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Python 3 (ipykernel)

```
[3]: import pandas as pd
from sklearn.datasets import load_breast_cancer

[4]: cancer = load_breast_cancer()

[5]: from sklearn.datasets import load_breast_cancer
cancer = load_breast_cancer()

[6]: cancer.keys()

[6]: dict_keys(['data', 'target', 'frame', 'target_names', 'DESCR', 'feature_names', 'filename', 'data_module'])

[7]: cancer['data'].shape

[7]: (569, 30)

[8]: X = cancer['data']
y = cancer['target']

[9]: from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(X, y)

[10]: from sklearn.preprocessing import StandardScaler
scaler = StandardScaler()
# Fit only to the training data
scaler.fit(X_train)

[10]: StandardScaler
Parameters

[11]: X_train = scaler.transform(X_train)
X_test = scaler.transform(X_test)
```

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JupyterLab Python 3 (ipykernel)

```
[12]: from sklearn.neural_network import MLPClassifier
[13]: mlp = MLPClassifier(hidden_layer_sizes=(30,30,30))
[14]: mlp.fit(X_train,y_train)
[14]: ▾ MLPClassifier
      ▶ Parameters
[15]: predictions = mlp.predict(X_test)
[16]: from sklearn.metrics import classification_report,confusion_matrix
      print(confusion_matrix(y_test,predictions))
      [[56  5]
       [ 0 82]]
[17]: print(classification_report(y_test,predictions))
```

	precision	recall	f1-score	support
0	1.00	0.92	0.96	61
1	0.94	1.00	0.97	82
accuracy			0.97	143
macro avg	0.97	0.96	0.96	143
weighted avg	0.97	0.97	0.96	143

```
[18]: # coefs_ is a list of weight matrices, where weight matrix at index i represents the weights between Layer i and Layer i+1.
      len(mlp.coefs_)
[18]: 4
[19]: len(mlp.coefs_[0])
```

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Kernel: Python 3 (ipykernel)

```
[19]: len(mlp.coefs_[0])
[19]: 30

[20]: # intercepts_ is a list of bias vectors, where the vector at index i represents the bias values added to layer i+1.
      len(mlp.intercepts_[0])
[20]: 30

[21]: X_train = scaler.transform(X_train)
      X_test = scaler.transform(X_test)

[22]: from sklearn.neural_network import MLPClassifier

[23]: mlp = MLPClassifier(hidden_layer_sizes=(30,40,50))

[24]: mlp.fit(X_train,y_train)

[24]: ▼ MLPClassifier
      ▶ Parameters

[25]: predictions = mlp.predict(X_test)

[26]: from sklearn.metrics import classification_report,confusion_matrix
      print(confusion_matrix(y_test,predictions))

[[56  5]
 [ 5 77]]

[27]: print(classification_report(y_test,predictions))
```

	precision	recall	f1-score	support
0	0.92	0.92	0.92	61
1	0.94	0.94	0.94	82

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ANN

Code error troubleshooting

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JupyterLab Python 3 (ipykernel)

[5 77]]

[27]:

```
print(classification_report(y_test,predictions))
```

	precision	recall	f1-score	support
0	0.92	0.92	0.92	61
1	0.94	0.94	0.94	82
accuracy			0.93	143
macro avg	0.93	0.93	0.93	143
weighted avg	0.93	0.93	0.93	143

[28]:

```
# coefs_ is a list of weight matrices, where weight matrix at index i represents the weights between layer i and layer i+1.  
len(mlp.coefs_)
```

[28]: 4

[29]:

```
len(mlp.coefs_[0])
```

[29]: 30

[30]:

```
# intercepts_ is a list of bias vectors, where the vector at index i represents the bias values added to layer i+1.  
len(mlp.intercepts_[0])
```

[30]: 30

[]:

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