ADTA 5550: Final Project
Important Notes

1. Overview

In training, testing, and evaluating convolutional neural networks in the final project, the student should use **TensorFlow** (Version 1.xx) as the **AI framework** for coding.

2. Important Note 1

As discussed in the syllabus, the course curriculum covers two AI frameworks: TensorFlow and Keras.
--) The **first half** of the course (until midterm) focuses on **Keras**.
--) The **second half** of the course (including final project) focuses on **TensorFlow**.

While working on the final project, it is **required** that the student should use the **TensorFlow** (Version 1.xx) directly as the AI framewrok for **coding**, **not** Keras, as discussed in the lectures (both PDFs & videos) of WEEK 5 and WEEK 6.

3. Important Notes 2

In coding the last phase: Run **tf.Session()** to Train and Test Model, we need to feed the data into the model to **train** the model and **test** it.

Here is an **important note**:

--) While **training** the **model**, we need to slice the training data set into batches to train it so that the model can learn a little bit each time it's trained. We don't want to use the whole data set to train it.

--) While **testing** the **model**, we can feed the whole testing data set into the model and let it predict. We don't need to use small batches of data to test the model

4. Important Note 3: Feed Data into Model

So, while training, feeding the batches into the model:

Like this:

```
batch_x,batch_y = ch.next_batch(100)
sess.run(cnn_trainer,feed_dict={x:batch_x,y_true:batch_y,hold_prob:0.5})
```

OR like this:

```
batch = ch.next_batch(100)
sess.run(cnn_trainer, feed_dict={x: batch[0], y_true: batch[1], hold_prob: 0.5})
```

Then, while testing the model, feed the whole testing data set into the model:
(NOTES: ONLY test the model at each 100th step)

```
print(sess.run(acc,feed_dict={x:ch.test_images,y_true:ch.test_labels,hold_prob:1.0}))
print('\n')
```

5. Important Notes 4: Steps and Epochs

5.1 Overview

While training a neural network, it is required to split the input data set into batches. Then, each batch of data will be fed into the model to train it.

- **STEP**: Each time an input batch is fed into the model during the training
- **EPOCH**: Each time all the input batches (split from the training data set) have been fed into the model during the training

So, STEP and EPOCH are related, but they are not the same.

For example:
--) *It is assumed that a training data set is split into N batches.*
--) *So, to finish an epoch, N steps must be done.*

5.2 Using STEP in the Final Project

In the final project, it is **required** that **STEP** should be used.

5.3 WHY Should We Use STEP?

In coding to train a neural network, either **step** or **epoch** can be used. However, using **STEP** provides a much better **granularity** in managing the training process.

For example:

*--) By using **STEP**, we can **repetitively test** the neural network after some number of STEPS of training. We **do not** have to wait until after the training process has been done.*

*--) In other words, we can **mix** both training and testing processes. As a result, we can **display the results** after each testing to see **how** the neural network is **improving** its performance, i.e., the accuracy level, **along** the training process.*