec feature success
##Testing## epoch acc: 0.66
epoch: 75 acc: 0.9879 avg loss: 0.0341
verify spec feature success
##Testing## epoch acc: 0.6663
epoch: 76 acc: 0.9895 avg loss: 0.0315
verify spec feature success
##Testing## epoch acc: 0.6489
epoch: 77 acc: 0.9879 avg loss: 0.0367
verify spec feature success
##Testing## epoch acc: 0.6551
epoch: 78 acc: 0.987 avg loss: 0.0379
verify spec feature success
##Testing## epoch acc: 0.6514
epoch: 79 acc: 0.9891 avg loss: 0.0320
verify spec feature success
##Testing## epoch acc: 0.66
epoch: 80 acc: 0.9884 avg loss: 0.0352
verify spec feature success
##Testing## epoch acc: 0.6588
epoch: 81 acc: 0.9899 avg loss: 0.0312
verify spec feature success
##Testing## epoch acc: 0.6576
epoch: 82 acc: 0.9879 avg loss: 0.0345
verify spec feature success
##Testing## epoch acc: 0.6576
epoch: 83 acc: 0.9888 avg loss: 0.0342
verify spec feature success
##Testing## epoch acc: 0.6563
epoch: 84 acc: 0.9883 avg loss: 0.0327
verify spec feature success
##Testing## epoch acc: 0.6588
epoch: 85 acc: 0.9898 avg loss: 0.0302
verify spec feature success
##Testing## epoch acc: 0.6576
epoch: 86 acc: 0.9897 avg loss: 0.0333
verify spec feature success
##Testing## epoch acc: 0.66
epoch: 87 acc: 0.9879 avg loss: 0.0343
verify spec feature success
##Testing## epoch acc: 0.6576
epoch: 88 acc: 0.9885 avg loss: 0.0312
verify spec feature success
##Testing## epoch acc: 0.6576
epoch: 89 acc: 0.9893 avg loss: 0.0332
verify spec feature success
##Testing## epoch acc: 0.6551
epoch: 90 acc: 0.9886 avg loss: 0.0333
verify spec feature success
##Testing## epoch acc: 0.6576
epoch: 91 acc: 0.9868 avg loss: 0.0348
verify spec feature success
##Testing## epoch acc: 0.6576
epoch: 92 acc: 0.9894 avg loss: 0.0300
verify spec feature success
##Testing## epoch acc: 0.6563
epoch: 93 acc: 0.989 avg loss: 0.0322
verify spec feature success
##Testing## epoch acc: 0.6563
epoch: 94 acc: 0.9907 avg loss: 0.0299
verify spec feature success
```

```

##Testing## epoch acc: 0.6563
epoch: 95 acc: 0.9865 avg loss: 0.0387
verify spec feature success
##Testing## epoch acc: 0.6563
epoch: 96 acc: 0.9885 avg loss: 0.0304
verify spec feature success
##Testing## epoch acc: 0.6563
epoch: 97 acc: 0.9895 avg loss: 0.0296
verify spec feature success
##Testing## epoch acc: 0.6563
epoch: 98 acc: 0.9899 avg loss: 0.0293
verify spec feature success
##Testing## epoch acc: 0.6563
epoch: 99 acc: 0.9875 avg loss: 0.0346
verify spec feature success
##Testing## epoch acc: 0.6551

```



```

In [6]: train(100)
        # vgg11 fold8 mfcc

```

```

verify mfcc feature success
epoch: 0 acc: 0.1914 avg loss: 2.1536
verify mfcc feature success
##Testing## epoch acc: 0.2742
epoch: 1 acc: 0.3043 avg loss: 1.9155
verify mfcc feature success
##Testing## epoch acc: 0.3921
epoch: 2 acc: 0.4484 avg loss: 1.5737

```

```
verify mfcc feature success
##Testing## epoch acc: 0.4988
epoch: 3 acc: 0.5731 avg loss: 1.2717
verify mfcc feature success
##Testing## epoch acc: 0.5223
epoch: 4 acc: 0.6477 avg loss: 1.0484
verify mfcc feature success
##Testing## epoch acc: 0.5248
epoch: 5 acc: 0.6998 avg loss: 0.8968
verify mfcc feature success
##Testing## epoch acc: 0.4814
epoch: 6 acc: 0.7523 avg loss: 0.7358
verify mfcc feature success
##Testing## epoch acc: 0.5211
epoch: 7 acc: 0.7938 avg loss: 0.6223
verify mfcc feature success
##Testing## epoch acc: 0.5521
epoch: 8 acc: 0.8181 avg loss: 0.5335
verify mfcc feature success
##Testing## epoch acc: 0.5757
epoch: 9 acc: 0.8489 avg loss: 0.4570
verify mfcc feature success
##Testing## epoch acc: 0.5335
epoch: 10 acc: 0.87 avg loss: 0.3867
verify mfcc feature success
##Testing## epoch acc: 0.4938
epoch: 11 acc: 0.882 avg loss: 0.3458
verify mfcc feature success
##Testing## epoch acc: 0.5409
epoch: 12 acc: 0.8948 avg loss: 0.3133
verify mfcc feature success
##Testing## epoch acc: 0.5248
epoch: 13 acc: 0.9098 avg loss: 0.2667
verify mfcc feature success
##Testing## epoch acc: 0.5893
epoch: 14 acc: 0.9266 avg loss: 0.2221
verify mfcc feature success
##Testing## epoch acc: 0.562
epoch: 15 acc: 0.9283 avg loss: 0.2150
verify mfcc feature success
##Testing## epoch acc: 0.5298
epoch: 16 acc: 0.9397 avg loss: 0.1885
verify mfcc feature success
##Testing## epoch acc: 0.536
epoch: 17 acc: 0.9373 avg loss: 0.1845
verify mfcc feature success
##Testing## epoch acc: 0.5037
epoch: 18 acc: 0.9487 avg loss: 0.1551
verify mfcc feature success
##Testing## epoch acc: 0.5434
epoch: 19 acc: 0.9485 avg loss: 0.1512
verify mfcc feature success
##Testing## epoch acc: 0.562
epoch: 20 acc: 0.9778 avg loss: 0.0701
verify mfcc feature success
##Testing## epoch acc: 0.5571
epoch: 21 acc: 0.9808 avg loss: 0.0577
verify mfcc feature success
##Testing## epoch acc: 0.5682
epoch: 22 acc: 0.9846 avg loss: 0.0463
verify mfcc feature success
```

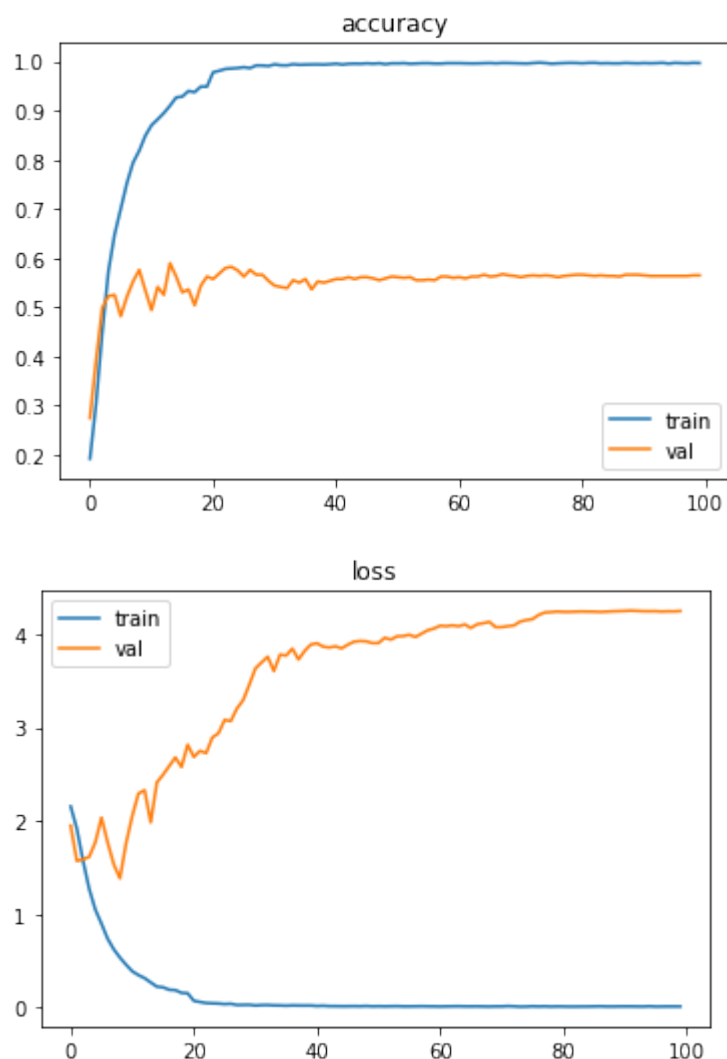
```
##Testing## epoch acc: 0.5794
epoch: 23 acc: 0.9855 avg loss: 0.0434
verify mfcc feature success
##Testing## epoch acc: 0.5819
epoch: 24 acc: 0.9864 avg loss: 0.0410
verify mfcc feature success
##Testing## epoch acc: 0.5744
epoch: 25 acc: 0.9881 avg loss: 0.0351
verify mfcc feature success
##Testing## epoch acc: 0.562
epoch: 26 acc: 0.9862 avg loss: 0.0384
verify mfcc feature success
##Testing## epoch acc: 0.5757
epoch: 27 acc: 0.9917 avg loss: 0.0254
verify mfcc feature success
##Testing## epoch acc: 0.5658
epoch: 28 acc: 0.9915 avg loss: 0.0263
verify mfcc feature success
##Testing## epoch acc: 0.5658
epoch: 29 acc: 0.9905 avg loss: 0.0275
verify mfcc feature success
##Testing## epoch acc: 0.5533
epoch: 30 acc: 0.9939 avg loss: 0.0198
verify mfcc feature success
##Testing## epoch acc: 0.5434
epoch: 31 acc: 0.9921 avg loss: 0.0241
verify mfcc feature success
##Testing## epoch acc: 0.5409
epoch: 32 acc: 0.9918 avg loss: 0.0249
verify mfcc feature success
##Testing## epoch acc: 0.5385
epoch: 33 acc: 0.9942 avg loss: 0.0212
verify mfcc feature success
##Testing## epoch acc: 0.5546
epoch: 34 acc: 0.9931 avg loss: 0.0205
verify mfcc feature success
##Testing## epoch acc: 0.5496
epoch: 35 acc: 0.9934 avg loss: 0.0179
verify mfcc feature success
##Testing## epoch acc: 0.5571
epoch: 36 acc: 0.9937 avg loss: 0.0209
verify mfcc feature success
##Testing## epoch acc: 0.536
epoch: 37 acc: 0.9938 avg loss: 0.0198
verify mfcc feature success
##Testing## epoch acc: 0.5521
epoch: 38 acc: 0.9934 avg loss: 0.0192
verify mfcc feature success
##Testing## epoch acc: 0.5496
epoch: 39 acc: 0.9942 avg loss: 0.0196
verify mfcc feature success
##Testing## epoch acc: 0.5533
epoch: 40 acc: 0.9952 avg loss: 0.0146
verify mfcc feature success
##Testing## epoch acc: 0.5571
epoch: 41 acc: 0.9936 avg loss: 0.0171
verify mfcc feature success
##Testing## epoch acc: 0.5571
epoch: 42 acc: 0.995 avg loss: 0.0132
verify mfcc feature success
##Testing## epoch acc: 0.5608
```

```
epoch: 43 acc: 0.9953 avg loss: 0.0130
verify mfcc feature success
##Testing## epoch acc: 0.5571
epoch: 44 acc: 0.9951 avg loss: 0.0120
verify mfcc feature success
##Testing## epoch acc: 0.5608
epoch: 45 acc: 0.996 avg loss: 0.0121
verify mfcc feature success
##Testing## epoch acc: 0.5608
epoch: 46 acc: 0.9952 avg loss: 0.0130
verify mfcc feature success
##Testing## epoch acc: 0.5583
epoch: 47 acc: 0.9961 avg loss: 0.0118
verify mfcc feature success
##Testing## epoch acc: 0.5546
epoch: 48 acc: 0.9942 avg loss: 0.0142
verify mfcc feature success
##Testing## epoch acc: 0.5583
epoch: 49 acc: 0.996 avg loss: 0.0108
verify mfcc feature success
##Testing## epoch acc: 0.562
epoch: 50 acc: 0.9958 avg loss: 0.0122
verify mfcc feature success
##Testing## epoch acc: 0.5608
epoch: 51 acc: 0.9963 avg loss: 0.0107
verify mfcc feature success
##Testing## epoch acc: 0.5596
epoch: 52 acc: 0.9951 avg loss: 0.0119
verify mfcc feature success
##Testing## epoch acc: 0.5608
epoch: 53 acc: 0.9956 avg loss: 0.0127
verify mfcc feature success
##Testing## epoch acc: 0.5546
epoch: 54 acc: 0.9962 avg loss: 0.0104
verify mfcc feature success
##Testing## epoch acc: 0.5546
epoch: 55 acc: 0.9962 avg loss: 0.0104
verify mfcc feature success
##Testing## epoch acc: 0.5558
epoch: 56 acc: 0.9955 avg loss: 0.0111
verify mfcc feature success
##Testing## epoch acc: 0.5546
epoch: 57 acc: 0.9955 avg loss: 0.0123
verify mfcc feature success
##Testing## epoch acc: 0.562
epoch: 58 acc: 0.9963 avg loss: 0.0109
verify mfcc feature success
##Testing## epoch acc: 0.562
epoch: 59 acc: 0.9963 avg loss: 0.0103
verify mfcc feature success
##Testing## epoch acc: 0.5596
epoch: 60 acc: 0.9963 avg loss: 0.0090
verify mfcc feature success
##Testing## epoch acc: 0.5608
epoch: 61 acc: 0.996 avg loss: 0.0104
verify mfcc feature success
##Testing## epoch acc: 0.5583
epoch: 62 acc: 0.9957 avg loss: 0.0113
verify mfcc feature success
##Testing## epoch acc: 0.562
epoch: 63 acc: 0.9958 avg loss: 0.0121
```



```
verify mfcc feature success
##Testing## epoch acc: 0.562
epoch: 64 acc: 0.9963 avg loss: 0.0106
verify mfcc feature success
##Testing## epoch acc: 0.5658
epoch: 65 acc: 0.9966 avg loss: 0.0104
verify mfcc feature success
##Testing## epoch acc: 0.562
epoch: 66 acc: 0.996 avg loss: 0.0109
verify mfcc feature success
##Testing## epoch acc: 0.5633
epoch: 67 acc: 0.9967 avg loss: 0.0096
verify mfcc feature success
##Testing## epoch acc: 0.567
epoch: 68 acc: 0.9966 avg loss: 0.0086
verify mfcc feature success
##Testing## epoch acc: 0.5645
epoch: 69 acc: 0.9962 avg loss: 0.0105
verify mfcc feature success
##Testing## epoch acc: 0.5633
epoch: 70 acc: 0.9958 avg loss: 0.0102
verify mfcc feature success
##Testing## epoch acc: 0.5608
epoch: 71 acc: 0.9956 avg loss: 0.0136
verify mfcc feature success
##Testing## epoch acc: 0.5633
epoch: 72 acc: 0.9966 avg loss: 0.0112
verify mfcc feature success
##Testing## epoch acc: 0.5645
epoch: 73 acc: 0.9975 avg loss: 0.0070
verify mfcc feature success
##Testing## epoch acc: 0.5633
epoch: 74 acc: 0.9966 avg loss: 0.0083
verify mfcc feature success
##Testing## epoch acc: 0.5645
epoch: 75 acc: 0.9952 avg loss: 0.0117
verify mfcc feature success
##Testing## epoch acc: 0.5633
epoch: 76 acc: 0.996 avg loss: 0.0093
verify mfcc feature success
##Testing## epoch acc: 0.5608
epoch: 77 acc: 0.9966 avg loss: 0.0111
verify mfcc feature success
##Testing## epoch acc: 0.5633
epoch: 78 acc: 0.997 avg loss: 0.0083
verify mfcc feature success
##Testing## epoch acc: 0.5645
epoch: 79 acc: 0.9967 avg loss: 0.0100
verify mfcc feature success
##Testing## epoch acc: 0.5658
epoch: 80 acc: 0.9961 avg loss: 0.0095
verify mfcc feature success
##Testing## epoch acc: 0.5658
epoch: 81 acc: 0.997 avg loss: 0.0079
verify mfcc feature success
##Testing## epoch acc: 0.5645
epoch: 82 acc: 0.9971 avg loss: 0.0083
verify mfcc feature success
##Testing## epoch acc: 0.5633
epoch: 83 acc: 0.996 avg loss: 0.0089
verify mfcc feature success
```

```
##Testing## epoch acc: 0.5645
epoch: 84 acc: 0.9963 avg loss: 0.0090
verify mfcc feature success
##Testing## epoch acc: 0.5633
epoch: 85 acc: 0.9958 avg loss: 0.0103
verify mfcc feature success
##Testing## epoch acc: 0.5633
epoch: 86 acc: 0.996 avg loss: 0.0115
verify mfcc feature success
##Testing## epoch acc: 0.562
epoch: 87 acc: 0.9968 avg loss: 0.0094
verify mfcc feature success
##Testing## epoch acc: 0.5658
epoch: 88 acc: 0.9963 avg loss: 0.0089
verify mfcc feature success
##Testing## epoch acc: 0.5658
epoch: 89 acc: 0.996 avg loss: 0.0104
verify mfcc feature success
##Testing## epoch acc: 0.5658
epoch: 90 acc: 0.9966 avg loss: 0.0103
verify mfcc feature success
##Testing## epoch acc: 0.5645
epoch: 91 acc: 0.9961 avg loss: 0.0105
verify mfcc feature success
##Testing## epoch acc: 0.5633
epoch: 92 acc: 0.9965 avg loss: 0.0092
verify mfcc feature success
##Testing## epoch acc: 0.5633
epoch: 93 acc: 0.9971 avg loss: 0.0088
verify mfcc feature success
##Testing## epoch acc: 0.5633
epoch: 94 acc: 0.9955 avg loss: 0.0117
verify mfcc feature success
##Testing## epoch acc: 0.5633
epoch: 95 acc: 0.997 avg loss: 0.0083
verify mfcc feature success
##Testing## epoch acc: 0.5633
epoch: 96 acc: 0.9965 avg loss: 0.0088
verify mfcc feature success
##Testing## epoch acc: 0.5633
epoch: 97 acc: 0.9961 avg loss: 0.0100
verify mfcc feature success
##Testing## epoch acc: 0.5633
epoch: 98 acc: 0.997 avg loss: 0.0094
verify mfcc feature success
##Testing## epoch acc: 0.5645
epoch: 99 acc: 0.9966 avg loss: 0.0092
verify mfcc feature success
##Testing## epoch acc: 0.5645
```



```
In [6]: train(100)
# vgg11 fold9 spec
```

```
verify spec feature success
epoch: 0 acc: 0.2659 avg loss: 2.1320
verify spec feature success
##Testing## epoch acc: 0.4608
epoch: 1 acc: 0.5484 avg loss: 1.2457
verify spec feature success
##Testing## epoch acc: 0.5809
epoch: 2 acc: 0.6502 avg loss: 0.9847
verify spec feature success
##Testing## epoch acc: 0.6164
epoch: 3 acc: 0.7091 avg loss: 0.8340
verify spec feature success
##Testing## epoch acc: 0.6875
epoch: 4 acc: 0.7586 avg loss: 0.7070
verify spec feature success
##Testing## epoch acc: 0.7071
epoch: 5 acc: 0.7773 avg loss: 0.6532
verify spec feature success
##Testing## epoch acc: 0.7659
epoch: 6 acc: 0.8104 avg loss: 0.5691
verify spec feature success
##Testing## epoch acc: 0.6998
epoch: 7 acc: 0.8254 avg loss: 0.5229
verify spec feature success
##Testing## epoch acc: 0.7255
```

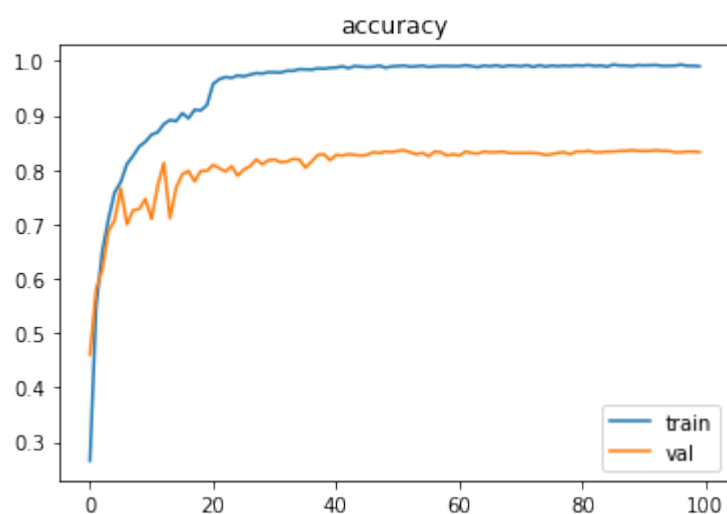
```
epoch: 8 acc: 0.8426 avg loss: 0.4610
verify spec feature success
##Testing## epoch acc: 0.7279
epoch: 9 acc: 0.8512 avg loss: 0.4442
verify spec feature success
##Testing## epoch acc: 0.7463
epoch: 10 acc: 0.8642 avg loss: 0.4208
verify spec feature success
##Testing## epoch acc: 0.7096
epoch: 11 acc: 0.8687 avg loss: 0.3959
verify spec feature success
##Testing## epoch acc: 0.7708
epoch: 12 acc: 0.8838 avg loss: 0.3539
verify spec feature success
##Testing## epoch acc: 0.8125
epoch: 13 acc: 0.8912 avg loss: 0.3189
verify spec feature success
##Testing## epoch acc: 0.7108
epoch: 14 acc: 0.8891 avg loss: 0.3339
verify spec feature success
##Testing## epoch acc: 0.7672
epoch: 15 acc: 0.9037 avg loss: 0.2919
verify spec feature success
##Testing## epoch acc: 0.7917
epoch: 16 acc: 0.8943 avg loss: 0.3180
verify spec feature success
##Testing## epoch acc: 0.7978
epoch: 17 acc: 0.9101 avg loss: 0.2673
verify spec feature success
##Testing## epoch acc: 0.7782
epoch: 18 acc: 0.9087 avg loss: 0.2821
verify spec feature success
##Testing## epoch acc: 0.7978
epoch: 19 acc: 0.9186 avg loss: 0.2546
verify spec feature success
##Testing## epoch acc: 0.7978
epoch: 20 acc: 0.9574 avg loss: 0.1313
verify spec feature success
##Testing## epoch acc: 0.8088
epoch: 21 acc: 0.966 avg loss: 0.1027
verify spec feature success
##Testing## epoch acc: 0.8027
epoch: 22 acc: 0.9701 avg loss: 0.0902
verify spec feature success
##Testing## epoch acc: 0.7966
epoch: 23 acc: 0.9685 avg loss: 0.0954
verify spec feature success
##Testing## epoch acc: 0.8064
epoch: 24 acc: 0.973 avg loss: 0.0785
verify spec feature success
##Testing## epoch acc: 0.7892
epoch: 25 acc: 0.9713 avg loss: 0.0819
verify spec feature success
##Testing## epoch acc: 0.8002
epoch: 26 acc: 0.9745 avg loss: 0.0767
verify spec feature success
##Testing## epoch acc: 0.8064
epoch: 27 acc: 0.9773 avg loss: 0.0673
verify spec feature success
##Testing## epoch acc: 0.8186
epoch: 28 acc: 0.9765 avg loss: 0.0715
```

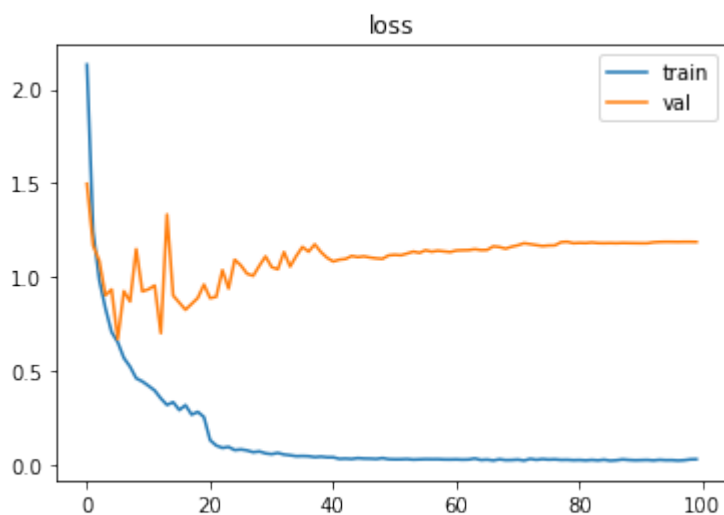
```
verify spec feature success
##Testing## epoch acc: 0.81
epoch: 29 acc: 0.979 avg loss: 0.0612
verify spec feature success
##Testing## epoch acc: 0.8174
epoch: 30 acc: 0.9787 avg loss: 0.0570
verify spec feature success
##Testing## epoch acc: 0.8186
epoch: 31 acc: 0.9784 avg loss: 0.0635
verify spec feature success
##Testing## epoch acc: 0.8137
epoch: 32 acc: 0.9816 avg loss: 0.0548
verify spec feature success
##Testing## epoch acc: 0.815
epoch: 33 acc: 0.9814 avg loss: 0.0510
verify spec feature success
##Testing## epoch acc: 0.8199
epoch: 34 acc: 0.9845 avg loss: 0.0460
verify spec feature success
##Testing## epoch acc: 0.8186
epoch: 35 acc: 0.9841 avg loss: 0.0469
verify spec feature success
##Testing## epoch acc: 0.8039
epoch: 36 acc: 0.9836 avg loss: 0.0458
verify spec feature success
##Testing## epoch acc: 0.815
epoch: 37 acc: 0.986 avg loss: 0.0410
verify spec feature success
##Testing## epoch acc: 0.8272
epoch: 38 acc: 0.9853 avg loss: 0.0436
verify spec feature success
##Testing## epoch acc: 0.8284
epoch: 39 acc: 0.9869 avg loss: 0.0402
verify spec feature success
##Testing## epoch acc: 0.8174
epoch: 40 acc: 0.9876 avg loss: 0.0401
verify spec feature success
##Testing## epoch acc: 0.8272
epoch: 41 acc: 0.9896 avg loss: 0.0317
verify spec feature success
##Testing## epoch acc: 0.826
epoch: 42 acc: 0.9864 avg loss: 0.0331
verify spec feature success
##Testing## epoch acc: 0.8284
epoch: 43 acc: 0.9903 avg loss: 0.0312
verify spec feature success
##Testing## epoch acc: 0.8272
epoch: 44 acc: 0.9891 avg loss: 0.0357
verify spec feature success
##Testing## epoch acc: 0.826
epoch: 45 acc: 0.9883 avg loss: 0.0334
verify spec feature success
##Testing## epoch acc: 0.8272
epoch: 46 acc: 0.989 avg loss: 0.0328
verify spec feature success
##Testing## epoch acc: 0.8321
epoch: 47 acc: 0.9909 avg loss: 0.0312
verify spec feature success
##Testing## epoch acc: 0.8309
epoch: 48 acc: 0.9872 avg loss: 0.0359
verify spec feature success
```

```
##Testing## epoch acc: 0.8333
epoch: 49 acc: 0.9895 avg loss: 0.0301
verify spec feature success
##Testing## epoch acc: 0.8321
epoch: 50 acc: 0.9903 avg loss: 0.0292
verify spec feature success
##Testing## epoch acc: 0.8346
epoch: 51 acc: 0.991 avg loss: 0.0295
verify spec feature success
##Testing## epoch acc: 0.8358
epoch: 52 acc: 0.9891 avg loss: 0.0308
verify spec feature success
##Testing## epoch acc: 0.8321
epoch: 53 acc: 0.9898 avg loss: 0.0278
verify spec feature success
##Testing## epoch acc: 0.8284
epoch: 54 acc: 0.991 avg loss: 0.0291
verify spec feature success
##Testing## epoch acc: 0.8309
epoch: 55 acc: 0.9886 avg loss: 0.0303
verify spec feature success
##Testing## epoch acc: 0.8248
epoch: 56 acc: 0.9896 avg loss: 0.0298
verify spec feature success
##Testing## epoch acc: 0.8333
epoch: 57 acc: 0.9904 avg loss: 0.0300
verify spec feature success
##Testing## epoch acc: 0.8321
epoch: 58 acc: 0.9903 avg loss: 0.0286
verify spec feature success
##Testing## epoch acc: 0.826
epoch: 59 acc: 0.9899 avg loss: 0.0283
verify spec feature success
##Testing## epoch acc: 0.8284
epoch: 60 acc: 0.99 avg loss: 0.0290
verify spec feature success
##Testing## epoch acc: 0.826
epoch: 61 acc: 0.9917 avg loss: 0.0275
verify spec feature success
##Testing## epoch acc: 0.8333
epoch: 62 acc: 0.99 avg loss: 0.0285
verify spec feature success
##Testing## epoch acc: 0.8309
epoch: 63 acc: 0.9883 avg loss: 0.0338
verify spec feature success
##Testing## epoch acc: 0.8297
epoch: 64 acc: 0.991 avg loss: 0.0257
verify spec feature success
##Testing## epoch acc: 0.8333
epoch: 65 acc: 0.9899 avg loss: 0.0279
verify spec feature success
##Testing## epoch acc: 0.8321
epoch: 66 acc: 0.9915 avg loss: 0.0232
verify spec feature success
##Testing## epoch acc: 0.8321
epoch: 67 acc: 0.9891 avg loss: 0.0297
verify spec feature success
##Testing## epoch acc: 0.8333
epoch: 68 acc: 0.9912 avg loss: 0.0251
verify spec feature success
##Testing## epoch acc: 0.8309
```

```
epoch: 69 acc: 0.9909 avg loss: 0.0257
verify spec feature success
##Testing## epoch acc: 0.8309
epoch: 70 acc: 0.9899 avg loss: 0.0279
verify spec feature success
##Testing## epoch acc: 0.8309
epoch: 71 acc: 0.9918 avg loss: 0.0228
verify spec feature success
##Testing## epoch acc: 0.8309
epoch: 72 acc: 0.9885 avg loss: 0.0319
verify spec feature success
##Testing## epoch acc: 0.8309
epoch: 73 acc: 0.9918 avg loss: 0.0269
verify spec feature success
##Testing## epoch acc: 0.8297
epoch: 74 acc: 0.9893 avg loss: 0.0307
verify spec feature success
##Testing## epoch acc: 0.8272
epoch: 75 acc: 0.9912 avg loss: 0.0279
verify spec feature success
##Testing## epoch acc: 0.8284
epoch: 76 acc: 0.99 avg loss: 0.0292
verify spec feature success
##Testing## epoch acc: 0.8309
epoch: 77 acc: 0.991 avg loss: 0.0262
verify spec feature success
##Testing## epoch acc: 0.8321
epoch: 78 acc: 0.9904 avg loss: 0.0269
verify spec feature success
##Testing## epoch acc: 0.8284
epoch: 79 acc: 0.9915 avg loss: 0.0247
verify spec feature success
##Testing## epoch acc: 0.8333
epoch: 80 acc: 0.9909 avg loss: 0.0257
verify spec feature success
##Testing## epoch acc: 0.8333
epoch: 81 acc: 0.9922 avg loss: 0.0235
verify spec feature success
##Testing## epoch acc: 0.8346
epoch: 82 acc: 0.9904 avg loss: 0.0261
verify spec feature success
##Testing## epoch acc: 0.8321
epoch: 83 acc: 0.9913 avg loss: 0.0236
verify spec feature success
##Testing## epoch acc: 0.8321
epoch: 84 acc: 0.9891 avg loss: 0.0272
verify spec feature success
##Testing## epoch acc: 0.8333
epoch: 85 acc: 0.9929 avg loss: 0.0220
verify spec feature success
##Testing## epoch acc: 0.8333
epoch: 86 acc: 0.9913 avg loss: 0.0243
verify spec feature success
##Testing## epoch acc: 0.8346
epoch: 87 acc: 0.9912 avg loss: 0.0288
verify spec feature success
##Testing## epoch acc: 0.8346
epoch: 88 acc: 0.99 avg loss: 0.0259
verify spec feature success
##Testing## epoch acc: 0.8358
epoch: 89 acc: 0.992 avg loss: 0.0242
```

```
verify spec feature success
##Testing## epoch acc: 0.8346
epoch: 90 acc: 0.9914 avg loss: 0.0250
verify spec feature success
##Testing## epoch acc: 0.8346
epoch: 91 acc: 0.9918 avg loss: 0.0260
verify spec feature success
##Testing## epoch acc: 0.8346
epoch: 92 acc: 0.992 avg loss: 0.0234
verify spec feature success
##Testing## epoch acc: 0.8358
epoch: 93 acc: 0.9905 avg loss: 0.0267
verify spec feature success
##Testing## epoch acc: 0.8346
epoch: 94 acc: 0.9907 avg loss: 0.0247
verify spec feature success
##Testing## epoch acc: 0.8346
epoch: 95 acc: 0.9909 avg loss: 0.0249
verify spec feature success
##Testing## epoch acc: 0.8321
epoch: 96 acc: 0.9929 avg loss: 0.0227
verify spec feature success
##Testing## epoch acc: 0.8321
epoch: 97 acc: 0.9905 avg loss: 0.0245
verify spec feature success
##Testing## epoch acc: 0.8333
epoch: 98 acc: 0.9907 avg loss: 0.0289
verify spec feature success
##Testing## epoch acc: 0.8333
epoch: 99 acc: 0.9898 avg loss: 0.0298
verify spec feature success
##Testing## epoch acc: 0.8321
```





```
In [6]: train(100)
# vgg11 fold9 mfcc

verify mfcc feature success
epoch: 0 acc: 0.1983 avg loss: 2.1533
verify mfcc feature success
##Testing## epoch acc: 0.19
epoch: 1 acc: 0.3585 avg loss: 1.8021
verify mfcc feature success
##Testing## epoch acc: 0.4252
epoch: 2 acc: 0.4953 avg loss: 1.4481
verify mfcc feature success
##Testing## epoch acc: 0.5061
epoch: 3 acc: 0.5995 avg loss: 1.1823
verify mfcc feature success
##Testing## epoch acc: 0.5564
epoch: 4 acc: 0.6782 avg loss: 0.9628
verify mfcc feature success
##Testing## epoch acc: 0.6054
epoch: 5 acc: 0.7294 avg loss: 0.8163
verify mfcc feature success
##Testing## epoch acc: 0.6042
epoch: 6 acc: 0.7665 avg loss: 0.6939
verify mfcc feature success
##Testing## epoch acc: 0.5968
epoch: 7 acc: 0.8034 avg loss: 0.5846
verify mfcc feature success
##Testing## epoch acc: 0.6054
epoch: 8 acc: 0.8351 avg loss: 0.4823
verify mfcc feature success
##Testing## epoch acc: 0.5784
epoch: 9 acc: 0.8579 avg loss: 0.4121
verify mfcc feature success
##Testing## epoch acc: 0.5515
epoch: 10 acc: 0.8759 avg loss: 0.3644
verify mfcc feature success
##Testing## epoch acc: 0.6127
epoch: 11 acc: 0.8943 avg loss: 0.3131
verify mfcc feature success
##Testing## epoch acc: 0.576
epoch: 12 acc: 0.8998 avg loss: 0.2878
verify mfcc feature success
##Testing## epoch acc: 0.5551
epoch: 13 acc: 0.9184 avg loss: 0.2496
```

```
verify mfcc feature success
##Testing## epoch acc: 0.6311
epoch: 14 acc: 0.9222 avg loss: 0.2206
verify mfcc feature success
##Testing## epoch acc: 0.6029
epoch: 15 acc: 0.9361 avg loss: 0.1980
verify mfcc feature success
##Testing## epoch acc: 0.5956
epoch: 16 acc: 0.9462 avg loss: 0.1594
verify mfcc feature success
##Testing## epoch acc: 0.5784
epoch: 17 acc: 0.941 avg loss: 0.1811
verify mfcc feature success
##Testing## epoch acc: 0.6017
epoch: 18 acc: 0.9531 avg loss: 0.1399
verify mfcc feature success
##Testing## epoch acc: 0.6103
epoch: 19 acc: 0.9505 avg loss: 0.1493
verify mfcc feature success
##Testing## epoch acc: 0.6029
epoch: 20 acc: 0.9766 avg loss: 0.0714
verify mfcc feature success
##Testing## epoch acc: 0.6262
epoch: 21 acc: 0.9833 avg loss: 0.0496
verify mfcc feature success
##Testing## epoch acc: 0.6066
epoch: 22 acc: 0.9876 avg loss: 0.0411
verify mfcc feature success
##Testing## epoch acc: 0.6127
epoch: 23 acc: 0.9899 avg loss: 0.0310
verify mfcc feature success
##Testing## epoch acc: 0.614
epoch: 24 acc: 0.9893 avg loss: 0.0298
verify mfcc feature success
##Testing## epoch acc: 0.6017
epoch: 25 acc: 0.9894 avg loss: 0.0297
verify mfcc feature success
##Testing## epoch acc: 0.5968
epoch: 26 acc: 0.9901 avg loss: 0.0267
verify mfcc feature success
##Testing## epoch acc: 0.598
epoch: 27 acc: 0.9919 avg loss: 0.0223
verify mfcc feature success
##Testing## epoch acc: 0.587
epoch: 28 acc: 0.9939 avg loss: 0.0191
verify mfcc feature success
##Testing## epoch acc: 0.6176
epoch: 29 acc: 0.9927 avg loss: 0.0199
verify mfcc feature success
##Testing## epoch acc: 0.6078
epoch: 30 acc: 0.9924 avg loss: 0.0254
verify mfcc feature success
##Testing## epoch acc: 0.5882
epoch: 31 acc: 0.9933 avg loss: 0.0201
verify mfcc feature success
##Testing## epoch acc: 0.6127
epoch: 32 acc: 0.9922 avg loss: 0.0203
verify mfcc feature success
##Testing## epoch acc: 0.6029
epoch: 33 acc: 0.9941 avg loss: 0.0181
verify mfcc feature success
```

```
##Testing## epoch acc: 0.614
epoch: 34 acc: 0.9942 avg loss: 0.0171
verify mfcc feature success
##Testing## epoch acc: 0.6005
epoch: 35 acc: 0.9942 avg loss: 0.0169
verify mfcc feature success
##Testing## epoch acc: 0.6189
epoch: 36 acc: 0.9942 avg loss: 0.0165
verify mfcc feature success
##Testing## epoch acc: 0.5956
epoch: 37 acc: 0.9937 avg loss: 0.0171
verify mfcc feature success
##Testing## epoch acc: 0.5956
epoch: 38 acc: 0.9939 avg loss: 0.0168
verify mfcc feature success
##Testing## epoch acc: 0.5993
epoch: 39 acc: 0.996 avg loss: 0.0112
verify mfcc feature success
##Testing## epoch acc: 0.6005
epoch: 40 acc: 0.9947 avg loss: 0.0133
verify mfcc feature success
##Testing## epoch acc: 0.598
epoch: 41 acc: 0.9965 avg loss: 0.0108
verify mfcc feature success
##Testing## epoch acc: 0.5993
epoch: 42 acc: 0.997 avg loss: 0.0091
verify mfcc feature success
##Testing## epoch acc: 0.598
epoch: 43 acc: 0.9963 avg loss: 0.0110
verify mfcc feature success
##Testing## epoch acc: 0.5968
epoch: 44 acc: 0.9973 avg loss: 0.0079
verify mfcc feature success
##Testing## epoch acc: 0.5956
epoch: 45 acc: 0.9967 avg loss: 0.0108
verify mfcc feature success
##Testing## epoch acc: 0.5956
epoch: 46 acc: 0.9963 avg loss: 0.0098
verify mfcc feature success
##Testing## epoch acc: 0.5931
epoch: 47 acc: 0.996 avg loss: 0.0107
verify mfcc feature success
##Testing## epoch acc: 0.5968
epoch: 48 acc: 0.9967 avg loss: 0.0103
verify mfcc feature success
##Testing## epoch acc: 0.5993
epoch: 49 acc: 0.9966 avg loss: 0.0104
verify mfcc feature success
##Testing## epoch acc: 0.5944
epoch: 50 acc: 0.9966 avg loss: 0.0107
verify mfcc feature success
##Testing## epoch acc: 0.598
epoch: 51 acc: 0.9973 avg loss: 0.0080
verify mfcc feature success
##Testing## epoch acc: 0.5944
epoch: 52 acc: 0.9958 avg loss: 0.0106
verify mfcc feature success
##Testing## epoch acc: 0.5993
epoch: 53 acc: 0.9976 avg loss: 0.0070
verify mfcc feature success
##Testing## epoch acc: 0.5919
```

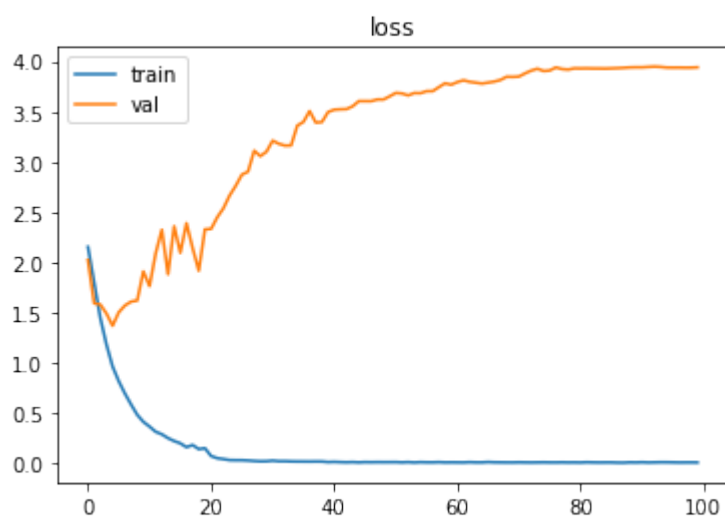
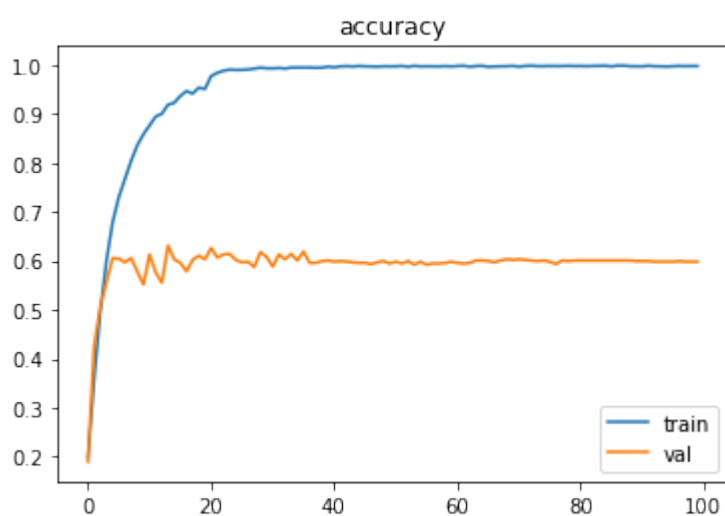
```
epoch: 54 acc: 0.9965 avg loss: 0.0102
verify mfcc feature success
##Testing## epoch acc: 0.598
epoch: 55 acc: 0.9967 avg loss: 0.0087
verify mfcc feature success
##Testing## epoch acc: 0.5919
epoch: 56 acc: 0.9966 avg loss: 0.0084
verify mfcc feature success
##Testing## epoch acc: 0.5944
epoch: 57 acc: 0.9963 avg loss: 0.0104
verify mfcc feature success
##Testing## epoch acc: 0.5944
epoch: 58 acc: 0.9971 avg loss: 0.0077
verify mfcc feature success
##Testing## epoch acc: 0.5956
epoch: 59 acc: 0.9963 avg loss: 0.0085
verify mfcc feature success
##Testing## epoch acc: 0.598
epoch: 60 acc: 0.9972 avg loss: 0.0079
verify mfcc feature success
##Testing## epoch acc: 0.5956
epoch: 61 acc: 0.9979 avg loss: 0.0073
verify mfcc feature success
##Testing## epoch acc: 0.5944
epoch: 62 acc: 0.9958 avg loss: 0.0103
verify mfcc feature success
##Testing## epoch acc: 0.5956
epoch: 63 acc: 0.9972 avg loss: 0.0080
verify mfcc feature success
##Testing## epoch acc: 0.6005
epoch: 64 acc: 0.9977 avg loss: 0.0080
verify mfcc feature success
##Testing## epoch acc: 0.6005
epoch: 65 acc: 0.9957 avg loss: 0.0114
verify mfcc feature success
##Testing## epoch acc: 0.5993
epoch: 66 acc: 0.9962 avg loss: 0.0088
verify mfcc feature success
##Testing## epoch acc: 0.5968
epoch: 67 acc: 0.9966 avg loss: 0.0082
verify mfcc feature success
##Testing## epoch acc: 0.6005
epoch: 68 acc: 0.997 avg loss: 0.0075
verify mfcc feature success
##Testing## epoch acc: 0.6029
epoch: 69 acc: 0.9975 avg loss: 0.0074
verify mfcc feature success
##Testing## epoch acc: 0.6017
epoch: 70 acc: 0.9961 avg loss: 0.0088
verify mfcc feature success
##Testing## epoch acc: 0.6029
epoch: 71 acc: 0.9973 avg loss: 0.0078
verify mfcc feature success
##Testing## epoch acc: 0.6017
epoch: 72 acc: 0.9979 avg loss: 0.0072
verify mfcc feature success
##Testing## epoch acc: 0.6005
epoch: 73 acc: 0.9971 avg loss: 0.0080
verify mfcc feature success
##Testing## epoch acc: 0.5993
epoch: 74 acc: 0.997 avg loss: 0.0087
```

```
verify mfcc feature success
##Testing## epoch acc: 0.6005
epoch: 75 acc: 0.9973 avg loss: 0.0077
verify mfcc feature success
##Testing## epoch acc: 0.598
epoch: 76 acc: 0.9972 avg loss: 0.0076
verify mfcc feature success
##Testing## epoch acc: 0.5931
epoch: 77 acc: 0.9972 avg loss: 0.0086
verify mfcc feature success
##Testing## epoch acc: 0.6005
epoch: 78 acc: 0.9976 avg loss: 0.0072
verify mfcc feature success
##Testing## epoch acc: 0.5993
epoch: 79 acc: 0.9972 avg loss: 0.0079
verify mfcc feature success
##Testing## epoch acc: 0.6005
epoch: 80 acc: 0.9973 avg loss: 0.0067
verify mfcc feature success
##Testing## epoch acc: 0.6005
epoch: 81 acc: 0.997 avg loss: 0.0094
verify mfcc feature success
##Testing## epoch acc: 0.6005
epoch: 82 acc: 0.9973 avg loss: 0.0080
verify mfcc feature success
##Testing## epoch acc: 0.6005
epoch: 83 acc: 0.9976 avg loss: 0.0071
verify mfcc feature success
##Testing## epoch acc: 0.6005
epoch: 84 acc: 0.998 avg loss: 0.0076
verify mfcc feature success
##Testing## epoch acc: 0.6005
epoch: 85 acc: 0.9966 avg loss: 0.0077
verify mfcc feature success
##Testing## epoch acc: 0.6005
epoch: 86 acc: 0.9981 avg loss: 0.0057
verify mfcc feature success
##Testing## epoch acc: 0.6005
epoch: 87 acc: 0.9981 avg loss: 0.0051
verify mfcc feature success
##Testing## epoch acc: 0.6005
epoch: 88 acc: 0.997 avg loss: 0.0085
verify mfcc feature success
##Testing## epoch acc: 0.6005
epoch: 89 acc: 0.9967 avg loss: 0.0074
verify mfcc feature success
##Testing## epoch acc: 0.5993
epoch: 90 acc: 0.9966 avg loss: 0.0096
verify mfcc feature success
##Testing## epoch acc: 0.5993
epoch: 91 acc: 0.9979 avg loss: 0.0069
verify mfcc feature success
##Testing## epoch acc: 0.5993
epoch: 92 acc: 0.9968 avg loss: 0.0083
verify mfcc feature success
##Testing## epoch acc: 0.598
epoch: 93 acc: 0.9966 avg loss: 0.0096
verify mfcc feature success
##Testing## epoch acc: 0.598
epoch: 94 acc: 0.9961 avg loss: 0.0093
verify mfcc feature success
```

```

##Testing## epoch acc: 0.598
epoch: 95 acc: 0.9968 avg loss: 0.0083
verify mfcc feature success
##Testing## epoch acc: 0.598
epoch: 96 acc: 0.9975 avg loss: 0.0071
verify mfcc feature success
##Testing## epoch acc: 0.5993
epoch: 97 acc: 0.997 avg loss: 0.0076
verify mfcc feature success
##Testing## epoch acc: 0.598
epoch: 98 acc: 0.9972 avg loss: 0.0078
verify mfcc feature success
##Testing## epoch acc: 0.598
epoch: 99 acc: 0.9972 avg loss: 0.0070
verify mfcc feature success
##Testing## epoch acc: 0.598

```



```

In [6]: train(100)
        # vgg11 fold10 spec

```

```

verify spec feature success
epoch: 0 acc: 0.2755 avg loss: 2.1900
verify spec feature success
##Testing## epoch acc: 0.4851
epoch: 1 acc: 0.5345 avg loss: 1.2973
verify spec feature success
##Testing## epoch acc: 0.5496
epoch: 2 acc: 0.6518 avg loss: 0.9924

```

```
verify spec feature success
##Testing## epoch acc: 0.6117
epoch: 3 acc: 0.7159 avg loss: 0.8102
verify spec feature success
##Testing## epoch acc: 0.7025
epoch: 4 acc: 0.7567 avg loss: 0.7074
verify spec feature success
##Testing## epoch acc: 0.6846
epoch: 5 acc: 0.79 avg loss: 0.6115
verify spec feature success
##Testing## epoch acc: 0.7395
epoch: 6 acc: 0.8032 avg loss: 0.5829
verify spec feature success
##Testing## epoch acc: 0.7324
epoch: 7 acc: 0.8322 avg loss: 0.5026
verify spec feature success
##Testing## epoch acc: 0.7503
epoch: 8 acc: 0.8471 avg loss: 0.4594
verify spec feature success
##Testing## epoch acc: 0.7718
epoch: 9 acc: 0.8641 avg loss: 0.4054
verify spec feature success
##Testing## epoch acc: 0.7204
epoch: 10 acc: 0.864 avg loss: 0.4093
verify spec feature success
##Testing## epoch acc: 0.7276
epoch: 11 acc: 0.8685 avg loss: 0.3996
verify spec feature success
##Testing## epoch acc: 0.7658
epoch: 12 acc: 0.8761 avg loss: 0.3735
verify spec feature success
##Testing## epoch acc: 0.7897
epoch: 13 acc: 0.8884 avg loss: 0.3283
verify spec feature success
##Testing## epoch acc: 0.7682
epoch: 14 acc: 0.888 avg loss: 0.3380
verify spec feature success
##Testing## epoch acc: 0.7527
epoch: 15 acc: 0.9028 avg loss: 0.2938
verify spec feature success
##Testing## epoch acc: 0.7826
epoch: 16 acc: 0.9022 avg loss: 0.2892
verify spec feature success
##Testing## epoch acc: 0.7611
epoch: 17 acc: 0.9056 avg loss: 0.2822
verify spec feature success
##Testing## epoch acc: 0.7312
epoch: 18 acc: 0.9066 avg loss: 0.2867
verify spec feature success
##Testing## epoch acc: 0.7611
epoch: 19 acc: 0.9101 avg loss: 0.2831
verify spec feature success
##Testing## epoch acc: 0.7479
epoch: 20 acc: 0.9427 avg loss: 0.1698
verify spec feature success
##Testing## epoch acc: 0.7838
epoch: 21 acc: 0.9611 avg loss: 0.1157
verify spec feature success
##Testing## epoch acc: 0.7861
epoch: 22 acc: 0.9649 avg loss: 0.1069
verify spec feature success
```

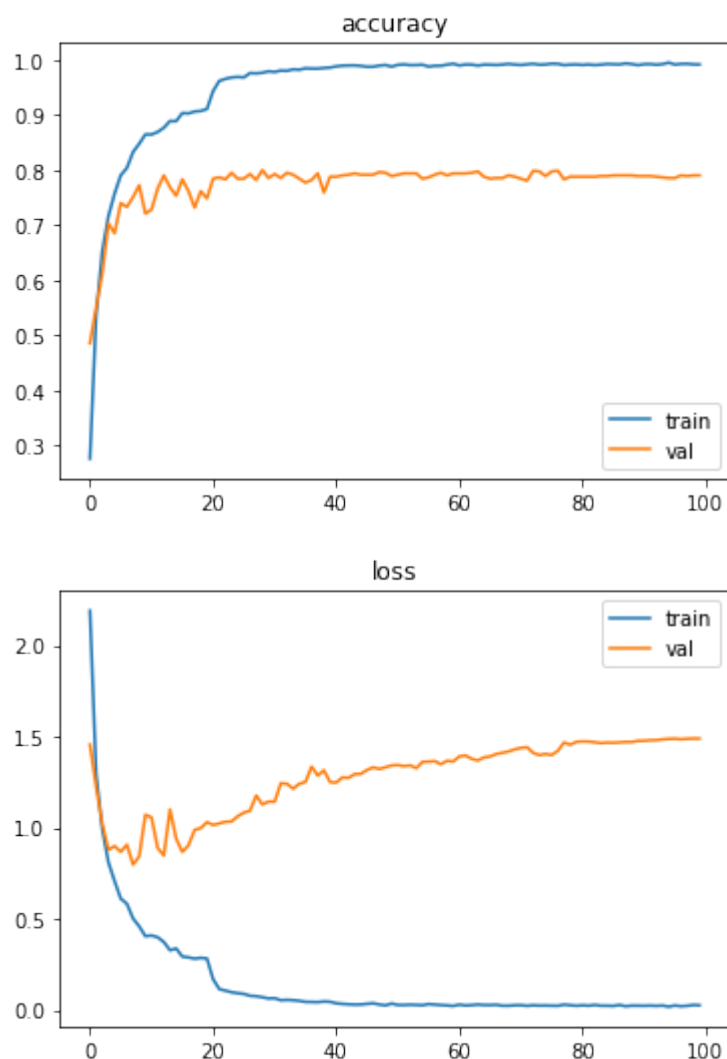
```
##Testing## epoch acc: 0.7826
epoch: 23 acc: 0.9674 avg loss: 0.0982
verify spec feature success
##Testing## epoch acc: 0.7945
epoch: 24 acc: 0.9685 avg loss: 0.0929
verify spec feature success
##Testing## epoch acc: 0.7838
epoch: 25 acc: 0.9676 avg loss: 0.0892
verify spec feature success
##Testing## epoch acc: 0.7838
epoch: 26 acc: 0.9754 avg loss: 0.0787
verify spec feature success
##Testing## epoch acc: 0.7921
epoch: 27 acc: 0.9749 avg loss: 0.0764
verify spec feature success
##Testing## epoch acc: 0.7814
epoch: 28 acc: 0.9759 avg loss: 0.0708
verify spec feature success
##Testing## epoch acc: 0.7993
epoch: 29 acc: 0.9786 avg loss: 0.0640
verify spec feature success
##Testing## epoch acc: 0.7849
epoch: 30 acc: 0.9775 avg loss: 0.0653
verify spec feature success
##Testing## epoch acc: 0.7921
epoch: 31 acc: 0.98 avg loss: 0.0544
verify spec feature success
##Testing## epoch acc: 0.7849
epoch: 32 acc: 0.9795 avg loss: 0.0562
verify spec feature success
##Testing## epoch acc: 0.7945
epoch: 33 acc: 0.9821 avg loss: 0.0544
verify spec feature success
##Testing## epoch acc: 0.7909
epoch: 34 acc: 0.9815 avg loss: 0.0511
verify spec feature success
##Testing## epoch acc: 0.7838
epoch: 35 acc: 0.984 avg loss: 0.0455
verify spec feature success
##Testing## epoch acc: 0.7766
epoch: 36 acc: 0.9835 avg loss: 0.0450
verify spec feature success
##Testing## epoch acc: 0.7814
epoch: 37 acc: 0.9835 avg loss: 0.0439
verify spec feature success
##Testing## epoch acc: 0.7933
epoch: 38 acc: 0.9847 avg loss: 0.0476
verify spec feature success
##Testing## epoch acc: 0.7587
epoch: 39 acc: 0.9854 avg loss: 0.0459
verify spec feature success
##Testing## epoch acc: 0.7873
epoch: 40 acc: 0.9876 avg loss: 0.0377
verify spec feature success
##Testing## epoch acc: 0.7873
epoch: 41 acc: 0.9889 avg loss: 0.0344
verify spec feature success
##Testing## epoch acc: 0.7897
epoch: 42 acc: 0.9892 avg loss: 0.0322
verify spec feature success
##Testing## epoch acc: 0.7909
```



```
epoch: 43 acc: 0.9894 avg loss: 0.0304
verify spec feature success
##Testing## epoch acc: 0.7933
epoch: 44 acc: 0.9885 avg loss: 0.0312
verify spec feature success
##Testing## epoch acc: 0.7909
epoch: 45 acc: 0.9868 avg loss: 0.0345
verify spec feature success
##Testing## epoch acc: 0.7909
epoch: 46 acc: 0.987 avg loss: 0.0375
verify spec feature success
##Testing## epoch acc: 0.7909
epoch: 47 acc: 0.989 avg loss: 0.0309
verify spec feature success
##Testing## epoch acc: 0.7957
epoch: 48 acc: 0.99 avg loss: 0.0262
verify spec feature success
##Testing## epoch acc: 0.7945
epoch: 49 acc: 0.9871 avg loss: 0.0362
verify spec feature success
##Testing## epoch acc: 0.7885
epoch: 50 acc: 0.9904 avg loss: 0.0285
verify spec feature success
##Testing## epoch acc: 0.7909
epoch: 51 acc: 0.9911 avg loss: 0.0282
verify spec feature success
##Testing## epoch acc: 0.7933
epoch: 52 acc: 0.9899 avg loss: 0.0300
verify spec feature success
##Testing## epoch acc: 0.7933
epoch: 53 acc: 0.99 avg loss: 0.0286
verify spec feature success
##Testing## epoch acc: 0.7933
epoch: 54 acc: 0.9906 avg loss: 0.0271
verify spec feature success
##Testing## epoch acc: 0.7838
epoch: 55 acc: 0.9872 avg loss: 0.0333
verify spec feature success
##Testing## epoch acc: 0.7861
epoch: 56 acc: 0.9886 avg loss: 0.0304
verify spec feature success
##Testing## epoch acc: 0.7909
epoch: 57 acc: 0.9887 avg loss: 0.0280
verify spec feature success
##Testing## epoch acc: 0.7945
epoch: 58 acc: 0.9908 avg loss: 0.0261
verify spec feature success
##Testing## epoch acc: 0.7897
epoch: 59 acc: 0.9924 avg loss: 0.0230
verify spec feature success
##Testing## epoch acc: 0.7933
epoch: 60 acc: 0.9892 avg loss: 0.0302
verify spec feature success
##Testing## epoch acc: 0.7933
epoch: 61 acc: 0.991 avg loss: 0.0256
verify spec feature success
##Testing## epoch acc: 0.7933
epoch: 62 acc: 0.9908 avg loss: 0.0276
verify spec feature success
##Testing## epoch acc: 0.7945
epoch: 63 acc: 0.9891 avg loss: 0.0307
```

```
verify spec feature success
##Testing## epoch acc: 0.7969
epoch: 64 acc: 0.9908 avg loss: 0.0282
verify spec feature success
##Testing## epoch acc: 0.7873
epoch: 65 acc: 0.9906 avg loss: 0.0280
verify spec feature success
##Testing## epoch acc: 0.7838
epoch: 66 acc: 0.9901 avg loss: 0.0293
verify spec feature success
##Testing## epoch acc: 0.7849
epoch: 67 acc: 0.9909 avg loss: 0.0242
verify spec feature success
##Testing## epoch acc: 0.7849
epoch: 68 acc: 0.992 avg loss: 0.0243
verify spec feature success
##Testing## epoch acc: 0.7897
epoch: 69 acc: 0.9909 avg loss: 0.0269
verify spec feature success
##Testing## epoch acc: 0.7873
epoch: 70 acc: 0.9901 avg loss: 0.0274
verify spec feature success
##Testing## epoch acc: 0.7838
epoch: 71 acc: 0.9913 avg loss: 0.0237
verify spec feature success
##Testing## epoch acc: 0.7802
epoch: 72 acc: 0.9923 avg loss: 0.0269
verify spec feature success
##Testing## epoch acc: 0.7981
epoch: 73 acc: 0.9906 avg loss: 0.0251
verify spec feature success
##Testing## epoch acc: 0.7969
epoch: 74 acc: 0.991 avg loss: 0.0256
verify spec feature success
##Testing## epoch acc: 0.7885
epoch: 75 acc: 0.9925 avg loss: 0.0245
verify spec feature success
##Testing## epoch acc: 0.7969
epoch: 76 acc: 0.9921 avg loss: 0.0238
verify spec feature success
##Testing## epoch acc: 0.7981
epoch: 77 acc: 0.9899 avg loss: 0.0303
verify spec feature success
##Testing## epoch acc: 0.7826
epoch: 78 acc: 0.9908 avg loss: 0.0269
verify spec feature success
##Testing## epoch acc: 0.7873
epoch: 79 acc: 0.991 avg loss: 0.0242
verify spec feature success
##Testing## epoch acc: 0.7873
epoch: 80 acc: 0.9902 avg loss: 0.0267
verify spec feature success
##Testing## epoch acc: 0.7873
epoch: 81 acc: 0.991 avg loss: 0.0246
verify spec feature success
##Testing## epoch acc: 0.7873
epoch: 82 acc: 0.99 avg loss: 0.0286
verify spec feature success
##Testing## epoch acc: 0.7873
epoch: 83 acc: 0.9908 avg loss: 0.0244
verify spec feature success
```

```
##Testing## epoch acc: 0.7885
epoch: 84 acc: 0.9919 avg loss: 0.0244
verify spec feature success
##Testing## epoch acc: 0.7885
epoch: 85 acc: 0.9915 avg loss: 0.0230
verify spec feature success
##Testing## epoch acc: 0.7897
epoch: 86 acc: 0.9911 avg loss: 0.0286
verify spec feature success
##Testing## epoch acc: 0.7897
epoch: 87 acc: 0.993 avg loss: 0.0215
verify spec feature success
##Testing## epoch acc: 0.7897
epoch: 88 acc: 0.9918 avg loss: 0.0248
verify spec feature success
##Testing## epoch acc: 0.7897
epoch: 89 acc: 0.9899 avg loss: 0.0246
verify spec feature success
##Testing## epoch acc: 0.7885
epoch: 90 acc: 0.9915 avg loss: 0.0239
verify spec feature success
##Testing## epoch acc: 0.7885
epoch: 91 acc: 0.9918 avg loss: 0.0251
verify spec feature success
##Testing## epoch acc: 0.7885
epoch: 92 acc: 0.9906 avg loss: 0.0234
verify spec feature success
##Testing## epoch acc: 0.7873
epoch: 93 acc: 0.9916 avg loss: 0.0254
verify spec feature success
##Testing## epoch acc: 0.7861
epoch: 94 acc: 0.9944 avg loss: 0.0190
verify spec feature success
##Testing## epoch acc: 0.7849
epoch: 95 acc: 0.9909 avg loss: 0.0258
verify spec feature success
##Testing## epoch acc: 0.7849
epoch: 96 acc: 0.992 avg loss: 0.0216
verify spec feature success
##Testing## epoch acc: 0.7897
epoch: 97 acc: 0.9923 avg loss: 0.0238
verify spec feature success
##Testing## epoch acc: 0.7885
epoch: 98 acc: 0.9913 avg loss: 0.0282
verify spec feature success
##Testing## epoch acc: 0.7897
epoch: 99 acc: 0.991 avg loss: 0.0267
verify spec feature success
##Testing## epoch acc: 0.7897
```



```
In [6]: train(100)
# vgg11 fold10 mfcc lr=1e-4

verify mfcc feature success
epoch: 0 acc: 0.194 avg loss: 2.1616
verify mfcc feature success
##Testing## epoch acc: 0.2545
epoch: 1 acc: 0.3249 avg loss: 1.8696
verify mfcc feature success
##Testing## epoch acc: 0.3835
epoch: 2 acc: 0.444 avg loss: 1.5797
verify mfcc feature success
##Testing## epoch acc: 0.4886
epoch: 3 acc: 0.5569 avg loss: 1.3069
verify mfcc feature success
##Testing## epoch acc: 0.4851
epoch: 4 acc: 0.627 avg loss: 1.1016
verify mfcc feature success
##Testing## epoch acc: 0.5233
epoch: 5 acc: 0.6845 avg loss: 0.9344
verify mfcc feature success
##Testing## epoch acc: 0.5018
epoch: 6 acc: 0.7398 avg loss: 0.7682
verify mfcc feature success
##Testing## epoch acc: 0.5579
epoch: 7 acc: 0.7794 avg loss: 0.6540
verify mfcc feature success
##Testing## epoch acc: 0.5484
```

```
epoch: 8 acc: 0.8161 avg loss: 0.5341
verify mfcc feature success
##Testing## epoch acc: 0.5114
epoch: 9 acc: 0.8336 avg loss: 0.4871
verify mfcc feature success
##Testing## epoch acc: 0.5245
epoch: 10 acc: 0.8621 avg loss: 0.4005
verify mfcc feature success
##Testing## epoch acc: 0.5257
epoch: 11 acc: 0.8759 avg loss: 0.3698
verify mfcc feature success
##Testing## epoch acc: 0.5508
epoch: 12 acc: 0.8953 avg loss: 0.3092
verify mfcc feature success
##Testing## epoch acc: 0.6165
epoch: 13 acc: 0.8993 avg loss: 0.2955
verify mfcc feature success
##Testing## epoch acc: 0.5759
epoch: 14 acc: 0.9156 avg loss: 0.2589
verify mfcc feature success
##Testing## epoch acc: 0.6105
epoch: 15 acc: 0.923 avg loss: 0.2390
verify mfcc feature success
##Testing## epoch acc: 0.6105
epoch: 16 acc: 0.9351 avg loss: 0.1934
verify mfcc feature success
##Testing## epoch acc: 0.6225
epoch: 17 acc: 0.9324 avg loss: 0.1956
verify mfcc feature success
##Testing## epoch acc: 0.5806
epoch: 18 acc: 0.9445 avg loss: 0.1631
verify mfcc feature success
##Testing## epoch acc: 0.546
epoch: 19 acc: 0.9479 avg loss: 0.1644
verify mfcc feature success
##Testing## epoch acc: 0.5711
epoch: 20 acc: 0.9723 avg loss: 0.0907
verify mfcc feature success
##Testing## epoch acc: 0.6045
epoch: 21 acc: 0.9788 avg loss: 0.0603
verify mfcc feature success
##Testing## epoch acc: 0.6081
epoch: 22 acc: 0.9839 avg loss: 0.0524
verify mfcc feature success
##Testing## epoch acc: 0.6201
epoch: 23 acc: 0.9848 avg loss: 0.0471
verify mfcc feature success
##Testing## epoch acc: 0.6057
epoch: 24 acc: 0.9842 avg loss: 0.0458
verify mfcc feature success
##Testing## epoch acc: 0.595
epoch: 25 acc: 0.9878 avg loss: 0.0362
verify mfcc feature success
##Testing## epoch acc: 0.595
epoch: 26 acc: 0.9891 avg loss: 0.0302
verify mfcc feature success
##Testing## epoch acc: 0.6045
epoch: 27 acc: 0.9889 avg loss: 0.0293
verify mfcc feature success
##Testing## epoch acc: 0.6045
epoch: 28 acc: 0.9894 avg loss: 0.0351
```

```
verify mfcc feature success
##Testing## epoch acc: 0.6272
epoch: 29 acc: 0.9908 avg loss: 0.0289
verify mfcc feature success
##Testing## epoch acc: 0.6153
epoch: 30 acc: 0.9906 avg loss: 0.0268
verify mfcc feature success
##Testing## epoch acc: 0.6081
epoch: 31 acc: 0.9914 avg loss: 0.0257
verify mfcc feature success
##Testing## epoch acc: 0.6117
epoch: 32 acc: 0.99 avg loss: 0.0269
verify mfcc feature success
##Testing## epoch acc: 0.6165
epoch: 33 acc: 0.9924 avg loss: 0.0222
verify mfcc feature success
##Testing## epoch acc: 0.6189
epoch: 34 acc: 0.9916 avg loss: 0.0216
verify mfcc feature success
##Testing## epoch acc: 0.6249
epoch: 35 acc: 0.9923 avg loss: 0.0198
verify mfcc feature success
##Testing## epoch acc: 0.6237
epoch: 36 acc: 0.9916 avg loss: 0.0243
verify mfcc feature success
##Testing## epoch acc: 0.6344
epoch: 37 acc: 0.9918 avg loss: 0.0199
verify mfcc feature success
##Testing## epoch acc: 0.6189
epoch: 38 acc: 0.9906 avg loss: 0.0256
verify mfcc feature success
##Testing## epoch acc: 0.6452
epoch: 39 acc: 0.9932 avg loss: 0.0190
verify mfcc feature success
##Testing## epoch acc: 0.6308
epoch: 40 acc: 0.9934 avg loss: 0.0204
verify mfcc feature success
##Testing## epoch acc: 0.6332
epoch: 41 acc: 0.9935 avg loss: 0.0188
verify mfcc feature success
##Testing## epoch acc: 0.638
epoch: 42 acc: 0.994 avg loss: 0.0151
verify mfcc feature success
##Testing## epoch acc: 0.6308
epoch: 43 acc: 0.9938 avg loss: 0.0153
verify mfcc feature success
##Testing## epoch acc: 0.6249
epoch: 44 acc: 0.9951 avg loss: 0.0141
verify mfcc feature success
##Testing## epoch acc: 0.626
epoch: 45 acc: 0.9961 avg loss: 0.0135
verify mfcc feature success
##Testing## epoch acc: 0.6272
epoch: 46 acc: 0.9956 avg loss: 0.0122
verify mfcc feature success
##Testing## epoch acc: 0.6284
epoch: 47 acc: 0.9949 avg loss: 0.0165
verify mfcc feature success
##Testing## epoch acc: 0.6272
epoch: 48 acc: 0.9958 avg loss: 0.0134
verify mfcc feature success
```

```
##Testing## epoch acc: 0.6296
epoch: 49 acc: 0.9953 avg loss: 0.0150
verify mfcc feature success
##Testing## epoch acc: 0.6296
epoch: 50 acc: 0.9954 avg loss: 0.0118
verify mfcc feature success
##Testing## epoch acc: 0.6344
epoch: 51 acc: 0.9951 avg loss: 0.0134
verify mfcc feature success
##Testing## epoch acc: 0.6332
epoch: 52 acc: 0.9961 avg loss: 0.0118
verify mfcc feature success
##Testing## epoch acc: 0.632
epoch: 53 acc: 0.9958 avg loss: 0.0118
verify mfcc feature success
##Testing## epoch acc: 0.6368
epoch: 54 acc: 0.9965 avg loss: 0.0101
verify mfcc feature success
##Testing## epoch acc: 0.632
epoch: 55 acc: 0.9948 avg loss: 0.0125
verify mfcc feature success
##Testing## epoch acc: 0.6284
epoch: 56 acc: 0.9959 avg loss: 0.0111
verify mfcc feature success
##Testing## epoch acc: 0.6308
epoch: 57 acc: 0.9972 avg loss: 0.0100
verify mfcc feature success
##Testing## epoch acc: 0.626
epoch: 58 acc: 0.9953 avg loss: 0.0130
verify mfcc feature success
##Testing## epoch acc: 0.6308
epoch: 59 acc: 0.9966 avg loss: 0.0108
verify mfcc feature success
##Testing## epoch acc: 0.6356
epoch: 60 acc: 0.9957 avg loss: 0.0117
verify mfcc feature success
##Testing## epoch acc: 0.632
epoch: 61 acc: 0.9962 avg loss: 0.0109
verify mfcc feature success
##Testing## epoch acc: 0.6356
epoch: 62 acc: 0.9962 avg loss: 0.0108
verify mfcc feature success
##Testing## epoch acc: 0.632
epoch: 63 acc: 0.9962 avg loss: 0.0119
verify mfcc feature success
##Testing## epoch acc: 0.6356
epoch: 64 acc: 0.9952 avg loss: 0.0136
verify mfcc feature success
##Testing## epoch acc: 0.6344
epoch: 65 acc: 0.9959 avg loss: 0.0108
verify mfcc feature success
##Testing## epoch acc: 0.6296
epoch: 66 acc: 0.9953 avg loss: 0.0127
verify mfcc feature success
##Testing## epoch acc: 0.6272
epoch: 67 acc: 0.9947 avg loss: 0.0135
verify mfcc feature success
##Testing## epoch acc: 0.6308
epoch: 68 acc: 0.9965 avg loss: 0.0106
verify mfcc feature success
##Testing## epoch acc: 0.6272
```

```
epoch: 69 acc: 0.9958 avg loss: 0.0109
verify mfcc feature success
##Testing## epoch acc: 0.6308
epoch: 70 acc: 0.9966 avg loss: 0.0114
verify mfcc feature success
##Testing## epoch acc: 0.6368
epoch: 71 acc: 0.9962 avg loss: 0.0112
verify mfcc feature success
##Testing## epoch acc: 0.6272
epoch: 72 acc: 0.9958 avg loss: 0.0125
verify mfcc feature success
##Testing## epoch acc: 0.6296
epoch: 73 acc: 0.9951 avg loss: 0.0136
verify mfcc feature success
##Testing## epoch acc: 0.6284
epoch: 74 acc: 0.9967 avg loss: 0.0096
verify mfcc feature success
##Testing## epoch acc: 0.6272
epoch: 75 acc: 0.9957 avg loss: 0.0105
verify mfcc feature success
##Testing## epoch acc: 0.6308
epoch: 76 acc: 0.9959 avg loss: 0.0111
verify mfcc feature success
##Testing## epoch acc: 0.6296
epoch: 77 acc: 0.9956 avg loss: 0.0121
verify mfcc feature success
##Testing## epoch acc: 0.626
epoch: 78 acc: 0.9951 avg loss: 0.0130
verify mfcc feature success
##Testing## epoch acc: 0.6284
epoch: 79 acc: 0.9967 avg loss: 0.0104
verify mfcc feature success
##Testing## epoch acc: 0.6284
epoch: 80 acc: 0.9951 avg loss: 0.0118
verify mfcc feature success
##Testing## epoch acc: 0.6284
epoch: 81 acc: 0.9962 avg loss: 0.0091
verify mfcc feature success
##Testing## epoch acc: 0.6296
epoch: 82 acc: 0.9954 avg loss: 0.0117
verify mfcc feature success
##Testing## epoch acc: 0.6296
epoch: 83 acc: 0.9973 avg loss: 0.0082
verify mfcc feature success
##Testing## epoch acc: 0.6284
epoch: 84 acc: 0.9953 avg loss: 0.0109
verify mfcc feature success
##Testing## epoch acc: 0.6284
epoch: 85 acc: 0.9966 avg loss: 0.0094
verify mfcc feature success
##Testing## epoch acc: 0.6284
epoch: 86 acc: 0.9968 avg loss: 0.0092
verify mfcc feature success
##Testing## epoch acc: 0.6272
epoch: 87 acc: 0.9968 avg loss: 0.0090
verify mfcc feature success
##Testing## epoch acc: 0.6272
epoch: 88 acc: 0.9952 avg loss: 0.0120
verify mfcc feature success
##Testing## epoch acc: 0.6272
epoch: 89 acc: 0.9961 avg loss: 0.0104
```



```
verify mfcc feature success
##Testing## epoch acc: 0.6272
epoch: 90 acc: 0.9967 avg loss: 0.0096
verify mfcc feature success
##Testing## epoch acc: 0.6272
epoch: 91 acc: 0.9968 avg loss: 0.0094
verify mfcc feature success
##Testing## epoch acc: 0.6272
epoch: 92 acc: 0.9953 avg loss: 0.0138
verify mfcc feature success
##Testing## epoch acc: 0.6272
epoch: 93 acc: 0.9965 avg loss: 0.0102
verify mfcc feature success
##Testing## epoch acc: 0.6272
epoch: 94 acc: 0.9962 avg loss: 0.0098
verify mfcc feature success
##Testing## epoch acc: 0.6272
epoch: 95 acc: 0.9953 avg loss: 0.0109
verify mfcc feature success
##Testing## epoch acc: 0.6284
epoch: 96 acc: 0.9966 avg loss: 0.0099
verify mfcc feature success
##Testing## epoch acc: 0.6284
epoch: 97 acc: 0.9959 avg loss: 0.0098
verify mfcc feature success
##Testing## epoch acc: 0.6272
epoch: 98 acc: 0.9958 avg loss: 0.0120
verify mfcc feature success
##Testing## epoch acc: 0.6284
epoch: 99 acc: 0.9959 avg loss: 0.0108
verify mfcc feature success
##Testing## epoch acc: 0.6284
```

