In [6]:

```
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
import pandas as pd
%matplotlib inline
```

In [7]:

```
columns = ['Sepal length', 'Sepal width', 'Petal length', 'Petal width', 'Class_lal

df = pd.read_csv('irisdata.csv', names=columns)
df.head()
```

Out[7]:

	Sepal length	Sepal width	Petal length	Petal width	Class_labels
0	5.1	3.5	1.4	0.2	Iris-setosa
1	4.9	3.0	1.4	0.2	Iris-setosa
2	4.7	3.2	1.3	0.2	Iris-setosa
3	4.6	3.1	1.5	0.2	Iris-setosa
4	5.0	3.6	1.4	0.2	Iris-setosa

In [8]:

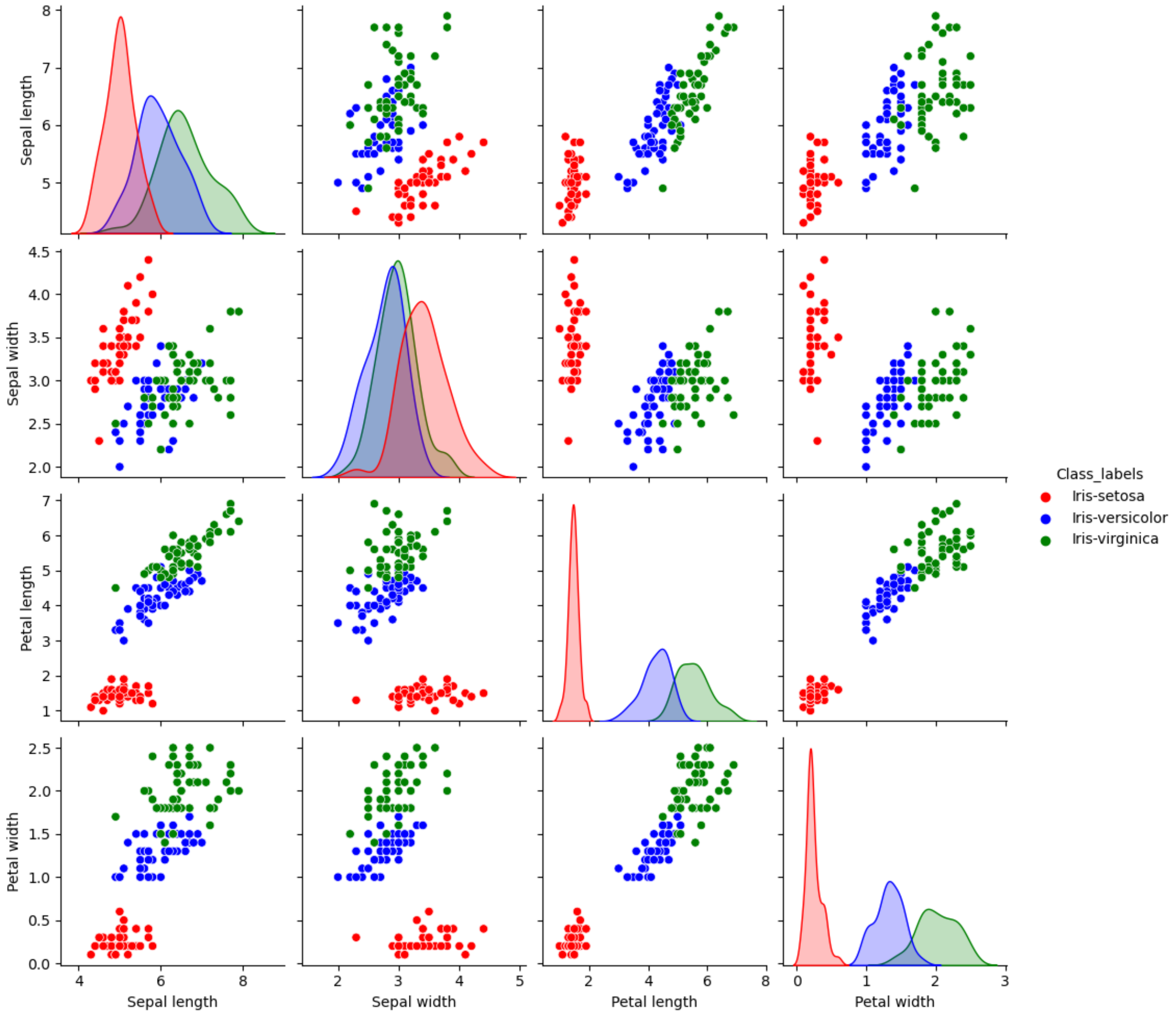
```
df.describe()
```

Out[8]:

	Sepal length	Sepal width	Petal length	Petal width
count	150.000000	150.000000	150.000000	150.000000
mean	5.843333	3.054000	3.758667	1.198667
std	0.828066	0.433594	1.764420	0.763161
min	4.300000	2.000000	1.000000	0.100000
25%	5.100000	2.800000	1.600000	0.300000
50%	5.800000	3.000000	4.350000	1.300000
75%	6.400000	3.300000	5.100000	1.800000
max	7.900000	4.400000	6.900000	2.500000

In [10]:

```
custom_palette = ['red', 'blue', 'green']
sns.pairplot(df, hue='Class_labels', palette=custom_palette)
plt.show()
```



In [11]:

```
data = df.values
X = data[:,0:4]
Y = data[:,4]
```

In [12]:

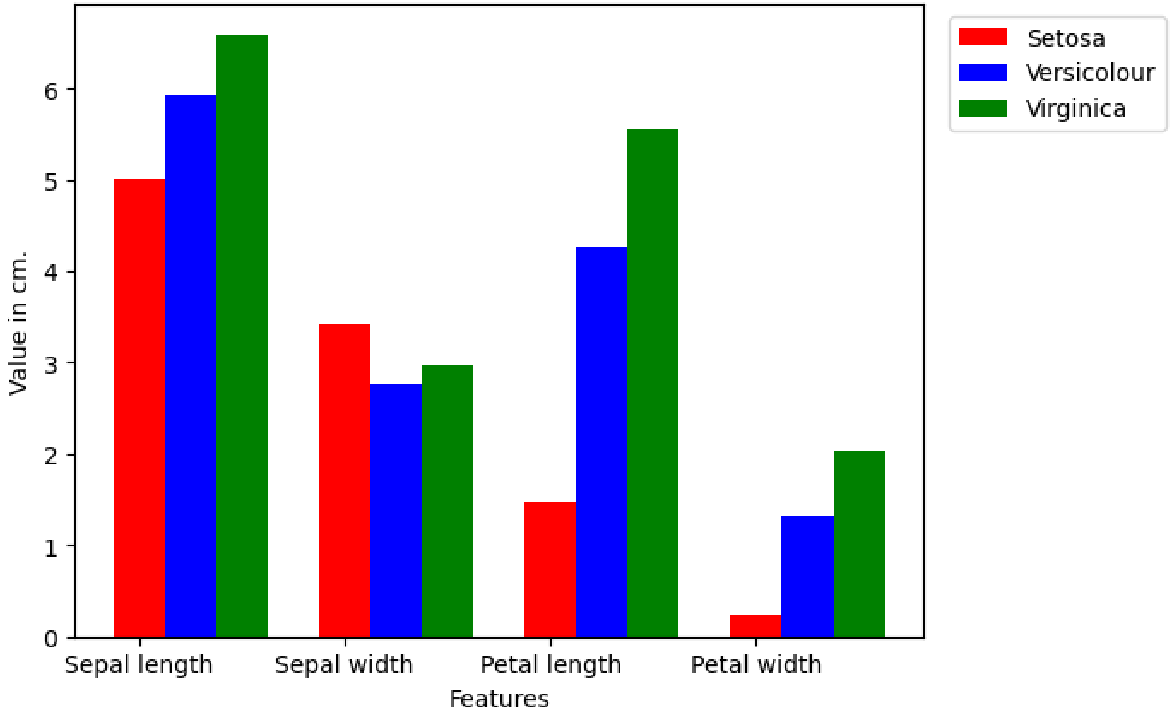
```
Y_Data = np.array([np.average(X[:, i][Y==j].astype('float32')) for i in range (X.s
 for j in (np.unique(Y))])
Y_Data_reshaped = Y_Data.reshape(4, 3)
Y_Data_reshaped = np.swapaxes(Y_Data_reshaped, 0, 1)
X_axis = np.arange(len(columns)-1)
width = 0.25
```

In [14]:

```
import matplotlib.pyplot as plt
colors = ['red', 'blue', 'green']

plt.bar(X_axis, Y_Data_reshaped[0], width, label='Setosa', color=colors[0])
plt.bar(X_axis + width, Y_Data_reshaped[1], width, label='Versicolour', color=colo
plt.bar(X_axis + width * 2, Y_Data_reshaped[2], width, label='Virginica', color=co

plt.xticks(X_axis, columns[:4])
plt.xlabel("Features")
plt.ylabel("Value in cm.")
plt.legend(bbox_to_anchor=(1.3, 1))
plt.show()
```



In [16]:
```
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)
```

In [18]:
```
from sklearn.svm import SVC
svn = SVC()
svn.fit(X_train, y_train)
```

Out[18]:
```
▾ SVC
SVC()
```

In [19]:
```
predictions = svn.predict(X_test)
from sklearn.metrics import accuracy_score
accuracy_score(y_test, predictions)
```

Out[19]:
```
0.9666666666666667
```

In [20]:
```
from sklearn.metrics import classification_report
print(classification_report(y_test, predictions))
```

```
                 precision    recall  f1-score   support

    Iris-setosa       1.00      1.00      1.00        11
Iris-versicolor       1.00      0.91      0.95        11
 Iris-virginica       0.89      1.00      0.94         8

       accuracy                           0.97        30
      macro avg       0.96      0.97      0.96        30
   weighted avg       0.97      0.97      0.97        30
```

In [21]:
```
X_new = np.array([[6.4,3.2,5.3,2.3], [6.0,3.4,4.5,1.6], [4.8,3.4,1.6,0.2]])
prediction = svn.predict(X_new)
print("Prediction of Species: {}".format(prediction))
```

```
Prediction of Species: ['Iris-virginica' 'Iris-versicolor' 'Iris-setosa']
```

In [22]:
```
import pickle
with open('SVM.pickle', 'wb') as f:
    pickle.dump(svn, f)

with open('SVM.pickle', 'rb') as f:
    model = pickle.load(f)
model.predict(X_new)
```

```
Out[22]: array(['Iris-virginica', 'Iris-versicolor', 'Iris-setosa'], dtype=object)
```