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_labels']

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]:

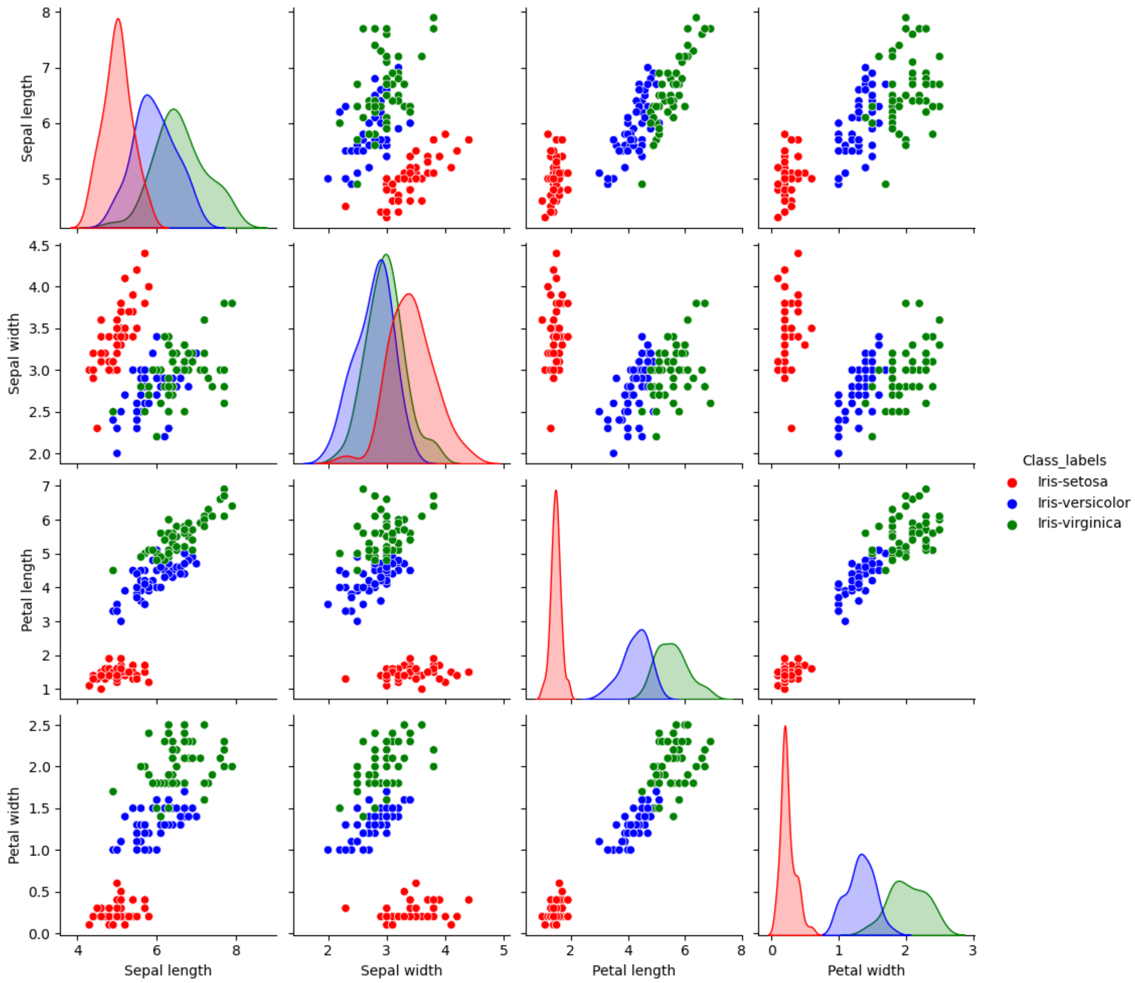
```
df.describe()
```

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]:

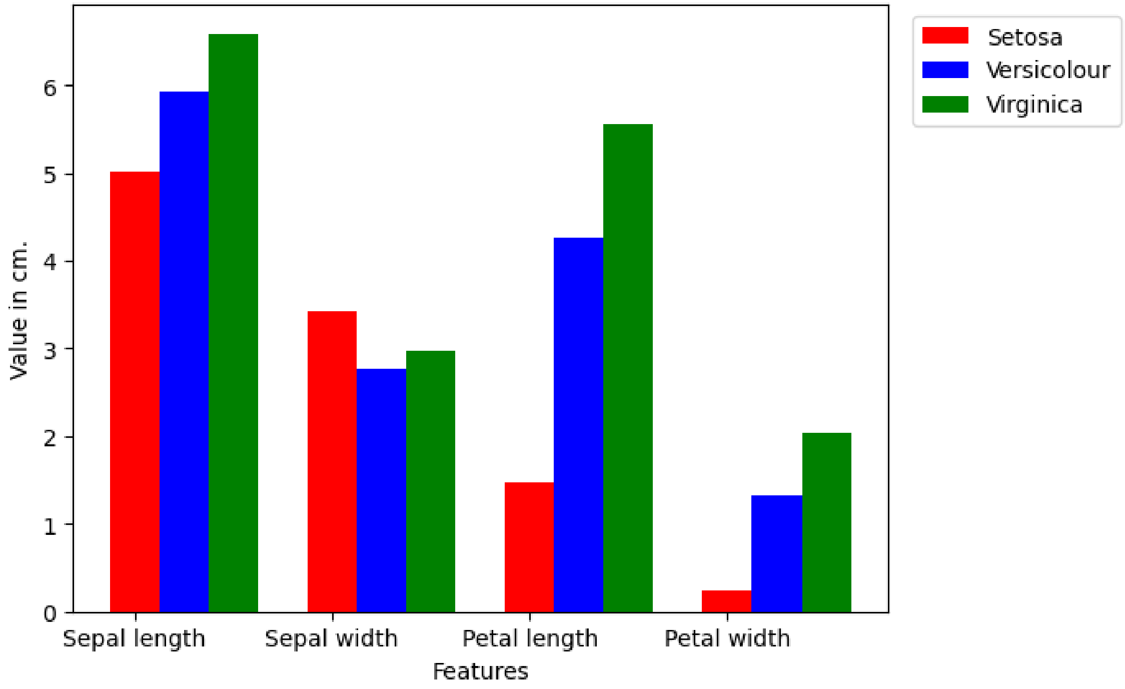
```
Y_Data = np.array([np.average(X[:, i][Y==j].astype('float32')) for i in range (X.shape[1
 for j in (np.unique(Y))])
Y_Data_reshaped = Y_Data.reshape(4, 3)
Y_Data_reshaped = np.swapaxes(Y_Data_reshaped, 0, 1)
X_axis = np.arange(len(columns)-1)
width = 0.25
```

In [14]:

```
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=colors[1])
plt.bar(X_axis + width * 2, Y_Data_reshaped[2], width, label='Virginica', color=colors[2

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()
```

In a Jupyter environment, please rerun this cell to show the HTML representation or trust the notebook.
On GitHub, the HTML representation is unable to render, please try loading this page with nbviewer.org.

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)
```