Machine learning algorithms for classification and regression on iris in Python

In [19]:
```
import seaborn as sns
import matplotlib.pyplot as plt
from sklearn import datasets
import pandas as pd
import numpy as np


# Convert 'iris.data' numpy array to 'iris.dataframe' pandas dataframe
# complete the iris dataset by adding species
iris = datasets.load_iris()
iris = pd.DataFrame(
    data= np.c_[iris['data'], iris['target']],
    columns= iris['feature_names'] + ['target']
    )

species = []

for i in range(len(iris['target'])):
    if iris['target'][i] == 0:
        species.append("setosa")
    elif iris['target'][i] == 1:
        species.append('versicolor')
    else:
        species.append('virginica')


iris['species'] = species
iris
```

Out[19]:

	sepal length (cm)	sepal width (cm)	petal length (cm)	petal width (cm)	target	species
0	5.1	3.5	1.4	0.2	0.0	setosa
1	4.9	3.0	1.4	0.2	0.0	setosa
2	4.7	3.2	1.3	0.2	0.0	setosa
3	4.6	3.1	1.5	0.2	0.0	setosa
4	5.0	3.6	1.4	0.2	0.0	setosa
...	...	...	...	...	...	...
145	6.7	3.0	5.2	2.3	2.0	virginica
146	6.3	2.5	5.0	1.9	2.0	virginica
147	6.5	3.0	5.2	2.0	2.0	virginica
148	6.2	3.4	5.4	2.3	2.0	virginica
149	5.9	3.0	5.1	1.8	2.0	virginica

150 rows × 6 columns

1. splitting the dataset into training and test sets

In [20]:
```
X = iris.iloc[:, 0:4]
y = iris.iloc[:, 4]
class_names = iris.iloc[:, 5]

from sklearn.model_selection import train_test_split
from sklearn.tree import DecisionTreeRegressor

X_train, X_test, y_train, y_test = train_test_split(X, y, random_state=0, train_si
```

2. Saving a copy of the different datasets in .csv files

In [21]:
```
# 2. save entire dataset, training and testing datasets
# save a copy of the dataset in .csv
iris.to_csv('C:/Users/julia/OneDrive/Desktop/github/24. Machine learning toolbox Py

iris.to_csv('C:/Users/julia/OneDrive/Desktop/github/24. Machine learning toolbox Py
          index = False)

iris.to_csv('C:/Users/julia/OneDrive/Desktop/github/24. Machine learning toolbox Py
          index = False)
```

In [ ]:
```

```

2. Random forest classifier

In [55]:
```
from sklearn.ensemble import RandomForestClassifier

# create a Gaussian RF classifier
rf_model = RandomForestClassifier(n_estimators=100)

# fit the model to the iris dataset
rf_model.fit(X_train,y_train)

# make predictions on test set
y_pred=rf_model.predict(X_test)
```

2.2 Confusion matrix and accuracy

Now that we have predictions, we can compute a confusion matrix and the accuracy of our trained SVM classifier on the testing set.

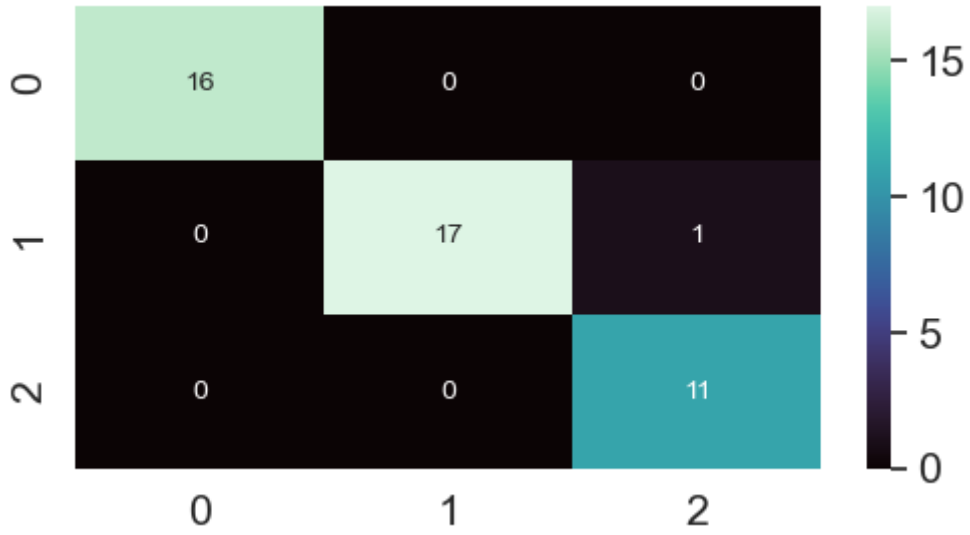
In [56]:
```
from sklearn.metrics import confusion_matrix

cm_rf = confusion_matrix(y_test, y_pred)
cm_rf

df_cm_rf = pd.DataFrame(cm_rf, range(len(class_names.unique())), range(len(class_n

plt.figure(figsize=(6,3))
sns.set(font_scale=1.4) # for label size
sns.heatmap(df_cm_rf, annot=True, annot_kws={"size": 10}, cmap = sns.color_palette
```

```
plt.show()
```



Accuracy of the Random forest classifier

In [58]:
```
from sklearn.model_selection import cross_val_score

accuracies = cross_val_score(estimator = rf_model, X = X_train, y = y_train, cv = 
print("Accuracy: {:.2f} %".format(accuracies.mean()*100))
print("Standard Deviation: {:.2f} %".format(accuracies.std()*100))
```

```
Accuracy: 95.18 %
Standard Deviation: 6.58 %
```

4. Support vector machines classifier

In [32]:
```
from sklearn.svm import SVC
from sklearn.metrics import accuracy_score

# create a SVM model
svm_model = SVC(kernel = 'linear', random_state = 0)

# fit the model to the iris dataset
svm_model.fit(X_train, y_train)

# make predictions on test set
y_pred = svm_model.predict(X_test)
```

4.2 Confusion matrix and accuracy

Now that we have predictions, we can compute a confusion matrix and the accuracy of our trained SVM classifier on the testing set.

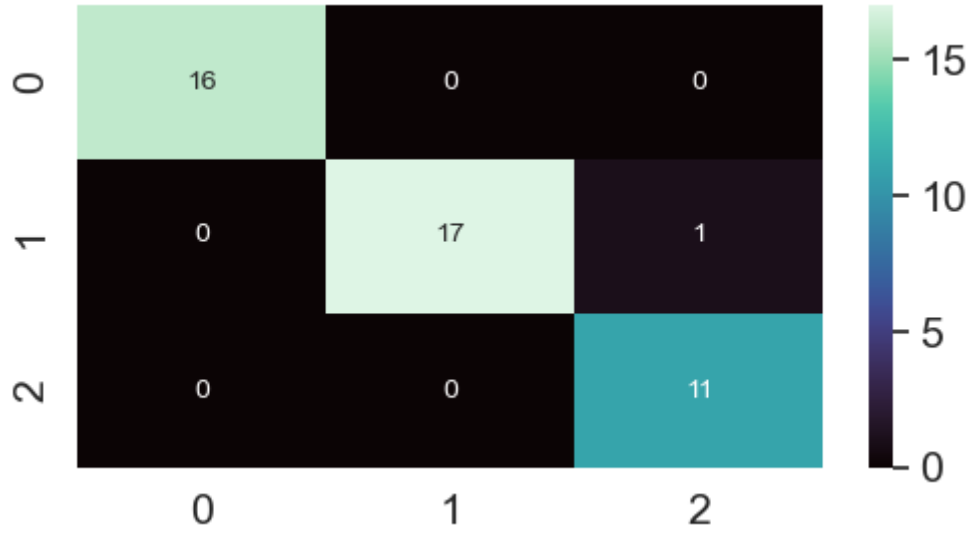
In [50]:
```
from sklearn.metrics import confusion_matrix
cm = confusion_matrix(y_test, y_pred)
cm

df_cm = pd.DataFrame(cm, range(len(class_names.unique())), range(len(class_names.u

plt.figure(figsize=(6,3))
```

```
sns.set(font_scale=1.4) # for label size
sns.heatmap(df_cm, annot=True, annot_kws={"size": 10}, cmap = sns.color_palette("m

plt.show()
```



Accuracy of the SVM classifier

In [34]:
```
from sklearn.model_selection import cross_val_score

accuracies = cross_val_score(estimator = svm_model, X = X_train, y = y_train, cv =
print("Accuracy: {:.2f} %".format(accuracies.mean()*100))
print("Standard Deviation: {:.2f} %".format(accuracies.std()*100))
```

```
Accuracy: 98.00 %
Standard Deviation: 4.00 %
```

In [ ]:
```

```