Question9

June 6, 2021

[ ]:
```
from keras.models import Sequential
from keras.layers import Dense
import pandas as pd
from sklearn.model_selection import train_test_split

# read dataset
df = pd.read_csv('wine.data')
print(df.shape)
x = df.iloc[:,1:].to_numpy()
y = df.iloc[:,0].to_numpy()

# split train and test dataset
X_train, X_test, y_train, y_test = train_test_split(x, y, test_size=0.3,␣
 ↪random_state=42)
```

[27]:
```
sum_accuracy = 0.0
network = Sequential();
for i in range(1,11):
    print('round:',i)
    network.add(Dense(units=10*i, activation='relu',input_dim=13))
    network.add(Dense(units=1, activation='softmax'))
    network.compile(optimizer='adam',␣
 ↪loss='categorical_crossentropy',metrics=['accuracy'])
    network.fit(X_train, y_train, epochs=10, batch_size=20, verbose=0)
    test_loss, test_accuracy = network.evaluate(X_test, y_test)
    sum_accuracy = test_accuracy+sum_accuracy
# take average
average_acc = sum_accuracy/10
print('average accuracy:',average_acc)
```

```
round: 1
2/2 [==============================] - 0s 2ms/step - loss: 0.0000e+00 -
accuracy: 0.3519
round: 2
2/2 [==============================] - 0s 2ms/step - loss: 0.0000e+00 -
accuracy: 0.3519
round: 3
2/2 [==============================] - 0s 2ms/step - loss: 0.0000e+00 -
```

```
accuracy: 0.3519
round: 4
2/2 [==============================] - 0s 2ms/step - loss: 0.0000e+00 -
accuracy: 0.3519
round: 5
2/2 [==============================] - 0s 2ms/step - loss: 0.0000e+00 -
accuracy: 0.3519
round: 6
2/2 [==============================] - 1s 5ms/step - loss: 0.0000e+00 -
accuracy: 0.3519
round: 7
2/2 [==============================] - 0s 2ms/step - loss: 0.0000e+00 -
accuracy: 0.3519
round: 8
2/2 [==============================] - 1s 2ms/step - loss: 0.0000e+00 -
accuracy: 0.3519
round: 9
2/2 [==============================] - 1s 2ms/step - loss: 0.0000e+00 -
accuracy: 0.3519
round: 10
2/2 [==============================] - 1s 2ms/step - loss: 0.0000e+00 -
accuracy: 0.3519
average accuracy: 0.35185185074806213
```