# 20250607_01

June 7, 2025

[1]:
```
# Loading dataset
from sklearn.datasets import load_breast_cancer

data = load_breast_cancer()
```

[3]:
```
# Defineing features and target
X = data.data
y = data.target
```

[15]:
```
# Train-test split
#Quick reinder : test_size is defaulted to 0.25
from sklearn.model_selection import train_test_split

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size = 0.2,␣
 ↪random_state = 42)
```

[5]:
```
# I use Logistic Regression for this exercise
from sklearn.linear_model import LogisticRegression

model = LogisticRegression(max_iter = 10000)
model.fit(X_train, y_train)
```

[5]:
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LogisticRegression(max_iter=10000)
```

[6]:
```
# Making prediction
y_prediction = model.predict(X_test)
```

[9]:
```
# Making Confusion Matrix
from sklearn.metrics import confusion_matrix

cm = confusion_matrix(y_test, y_prediction)
print("Confusion Matrix:")
print(cm)
```

```
Confusion Matrix:
[[39  4]
 [ 1 70]]
```

[14]:
```
# Using Core Metrics
from sklearn.metrics import accuracy_score, precision_score, recall_score,␣
 ↪f1_score


acc = accuracy_score(y_test, y_prediction)
prec = precision_score(y_test, y_prediction)
rec = recall_score(y_test, y_prediction)
f1 = f1_score(y_test, y_prediction)

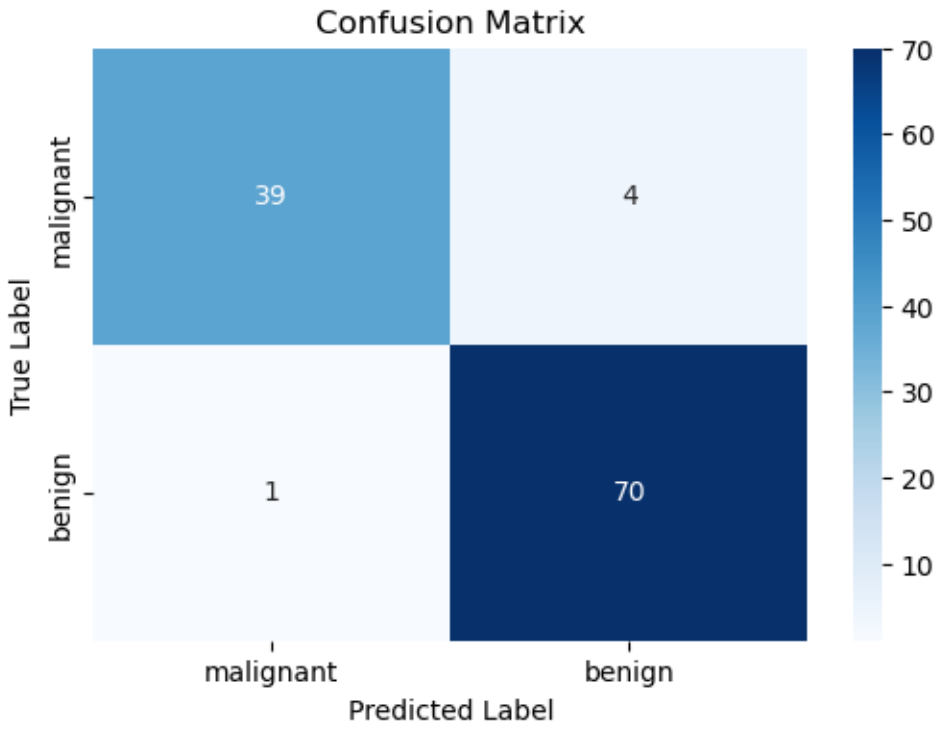
print(f"Accuracy: {acc:.3f}")
print(f"Precision: {prec:.3f}")
print(f"Recall: {rec:.3f}")
print(f"F1 Score: {f1:.3f}")
```

```
Accuracy: 0.956
Precision: 0.946
Recall: 0.986
F1 Score: 0.966
```

[19]:
```
# Plotting
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.metrics import ConfusionMatrixDisplay

# 'annot = True' adds numbers on the plot.
# fmt means the format for annotation, 'd' is for decimal integer, can also be␣
 ↪'f (floating)' or 'g (general)'.
# cmap means colormap, quite self-explanatory.

plt.figure(figsize = (6, 4))
sns.heatmap(cm, annot = True, fmt = 'd', cmap = 'Blues', xticklabels = data.
 ↪target_names, yticklabels = data.target_names)
plt.xlabel('Predicted Label')
plt.ylabel('True Label')
plt.title('Confusion Matrix')
plt.show()
```


Confusion Matrix
True Label
malignant
benign
39
4
1
70
malignant
benign
Predicted Label
70
60
50
40
30
20
10