HW3

Machine Learning, 2016 Fall

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● Supervised learning

BATCH_SIZE=12
EPOCH=40
loss='categorical_crossentropy'
optimizer='adam'
3 times 2D convolution → 2 layers with 512 neurons → 1 output layer with 10 neurons

training accuracy ≒ 0.80, testing accuracy ≒ 0.47

● Semi-supervised learning (1)

use prediction probability > 0.85 unlabel data to re-train previous model

```
EPOCH=20
for i in range(0,45000):
   if(np.amax(y_predict[i][:])>0.85):
         x_selflearn.append(x_unlabeldata[i])
         y_selflearn.append(model.predict_classes(x_unlabeldata[i:i+1],batch_size=12))
y_selflearn=np_utils.to_categorical(y_selflearn,10)
model.fit(x_selflearn,y_selflearn,batch_size=BATCH_SIZE,nb_epoch=EPOCH)
```

Because my computer cannot afford such large amount of data, I failed to know the accuracy.

● Semi-supervised learning (2)

I didn't implement.

● Compare and analyze your results

1. My computer only have 4G ram.
2. BATCH_SIZE=12，because too large will cause memory allocation crash.
3. After read model, read 45000 unlabel data will cause memory allocation crash. As a result, I cannot test my semi-supervised learning code.
4. If using small model, the performance is too bad to proceed training. That is to say, it is a trade-off between small model and large model.

	Small model	Large model
Pros	enough memory	not enough memory
Cons	bad performance	good performance