HW2_P1P2

October 9, 2022

[2]:
```
"""
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    ECGR 4105 HW2
"""
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
```

[3]:
```
from sklearn.model_selection import train_test_split
```

[7]:
```
diabetes = pd.DataFrame(pd.read_csv("diabetes.csv"))
diabetes.head()
```

[7]:

	Pregnancies	Glucose	BloodPressure	SkinThickness	Insulin	BMI	DiabetesPedigreeFunction	Age	Outcome
0	6	148	72	35	0	33.6	0.627	50	1
1	1	85	66	29	0	26.6	0.351	31	0
2	8	183	64	0	0	23.3	0.672	32	1
3	1	89	66	23	94	28.1	0.167	21	0
4	0	137	40	35	168	43.1	2.288	33	1

[8]:
```
np.random.seed(0)

df_Train, df_Test = train_test_split(diabetes, train_size = 0.8, test_size = 0.
↪2)
```

[11]:
```
df_Train.shape
```

[11]:
```
(614, 9)
```

[12]:
```
df_Test.shape
```

[12]:
```
(154, 9)
```

[23]:
```
X_train = diabetes.iloc[:,[0,1,2,3,4,5,6,7]].values
Y_train = diabetes.iloc[:,8].values
X_test = diabetes.iloc[:,[0,1,2,3,4,5,6,7]].values
Y_test = diabetes.iloc[:,8].values
```

[24]:
```
X_train[0:5]
```

[24]:
```
array([[6.000e+00, 1.480e+02, 7.200e+01, 3.500e+01, 0.000e+00, 3.360e+01,
        6.270e-01, 5.000e+01],
       [1.000e+00, 8.500e+01, 6.600e+01, 2.900e+01, 0.000e+00, 2.660e+01,
        3.510e-01, 3.100e+01],
       [8.000e+00, 1.830e+02, 6.400e+01, 0.000e+00, 0.000e+00, 2.330e+01,
        6.720e-01, 3.200e+01],
       [1.000e+00, 8.900e+01, 6.600e+01, 2.300e+01, 9.400e+01, 2.810e+01,
        1.670e-01, 2.100e+01],
       [0.000e+00, 1.370e+02, 4.000e+01, 3.500e+01, 1.680e+02, 4.310e+01,
        2.288e+00, 3.300e+01]])
```

[25]:
```
from sklearn.preprocessing import StandardScaler
sc_X = StandardScaler()

X_train = sc_X.fit_transform(X_train)
X_test = sc_X.transform(X_test)
```

[28]:
```
from sklearn.linear_model import LogisticRegression

classifer = LogisticRegression(random_state = 0)
classifer.fit(X_train, Y_train)
```

[28]:
```
LogisticRegression(random_state=0)
```

[29]:
```
Y_Pred = classifer.predict(X_test)
```

[35]:
```
from sklearn.metrics import confusion_matrix

cnf_matrix = confusion_matrix(Y_test, Y_Pred)
cnf_matrix
```

[35]:
```
array([[446,  54],
       [112, 156]], dtype=int64)
```

[37]:
```
from sklearn import metrics

print("Accuracy: ", metrics.accuracy_score(Y_test, Y_Pred))
print("Precision: ", metrics.precision_score(Y_test,Y_Pred))
print("Recall: ", metrics.recall_score(Y_test, Y_Pred))
```

```
Accuracy:  0.7838541666666666
Precision:  0.7428571428571429
Recall:  0.582089552238806
```

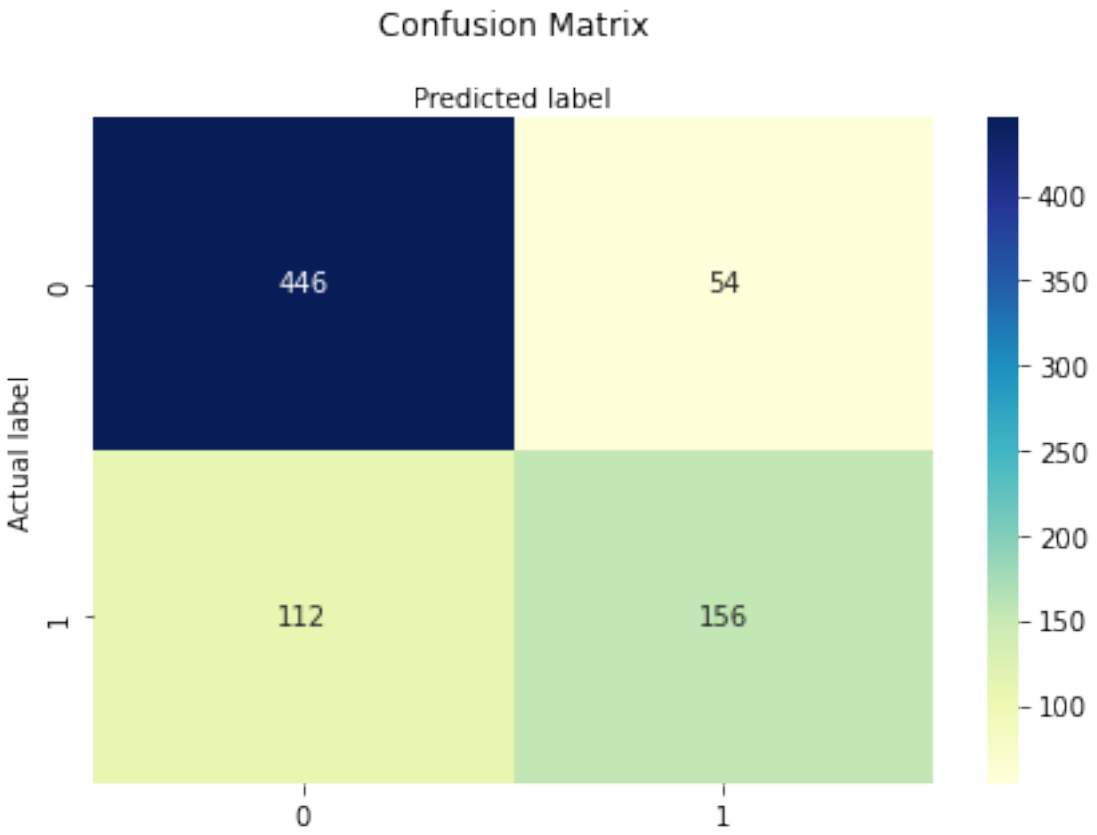
[39]:
```
import seaborn as sns

class_names = [0,1]

fig, ax = plt.subplots()
tick_marks = np.arange(len(class_names))
plt.xticks(tick_marks, class_names)
plt.yticks(tick_marks, class_names)

sns.heatmap(pd.DataFrame(cnf_matrix), annot = True, cmap = "YlGnBu", fmt = 'g')
ax.xaxis.set_label_position("top")
plt.tight_layout()
plt.title('Confusion Matrix', y = 1.1)
plt.ylabel('Actual label')
plt.xlabel('Predicted label')
```

[39]:
```
Text(0.5, 257.44, 'Predicted label')
```



[62]:
```
from sklearn.model_selection import KFold
from sklearn.model_selection import cross_val_score
```

[63]:
```
X = diabetes.iloc[:,[0,1,2,3,4,5,6,7]].values
y = diabetes.iloc[:,8].values
```

[65]:
```
kfold = KFold(n_splits = 5, random_state = 0, shuffle = True)

model = LogisticRegression(solver = 'liblinear')

results = cross_val_score(model, X, y, cv = kfold)

print("Accuracy: %.3f%% (%.3f%%)" % (results.mean()*100.0, results.std()*100.0))
```

```
Accuracy: 76.425% (3.278%)
```

[66]:
```
kfold = KFold(n_splits = 10, random_state = 0, shuffle = True)

model = LogisticRegression(solver = 'liblinear')

results = cross_val_score(model, X, y, cv = kfold)

print("Accuracy: %.3f%% (%.3f%%)" % (results.mean()*100.0, results.std()*100.0))
```

```
Accuracy: 76.818% (3.744%)
```

[ ]:
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```