LSTM_10_FOLD_CROSS_VALIDATION_UNIQUE_DATASET

December 12, 2018

In [0]:
```
# LSTM 10 FOLD CROSS VALIDATION ON UNIQUE DATASET (based on model 'lstm_with_unique_8'
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# Courtesy: https://github.com/mchablani/deep-learning/blob/master/sentiment-rnn/Senti
```

In [0]:
```
import numpy as np
import tensorflow as tf
from timeit import default_timer as timer
from collections import Counter
from string import punctuation
from google.colab import files
```

In [0]:
```
lstm_size = 128
lstm_layers = 5
k = 10
batch_size = 5
learning_rate = 0.0001
epochs = 3
```

In [4]:
```
fileName = "lstm_10_fold_cross_validation_12"
checkpointName = "checkpoints/"+fileName+".ckpt"
print(checkpointName)
print(type(checkpointName))
```

```
checkpoints/lstm_10_fold_cross_validation_12.ckpt
<class 'str'>
```

In [5]:
```
files.upload()
files.upload()

with open('data_all_unique_dnd_stratified_text.txt', 'r', encoding="utf8") as f:
    tweets = f.read()
with open('data_all_unique_dnd_stratified_labels.txt', 'r', encoding="utf8") as f:
    labels_org = f.read()

print('File upload done!')
```

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


Saving data_all_unique_dnd_stratified_text.txt to data_all_unique_dnd_stratified_text.txt


<IPython.core.display.HTML object>


Saving data_all_unique_dnd_stratified_labels.txt to data_all_unique_dnd_stratified_labels.txt
File upload done!
```

```
In [0]: # Data preprocessing::
        #all_text = ''.join([c for c in tweets if c not in punctuation])
        all_text = ''.join([c for c in tweets])
        tweets = all_text.split('\n')

        all_text = ' '.join(tweets)
        words = all_text.split()
```

```
In [0]: counts = Counter(words)
        vocab = sorted(counts, key=counts.get, reverse=True)
        vocab_to_int = {word: ii for ii, word in enumerate(vocab, 1)}

        tweets_ints = []
        for each in tweets:
            tweets_ints.append([vocab_to_int[word] for word in each.split()])
```

```
In [8]: # Encoding the labels::
        list_labels = []

        for l in labels_org.split():
            if l == "depressive":
                list_labels.append(1)
            else:
                list_labels.append(0)

        labels = np.array(list_labels)
        print(len(labels))
```

```
1176
```

```
In [9]: tweets_lens = Counter([len(x) for x in tweets_ints])
        print("Zero-length tweets: {}".format(tweets_lens[0]))
        print("Maximum tweets length: {}".format(max(tweets_lens)))
```

```
Zero-length tweets: 1
Maximum tweets length: 63
```

```
In [0]: # Filter out that tweets with 0 length
        tweets_ints = [r[0:200] for r in tweets_ints if len(r) > 0]

In [11]: from collections import Counter
         tweets_lens = Counter([len(x) for x in tweets_ints])
         print("Zero-length tweets: {}".format(tweets_lens[0]))
         print("Maximum tweet length: {}".format(max(tweets_lens)))

Zero-length tweets: 0
Maximum tweet length: 63


In [0]: seq_len = 200
        features = np.zeros((len(tweets_ints), seq_len), dtype=int)
        # print(features[:10,:100])
        for i, row in enumerate(tweets_ints):
            features[i, -len(row):] = np.array(row)[:seq_len]
        #features[:10,:100]

In [13]: #split_frac = 0.8

         #split_index = int(split_frac * len(features))

         #training_validation_x, test_x = features[:split_index], features[split_index:]
         #training_validation_y, test_y = labels[:split_index], labels[split_index:]

         training_validation_x = features
         training_validation_y = labels

         split_train_val = int(len(features)/k)
         #split_index = int(split_frac * len(val_x))

         #val_x, test_x = val_x[:split_index], val_x[split_index:]
         #val_y, test_y = val_y[:split_index], val_y[split_index:]

         print("\t\t\tFeature Shapes:")
         print("Train & Validation data set: {}".format(training_validation_x.shape))
         print("Train & Validation label set: {}".format(training_validation_y.shape))

         ############
         '''
         dataset_split_index = int(len(final_dataset)*0.1)

         training_validation_dataset = final_dataset[dataset_split_index:]
         testing_dataset = final_dataset[:dataset_split_index]

         training_validation_labelset = final_labelset[dataset_split_index:]
         testing_labelset = final_labelset[:dataset_split_index]
```

```
        print(dataset_split_index)

        print('len(training_validation_dataset) =',len(training_validation_dataset))
        print('len(training_validation_labelset) =',len(training_validation_labelset))

        print('len(testing_dataset) =',len(testing_dataset))
        print('len(testing_labelset)',len(testing_labelset))
        '''
```

```
                      Feature Shapes:
Train & Validation data set: (1176, 200)
Train & Validation label set: (1176,)
```

```
Out[13]: "\ndataset_split_index = int(len(final_dataset)*0.1)\n\ntraining_validation_dataset =
```

```
In [0]: n_words = len(vocab_to_int) + 1 # Add 1 for 0 added to vocab

        # Create the graph object
        tf.reset_default_graph()
        with tf.name_scope('inputs'):
            inputs_ = tf.placeholder(tf.int32, [None, None], name="inputs")
            labels_ = tf.placeholder(tf.int32, [None, None], name="labels")
            keep_prob = tf.placeholder(tf.float32, name="keep_prob")
```

```
In [0]: # Size of the embedding vectors (number of units in the embedding layer)
        embed_size = 300

        with tf.name_scope("Embeddings"):
            embedding = tf.Variable(tf.random_uniform((n_words, embed_size), -1, 1))
            embed = tf.nn.embedding_lookup(embedding, inputs_)
```

```
In [16]: def lstm_cell():
             # Your basic LSTM cell
             lstm = tf.contrib.rnn.BasicLSTMCell(lstm_size, reuse=tf.get_variable_scope().reuse
             # Add dropout to the cell
             return tf.contrib.rnn.DropoutWrapper(lstm, output_keep_prob=keep_prob)

         with tf.name_scope("RNN_layers"):
             # Stack up multiple LSTM layers, for deep learning
             cell = tf.contrib.rnn.MultiRNNCell([lstm_cell() for _ in range(lstm_layers)])

             # Getting an initial state of all zeros
             initial_state = cell.zero_state(batch_size, tf.float32)
```

```
WARNING:tensorflow:From <ipython-input-16-678741cf60df>:3: BasicLSTMCell.__init__ (from tensor
Instructions for updating:
This class is deprecated, please use tf.nn.rnn_cell.LSTMCell, which supports all the feature t
```

```
In [0]: with tf.name_scope("RNN_forward"):
            outputs, final_state = tf.nn.dynamic_rnn(cell, embed, initial_state=initial_state)

In [0]: # Output::

        with tf.name_scope('predictions'):
            predictions = tf.contrib.layers.fully_connected(outputs[:, -1], 1, activation_fn=t
            tf.summary.histogram('predictions', predictions)
        with tf.name_scope('cost'):
            cost = tf.losses.mean_squared_error(labels_, predictions)
            tf.summary.scalar('cost', cost)

        with tf.name_scope('train'):
            optimizer = tf.train.AdamOptimizer(learning_rate).minimize(cost)

        merged = tf.summary.merge_all()

In [0]: # Validation accuracy::

        with tf.name_scope('validation'):
            correct_pred = tf.equal(tf.cast(tf.round(predictions), tf.int32), labels_)
            accuracy = tf.reduce_mean(tf.cast(correct_pred, tf.float32))

In [0]: # Batching::

        def get_batches(x, y, batch_size=100):

            n_batches = len(x)//batch_size
            x, y = x[:n_batches*batch_size], y[:n_batches*batch_size]
            for ii in range(0, len(x), batch_size):
                yield x[ii:ii+batch_size], y[ii:ii+batch_size]

In [21]: # Training::
         saver = tf.train.Saver()
         start = timer()
         folds_val_acc = []

         with tf.Session() as sess:
             sess.run(tf.global_variables_initializer())
             train_writer = tf.summary.FileWriter('./logs/tb/train', sess.graph)
             test_writer = tf.summary.FileWriter('./logs/tb/test', sess.graph)

             for fold in range(1,k+1):
                 print('Fold -',fold,'out of',k,'::')
                 print('--------------')

                 training_validation_x = training_validation_x.tolist()
                 train_x = training_validation_x[:fold*split_train_val-split_train_val]
                 train_x += training_validation_x[fold*split_train_val:]
```

```
val_x = training_validation_x[fold*split_train_val-split_train_val:fold*split_

training_validation_x = np.array(training_validation_x)
train_x = np.array(train_x)
val_x = np.array(val_x)

training_validation_y = training_validation_y.tolist()
train_y = training_validation_y[:fold*split_train_val-split_train_val]
train_y += training_validation_y[fold*split_train_val:]
val_y = training_validation_y[fold*split_train_val-split_train_val:fold*split_

training_validation_y = np.array(training_validation_y)
train_y = np.array(train_y)
val_y = np.array(val_y)

print('Training on',len(train_y),'samples & validating on',len(val_y),'samples
iteration = 1
for e in range(1, epochs+1):
    state = sess.run(initial_state)
    for ii, (x, y) in enumerate(get_batches(train_x, train_y, batch_size), 1)
        feed = {inputs_: x,
                labels_: y[:, None],
                keep_prob: 0.5,
                initial_state: state}
        summary, loss, state, _ = sess.run([merged, cost, final_state, optimiz

        train_writer.add_summary(summary, iteration)

        if iteration%5==0:
            print("Epoch: {}/{}".format(e, epochs),
                  "Iteration: {}".format(iteration),
                  "Train loss: {:.3f}".format(loss))

        if iteration%25==0:
            val_acc = []
            val_state = sess.run(cell.zero_state(batch_size, tf.float32))
            for x, y in get_batches(val_x, val_y, batch_size):
                feed = {inputs_: x,
                        labels_: y[:, None],
                        keep_prob: 1,
                        initial_state: val_state}
                summary, batch_acc, val_state = sess.run([merged, accuracy, fi
                val_acc.append(batch_acc)
            print("Val acc: {:.3f}".format(np.mean(val_acc)))
        iteration +=1
        test_writer.add_summary(summary, iteration)
        saver.save(sess, checkpointName)
```

```
                    #saver.save(sess, checkpointName)
                    # After an epoch is completed:
                    val_acc = []
                    val_state = sess.run(cell.zero_state(batch_size, tf.float32))
                    for x, y in get_batches(val_x, val_y, batch_size):
                        feed = {inputs_: x,
                                labels_: y[:, None],
                                keep_prob: 1,
                                initial_state: val_state}
                        summary, batch_acc, val_state = sess.run([merged, accuracy, final_sta
                        val_acc.append(batch_acc)
                    print("Val acc for epoch {:} = {:.4f}".format(e,np.mean(val_acc)))
                    test_writer.add_summary(summary, iteration)
                    saver.save(sess, checkpointName)

                saver.save(sess, checkpointName)
                # After a fold is completed:
                val_acc = []
                val_state = sess.run(cell.zero_state(batch_size, tf.float32))
                for x, y in get_batches(val_x, val_y, batch_size):
                    feed = {inputs_: x,
                            labels_: y[:, None],
                            keep_prob: 1,
                            initial_state: val_state}
                    summary, batch_acc, val_state = sess.run([merged, accuracy, final_state],
                    val_acc.append(batch_acc)
                    folds_val_acc.append(batch_acc)
                print("Val acc for fold {:} = {:.4f}".format(k,np.mean(val_acc)))
                test_writer.add_summary(summary, iteration)
                saver.save(sess, checkpointName)

                print('--------------\n')

        duration = timer() - start
        print('Time elasped =',duration,'sec(s)')
```

```
Fold - 1 out of 10 ::
--------------
Training on 1059 samples & validating on 117 samples with batch size 5 .
Epoch: 1/3 Iteration: 5 Train loss: 0.250
Epoch: 1/3 Iteration: 10 Train loss: 0.250
Epoch: 1/3 Iteration: 15 Train loss: 0.238
Epoch: 1/3 Iteration: 20 Train loss: 0.251
Epoch: 1/3 Iteration: 25 Train loss: 0.263
Val acc: 0.513
Epoch: 1/3 Iteration: 30 Train loss: 0.251
Epoch: 1/3 Iteration: 35 Train loss: 0.258
Epoch: 1/3 Iteration: 40 Train loss: 0.248
```

```
Epoch: 1/3 Iteration: 45 Train loss: 0.240
Epoch: 1/3 Iteration: 50 Train loss: 0.255
Val acc: 0.504
Epoch: 1/3 Iteration: 55 Train loss: 0.254
Epoch: 1/3 Iteration: 60 Train loss: 0.263
Epoch: 1/3 Iteration: 65 Train loss: 0.251
Epoch: 1/3 Iteration: 70 Train loss: 0.240
Epoch: 1/3 Iteration: 75 Train loss: 0.242
Val acc: 0.539
Epoch: 1/3 Iteration: 80 Train loss: 0.255
Epoch: 1/3 Iteration: 85 Train loss: 0.237
Epoch: 1/3 Iteration: 90 Train loss: 0.266
Epoch: 1/3 Iteration: 95 Train loss: 0.223
Epoch: 1/3 Iteration: 100 Train loss: 0.251
Val acc: 0.539
Epoch: 1/3 Iteration: 105 Train loss: 0.237
Epoch: 1/3 Iteration: 110 Train loss: 0.279
Epoch: 1/3 Iteration: 115 Train loss: 0.227
Epoch: 1/3 Iteration: 120 Train loss: 0.245
Epoch: 1/3 Iteration: 125 Train loss: 0.256
Val acc: 0.548
Epoch: 1/3 Iteration: 130 Train loss: 0.253
Epoch: 1/3 Iteration: 135 Train loss: 0.287
Epoch: 1/3 Iteration: 140 Train loss: 0.260
Epoch: 1/3 Iteration: 145 Train loss: 0.282
Epoch: 1/3 Iteration: 150 Train loss: 0.234
Val acc: 0.504
Epoch: 1/3 Iteration: 155 Train loss: 0.260
Epoch: 1/3 Iteration: 160 Train loss: 0.247
Epoch: 1/3 Iteration: 165 Train loss: 0.238
Epoch: 1/3 Iteration: 170 Train loss: 0.265
Epoch: 1/3 Iteration: 175 Train loss: 0.261
Val acc: 0.487
Epoch: 1/3 Iteration: 180 Train loss: 0.226
Epoch: 1/3 Iteration: 185 Train loss: 0.255
Epoch: 1/3 Iteration: 190 Train loss: 0.229
Epoch: 1/3 Iteration: 195 Train loss: 0.230
Epoch: 1/3 Iteration: 200 Train loss: 0.225
Val acc: 0.470
Epoch: 1/3 Iteration: 205 Train loss: 0.211
Epoch: 1/3 Iteration: 210 Train loss: 0.209
Val acc for epoch 1 = 0.4870
Epoch: 2/3 Iteration: 215 Train loss: 0.309
Epoch: 2/3 Iteration: 220 Train loss: 0.259
Epoch: 2/3 Iteration: 225 Train loss: 0.254
Val acc: 0.496
Epoch: 2/3 Iteration: 230 Train loss: 0.229
Epoch: 2/3 Iteration: 235 Train loss: 0.281
```

```
Epoch: 2/3 Iteration: 240 Train loss: 0.224
Epoch: 2/3 Iteration: 245 Train loss: 0.252
Epoch: 2/3 Iteration: 250 Train loss: 0.244
Val acc: 0.522
Epoch: 2/3 Iteration: 255 Train loss: 0.253
Epoch: 2/3 Iteration: 260 Train loss: 0.235
Epoch: 2/3 Iteration: 265 Train loss: 0.267
Epoch: 2/3 Iteration: 270 Train loss: 0.246
Epoch: 2/3 Iteration: 275 Train loss: 0.268
Val acc: 0.513
Epoch: 2/3 Iteration: 280 Train loss: 0.262
Epoch: 2/3 Iteration: 285 Train loss: 0.228
Epoch: 2/3 Iteration: 290 Train loss: 0.213
Epoch: 2/3 Iteration: 295 Train loss: 0.279
Epoch: 2/3 Iteration: 300 Train loss: 0.283
Val acc: 0.513
Epoch: 2/3 Iteration: 305 Train loss: 0.229
Epoch: 2/3 Iteration: 310 Train loss: 0.222
Epoch: 2/3 Iteration: 315 Train loss: 0.314
Epoch: 2/3 Iteration: 320 Train loss: 0.190
Epoch: 2/3 Iteration: 325 Train loss: 0.248
Val acc: 0.522
Epoch: 2/3 Iteration: 330 Train loss: 0.284
Epoch: 2/3 Iteration: 335 Train loss: 0.277
Epoch: 2/3 Iteration: 340 Train loss: 0.248
Epoch: 2/3 Iteration: 345 Train loss: 0.275
Epoch: 2/3 Iteration: 350 Train loss: 0.258
Val acc: 0.504
Epoch: 2/3 Iteration: 355 Train loss: 0.245
Epoch: 2/3 Iteration: 360 Train loss: 0.291
Epoch: 2/3 Iteration: 365 Train loss: 0.247
Epoch: 2/3 Iteration: 370 Train loss: 0.236
Epoch: 2/3 Iteration: 375 Train loss: 0.240
Val acc: 0.565
Epoch: 2/3 Iteration: 380 Train loss: 0.261
Epoch: 2/3 Iteration: 385 Train loss: 0.255
Epoch: 2/3 Iteration: 390 Train loss: 0.246
Epoch: 2/3 Iteration: 395 Train loss: 0.199
Epoch: 2/3 Iteration: 400 Train loss: 0.279
Val acc: 0.470
Epoch: 2/3 Iteration: 405 Train loss: 0.191
Epoch: 2/3 Iteration: 410 Train loss: 0.195
Epoch: 2/3 Iteration: 415 Train loss: 0.176
Epoch: 2/3 Iteration: 420 Train loss: 0.247
Val acc for epoch 2 = 0.4696
Epoch: 3/3 Iteration: 425 Train loss: 0.244
Val acc: 0.478
Epoch: 3/3 Iteration: 430 Train loss: 0.276
```

```
Epoch: 3/3 Iteration: 435 Train loss: 0.233
Epoch: 3/3 Iteration: 440 Train loss: 0.264
Epoch: 3/3 Iteration: 445 Train loss: 0.236
Epoch: 3/3 Iteration: 450 Train loss: 0.268
Val acc: 0.513
Epoch: 3/3 Iteration: 455 Train loss: 0.252
Epoch: 3/3 Iteration: 460 Train loss: 0.230
Epoch: 3/3 Iteration: 465 Train loss: 0.256
Epoch: 3/3 Iteration: 470 Train loss: 0.246
Epoch: 3/3 Iteration: 475 Train loss: 0.226
Val acc: 0.522
Epoch: 3/3 Iteration: 480 Train loss: 0.259
Epoch: 3/3 Iteration: 485 Train loss: 0.249
Epoch: 3/3 Iteration: 490 Train loss: 0.261
Epoch: 3/3 Iteration: 495 Train loss: 0.224
Epoch: 3/3 Iteration: 500 Train loss: 0.233
Val acc: 0.548
Epoch: 3/3 Iteration: 505 Train loss: 0.228
Epoch: 3/3 Iteration: 510 Train loss: 0.235
Epoch: 3/3 Iteration: 515 Train loss: 0.252
Epoch: 3/3 Iteration: 520 Train loss: 0.265
Epoch: 3/3 Iteration: 525 Train loss: 0.247
Val acc: 0.539
Epoch: 3/3 Iteration: 530 Train loss: 0.256
Epoch: 3/3 Iteration: 535 Train loss: 0.208
Epoch: 3/3 Iteration: 540 Train loss: 0.223
Epoch: 3/3 Iteration: 545 Train loss: 0.239
Epoch: 3/3 Iteration: 550 Train loss: 0.243
Val acc: 0.513
Epoch: 3/3 Iteration: 555 Train loss: 0.292
Epoch: 3/3 Iteration: 560 Train loss: 0.231
Epoch: 3/3 Iteration: 565 Train loss: 0.241
Epoch: 3/3 Iteration: 570 Train loss: 0.247
Epoch: 3/3 Iteration: 575 Train loss: 0.242
Val acc: 0.513
Epoch: 3/3 Iteration: 580 Train loss: 0.218
Epoch: 3/3 Iteration: 585 Train loss: 0.250
Epoch: 3/3 Iteration: 590 Train loss: 0.163
Epoch: 3/3 Iteration: 595 Train loss: 0.169
Epoch: 3/3 Iteration: 600 Train loss: 0.207
Val acc: 0.487
Epoch: 3/3 Iteration: 605 Train loss: 0.190
Epoch: 3/3 Iteration: 610 Train loss: 0.244
Epoch: 3/3 Iteration: 615 Train loss: 0.266
Epoch: 3/3 Iteration: 620 Train loss: 0.142
Epoch: 3/3 Iteration: 625 Train loss: 0.272
Val acc: 0.496
Epoch: 3/3 Iteration: 630 Train loss: 0.102
```

```
Val acc for epoch 3 = 0.4870
Val acc for fold 10 = 0.4870
--------------

Fold - 2 out of 10 ::
--------------
Training on 1059 samples & validating on 117 samples with batch size 5 .
Epoch: 1/3 Iteration: 5 Train loss: 0.334
Epoch: 1/3 Iteration: 10 Train loss: 0.288
Epoch: 1/3 Iteration: 15 Train loss: 0.255
Epoch: 1/3 Iteration: 20 Train loss: 0.235
Epoch: 1/3 Iteration: 25 Train loss: 0.245
Val acc: 0.539
Epoch: 1/3 Iteration: 30 Train loss: 0.257
Epoch: 1/3 Iteration: 35 Train loss: 0.257
Epoch: 1/3 Iteration: 40 Train loss: 0.245
Epoch: 1/3 Iteration: 45 Train loss: 0.243
Epoch: 1/3 Iteration: 50 Train loss: 0.236
Val acc: 0.609
Epoch: 1/3 Iteration: 55 Train loss: 0.216
Epoch: 1/3 Iteration: 60 Train loss: 0.239
Epoch: 1/3 Iteration: 65 Train loss: 0.280
Epoch: 1/3 Iteration: 70 Train loss: 0.219
Epoch: 1/3 Iteration: 75 Train loss: 0.232
Val acc: 0.591
Epoch: 1/3 Iteration: 80 Train loss: 0.252
Epoch: 1/3 Iteration: 85 Train loss: 0.231
Epoch: 1/3 Iteration: 90 Train loss: 0.251
Epoch: 1/3 Iteration: 95 Train loss: 0.197
Epoch: 1/3 Iteration: 100 Train loss: 0.273
Val acc: 0.591
Epoch: 1/3 Iteration: 105 Train loss: 0.233
Epoch: 1/3 Iteration: 110 Train loss: 0.228
Epoch: 1/3 Iteration: 115 Train loss: 0.196
Epoch: 1/3 Iteration: 120 Train loss: 0.224
Epoch: 1/3 Iteration: 125 Train loss: 0.242
Val acc: 0.643
Epoch: 1/3 Iteration: 130 Train loss: 0.296
Epoch: 1/3 Iteration: 135 Train loss: 0.261
Epoch: 1/3 Iteration: 140 Train loss: 0.220
Epoch: 1/3 Iteration: 145 Train loss: 0.222
Epoch: 1/3 Iteration: 150 Train loss: 0.182
Val acc: 0.478
Epoch: 1/3 Iteration: 155 Train loss: 0.181
Epoch: 1/3 Iteration: 160 Train loss: 0.255
Epoch: 1/3 Iteration: 165 Train loss: 0.197
Epoch: 1/3 Iteration: 170 Train loss: 0.186
Epoch: 1/3 Iteration: 175 Train loss: 0.178
```

```
Val acc: 0.435
Epoch: 1/3 Iteration: 180 Train loss: 0.108
Epoch: 1/3 Iteration: 185 Train loss: 0.167
Epoch: 1/3 Iteration: 190 Train loss: 0.142
Epoch: 1/3 Iteration: 195 Train loss: 0.201
Epoch: 1/3 Iteration: 200 Train loss: 0.147
Val acc: 0.426
Epoch: 1/3 Iteration: 205 Train loss: 0.134
Epoch: 1/3 Iteration: 210 Train loss: 0.156
Val acc for epoch 1 = 0.4609
Epoch: 2/3 Iteration: 215 Train loss: 0.407
Epoch: 2/3 Iteration: 220 Train loss: 0.368
Epoch: 2/3 Iteration: 225 Train loss: 0.234
Val acc: 0.557
Epoch: 2/3 Iteration: 230 Train loss: 0.187
Epoch: 2/3 Iteration: 235 Train loss: 0.237
Epoch: 2/3 Iteration: 240 Train loss: 0.185
Epoch: 2/3 Iteration: 245 Train loss: 0.208
Epoch: 2/3 Iteration: 250 Train loss: 0.190
Val acc: 0.617
Epoch: 2/3 Iteration: 255 Train loss: 0.223
Epoch: 2/3 Iteration: 260 Train loss: 0.269
Epoch: 2/3 Iteration: 265 Train loss: 0.295
Epoch: 2/3 Iteration: 270 Train loss: 0.144
Epoch: 2/3 Iteration: 275 Train loss: 0.202
Val acc: 0.617
Epoch: 2/3 Iteration: 280 Train loss: 0.212
Epoch: 2/3 Iteration: 285 Train loss: 0.200
Epoch: 2/3 Iteration: 290 Train loss: 0.221
Epoch: 2/3 Iteration: 295 Train loss: 0.275
Epoch: 2/3 Iteration: 300 Train loss: 0.222
Val acc: 0.609
Epoch: 2/3 Iteration: 305 Train loss: 0.180
Epoch: 2/3 Iteration: 310 Train loss: 0.201
Epoch: 2/3 Iteration: 315 Train loss: 0.359
Epoch: 2/3 Iteration: 320 Train loss: 0.097
Epoch: 2/3 Iteration: 325 Train loss: 0.216
Val acc: 0.635
Epoch: 2/3 Iteration: 330 Train loss: 0.366
Epoch: 2/3 Iteration: 335 Train loss: 0.170
Epoch: 2/3 Iteration: 340 Train loss: 0.122
Epoch: 2/3 Iteration: 345 Train loss: 0.266
Epoch: 2/3 Iteration: 350 Train loss: 0.168
Val acc: 0.513
Epoch: 2/3 Iteration: 355 Train loss: 0.169
Epoch: 2/3 Iteration: 360 Train loss: 0.295
Epoch: 2/3 Iteration: 365 Train loss: 0.148
Epoch: 2/3 Iteration: 370 Train loss: 0.220
```

```
Epoch: 2/3 Iteration: 375 Train loss: 0.213
Val acc: 0.522
Epoch: 2/3 Iteration: 380 Train loss: 0.208
Epoch: 2/3 Iteration: 385 Train loss: 0.166
Epoch: 2/3 Iteration: 390 Train loss: 0.136
Epoch: 2/3 Iteration: 395 Train loss: 0.063
Epoch: 2/3 Iteration: 400 Train loss: 0.473
Val acc: 0.504
Epoch: 2/3 Iteration: 405 Train loss: 0.165
Epoch: 2/3 Iteration: 410 Train loss: 0.023
Epoch: 2/3 Iteration: 415 Train loss: 0.038
Epoch: 2/3 Iteration: 420 Train loss: 0.084
Val acc for epoch 2 = 0.4696
Epoch: 3/3 Iteration: 425 Train loss: 0.533
Val acc: 0.496
Epoch: 3/3 Iteration: 430 Train loss: 0.317
Epoch: 3/3 Iteration: 435 Train loss: 0.444
Epoch: 3/3 Iteration: 440 Train loss: 0.271
Epoch: 3/3 Iteration: 445 Train loss: 0.178
Epoch: 3/3 Iteration: 450 Train loss: 0.216
Val acc: 0.600
Epoch: 3/3 Iteration: 455 Train loss: 0.184
Epoch: 3/3 Iteration: 460 Train loss: 0.194
Epoch: 3/3 Iteration: 465 Train loss: 0.240
Epoch: 3/3 Iteration: 470 Train loss: 0.296
Epoch: 3/3 Iteration: 475 Train loss: 0.208
Val acc: 0.609
Epoch: 3/3 Iteration: 480 Train loss: 0.186
Epoch: 3/3 Iteration: 485 Train loss: 0.055
Epoch: 3/3 Iteration: 490 Train loss: 0.334
Epoch: 3/3 Iteration: 495 Train loss: 0.107
Epoch: 3/3 Iteration: 500 Train loss: 0.122
Val acc: 0.609
Epoch: 3/3 Iteration: 505 Train loss: 0.162
Epoch: 3/3 Iteration: 510 Train loss: 0.185
Epoch: 3/3 Iteration: 515 Train loss: 0.118
Epoch: 3/3 Iteration: 520 Train loss: 0.250
Epoch: 3/3 Iteration: 525 Train loss: 0.248
Val acc: 0.609
Epoch: 3/3 Iteration: 530 Train loss: 0.156
Epoch: 3/3 Iteration: 535 Train loss: 0.086
Epoch: 3/3 Iteration: 540 Train loss: 0.105
Epoch: 3/3 Iteration: 545 Train loss: 0.236
Epoch: 3/3 Iteration: 550 Train loss: 0.152
Val acc: 0.643
Epoch: 3/3 Iteration: 555 Train loss: 0.154
Epoch: 3/3 Iteration: 560 Train loss: 0.160
Epoch: 3/3 Iteration: 565 Train loss: 0.327
```

```
Epoch: 3/3 Iteration: 570 Train loss: 0.049
Epoch: 3/3 Iteration: 575 Train loss: 0.236
Val acc: 0.504
Epoch: 3/3 Iteration: 580 Train loss: 0.145
Epoch: 3/3 Iteration: 585 Train loss: 0.055
Epoch: 3/3 Iteration: 590 Train loss: 0.233
Epoch: 3/3 Iteration: 595 Train loss: 0.073
Epoch: 3/3 Iteration: 600 Train loss: 0.173
Val acc: 0.487
Epoch: 3/3 Iteration: 605 Train loss: 0.165
Epoch: 3/3 Iteration: 610 Train loss: 0.076
Epoch: 3/3 Iteration: 615 Train loss: 0.024
Epoch: 3/3 Iteration: 620 Train loss: 0.057
Epoch: 3/3 Iteration: 625 Train loss: 0.121
Val acc: 0.470
Epoch: 3/3 Iteration: 630 Train loss: 0.020
Val acc for epoch 3 = 0.4696
Val acc for fold 10 = 0.4696
--------------

Fold - 3 out of 10 ::
--------------
Training on 1059 samples & validating on 117 samples with batch size 5 .
Epoch: 1/3 Iteration: 5 Train loss: 0.252
Epoch: 1/3 Iteration: 10 Train loss: 0.287
Epoch: 1/3 Iteration: 15 Train loss: 0.167
Epoch: 1/3 Iteration: 20 Train loss: 0.100
Epoch: 1/3 Iteration: 25 Train loss: 0.526
Val acc: 0.817
Epoch: 1/3 Iteration: 30 Train loss: 0.190
Epoch: 1/3 Iteration: 35 Train loss: 0.253
Epoch: 1/3 Iteration: 40 Train loss: 0.271
Epoch: 1/3 Iteration: 45 Train loss: 0.222
Epoch: 1/3 Iteration: 50 Train loss: 0.082
Val acc: 0.826
Epoch: 1/3 Iteration: 55 Train loss: 0.041
Epoch: 1/3 Iteration: 60 Train loss: 0.091
Epoch: 1/3 Iteration: 65 Train loss: 0.169
Epoch: 1/3 Iteration: 70 Train loss: 0.038
Epoch: 1/3 Iteration: 75 Train loss: 0.079
Val acc: 0.835
Epoch: 1/3 Iteration: 80 Train loss: 0.094
Epoch: 1/3 Iteration: 85 Train loss: 0.172
Epoch: 1/3 Iteration: 90 Train loss: 0.085
Epoch: 1/3 Iteration: 95 Train loss: 0.041
Epoch: 1/3 Iteration: 100 Train loss: 0.154
Val acc: 0.817
Epoch: 1/3 Iteration: 105 Train loss: 0.053
```

```
Epoch: 1/3 Iteration: 110 Train loss: 0.026
Epoch: 1/3 Iteration: 115 Train loss: 0.077
Epoch: 1/3 Iteration: 120 Train loss: 0.072
Epoch: 1/3 Iteration: 125 Train loss: 0.009
Val acc: 0.800
Epoch: 1/3 Iteration: 130 Train loss: 0.271
Epoch: 1/3 Iteration: 135 Train loss: 0.052
Epoch: 1/3 Iteration: 140 Train loss: 0.041
Epoch: 1/3 Iteration: 145 Train loss: 0.040
Epoch: 1/3 Iteration: 150 Train loss: 0.042
Val acc: 0.713
Epoch: 1/3 Iteration: 155 Train loss: 0.002
Epoch: 1/3 Iteration: 160 Train loss: 0.242
Epoch: 1/3 Iteration: 165 Train loss: 0.118
Epoch: 1/3 Iteration: 170 Train loss: 0.067
Epoch: 1/3 Iteration: 175 Train loss: 0.080
Val acc: 0.748
Epoch: 1/3 Iteration: 180 Train loss: 0.054
Epoch: 1/3 Iteration: 185 Train loss: 0.063
Epoch: 1/3 Iteration: 190 Train loss: 0.053
Epoch: 1/3 Iteration: 195 Train loss: 0.115
Epoch: 1/3 Iteration: 200 Train loss: 0.157
Val acc: 0.730
Epoch: 1/3 Iteration: 205 Train loss: 0.019
Epoch: 1/3 Iteration: 210 Train loss: 0.056
Val acc for epoch 1 = 0.7130
Epoch: 2/3 Iteration: 215 Train loss: 0.273
Epoch: 2/3 Iteration: 220 Train loss: 0.029
Epoch: 2/3 Iteration: 225 Train loss: 0.006
Val acc: 0.739
Epoch: 2/3 Iteration: 230 Train loss: 0.002
Epoch: 2/3 Iteration: 235 Train loss: 0.101
Epoch: 2/3 Iteration: 240 Train loss: 0.137
Epoch: 2/3 Iteration: 245 Train loss: 0.126
Epoch: 2/3 Iteration: 250 Train loss: 0.170
Val acc: 0.809
Epoch: 2/3 Iteration: 255 Train loss: 0.182
Epoch: 2/3 Iteration: 260 Train loss: 0.117
Epoch: 2/3 Iteration: 265 Train loss: 0.118
Epoch: 2/3 Iteration: 270 Train loss: 0.027
Epoch: 2/3 Iteration: 275 Train loss: 0.004
Val acc: 0.835
Epoch: 2/3 Iteration: 280 Train loss: 0.006
Epoch: 2/3 Iteration: 285 Train loss: 0.121
Epoch: 2/3 Iteration: 290 Train loss: 0.090
Epoch: 2/3 Iteration: 295 Train loss: 0.064
Epoch: 2/3 Iteration: 300 Train loss: 0.014
Val acc: 0.826
```

```
Epoch: 2/3 Iteration: 305 Train loss: 0.013
Epoch: 2/3 Iteration: 310 Train loss: 0.034
Epoch: 2/3 Iteration: 315 Train loss: 0.364
Epoch: 2/3 Iteration: 320 Train loss: 0.039
Epoch: 2/3 Iteration: 325 Train loss: 0.076
Val acc: 0.809
Epoch: 2/3 Iteration: 330 Train loss: 0.132
Epoch: 2/3 Iteration: 335 Train loss: 0.123
Epoch: 2/3 Iteration: 340 Train loss: 0.005
Epoch: 2/3 Iteration: 345 Train loss: 0.095
Epoch: 2/3 Iteration: 350 Train loss: 0.018
Val acc: 0.783
Epoch: 2/3 Iteration: 355 Train loss: 0.055
Epoch: 2/3 Iteration: 360 Train loss: 0.125
Epoch: 2/3 Iteration: 365 Train loss: 0.011
Epoch: 2/3 Iteration: 370 Train loss: 0.101
Epoch: 2/3 Iteration: 375 Train loss: 0.049
Val acc: 0.783
Epoch: 2/3 Iteration: 380 Train loss: 0.174
Epoch: 2/3 Iteration: 385 Train loss: 0.072
Epoch: 2/3 Iteration: 390 Train loss: 0.058
Epoch: 2/3 Iteration: 395 Train loss: 0.053
Epoch: 2/3 Iteration: 400 Train loss: 0.488
Val acc: 0.757
Epoch: 2/3 Iteration: 405 Train loss: 0.031
Epoch: 2/3 Iteration: 410 Train loss: 0.005
Epoch: 2/3 Iteration: 415 Train loss: 0.014
Epoch: 2/3 Iteration: 420 Train loss: 0.122
Val acc for epoch 2 = 0.7043
Epoch: 3/3 Iteration: 425 Train loss: 0.357
Val acc: 0.704
Epoch: 3/3 Iteration: 430 Train loss: 0.157
Epoch: 3/3 Iteration: 435 Train loss: 0.392
Epoch: 3/3 Iteration: 440 Train loss: 0.139
Epoch: 3/3 Iteration: 445 Train loss: 0.011
Epoch: 3/3 Iteration: 450 Train loss: 0.331
Val acc: 0.826
Epoch: 3/3 Iteration: 455 Train loss: 0.017
Epoch: 3/3 Iteration: 460 Train loss: 0.074
Epoch: 3/3 Iteration: 465 Train loss: 0.153
Epoch: 3/3 Iteration: 470 Train loss: 0.312
Epoch: 3/3 Iteration: 475 Train loss: 0.200
Val acc: 0.800
Epoch: 3/3 Iteration: 480 Train loss: 0.001
Epoch: 3/3 Iteration: 485 Train loss: 0.008
Epoch: 3/3 Iteration: 490 Train loss: 0.274
Epoch: 3/3 Iteration: 495 Train loss: 0.049
Epoch: 3/3 Iteration: 500 Train loss: 0.110
```

```
Val acc: 0.791
Epoch: 3/3 Iteration: 505 Train loss: 0.005
Epoch: 3/3 Iteration: 510 Train loss: 0.179
Epoch: 3/3 Iteration: 515 Train loss: 0.026
Epoch: 3/3 Iteration: 520 Train loss: 0.254
Epoch: 3/3 Iteration: 525 Train loss: 0.040
Val acc: 0.800
Epoch: 3/3 Iteration: 530 Train loss: 0.005
Epoch: 3/3 Iteration: 535 Train loss: 0.020
Epoch: 3/3 Iteration: 540 Train loss: 0.024
Epoch: 3/3 Iteration: 545 Train loss: 0.197
Epoch: 3/3 Iteration: 550 Train loss: 0.061
Val acc: 0.791
Epoch: 3/3 Iteration: 555 Train loss: 0.126
Epoch: 3/3 Iteration: 560 Train loss: 0.142
Epoch: 3/3 Iteration: 565 Train loss: 0.105
Epoch: 3/3 Iteration: 570 Train loss: 0.078
Epoch: 3/3 Iteration: 575 Train loss: 0.190
Val acc: 0.774
Epoch: 3/3 Iteration: 580 Train loss: 0.112
Epoch: 3/3 Iteration: 585 Train loss: 0.016
Epoch: 3/3 Iteration: 590 Train loss: 0.015
Epoch: 3/3 Iteration: 595 Train loss: 0.018
Epoch: 3/3 Iteration: 600 Train loss: 0.122
Val acc: 0.791
Epoch: 3/3 Iteration: 605 Train loss: 0.124
Epoch: 3/3 Iteration: 610 Train loss: 0.012
Epoch: 3/3 Iteration: 615 Train loss: 0.002
Epoch: 3/3 Iteration: 620 Train loss: 0.007
Epoch: 3/3 Iteration: 625 Train loss: 0.106
Val acc: 0.783
Epoch: 3/3 Iteration: 630 Train loss: 0.020
Val acc for epoch 3 = 0.7913
Val acc for fold 10 = 0.7913
--------------

Fold - 4 out of 10 ::
--------------
Training on 1059 samples & validating on 117 samples with batch size 5 .
Epoch: 1/3 Iteration: 5 Train loss: 0.189
Epoch: 1/3 Iteration: 10 Train loss: 0.221
Epoch: 1/3 Iteration: 15 Train loss: 0.017
Epoch: 1/3 Iteration: 20 Train loss: 0.023
Epoch: 1/3 Iteration: 25 Train loss: 0.465
Val acc: 0.722
Epoch: 1/3 Iteration: 30 Train loss: 0.097
Epoch: 1/3 Iteration: 35 Train loss: 0.352
Epoch: 1/3 Iteration: 40 Train loss: 0.001
```

```
Epoch: 1/3 Iteration: 45 Train loss: 0.002
Epoch: 1/3 Iteration: 50 Train loss: 0.077
Val acc: 0.835
Epoch: 1/3 Iteration: 55 Train loss: 0.196
Epoch: 1/3 Iteration: 60 Train loss: 0.054
Epoch: 1/3 Iteration: 65 Train loss: 0.099
Epoch: 1/3 Iteration: 70 Train loss: 0.181
Epoch: 1/3 Iteration: 75 Train loss: 0.024
Val acc: 0.930
Epoch: 1/3 Iteration: 80 Train loss: 0.004
Epoch: 1/3 Iteration: 85 Train loss: 0.043
Epoch: 1/3 Iteration: 90 Train loss: 0.016
Epoch: 1/3 Iteration: 95 Train loss: 0.008
Epoch: 1/3 Iteration: 100 Train loss: 0.067
Val acc: 0.939
Epoch: 1/3 Iteration: 105 Train loss: 0.012
Epoch: 1/3 Iteration: 110 Train loss: 0.013
Epoch: 1/3 Iteration: 115 Train loss: 0.006
Epoch: 1/3 Iteration: 120 Train loss: 0.034
Epoch: 1/3 Iteration: 125 Train loss: 0.005
Val acc: 0.957
Epoch: 1/3 Iteration: 130 Train loss: 0.328
Epoch: 1/3 Iteration: 135 Train loss: 0.060
Epoch: 1/3 Iteration: 140 Train loss: 0.047
Epoch: 1/3 Iteration: 145 Train loss: 0.016
Epoch: 1/3 Iteration: 150 Train loss: 0.045
Val acc: 0.861
Epoch: 1/3 Iteration: 155 Train loss: 0.000
Epoch: 1/3 Iteration: 160 Train loss: 0.158
Epoch: 1/3 Iteration: 165 Train loss: 0.031
Epoch: 1/3 Iteration: 170 Train loss: 0.017
Epoch: 1/3 Iteration: 175 Train loss: 0.007
Val acc: 0.852
Epoch: 1/3 Iteration: 180 Train loss: 0.064
Epoch: 1/3 Iteration: 185 Train loss: 0.050
Epoch: 1/3 Iteration: 190 Train loss: 0.027
Epoch: 1/3 Iteration: 195 Train loss: 0.174
Epoch: 1/3 Iteration: 200 Train loss: 0.069
Val acc: 0.817
Epoch: 1/3 Iteration: 205 Train loss: 0.005
Epoch: 1/3 Iteration: 210 Train loss: 0.042
Val acc for epoch 1 = 0.8087
Epoch: 2/3 Iteration: 215 Train loss: 0.162
Epoch: 2/3 Iteration: 220 Train loss: 0.000
Epoch: 2/3 Iteration: 225 Train loss: 0.000
Val acc: 0.835
Epoch: 2/3 Iteration: 230 Train loss: 0.002
Epoch: 2/3 Iteration: 235 Train loss: 0.004
```

```
Epoch: 2/3 Iteration: 240 Train loss: 0.003
Epoch: 2/3 Iteration: 245 Train loss: 0.056
Epoch: 2/3 Iteration: 250 Train loss: 0.085
Val acc: 0.843
Epoch: 2/3 Iteration: 255 Train loss: 0.003
Epoch: 2/3 Iteration: 260 Train loss: 0.044
Epoch: 2/3 Iteration: 265 Train loss: 0.002
Epoch: 2/3 Iteration: 270 Train loss: 0.002
Epoch: 2/3 Iteration: 275 Train loss: 0.047
Val acc: 0.861
Epoch: 2/3 Iteration: 280 Train loss: 0.278
Epoch: 2/3 Iteration: 285 Train loss: 0.063
Epoch: 2/3 Iteration: 290 Train loss: 0.123
Epoch: 2/3 Iteration: 295 Train loss: 0.000
Epoch: 2/3 Iteration: 300 Train loss: 0.000
Val acc: 0.913
Epoch: 2/3 Iteration: 305 Train loss: 0.002
Epoch: 2/3 Iteration: 310 Train loss: 0.052
Epoch: 2/3 Iteration: 315 Train loss: 0.201
Epoch: 2/3 Iteration: 320 Train loss: 0.065
Epoch: 2/3 Iteration: 325 Train loss: 0.074
Val acc: 0.922
Epoch: 2/3 Iteration: 330 Train loss: 0.196
Epoch: 2/3 Iteration: 335 Train loss: 0.139
Epoch: 2/3 Iteration: 340 Train loss: 0.001
Epoch: 2/3 Iteration: 345 Train loss: 0.056
Epoch: 2/3 Iteration: 350 Train loss: 0.002
Val acc: 0.922
Epoch: 2/3 Iteration: 355 Train loss: 0.105
Epoch: 2/3 Iteration: 360 Train loss: 0.034
Epoch: 2/3 Iteration: 365 Train loss: 0.007
Epoch: 2/3 Iteration: 370 Train loss: 0.118
Epoch: 2/3 Iteration: 375 Train loss: 0.033
Val acc: 0.878
Epoch: 2/3 Iteration: 380 Train loss: 0.157
Epoch: 2/3 Iteration: 385 Train loss: 0.034
Epoch: 2/3 Iteration: 390 Train loss: 0.019
Epoch: 2/3 Iteration: 395 Train loss: 0.026
Epoch: 2/3 Iteration: 400 Train loss: 0.178
Val acc: 0.878
Epoch: 2/3 Iteration: 405 Train loss: 0.165
Epoch: 2/3 Iteration: 410 Train loss: 0.009
Epoch: 2/3 Iteration: 415 Train loss: 0.045
Epoch: 2/3 Iteration: 420 Train loss: 0.010
Val acc for epoch 2 = 0.8435
Epoch: 3/3 Iteration: 425 Train loss: 0.191
Val acc: 0.835
Epoch: 3/3 Iteration: 430 Train loss: 0.002
```

```
Epoch: 3/3 Iteration: 435 Train loss: 0.375
Epoch: 3/3 Iteration: 440 Train loss: 0.103
Epoch: 3/3 Iteration: 445 Train loss: 0.001
Epoch: 3/3 Iteration: 450 Train loss: 0.200
Val acc: 0.861
Epoch: 3/3 Iteration: 455 Train loss: 0.025
Epoch: 3/3 Iteration: 460 Train loss: 0.088
Epoch: 3/3 Iteration: 465 Train loss: 0.002
Epoch: 3/3 Iteration: 470 Train loss: 0.016
Epoch: 3/3 Iteration: 475 Train loss: 0.003
Val acc: 0.861
Epoch: 3/3 Iteration: 480 Train loss: 0.000
Epoch: 3/3 Iteration: 485 Train loss: 0.029
Epoch: 3/3 Iteration: 490 Train loss: 0.001
Epoch: 3/3 Iteration: 495 Train loss: 0.008
Epoch: 3/3 Iteration: 500 Train loss: 0.054
Val acc: 0.878
Epoch: 3/3 Iteration: 505 Train loss: 0.001
Epoch: 3/3 Iteration: 510 Train loss: 0.185
Epoch: 3/3 Iteration: 515 Train loss: 0.002
Epoch: 3/3 Iteration: 520 Train loss: 0.196
Epoch: 3/3 Iteration: 525 Train loss: 0.096
Val acc: 0.904
Epoch: 3/3 Iteration: 530 Train loss: 0.000
Epoch: 3/3 Iteration: 535 Train loss: 0.004
Epoch: 3/3 Iteration: 540 Train loss: 0.002
Epoch: 3/3 Iteration: 545 Train loss: 0.167
Epoch: 3/3 Iteration: 550 Train loss: 0.019
Val acc: 0.904
Epoch: 3/3 Iteration: 555 Train loss: 0.049
Epoch: 3/3 Iteration: 560 Train loss: 0.150
Epoch: 3/3 Iteration: 565 Train loss: 0.237
Epoch: 3/3 Iteration: 570 Train loss: 0.089
Epoch: 3/3 Iteration: 575 Train loss: 0.158
Val acc: 0.896
Epoch: 3/3 Iteration: 580 Train loss: 0.055
Epoch: 3/3 Iteration: 585 Train loss: 0.017
Epoch: 3/3 Iteration: 590 Train loss: 0.009
Epoch: 3/3 Iteration: 595 Train loss: 0.010
Epoch: 3/3 Iteration: 600 Train loss: 0.041
Val acc: 0.878
Epoch: 3/3 Iteration: 605 Train loss: 0.093
Epoch: 3/3 Iteration: 610 Train loss: 0.009
Epoch: 3/3 Iteration: 615 Train loss: 0.001
Epoch: 3/3 Iteration: 620 Train loss: 0.017
Epoch: 3/3 Iteration: 625 Train loss: 0.126
Val acc: 0.861
Epoch: 3/3 Iteration: 630 Train loss: 0.002
```

```
Val acc for epoch 3 = 0.8435
Val acc for fold 10 = 0.8435
--------------

Fold - 5 out of 10 ::
--------------
Training on 1059 samples & validating on 117 samples with batch size 5 .
Epoch: 1/3 Iteration: 5 Train loss: 0.002
Epoch: 1/3 Iteration: 10 Train loss: 0.201
Epoch: 1/3 Iteration: 15 Train loss: 0.003
Epoch: 1/3 Iteration: 20 Train loss: 0.000
Epoch: 1/3 Iteration: 25 Train loss: 0.228
Val acc: 0.939
Epoch: 1/3 Iteration: 30 Train loss: 0.058
Epoch: 1/3 Iteration: 35 Train loss: 0.002
Epoch: 1/3 Iteration: 40 Train loss: 0.052
Epoch: 1/3 Iteration: 45 Train loss: 0.003
Epoch: 1/3 Iteration: 50 Train loss: 0.026
Val acc: 0.957
Epoch: 1/3 Iteration: 55 Train loss: 0.001
Epoch: 1/3 Iteration: 60 Train loss: 0.000
Epoch: 1/3 Iteration: 65 Train loss: 0.179
Epoch: 1/3 Iteration: 70 Train loss: 0.010
Epoch: 1/3 Iteration: 75 Train loss: 0.217
Val acc: 0.991
Epoch: 1/3 Iteration: 80 Train loss: 0.050
Epoch: 1/3 Iteration: 85 Train loss: 0.029
Epoch: 1/3 Iteration: 90 Train loss: 0.018
Epoch: 1/3 Iteration: 95 Train loss: 0.001
Epoch: 1/3 Iteration: 100 Train loss: 0.002
Val acc: 0.991
Epoch: 1/3 Iteration: 105 Train loss: 0.004
Epoch: 1/3 Iteration: 110 Train loss: 0.060
Epoch: 1/3 Iteration: 115 Train loss: 0.004
Epoch: 1/3 Iteration: 120 Train loss: 0.105
Epoch: 1/3 Iteration: 125 Train loss: 0.020
Val acc: 0.991
Epoch: 1/3 Iteration: 130 Train loss: 0.143
Epoch: 1/3 Iteration: 135 Train loss: 0.007
Epoch: 1/3 Iteration: 140 Train loss: 0.046
Epoch: 1/3 Iteration: 145 Train loss: 0.017
Epoch: 1/3 Iteration: 150 Train loss: 0.002
Val acc: 0.991
Epoch: 1/3 Iteration: 155 Train loss: 0.000
Epoch: 1/3 Iteration: 160 Train loss: 0.096
Epoch: 1/3 Iteration: 165 Train loss: 0.081
Epoch: 1/3 Iteration: 170 Train loss: 0.001
Epoch: 1/3 Iteration: 175 Train loss: 0.001
```

```
Val acc: 0.983
Epoch: 1/3 Iteration: 180 Train loss: 0.008
Epoch: 1/3 Iteration: 185 Train loss: 0.007
Epoch: 1/3 Iteration: 190 Train loss: 0.024
Epoch: 1/3 Iteration: 195 Train loss: 0.123
Epoch: 1/3 Iteration: 200 Train loss: 0.013
Val acc: 0.957
Epoch: 1/3 Iteration: 205 Train loss: 0.000
Epoch: 1/3 Iteration: 210 Train loss: 0.006
Val acc for epoch 1 = 0.9478
Epoch: 2/3 Iteration: 215 Train loss: 0.121
Epoch: 2/3 Iteration: 220 Train loss: 0.000
Epoch: 2/3 Iteration: 225 Train loss: 0.000
Val acc: 0.922
Epoch: 2/3 Iteration: 230 Train loss: 0.000
Epoch: 2/3 Iteration: 235 Train loss: 0.000
Epoch: 2/3 Iteration: 240 Train loss: 0.001
Epoch: 2/3 Iteration: 245 Train loss: 0.133
Epoch: 2/3 Iteration: 250 Train loss: 0.047
Val acc: 0.965
Epoch: 2/3 Iteration: 255 Train loss: 0.001
Epoch: 2/3 Iteration: 260 Train loss: 0.011
Epoch: 2/3 Iteration: 265 Train loss: 0.000
Epoch: 2/3 Iteration: 270 Train loss: 0.001
Epoch: 2/3 Iteration: 275 Train loss: 0.004
Val acc: 0.957
Epoch: 2/3 Iteration: 280 Train loss: 0.243
Epoch: 2/3 Iteration: 285 Train loss: 0.003
Epoch: 2/3 Iteration: 290 Train loss: 0.001
Epoch: 2/3 Iteration: 295 Train loss: 0.178
Epoch: 2/3 Iteration: 300 Train loss: 0.311
Val acc: 0.948
Epoch: 2/3 Iteration: 305 Train loss: 0.000
Epoch: 2/3 Iteration: 310 Train loss: 0.028
Epoch: 2/3 Iteration: 315 Train loss: 0.003
Epoch: 2/3 Iteration: 320 Train loss: 0.041
Epoch: 2/3 Iteration: 325 Train loss: 0.069
Val acc: 0.974
Epoch: 2/3 Iteration: 330 Train loss: 0.194
Epoch: 2/3 Iteration: 335 Train loss: 0.011
Epoch: 2/3 Iteration: 340 Train loss: 0.004
Epoch: 2/3 Iteration: 345 Train loss: 0.035
Epoch: 2/3 Iteration: 350 Train loss: 0.002
Val acc: 0.983
Epoch: 2/3 Iteration: 355 Train loss: 0.014
Epoch: 2/3 Iteration: 360 Train loss: 0.061
Epoch: 2/3 Iteration: 365 Train loss: 0.001
Epoch: 2/3 Iteration: 370 Train loss: 0.035
```

```
Epoch: 2/3 Iteration: 375 Train loss: 0.007
Val acc: 0.974
Epoch: 2/3 Iteration: 380 Train loss: 0.033
Epoch: 2/3 Iteration: 385 Train loss: 0.009
Epoch: 2/3 Iteration: 390 Train loss: 0.048
Epoch: 2/3 Iteration: 395 Train loss: 0.018
Epoch: 2/3 Iteration: 400 Train loss: 0.140
Val acc: 0.965
Epoch: 2/3 Iteration: 405 Train loss: 0.004
Epoch: 2/3 Iteration: 410 Train loss: 0.005
Epoch: 2/3 Iteration: 415 Train loss: 0.028
Epoch: 2/3 Iteration: 420 Train loss: 0.005
Val acc for epoch 2 = 0.9565
Epoch: 3/3 Iteration: 425 Train loss: 0.165
Val acc: 0.957
Epoch: 3/3 Iteration: 430 Train loss: 0.001
Epoch: 3/3 Iteration: 435 Train loss: 0.000
Epoch: 3/3 Iteration: 440 Train loss: 0.175
Epoch: 3/3 Iteration: 445 Train loss: 0.000
Epoch: 3/3 Iteration: 450 Train loss: 0.003
Val acc: 0.965
Epoch: 3/3 Iteration: 455 Train loss: 0.004
Epoch: 3/3 Iteration: 460 Train loss: 0.003
Epoch: 3/3 Iteration: 465 Train loss: 0.001
Epoch: 3/3 Iteration: 470 Train loss: 0.000
Epoch: 3/3 Iteration: 475 Train loss: 0.000
Val acc: 0.965
Epoch: 3/3 Iteration: 480 Train loss: 0.000
Epoch: 3/3 Iteration: 485 Train loss: 0.005
Epoch: 3/3 Iteration: 490 Train loss: 0.001
Epoch: 3/3 Iteration: 495 Train loss: 0.003
Epoch: 3/3 Iteration: 500 Train loss: 0.000
Val acc: 0.965
Epoch: 3/3 Iteration: 505 Train loss: 0.045
Epoch: 3/3 Iteration: 510 Train loss: 0.041
Epoch: 3/3 Iteration: 515 Train loss: 0.000
Epoch: 3/3 Iteration: 520 Train loss: 0.194
Epoch: 3/3 Iteration: 525 Train loss: 0.102
Val acc: 0.983
Epoch: 3/3 Iteration: 530 Train loss: 0.000
Epoch: 3/3 Iteration: 535 Train loss: 0.005
Epoch: 3/3 Iteration: 540 Train loss: 0.000
Epoch: 3/3 Iteration: 545 Train loss: 0.048
Epoch: 3/3 Iteration: 550 Train loss: 0.014
Val acc: 0.983
Epoch: 3/3 Iteration: 555 Train loss: 0.010
Epoch: 3/3 Iteration: 560 Train loss: 0.075
Epoch: 3/3 Iteration: 565 Train loss: 0.068
```

```
Epoch: 3/3 Iteration: 570 Train loss: 0.132
Epoch: 3/3 Iteration: 575 Train loss: 0.138
Val acc: 0.974
Epoch: 3/3 Iteration: 580 Train loss: 0.040
Epoch: 3/3 Iteration: 585 Train loss: 0.006
Epoch: 3/3 Iteration: 590 Train loss: 0.001
Epoch: 3/3 Iteration: 595 Train loss: 0.007
Epoch: 3/3 Iteration: 600 Train loss: 0.024
Val acc: 0.965
Epoch: 3/3 Iteration: 605 Train loss: 0.099
Epoch: 3/3 Iteration: 610 Train loss: 0.007
Epoch: 3/3 Iteration: 615 Train loss: 0.000
Epoch: 3/3 Iteration: 620 Train loss: 0.018
Epoch: 3/3 Iteration: 625 Train loss: 0.087
Val acc: 0.957
Epoch: 3/3 Iteration: 630 Train loss: 0.003
Val acc for epoch 3 = 0.9565
Val acc for fold 10 = 0.9565
--------------

Fold - 6 out of 10 ::
--------------
Training on 1059 samples & validating on 117 samples with batch size 5 .
Epoch: 1/3 Iteration: 5 Train loss: 0.003
Epoch: 1/3 Iteration: 10 Train loss: 0.196
Epoch: 1/3 Iteration: 15 Train loss: 0.000
Epoch: 1/3 Iteration: 20 Train loss: 0.003
Epoch: 1/3 Iteration: 25 Train loss: 0.199
Val acc: 0.948
Epoch: 1/3 Iteration: 30 Train loss: 0.002
Epoch: 1/3 Iteration: 35 Train loss: 0.001
Epoch: 1/3 Iteration: 40 Train loss: 0.003
Epoch: 1/3 Iteration: 45 Train loss: 0.001
Epoch: 1/3 Iteration: 50 Train loss: 0.001
Val acc: 0.948
Epoch: 1/3 Iteration: 55 Train loss: 0.000
Epoch: 1/3 Iteration: 60 Train loss: 0.000
Epoch: 1/3 Iteration: 65 Train loss: 0.188
Epoch: 1/3 Iteration: 70 Train loss: 0.001
Epoch: 1/3 Iteration: 75 Train loss: 0.196
Val acc: 0.957
Epoch: 1/3 Iteration: 80 Train loss: 0.009
Epoch: 1/3 Iteration: 85 Train loss: 0.001
Epoch: 1/3 Iteration: 90 Train loss: 0.010
Epoch: 1/3 Iteration: 95 Train loss: 0.001
Epoch: 1/3 Iteration: 100 Train loss: 0.001
Val acc: 0.957
Epoch: 1/3 Iteration: 105 Train loss: 0.000
```

```
Epoch: 1/3 Iteration: 110 Train loss: 0.000
Epoch: 1/3 Iteration: 115 Train loss: 0.001
Epoch: 1/3 Iteration: 120 Train loss: 0.037
Epoch: 1/3 Iteration: 125 Train loss: 0.001
Val acc: 0.957
Epoch: 1/3 Iteration: 130 Train loss: 0.090
Epoch: 1/3 Iteration: 135 Train loss: 0.001
Epoch: 1/3 Iteration: 140 Train loss: 0.014
Epoch: 1/3 Iteration: 145 Train loss: 0.030
Epoch: 1/3 Iteration: 150 Train loss: 0.000
Val acc: 0.957
Epoch: 1/3 Iteration: 155 Train loss: 0.000
Epoch: 1/3 Iteration: 160 Train loss: 0.117
Epoch: 1/3 Iteration: 165 Train loss: 0.043
Epoch: 1/3 Iteration: 170 Train loss: 0.000
Epoch: 1/3 Iteration: 175 Train loss: 0.000
Val acc: 0.957
Epoch: 1/3 Iteration: 180 Train loss: 0.097
Epoch: 1/3 Iteration: 185 Train loss: 0.026
Epoch: 1/3 Iteration: 190 Train loss: 0.002
Epoch: 1/3 Iteration: 195 Train loss: 0.058
Epoch: 1/3 Iteration: 200 Train loss: 0.011
Val acc: 0.957
Epoch: 1/3 Iteration: 205 Train loss: 0.009
Epoch: 1/3 Iteration: 210 Train loss: 0.001
Val acc for epoch 1 = 0.9478
Epoch: 2/3 Iteration: 215 Train loss: 0.082
Epoch: 2/3 Iteration: 220 Train loss: 0.000
Epoch: 2/3 Iteration: 225 Train loss: 0.000
Val acc: 0.939
Epoch: 2/3 Iteration: 230 Train loss: 0.000
Epoch: 2/3 Iteration: 235 Train loss: 0.000
Epoch: 2/3 Iteration: 240 Train loss: 0.089
Epoch: 2/3 Iteration: 245 Train loss: 0.068
Epoch: 2/3 Iteration: 250 Train loss: 0.060
Val acc: 0.957
Epoch: 2/3 Iteration: 255 Train loss: 0.000
Epoch: 2/3 Iteration: 260 Train loss: 0.000
Epoch: 2/3 Iteration: 265 Train loss: 0.000
Epoch: 2/3 Iteration: 270 Train loss: 0.000
Epoch: 2/3 Iteration: 275 Train loss: 0.029
Val acc: 0.939
Epoch: 2/3 Iteration: 280 Train loss: 0.199
Epoch: 2/3 Iteration: 285 Train loss: 0.160
Epoch: 2/3 Iteration: 290 Train loss: 0.000
Epoch: 2/3 Iteration: 295 Train loss: 0.160
Epoch: 2/3 Iteration: 300 Train loss: 0.000
Val acc: 0.957
```

```
Epoch: 2/3 Iteration: 305 Train loss: 0.000
Epoch: 2/3 Iteration: 310 Train loss: 0.000
Epoch: 2/3 Iteration: 315 Train loss: 0.000
Epoch: 2/3 Iteration: 320 Train loss: 0.027
Epoch: 2/3 Iteration: 325 Train loss: 0.000
Val acc: 0.957
Epoch: 2/3 Iteration: 330 Train loss: 0.196
Epoch: 2/3 Iteration: 335 Train loss: 0.000
Epoch: 2/3 Iteration: 340 Train loss: 0.000
Epoch: 2/3 Iteration: 345 Train loss: 0.005
Epoch: 2/3 Iteration: 350 Train loss: 0.000
Val acc: 0.957
Epoch: 2/3 Iteration: 355 Train loss: 0.009
Epoch: 2/3 Iteration: 360 Train loss: 0.020
Epoch: 2/3 Iteration: 365 Train loss: 0.000
Epoch: 2/3 Iteration: 370 Train loss: 0.034
Epoch: 2/3 Iteration: 375 Train loss: 0.001
Val acc: 0.957
Epoch: 2/3 Iteration: 380 Train loss: 0.047
Epoch: 2/3 Iteration: 385 Train loss: 0.010
Epoch: 2/3 Iteration: 390 Train loss: 0.014
Epoch: 2/3 Iteration: 395 Train loss: 0.005
Epoch: 2/3 Iteration: 400 Train loss: 0.120
Val acc: 0.939
Epoch: 2/3 Iteration: 405 Train loss: 0.001
Epoch: 2/3 Iteration: 410 Train loss: 0.005
Epoch: 2/3 Iteration: 415 Train loss: 0.001
Epoch: 2/3 Iteration: 420 Train loss: 0.001
Val acc for epoch 2 = 0.9391
Epoch: 3/3 Iteration: 425 Train loss: 0.185
Val acc: 0.939
Epoch: 3/3 Iteration: 430 Train loss: 0.001
Epoch: 3/3 Iteration: 435 Train loss: 0.001
Epoch: 3/3 Iteration: 440 Train loss: 0.170
Epoch: 3/3 Iteration: 445 Train loss: 0.000
Epoch: 3/3 Iteration: 450 Train loss: 0.000
Val acc: 0.922
Epoch: 3/3 Iteration: 455 Train loss: 0.056
Epoch: 3/3 Iteration: 460 Train loss: 0.001
Epoch: 3/3 Iteration: 465 Train loss: 0.000
Epoch: 3/3 Iteration: 470 Train loss: 0.000
Epoch: 3/3 Iteration: 475 Train loss: 0.000
Val acc: 0.948
Epoch: 3/3 Iteration: 480 Train loss: 0.000
Epoch: 3/3 Iteration: 485 Train loss: 0.000
Epoch: 3/3 Iteration: 490 Train loss: 0.000
Epoch: 3/3 Iteration: 495 Train loss: 0.001
Epoch: 3/3 Iteration: 500 Train loss: 0.000
```

```
Val acc: 0.948
Epoch: 3/3 Iteration: 505 Train loss: 0.101
Epoch: 3/3 Iteration: 510 Train loss: 0.083
Epoch: 3/3 Iteration: 515 Train loss: 0.000
Epoch: 3/3 Iteration: 520 Train loss: 0.002
Epoch: 3/3 Iteration: 525 Train loss: 0.001
Val acc: 0.957
Epoch: 3/3 Iteration: 530 Train loss: 0.000
Epoch: 3/3 Iteration: 535 Train loss: 0.000
Epoch: 3/3 Iteration: 540 Train loss: 0.000
Epoch: 3/3 Iteration: 545 Train loss: 0.000
Epoch: 3/3 Iteration: 550 Train loss: 0.002
Val acc: 0.957
Epoch: 3/3 Iteration: 555 Train loss: 0.002
Epoch: 3/3 Iteration: 560 Train loss: 0.020
Epoch: 3/3 Iteration: 565 Train loss: 0.034
Epoch: 3/3 Iteration: 570 Train loss: 0.049
Epoch: 3/3 Iteration: 575 Train loss: 0.097
Val acc: 0.957
Epoch: 3/3 Iteration: 580 Train loss: 0.018
Epoch: 3/3 Iteration: 585 Train loss: 0.000
Epoch: 3/3 Iteration: 590 Train loss: 0.000
Epoch: 3/3 Iteration: 595 Train loss: 0.004
Epoch: 3/3 Iteration: 600 Train loss: 0.000
Val acc: 0.948
Epoch: 3/3 Iteration: 605 Train loss: 0.014
Epoch: 3/3 Iteration: 610 Train loss: 0.005
Epoch: 3/3 Iteration: 615 Train loss: 0.000
Epoch: 3/3 Iteration: 620 Train loss: 0.018
Epoch: 3/3 Iteration: 625 Train loss: 0.012
Val acc: 0.948
Epoch: 3/3 Iteration: 630 Train loss: 0.005
Val acc for epoch 3 = 0.9391
Val acc for fold 10 = 0.9391
--------------

Fold - 7 out of 10 ::
--------------
Training on 1059 samples & validating on 117 samples with batch size 5 .
Epoch: 1/3 Iteration: 5 Train loss: 0.000
Epoch: 1/3 Iteration: 10 Train loss: 0.004
Epoch: 1/3 Iteration: 15 Train loss: 0.000
Epoch: 1/3 Iteration: 20 Train loss: 0.000
Epoch: 1/3 Iteration: 25 Train loss: 0.196
Val acc: 0.983
Epoch: 1/3 Iteration: 30 Train loss: 0.007
Epoch: 1/3 Iteration: 35 Train loss: 0.016
Epoch: 1/3 Iteration: 40 Train loss: 0.000
```

```
Epoch: 1/3 Iteration: 45 Train loss: 0.000
Epoch: 1/3 Iteration: 50 Train loss: 0.002
Val acc: 0.991
Epoch: 1/3 Iteration: 55 Train loss: 0.000
Epoch: 1/3 Iteration: 60 Train loss: 0.000
Epoch: 1/3 Iteration: 65 Train loss: 0.150
Epoch: 1/3 Iteration: 70 Train loss: 0.001
Epoch: 1/3 Iteration: 75 Train loss: 0.004
Val acc: 0.991
Epoch: 1/3 Iteration: 80 Train loss: 0.023
Epoch: 1/3 Iteration: 85 Train loss: 0.000
Epoch: 1/3 Iteration: 90 Train loss: 0.005
Epoch: 1/3 Iteration: 95 Train loss: 0.003
Epoch: 1/3 Iteration: 100 Train loss: 0.000
Val acc: 0.983
Epoch: 1/3 Iteration: 105 Train loss: 0.000
Epoch: 1/3 Iteration: 110 Train loss: 0.000
Epoch: 1/3 Iteration: 115 Train loss: 0.073
Epoch: 1/3 Iteration: 120 Train loss: 0.000
Epoch: 1/3 Iteration: 125 Train loss: 0.098
Val acc: 0.991
Epoch: 1/3 Iteration: 130 Train loss: 0.000
Epoch: 1/3 Iteration: 135 Train loss: 0.001
Epoch: 1/3 Iteration: 140 Train loss: 0.153
Epoch: 1/3 Iteration: 145 Train loss: 0.020
Epoch: 1/3 Iteration: 150 Train loss: 0.000
Val acc: 0.983
Epoch: 1/3 Iteration: 155 Train loss: 0.000
Epoch: 1/3 Iteration: 160 Train loss: 0.069
Epoch: 1/3 Iteration: 165 Train loss: 0.064
Epoch: 1/3 Iteration: 170 Train loss: 0.000
Epoch: 1/3 Iteration: 175 Train loss: 0.000
Val acc: 0.991
Epoch: 1/3 Iteration: 180 Train loss: 0.001
Epoch: 1/3 Iteration: 185 Train loss: 0.011
Epoch: 1/3 Iteration: 190 Train loss: 0.117
Epoch: 1/3 Iteration: 195 Train loss: 0.060
Epoch: 1/3 Iteration: 200 Train loss: 0.009
Val acc: 0.983
Epoch: 1/3 Iteration: 205 Train loss: 0.006
Epoch: 1/3 Iteration: 210 Train loss: 0.001
Val acc for epoch 1 = 0.9826
Epoch: 2/3 Iteration: 215 Train loss: 0.041
Epoch: 2/3 Iteration: 220 Train loss: 0.000
Epoch: 2/3 Iteration: 225 Train loss: 0.000
Val acc: 0.983
Epoch: 2/3 Iteration: 230 Train loss: 0.000
Epoch: 2/3 Iteration: 235 Train loss: 0.000
```

```
Epoch: 2/3 Iteration: 240 Train loss: 0.000
Epoch: 2/3 Iteration: 245 Train loss: 0.020
Epoch: 2/3 Iteration: 250 Train loss: 0.030
Val acc: 0.983
Epoch: 2/3 Iteration: 255 Train loss: 0.000
Epoch: 2/3 Iteration: 260 Train loss: 0.000
Epoch: 2/3 Iteration: 265 Train loss: 0.000
Epoch: 2/3 Iteration: 270 Train loss: 0.000
Epoch: 2/3 Iteration: 275 Train loss: 0.000
Val acc: 0.983
Epoch: 2/3 Iteration: 280 Train loss: 0.194
Epoch: 2/3 Iteration: 285 Train loss: 0.001
Epoch: 2/3 Iteration: 290 Train loss: 0.000
Epoch: 2/3 Iteration: 295 Train loss: 0.001
Epoch: 2/3 Iteration: 300 Train loss: 0.000
Val acc: 0.983
Epoch: 2/3 Iteration: 305 Train loss: 0.000
Epoch: 2/3 Iteration: 310 Train loss: 0.000
Epoch: 2/3 Iteration: 315 Train loss: 0.000
Epoch: 2/3 Iteration: 320 Train loss: 0.062
Epoch: 2/3 Iteration: 325 Train loss: 0.000
Val acc: 0.991
Epoch: 2/3 Iteration: 330 Train loss: 0.001
Epoch: 2/3 Iteration: 335 Train loss: 0.000
Epoch: 2/3 Iteration: 340 Train loss: 0.002
Epoch: 2/3 Iteration: 345 Train loss: 0.000
Epoch: 2/3 Iteration: 350 Train loss: 0.000
Val acc: 0.965
Epoch: 2/3 Iteration: 355 Train loss: 0.001
Epoch: 2/3 Iteration: 360 Train loss: 0.086
Epoch: 2/3 Iteration: 365 Train loss: 0.000
Epoch: 2/3 Iteration: 370 Train loss: 0.004
Epoch: 2/3 Iteration: 375 Train loss: 0.000
Val acc: 0.991
Epoch: 2/3 Iteration: 380 Train loss: 0.001
Epoch: 2/3 Iteration: 385 Train loss: 0.001
Epoch: 2/3 Iteration: 390 Train loss: 0.005
Epoch: 2/3 Iteration: 395 Train loss: 0.062
Epoch: 2/3 Iteration: 400 Train loss: 0.058
Val acc: 0.991
Epoch: 2/3 Iteration: 405 Train loss: 0.003
Epoch: 2/3 Iteration: 410 Train loss: 0.005
Epoch: 2/3 Iteration: 415 Train loss: 0.003
Epoch: 2/3 Iteration: 420 Train loss: 0.002
Val acc for epoch 2 = 0.9913
Epoch: 3/3 Iteration: 425 Train loss: 0.126
Val acc: 0.991
Epoch: 3/3 Iteration: 430 Train loss: 0.000
```

```
Epoch: 3/3 Iteration: 435 Train loss: 0.000
Epoch: 3/3 Iteration: 440 Train loss: 0.162
Epoch: 3/3 Iteration: 445 Train loss: 0.000
Epoch: 3/3 Iteration: 450 Train loss: 0.000
Val acc: 0.991
Epoch: 3/3 Iteration: 455 Train loss: 0.013
Epoch: 3/3 Iteration: 460 Train loss: 0.000
Epoch: 3/3 Iteration: 465 Train loss: 0.000
Epoch: 3/3 Iteration: 470 Train loss: 0.000
Epoch: 3/3 Iteration: 475 Train loss: 0.000
Val acc: 0.991
Epoch: 3/3 Iteration: 480 Train loss: 0.000
Epoch: 3/3 Iteration: 485 Train loss: 0.000
Epoch: 3/3 Iteration: 490 Train loss: 0.000
Epoch: 3/3 Iteration: 495 Train loss: 0.043
Epoch: 3/3 Iteration: 500 Train loss: 0.000
Val acc: 0.991
Epoch: 3/3 Iteration: 505 Train loss: 0.089
Epoch: 3/3 Iteration: 510 Train loss: 0.005
Epoch: 3/3 Iteration: 515 Train loss: 0.000
Epoch: 3/3 Iteration: 520 Train loss: 0.000
Epoch: 3/3 Iteration: 525 Train loss: 0.000
Val acc: 0.983
Epoch: 3/3 Iteration: 530 Train loss: 0.000
Epoch: 3/3 Iteration: 535 Train loss: 0.000
Epoch: 3/3 Iteration: 540 Train loss: 0.000
Epoch: 3/3 Iteration: 545 Train loss: 0.000
Epoch: 3/3 Iteration: 550 Train loss: 0.000
Val acc: 0.983
Epoch: 3/3 Iteration: 555 Train loss: 0.000
Epoch: 3/3 Iteration: 560 Train loss: 0.000
Epoch: 3/3 Iteration: 565 Train loss: 0.003
Epoch: 3/3 Iteration: 570 Train loss: 0.025
Epoch: 3/3 Iteration: 575 Train loss: 0.014
Val acc: 0.983
Epoch: 3/3 Iteration: 580 Train loss: 0.083
Epoch: 3/3 Iteration: 585 Train loss: 0.003
Epoch: 3/3 Iteration: 590 Train loss: 0.005
Epoch: 3/3 Iteration: 595 Train loss: 0.000
Epoch: 3/3 Iteration: 600 Train loss: 0.000
Val acc: 0.991
Epoch: 3/3 Iteration: 605 Train loss: 0.015
Epoch: 3/3 Iteration: 610 Train loss: 0.003
Epoch: 3/3 Iteration: 615 Train loss: 0.000
Epoch: 3/3 Iteration: 620 Train loss: 0.013
Epoch: 3/3 Iteration: 625 Train loss: 0.001
Val acc: 0.991
Epoch: 3/3 Iteration: 630 Train loss: 0.001
```

```
Val acc for epoch 3 = 0.9913
Val acc for fold 10 = 0.9913
--------------

Fold - 8 out of 10 ::
--------------
Training on 1059 samples & validating on 117 samples with batch size 5 .
Epoch: 1/3 Iteration: 5 Train loss: 0.000
Epoch: 1/3 Iteration: 10 Train loss: 0.000
Epoch: 1/3 Iteration: 15 Train loss: 0.000
Epoch: 1/3 Iteration: 20 Train loss: 0.000
Epoch: 1/3 Iteration: 25 Train loss: 0.197
Val acc: 0.991
Epoch: 1/3 Iteration: 30 Train loss: 0.004
Epoch: 1/3 Iteration: 35 Train loss: 0.000
Epoch: 1/3 Iteration: 40 Train loss: 0.000
Epoch: 1/3 Iteration: 45 Train loss: 0.000
Epoch: 1/3 Iteration: 50 Train loss: 0.001
Val acc: 0.991
Epoch: 1/3 Iteration: 55 Train loss: 0.000
Epoch: 1/3 Iteration: 60 Train loss: 0.000
Epoch: 1/3 Iteration: 65 Train loss: 0.045
Epoch: 1/3 Iteration: 70 Train loss: 0.000
Epoch: 1/3 Iteration: 75 Train loss: 0.001
Val acc: 0.991
Epoch: 1/3 Iteration: 80 Train loss: 0.000
Epoch: 1/3 Iteration: 85 Train loss: 0.000
Epoch: 1/3 Iteration: 90 Train loss: 0.003
Epoch: 1/3 Iteration: 95 Train loss: 0.000
Epoch: 1/3 Iteration: 100 Train loss: 0.000
Val acc: 0.983
Epoch: 1/3 Iteration: 105 Train loss: 0.001
Epoch: 1/3 Iteration: 110 Train loss: 0.000
Epoch: 1/3 Iteration: 115 Train loss: 0.000
Epoch: 1/3 Iteration: 120 Train loss: 0.000
Epoch: 1/3 Iteration: 125 Train loss: 0.046
Val acc: 0.974
Epoch: 1/3 Iteration: 130 Train loss: 0.000
Epoch: 1/3 Iteration: 135 Train loss: 0.000
Epoch: 1/3 Iteration: 140 Train loss: 0.188
Epoch: 1/3 Iteration: 145 Train loss: 0.000
Epoch: 1/3 Iteration: 150 Train loss: 0.000
Val acc: 0.974
Epoch: 1/3 Iteration: 155 Train loss: 0.003
Epoch: 1/3 Iteration: 160 Train loss: 0.002
Epoch: 1/3 Iteration: 165 Train loss: 0.064
Epoch: 1/3 Iteration: 170 Train loss: 0.000
Epoch: 1/3 Iteration: 175 Train loss: 0.000
```

```
Val acc: 0.983
Epoch: 1/3 Iteration: 180 Train loss: 0.008
Epoch: 1/3 Iteration: 185 Train loss: 0.036
Epoch: 1/3 Iteration: 190 Train loss: 0.012
Epoch: 1/3 Iteration: 195 Train loss: 0.012
Epoch: 1/3 Iteration: 200 Train loss: 0.027
Val acc: 0.991
Epoch: 1/3 Iteration: 205 Train loss: 0.031
Epoch: 1/3 Iteration: 210 Train loss: 0.002
Val acc for epoch 1 = 0.9913
Epoch: 2/3 Iteration: 215 Train loss: 0.065
Epoch: 2/3 Iteration: 220 Train loss: 0.000
Epoch: 2/3 Iteration: 225 Train loss: 0.000
Val acc: 0.991
Epoch: 2/3 Iteration: 230 Train loss: 0.000
Epoch: 2/3 Iteration: 235 Train loss: 0.000
Epoch: 2/3 Iteration: 240 Train loss: 0.000
Epoch: 2/3 Iteration: 245 Train loss: 0.006
Epoch: 2/3 Iteration: 250 Train loss: 0.051
Val acc: 0.983
Epoch: 2/3 Iteration: 255 Train loss: 0.000
Epoch: 2/3 Iteration: 260 Train loss: 0.000
Epoch: 2/3 Iteration: 265 Train loss: 0.000
Epoch: 2/3 Iteration: 270 Train loss: 0.000
Epoch: 2/3 Iteration: 275 Train loss: 0.000
Val acc: 0.983
Epoch: 2/3 Iteration: 280 Train loss: 0.197
Epoch: 2/3 Iteration: 285 Train loss: 0.000
Epoch: 2/3 Iteration: 290 Train loss: 0.000
Epoch: 2/3 Iteration: 295 Train loss: 0.000
Epoch: 2/3 Iteration: 300 Train loss: 0.000
Val acc: 0.983
Epoch: 2/3 Iteration: 305 Train loss: 0.000
Epoch: 2/3 Iteration: 310 Train loss: 0.000
Epoch: 2/3 Iteration: 315 Train loss: 0.000
Epoch: 2/3 Iteration: 320 Train loss: 0.000
Epoch: 2/3 Iteration: 325 Train loss: 0.000
Val acc: 0.965
Epoch: 2/3 Iteration: 330 Train loss: 0.000
Epoch: 2/3 Iteration: 335 Train loss: 0.000
Epoch: 2/3 Iteration: 340 Train loss: 0.000
Epoch: 2/3 Iteration: 345 Train loss: 0.000
Epoch: 2/3 Iteration: 350 Train loss: 0.000
Val acc: 0.965
Epoch: 2/3 Iteration: 355 Train loss: 0.000
Epoch: 2/3 Iteration: 360 Train loss: 0.002
Epoch: 2/3 Iteration: 365 Train loss: 0.027
Epoch: 2/3 Iteration: 370 Train loss: 0.032
```

```
Epoch: 2/3 Iteration: 375 Train loss: 0.000
Val acc: 0.974
Epoch: 2/3 Iteration: 380 Train loss: 0.000
Epoch: 2/3 Iteration: 385 Train loss: 0.000
Epoch: 2/3 Iteration: 390 Train loss: 0.001
Epoch: 2/3 Iteration: 395 Train loss: 0.088
Epoch: 2/3 Iteration: 400 Train loss: 0.043
Val acc: 0.991
Epoch: 2/3 Iteration: 405 Train loss: 0.000
Epoch: 2/3 Iteration: 410 Train loss: 0.014
Epoch: 2/3 Iteration: 415 Train loss: 0.001
Epoch: 2/3 Iteration: 420 Train loss: 0.000
Val acc for epoch 2 = 0.9913
Epoch: 3/3 Iteration: 425 Train loss: 0.002
Val acc: 0.991
Epoch: 3/3 Iteration: 430 Train loss: 0.000
Epoch: 3/3 Iteration: 435 Train loss: 0.000
Epoch: 3/3 Iteration: 440 Train loss: 0.053
Epoch: 3/3 Iteration: 445 Train loss: 0.000
Epoch: 3/3 Iteration: 450 Train loss: 0.000
Val acc: 0.991
Epoch: 3/3 Iteration: 455 Train loss: 0.000
Epoch: 3/3 Iteration: 460 Train loss: 0.003
Epoch: 3/3 Iteration: 465 Train loss: 0.000
Epoch: 3/3 Iteration: 470 Train loss: 0.000
Epoch: 3/3 Iteration: 475 Train loss: 0.000
Val acc: 0.991
Epoch: 3/3 Iteration: 480 Train loss: 0.000
Epoch: 3/3 Iteration: 485 Train loss: 0.000
Epoch: 3/3 Iteration: 490 Train loss: 0.000
Epoch: 3/3 Iteration: 495 Train loss: 0.000
Epoch: 3/3 Iteration: 500 Train loss: 0.000
Val acc: 0.991
Epoch: 3/3 Iteration: 505 Train loss: 0.069
Epoch: 3/3 Iteration: 510 Train loss: 0.182
Epoch: 3/3 Iteration: 515 Train loss: 0.000
Epoch: 3/3 Iteration: 520 Train loss: 0.000
Epoch: 3/3 Iteration: 525 Train loss: 0.000
Val acc: 0.991
Epoch: 3/3 Iteration: 530 Train loss: 0.000
Epoch: 3/3 Iteration: 535 Train loss: 0.000
Epoch: 3/3 Iteration: 540 Train loss: 0.000
Epoch: 3/3 Iteration: 545 Train loss: 0.000
Epoch: 3/3 Iteration: 550 Train loss: 0.000
Val acc: 0.983
Epoch: 3/3 Iteration: 555 Train loss: 0.000
Epoch: 3/3 Iteration: 560 Train loss: 0.000
Epoch: 3/3 Iteration: 565 Train loss: 0.000
```

```
Epoch: 3/3 Iteration: 570 Train loss: 0.000
Epoch: 3/3 Iteration: 575 Train loss: 0.026
Val acc: 0.965
Epoch: 3/3 Iteration: 580 Train loss: 0.000
Epoch: 3/3 Iteration: 585 Train loss: 0.011
Epoch: 3/3 Iteration: 590 Train loss: 0.000
Epoch: 3/3 Iteration: 595 Train loss: 0.000
Epoch: 3/3 Iteration: 600 Train loss: 0.001
Val acc: 0.991
Epoch: 3/3 Iteration: 605 Train loss: 0.011
Epoch: 3/3 Iteration: 610 Train loss: 0.021
Epoch: 3/3 Iteration: 615 Train loss: 0.002
Epoch: 3/3 Iteration: 620 Train loss: 0.013
Epoch: 3/3 Iteration: 625 Train loss: 0.004
Val acc: 0.991
Epoch: 3/3 Iteration: 630 Train loss: 0.000
Val acc for epoch 3 = 0.9826
Val acc for fold 10 = 0.9826
--------------

Fold - 9 out of 10 ::
--------------
Training on 1059 samples & validating on 117 samples with batch size 5 .
Epoch: 1/3 Iteration: 5 Train loss: 0.000
Epoch: 1/3 Iteration: 10 Train loss: 0.000
Epoch: 1/3 Iteration: 15 Train loss: 0.000
Epoch: 1/3 Iteration: 20 Train loss: 0.000
Epoch: 1/3 Iteration: 25 Train loss: 0.314
Val acc: 1.000
Epoch: 1/3 Iteration: 30 Train loss: 0.002
Epoch: 1/3 Iteration: 35 Train loss: 0.000
Epoch: 1/3 Iteration: 40 Train loss: 0.000
Epoch: 1/3 Iteration: 45 Train loss: 0.000
Epoch: 1/3 Iteration: 50 Train loss: 0.000
Val acc: 1.000
Epoch: 1/3 Iteration: 55 Train loss: 0.000
Epoch: 1/3 Iteration: 60 Train loss: 0.000
Epoch: 1/3 Iteration: 65 Train loss: 0.001
Epoch: 1/3 Iteration: 70 Train loss: 0.000
Epoch: 1/3 Iteration: 75 Train loss: 0.000
Val acc: 1.000
Epoch: 1/3 Iteration: 80 Train loss: 0.000
Epoch: 1/3 Iteration: 85 Train loss: 0.000
Epoch: 1/3 Iteration: 90 Train loss: 0.002
Epoch: 1/3 Iteration: 95 Train loss: 0.000
Epoch: 1/3 Iteration: 100 Train loss: 0.000
Val acc: 0.991
Epoch: 1/3 Iteration: 105 Train loss: 0.000
```

```
Epoch: 1/3 Iteration: 110 Train loss: 0.000
Epoch: 1/3 Iteration: 115 Train loss: 0.000
Epoch: 1/3 Iteration: 120 Train loss: 0.000
Epoch: 1/3 Iteration: 125 Train loss: 0.015
Val acc: 0.983
Epoch: 1/3 Iteration: 130 Train loss: 0.000
Epoch: 1/3 Iteration: 135 Train loss: 0.000
Epoch: 1/3 Iteration: 140 Train loss: 0.141
Epoch: 1/3 Iteration: 145 Train loss: 0.000
Epoch: 1/3 Iteration: 150 Train loss: 0.000
Val acc: 0.983
Epoch: 1/3 Iteration: 155 Train loss: 0.000
Epoch: 1/3 Iteration: 160 Train loss: 0.000
Epoch: 1/3 Iteration: 165 Train loss: 0.006
Epoch: 1/3 Iteration: 170 Train loss: 0.001
Epoch: 1/3 Iteration: 175 Train loss: 0.000
Val acc: 1.000
Epoch: 1/3 Iteration: 180 Train loss: 0.000
Epoch: 1/3 Iteration: 185 Train loss: 0.072
Epoch: 1/3 Iteration: 190 Train loss: 0.012
Epoch: 1/3 Iteration: 195 Train loss: 0.007
Epoch: 1/3 Iteration: 200 Train loss: 0.032
Val acc: 0.991
Epoch: 1/3 Iteration: 205 Train loss: 0.006
Epoch: 1/3 Iteration: 210 Train loss: 0.001
Val acc for epoch 1 = 1.0000
Epoch: 2/3 Iteration: 215 Train loss: 0.102
Epoch: 2/3 Iteration: 220 Train loss: 0.000
Epoch: 2/3 Iteration: 225 Train loss: 0.000
Val acc: 1.000
Epoch: 2/3 Iteration: 230 Train loss: 0.000
Epoch: 2/3 Iteration: 235 Train loss: 0.000
Epoch: 2/3 Iteration: 240 Train loss: 0.009
Epoch: 2/3 Iteration: 245 Train loss: 0.001
Epoch: 2/3 Iteration: 250 Train loss: 0.044
Val acc: 1.000
Epoch: 2/3 Iteration: 255 Train loss: 0.000
Epoch: 2/3 Iteration: 260 Train loss: 0.000
Epoch: 2/3 Iteration: 265 Train loss: 0.000
Epoch: 2/3 Iteration: 270 Train loss: 0.000
Epoch: 2/3 Iteration: 275 Train loss: 0.000
Val acc: 1.000
Epoch: 2/3 Iteration: 280 Train loss: 0.005
Epoch: 2/3 Iteration: 285 Train loss: 0.000
Epoch: 2/3 Iteration: 290 Train loss: 0.000
Epoch: 2/3 Iteration: 295 Train loss: 0.000
Epoch: 2/3 Iteration: 300 Train loss: 0.000
Val acc: 1.000
```

```
Epoch: 2/3 Iteration: 305 Train loss: 0.000
Epoch: 2/3 Iteration: 310 Train loss: 0.000
Epoch: 2/3 Iteration: 315 Train loss: 0.000
Epoch: 2/3 Iteration: 320 Train loss: 0.000
Epoch: 2/3 Iteration: 325 Train loss: 0.000
Val acc: 0.991
Epoch: 2/3 Iteration: 330 Train loss: 0.000
Epoch: 2/3 Iteration: 335 Train loss: 0.000
Epoch: 2/3 Iteration: 340 Train loss: 0.000
Epoch: 2/3 Iteration: 345 Train loss: 0.000
Epoch: 2/3 Iteration: 350 Train loss: 0.000
Val acc: 0.991
Epoch: 2/3 Iteration: 355 Train loss: 0.000
Epoch: 2/3 Iteration: 360 Train loss: 0.000
Epoch: 2/3 Iteration: 365 Train loss: 0.080
Epoch: 2/3 Iteration: 370 Train loss: 0.020
Epoch: 2/3 Iteration: 375 Train loss: 0.000
Val acc: 1.000
Epoch: 2/3 Iteration: 380 Train loss: 0.021
Epoch: 2/3 Iteration: 385 Train loss: 0.000
Epoch: 2/3 Iteration: 390 Train loss: 0.001
Epoch: 2/3 Iteration: 395 Train loss: 0.000
Epoch: 2/3 Iteration: 400 Train loss: 0.099
Val acc: 1.000
Epoch: 2/3 Iteration: 405 Train loss: 0.000
Epoch: 2/3 Iteration: 410 Train loss: 0.003
Epoch: 2/3 Iteration: 415 Train loss: 0.000
Epoch: 2/3 Iteration: 420 Train loss: 0.000
Val acc for epoch 2 = 1.0000
Epoch: 3/3 Iteration: 425 Train loss: 0.003
Val acc: 1.000
Epoch: 3/3 Iteration: 430 Train loss: 0.000
Epoch: 3/3 Iteration: 435 Train loss: 0.005
Epoch: 3/3 Iteration: 440 Train loss: 0.105
Epoch: 3/3 Iteration: 445 Train loss: 0.000
Epoch: 3/3 Iteration: 450 Train loss: 0.000
Val acc: 1.000
Epoch: 3/3 Iteration: 455 Train loss: 0.000
Epoch: 3/3 Iteration: 460 Train loss: 0.000
Epoch: 3/3 Iteration: 465 Train loss: 0.000
Epoch: 3/3 Iteration: 470 Train loss: 0.000
Epoch: 3/3 Iteration: 475 Train loss: 0.000
Val acc: 1.000
Epoch: 3/3 Iteration: 480 Train loss: 0.000
Epoch: 3/3 Iteration: 485 Train loss: 0.000
Epoch: 3/3 Iteration: 490 Train loss: 0.000
Epoch: 3/3 Iteration: 495 Train loss: 0.000
Epoch: 3/3 Iteration: 500 Train loss: 0.000
```

```
Val acc: 1.000
Epoch: 3/3 Iteration: 505 Train loss: 0.009
Epoch: 3/3 Iteration: 510 Train loss: 0.000
Epoch: 3/3 Iteration: 515 Train loss: 0.000
Epoch: 3/3 Iteration: 520 Train loss: 0.002
Epoch: 3/3 Iteration: 525 Train loss: 0.000
Val acc: 0.991
Epoch: 3/3 Iteration: 530 Train loss: 0.000
Epoch: 3/3 Iteration: 535 Train loss: 0.000
Epoch: 3/3 Iteration: 540 Train loss: 0.035
Epoch: 3/3 Iteration: 545 Train loss: 0.000
Epoch: 3/3 Iteration: 550 Train loss: 0.000
Val acc: 1.000
Epoch: 3/3 Iteration: 555 Train loss: 0.000
Epoch: 3/3 Iteration: 560 Train loss: 0.000
Epoch: 3/3 Iteration: 565 Train loss: 0.000
Epoch: 3/3 Iteration: 570 Train loss: 0.000
Epoch: 3/3 Iteration: 575 Train loss: 0.002
Val acc: 0.974
Epoch: 3/3 Iteration: 580 Train loss: 0.000
Epoch: 3/3 Iteration: 585 Train loss: 0.000
Epoch: 3/3 Iteration: 590 Train loss: 0.000
Epoch: 3/3 Iteration: 595 Train loss: 0.000
Epoch: 3/3 Iteration: 600 Train loss: 0.000
Val acc: 0.991
Epoch: 3/3 Iteration: 605 Train loss: 0.108
Epoch: 3/3 Iteration: 610 Train loss: 0.007
Epoch: 3/3 Iteration: 615 Train loss: 0.016
Epoch: 3/3 Iteration: 620 Train loss: 0.005
Epoch: 3/3 Iteration: 625 Train loss: 0.001
Val acc: 0.991
Epoch: 3/3 Iteration: 630 Train loss: 0.000
Val acc for epoch 3 = 0.9913
Val acc for fold 10 = 0.9913
--------------

Fold - 10 out of 10 ::
--------------
Training on 1059 samples & validating on 117 samples with batch size 5 .
Epoch: 1/3 Iteration: 5 Train loss: 0.001
Epoch: 1/3 Iteration: 10 Train loss: 0.001
Epoch: 1/3 Iteration: 15 Train loss: 0.000
Epoch: 1/3 Iteration: 20 Train loss: 0.000
Epoch: 1/3 Iteration: 25 Train loss: 0.199
Val acc: 1.000
Epoch: 1/3 Iteration: 30 Train loss: 0.002
Epoch: 1/3 Iteration: 35 Train loss: 0.099
Epoch: 1/3 Iteration: 40 Train loss: 0.000
```

```
Epoch: 1/3 Iteration: 45 Train loss: 0.187
Epoch: 1/3 Iteration: 50 Train loss: 0.000
Val acc: 0.991
Epoch: 1/3 Iteration: 55 Train loss: 0.000
Epoch: 1/3 Iteration: 60 Train loss: 0.000
Epoch: 1/3 Iteration: 65 Train loss: 0.001
Epoch: 1/3 Iteration: 70 Train loss: 0.000
Epoch: 1/3 Iteration: 75 Train loss: 0.000
Val acc: 0.991
Epoch: 1/3 Iteration: 80 Train loss: 0.000
Epoch: 1/3 Iteration: 85 Train loss: 0.000
Epoch: 1/3 Iteration: 90 Train loss: 0.000
Epoch: 1/3 Iteration: 95 Train loss: 0.000
Epoch: 1/3 Iteration: 100 Train loss: 0.000
Val acc: 0.983
Epoch: 1/3 Iteration: 105 Train loss: 0.000
Epoch: 1/3 Iteration: 110 Train loss: 0.000
Epoch: 1/3 Iteration: 115 Train loss: 0.000
Epoch: 1/3 Iteration: 120 Train loss: 0.000
Epoch: 1/3 Iteration: 125 Train loss: 0.052
Val acc: 0.983
Epoch: 1/3 Iteration: 130 Train loss: 0.000
Epoch: 1/3 Iteration: 135 Train loss: 0.000
Epoch: 1/3 Iteration: 140 Train loss: 0.192
Epoch: 1/3 Iteration: 145 Train loss: 0.000
Epoch: 1/3 Iteration: 150 Train loss: 0.013
Val acc: 0.983
Epoch: 1/3 Iteration: 155 Train loss: 0.000
Epoch: 1/3 Iteration: 160 Train loss: 0.001
Epoch: 1/3 Iteration: 165 Train loss: 0.057
Epoch: 1/3 Iteration: 170 Train loss: 0.000
Epoch: 1/3 Iteration: 175 Train loss: 0.004
Val acc: 0.991
Epoch: 1/3 Iteration: 180 Train loss: 0.000
Epoch: 1/3 Iteration: 185 Train loss: 0.087
Epoch: 1/3 Iteration: 190 Train loss: 0.000
Epoch: 1/3 Iteration: 195 Train loss: 0.000
Epoch: 1/3 Iteration: 200 Train loss: 0.000
Val acc: 1.000
Epoch: 1/3 Iteration: 205 Train loss: 0.001
Epoch: 1/3 Iteration: 210 Train loss: 0.000
Val acc for epoch 1 = 1.0000
Epoch: 2/3 Iteration: 215 Train loss: 0.056
Epoch: 2/3 Iteration: 220 Train loss: 0.000
Epoch: 2/3 Iteration: 225 Train loss: 0.000
Val acc: 0.991
Epoch: 2/3 Iteration: 230 Train loss: 0.000
Epoch: 2/3 Iteration: 235 Train loss: 0.000
```

```
Epoch: 2/3 Iteration: 240 Train loss: 0.000
Epoch: 2/3 Iteration: 245 Train loss: 0.001
Epoch: 2/3 Iteration: 250 Train loss: 0.029
Val acc: 0.991
Epoch: 2/3 Iteration: 255 Train loss: 0.000
Epoch: 2/3 Iteration: 260 Train loss: 0.000
Epoch: 2/3 Iteration: 265 Train loss: 0.000
Epoch: 2/3 Iteration: 270 Train loss: 0.000
Epoch: 2/3 Iteration: 275 Train loss: 0.000
Val acc: 0.991
Epoch: 2/3 Iteration: 280 Train loss: 0.000
Epoch: 2/3 Iteration: 285 Train loss: 0.000
Epoch: 2/3 Iteration: 290 Train loss: 0.000
Epoch: 2/3 Iteration: 295 Train loss: 0.000
Epoch: 2/3 Iteration: 300 Train loss: 0.000
Val acc: 0.991
Epoch: 2/3 Iteration: 305 Train loss: 0.000
Epoch: 2/3 Iteration: 310 Train loss: 0.000
Epoch: 2/3 Iteration: 315 Train loss: 0.000
Epoch: 2/3 Iteration: 320 Train loss: 0.000
Epoch: 2/3 Iteration: 325 Train loss: 0.013
Val acc: 1.000
Epoch: 2/3 Iteration: 330 Train loss: 0.000
Epoch: 2/3 Iteration: 335 Train loss: 0.000
Epoch: 2/3 Iteration: 340 Train loss: 0.002
Epoch: 2/3 Iteration: 345 Train loss: 0.105
Epoch: 2/3 Iteration: 350 Train loss: 0.000
Val acc: 1.000
Epoch: 2/3 Iteration: 355 Train loss: 0.000
Epoch: 2/3 Iteration: 360 Train loss: 0.000
Epoch: 2/3 Iteration: 365 Train loss: 0.006
Epoch: 2/3 Iteration: 370 Train loss: 0.007
Epoch: 2/3 Iteration: 375 Train loss: 0.000
Val acc: 1.000
Epoch: 2/3 Iteration: 380 Train loss: 0.005
Epoch: 2/3 Iteration: 385 Train loss: 0.000
Epoch: 2/3 Iteration: 390 Train loss: 0.000
Epoch: 2/3 Iteration: 395 Train loss: 0.000
Epoch: 2/3 Iteration: 400 Train loss: 0.000
Val acc: 1.000
Epoch: 2/3 Iteration: 405 Train loss: 0.000
Epoch: 2/3 Iteration: 410 Train loss: 0.000
Epoch: 2/3 Iteration: 415 Train loss: 0.000
Epoch: 2/3 Iteration: 420 Train loss: 0.002
Val acc for epoch 2 = 0.9826
Epoch: 3/3 Iteration: 425 Train loss: 0.000
Val acc: 0.983
Epoch: 3/3 Iteration: 430 Train loss: 0.000
```

```
Epoch: 3/3 Iteration: 435 Train loss: 0.000
Epoch: 3/3 Iteration: 440 Train loss: 0.191
Epoch: 3/3 Iteration: 445 Train loss: 0.000
Epoch: 3/3 Iteration: 450 Train loss: 0.000
Val acc: 0.983
Epoch: 3/3 Iteration: 455 Train loss: 0.033
Epoch: 3/3 Iteration: 460 Train loss: 0.000
Epoch: 3/3 Iteration: 465 Train loss: 0.000
Epoch: 3/3 Iteration: 470 Train loss: 0.000
Epoch: 3/3 Iteration: 475 Train loss: 0.000
Val acc: 0.991
Epoch: 3/3 Iteration: 480 Train loss: 0.000
Epoch: 3/3 Iteration: 485 Train loss: 0.000
Epoch: 3/3 Iteration: 490 Train loss: 0.000
Epoch: 3/3 Iteration: 495 Train loss: 0.000
Epoch: 3/3 Iteration: 500 Train loss: 0.000
Val acc: 0.991
Epoch: 3/3 Iteration: 505 Train loss: 0.079
Epoch: 3/3 Iteration: 510 Train loss: 0.000
Epoch: 3/3 Iteration: 515 Train loss: 0.000
Epoch: 3/3 Iteration: 520 Train loss: 0.000
Epoch: 3/3 Iteration: 525 Train loss: 0.000
Val acc: 1.000
Epoch: 3/3 Iteration: 530 Train loss: 0.000
Epoch: 3/3 Iteration: 535 Train loss: 0.000
Epoch: 3/3 Iteration: 540 Train loss: 0.000
Epoch: 3/3 Iteration: 545 Train loss: 0.040
Epoch: 3/3 Iteration: 550 Train loss: 0.001
Val acc: 1.000
Epoch: 3/3 Iteration: 555 Train loss: 0.182
Epoch: 3/3 Iteration: 560 Train loss: 0.000
Epoch: 3/3 Iteration: 565 Train loss: 0.192
Epoch: 3/3 Iteration: 570 Train loss: 0.000
Epoch: 3/3 Iteration: 575 Train loss: 0.001
Val acc: 1.000
Epoch: 3/3 Iteration: 580 Train loss: 0.000
Epoch: 3/3 Iteration: 585 Train loss: 0.000
Epoch: 3/3 Iteration: 590 Train loss: 0.000
Epoch: 3/3 Iteration: 595 Train loss: 0.000
Epoch: 3/3 Iteration: 600 Train loss: 0.000
Val acc: 0.991
Epoch: 3/3 Iteration: 605 Train loss: 0.001
Epoch: 3/3 Iteration: 610 Train loss: 0.019
Epoch: 3/3 Iteration: 615 Train loss: 0.000
Epoch: 3/3 Iteration: 620 Train loss: 0.000
Epoch: 3/3 Iteration: 625 Train loss: 0.000
Val acc: 0.991
Epoch: 3/3 Iteration: 630 Train loss: 0.040
```

```
Val acc for epoch 3 = 0.9913
Val acc for fold 10 = 0.9913
--------------

Time elasped = 18707.318468702997 sec(s)
```

```
In [22]: # Testing::
         '''
         test_acc = []
         with tf.Session() as sess:
             saver.restore(sess, checkpointName)
             test_state = sess.run(cell.zero_state(batch_size, tf.float32))
             for ii, (x, y) in enumerate(get_batches(test_x, test_y, batch_size), 1):
                 feed = {inputs_: x,
                         labels_: y[:, None],
                         keep_prob: 1,
                         initial_state: test_state}
                 batch_acc, test_state = sess.run([accuracy, final_state], feed_dict=feed)
                 test_acc.append(batch_acc)
             print("Test accuracy: {:.3f}".format(np.mean(test_acc)))

         '''
```

```
Out[22]: '\ntest_acc = []\nwith tf.Session() as sess:\n    saver.restore(sess, checkpointName)'
```

```
In [24]: print("Accuracy: {:.3f}".format(np.mean(folds_val_acc)))
```

```
Accuracy: 0.844
```

```
In [26]: for acc in folds_val_acc:
           print("{:.3f}".format(acc))
```

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In [0]: