# ml-lab-5

April 17, 2024

[13]:
```
import numpy as np
import matplotlib.pyplot as plt
from sklearn.datasets import load_breast_cancer
from sklearn.model_selection import cross_val_predict, train_test_split
from sklearn.metrics import confusion_matrix, classification_report,␣
 ↪accuracy_score
from sklearn.ensemble import RandomForestClassifier
```

[14]:
```
breast_cancer = load_breast_cancer()
X = breast_cancer.data
y = breast_cancer.target
```

[15]:
```
X_train, X_test, y_train, y_test = train_test_split( X, y, test_size = 0.2,␣
 ↪random_state=42)
```

[16]:
```
rf = RandomForestClassifier(n_estimators=100)
```

[17]:
```
rf.fit(X_train, y_train)
```

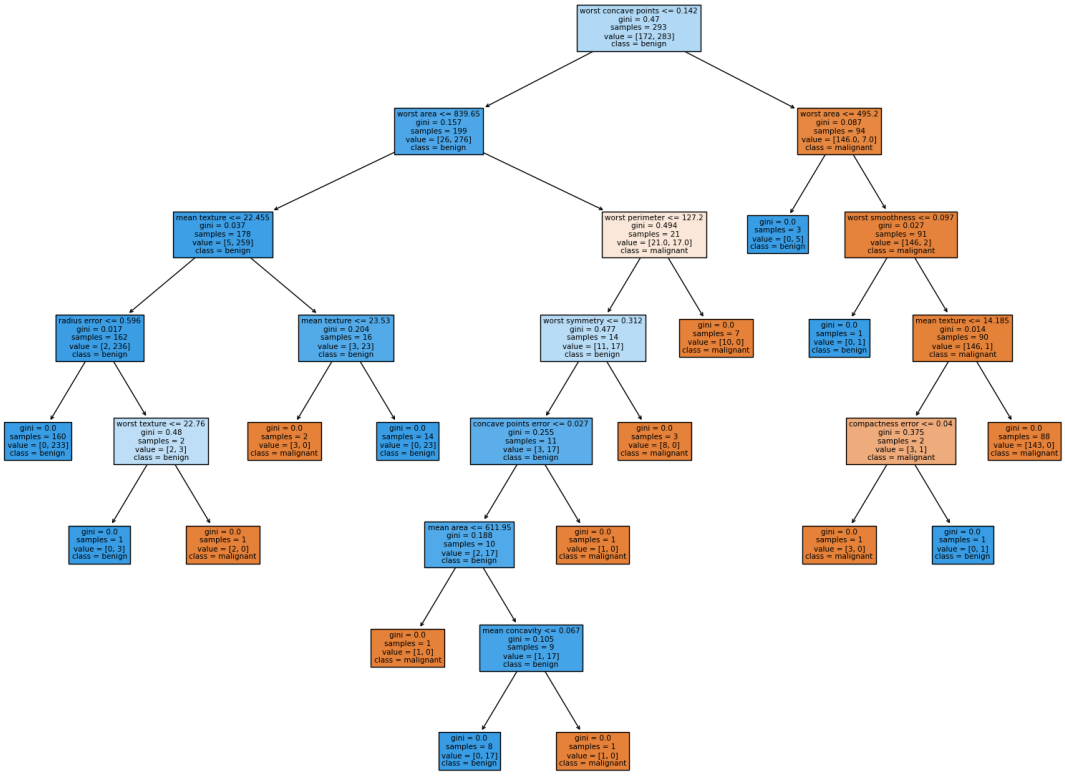
[17]:
```
RandomForestClassifier()
```

[18]:
```
y_pred = rf.predict(X_test)
```

[19]:
```
accuracy = accuracy_score(y_test,y_pred)
print("Accuracy:",accuracy)
```

```
Accuracy: 0.9649122807017544
```

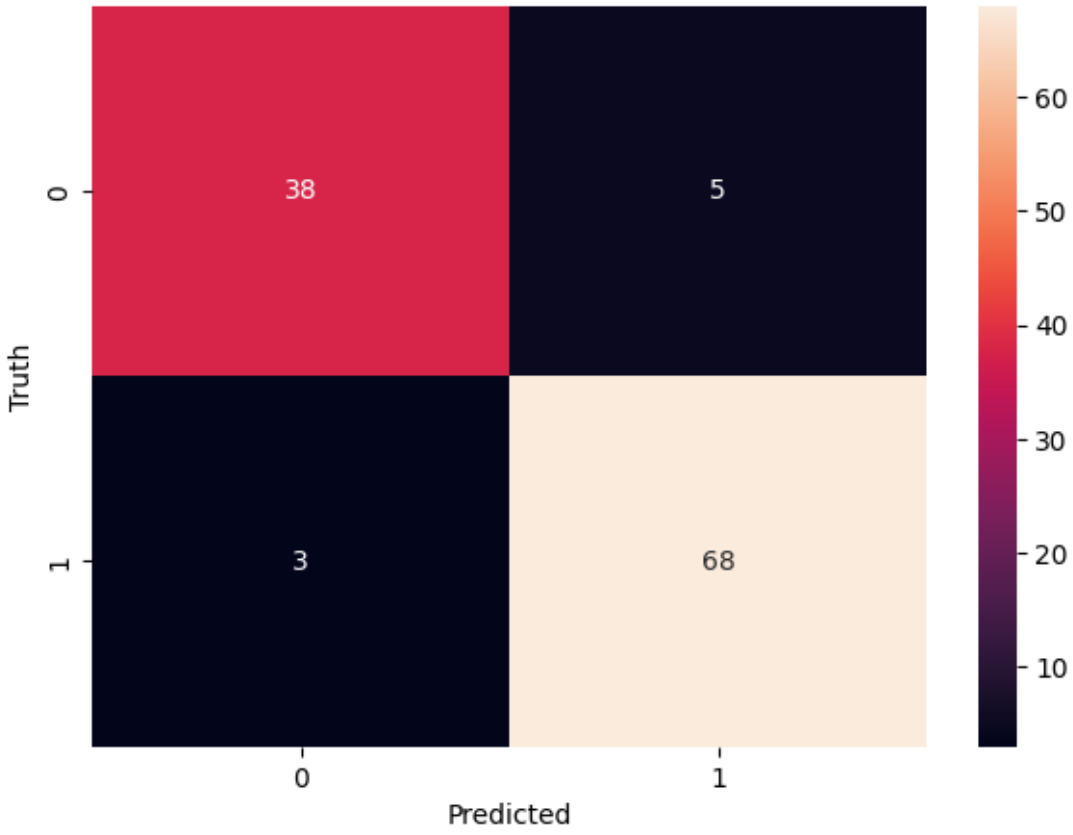
[20]:
```
from sklearn import tree
plt.figure(figsize=(20, 15))
#for i in range(5):
    #plt.subplot(5,5, i +1)
tree.plot_tree(rf.estimators_[75], filled=True, feature_names=breast_cancer.
 ↪feature_names, class_names=breast_cancer.target_names)
plt.show()
```




[21]:
```
y_pred_test = cross_val_predict(rf, X_test, y_test, cv=5)
conf_mat = confusion_matrix(y_test, y_pred_test)
class_report = classification_report(y_test, y_pred_test)
```

[22]:
```
import seaborn as sns
plt.figure(figsize=(7,5))
sns.heatmap(conf_mat, annot=True)
plt.xlabel('Predicted')
plt.ylabel('Truth')
```

[22]: Text(58.222222222222214, 0.5, 'Truth')




[23]:
```
print("Confusion Matrix:")
print(conf_mat)
print("\nClassification Report:")
print(class_report)
```

```
Confusion Matrix:
[[38  5]
 [ 3 68]]

Classification Report:
              precision    recall  f1-score   support

           0       0.93      0.88      0.90        43
           1       0.93      0.96      0.94        71

    accuracy                           0.93       114
   macro avg       0.93      0.92      0.92       114
weighted avg       0.93      0.93      0.93       114
```

[24]:
```
print("cross_val_predict ")
print(cross_val_predict)
```

```
cross_val_predict
<function cross_val_predict at 0x7f1f33c34ee0>
```

[ ]:
```

```