2019년 인공지능

- HW 02 -

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1. Deep Feedforward Neural Networks

```
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import LabelEncoder

datax = data[:,1:9]
datay = data[:,0]

trainx,testx,trainy,testy = train_test_split(datax,datay,test_size = 0.3)
e = LabelEncoder();
e.fit(trainy)
trainy_e = e.transform(trainy)
testy_e = e.transform(testy)

#

trainy_e = np.reshape(trainy_e,(-1,1)) # 정규화를 위해 모양을 바꿔줌
```

1. data를 train : test로 분할을 하였다.

```
from sklearn.preprocessing import MinMaxScaler
Scaler = MinMaxScaler()
Scaler.fit(trainx)
Scaler.fit(trainy_e)c
```

```
MinMaxScaler(copy=True, feature_range=(0, 1))
```

2. sklearn.preprocessing.MinMaxScaler를 사용해 변수 정규화를 실행하였다.

```
from sklearn.neural_network import MLPClassifier
clf = MLPClassifier(hidden_layer_sizes=(800,))
clf.fit(trainx,trainy_e)
testy_hat = clf.predict(testx)
```

```
C:₩Users₩micke₩Anaconda3₩lib₩site-packages₩sklearn₩neural_network₩multilayer_perceptron.py:921: Dat
aConversionWarning: A column-vector y was passed when a 1d array was expected. Please change the sh
ape of y to (n_samples, ), for example using ravel().
  y = column_or_1d(y, warn=True)
```

```
dif = testy_e - testy_hat
accuracy = 1 - (np.size(np.where(dif != 0))/np.size(testy_e))
print(accuracy)
```

```
0.5522745411013568
```

3. SKlearn을 이용해서 Classifier A를 만들었다.

```
import tensorflow as tf
import keras
from keras import layers, models, optimizers
from tensorflow.keras.models import Sequential
from keras.utils import to_categorical
```

```
input_shape = (8,)

mlp_model = models.Sequential()
mlp_model.add(layers.Dense(units = 600, activation = 'relu', input_shape=input_shape))
mlp_model.add(layers.Dense(units = 1200, activation = 'relu'))
mlp_model.add(layers.Dense(units = 600, activation = 'relu'))
mlp_model.add(layers.Dense(units = 3, activation = 'softmax'))

mlp_model.compile(optimizer='Adam', loss = 'sparse_categorical_crossentropy', metrics=['accuracy'])
```

```
mlp_model.summary()
```

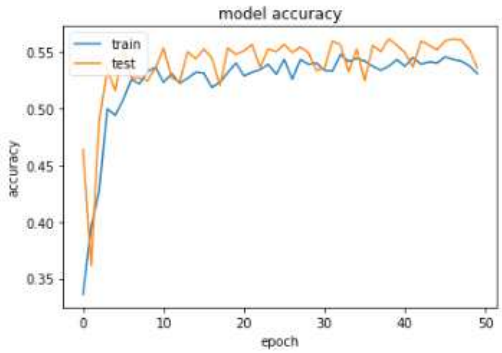
```
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
dense_21 (Dense)             (None, 600)               5400
_________________________________________________________________
dense_22 (Dense)             (None, 1200)              721200
_________________________________________________________________
dense_23 (Dense)             (None, 600)               720600
_________________________________________________________________
dense_24 (Dense)             (None, 3)                 1803
=================================================================
Total params: 1,449,003
Trainable params: 1,449,003
Non-trainable params: 0
_________________________________________________________________
```

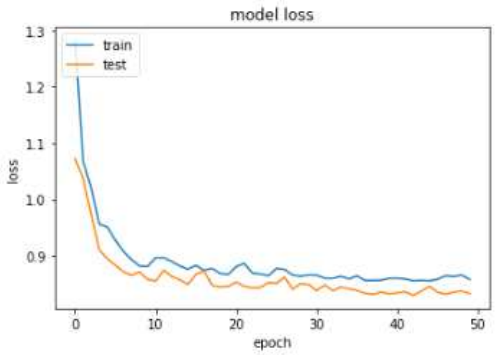
```
history = mlp_model.fit(trainx,trainy_e, validation_data= [testx,testy_e], batch_size= 250, epochs=
```

```
Train on 2923 samples, validate on 1253 samples
Epoch 1/50
2923/2923 [==============================] - 2s 739us/step - loss: 1.2830 - acc: 0.3360 - val_loss:
1.0724 - val_acc: 0.4637
Epoch 2/50
2923/2923 [==============================] - 1s 209us/step - loss: 1.0677 - acc: 0.3958 - val_loss:
1.0370 - val_acc: 0.3615
Epoch 3/50
2923/2923 [==============================] - 1s 211us/step - loss: 1.0207 - acc: 0.4270 - val_loss:
```

4. Keras를 이용해 Classifier B를 만들었다.

```
plt.plot(history.history['acc'])
    plt.plot(history.history['val_acc'])
plt.title('model accuracy')
plt.ylabel('accuracy')
plt.xlabel('epoch')
plt.legend(['train', 'test'], loc='upper left')
plt.show()
# summarize history for loss
plt.plot(history.history['loss'])
plt.plot(history.history['val_loss'])
plt.title('model loss')
plt.ylabel('loss')
plt.xlabel('epoch')
plt.legend(['train', 'test'], loc='upper left')
plt.show()
```






```
max(history.history['val_acc'])
```

0.5610534757114085

5. 정확도는 비슷하다.