Homework 2
DNN

Goal

- Given dataset and label
- Use DNN to predict $\hat{y}$
- Calculate Accuracy
- Explain the training process

Hint

- Build a DNN with five hidden layers of 128 neurons each
- Using He initialization : tf.contrib.layers.variance_scaling_initializer()
- Using ELU activation function: tf.nn.elu
- Using Adam optimization : tf.train.AdamOptimizer()
  - Apply early stopping
  - tf.train.Saver()
  - Checkpoint name: Team01_HW2.ckpt
- Using Cross Entropy :tf.nn.sparse_softmax_cross_entropy_with_logits

Hint

- Training on MNIST but only on digits 0 to 4
- softmax output layer with five neurons

```
from tensorflow.examples.tutorials.mnist import input_data
mnist = input_data.read_data_sets("/tmp/data/")

# training on MNIST but only on digits 0 to 4
X_train1 = mnist.train.images[mnist.train.labels < 5]
y_train1 = mnist.train.labels[mnist.train.labels < 5]
X_valid1 = mnist.validation.images[mnist.validation.labels < 5]
y_valid1 = mnist.validation.labels[mnist.validation.labels < 5]
X_test1 = mnist.test.images[mnist.test.labels < 5]
y_test1 = mnist.test.labels[mnist.test.labels < 5]

###### Do not modify here ######
```

```
Extracting /tmp/data/train-images-idx3-ubyte.gz
Extracting /tmp/data/train-labels-idx1-ubyte.gz
Extracting /tmp/data/t10k-images-idx3-ubyte.gz
Extracting /tmp/data/t10k-labels-idx1-ubyte.gz
```

Rule

- Upload to ilms: 40%
  - “屍體” is okay
- Print Accuracy, precision and recall: 30%
  - For testing set
- Explain the training process: 30%
  - Add comment at the end of your code
- Bouns 1 apply cross validation: 10%
  - 5-fold or 10-fold?
  - Print Accuracy, precision and recall
- Bouns 2 adding dropout : 10%
  - Does it help?
  - Print Accuracy, precision and recall

Rule

- Deadline: 11/17 23:59:59
- Naming: Team01_HW2.ipynb
- Add comment on your code
- Copy will get 0 point
- Delay will get 0 point
- Wrong naming will get 0 point