

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: 30%
 - “屍體” is okay
- Add comment on your code: 10%
- 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