Experiment 5

Given a dataset that contains information about different types of flowers (e.g., Iris dataset), perform classification using the k-Nearest Neighbors (kNN) algorithm. Evaluate the performance of the model by calculating its accuracy and visualize the results using appropriate techniques.

In [81]:

```
import matplotlib.pyplot as plt
import pandas as pd
from sklearn.metrics import accuracy_score
from sklearn.neighbors import KNeighborsClassifier
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import LabelEncoder, StandardScaler
```

In [82]:

```
df = pd.read_csv("iris_dataset.csv")
df.head()
```

Out[82]:

	sepal_length	sepal_width	petal_length	petal_width	target
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 [83]:

```
X = df[["sepal_length", "sepal_width", "petal_length", "petal_width"]]
Y = df["target"]
```

In [84]:

```
X_train, X_test, Y_train, Y_test = train_test_split(X, Y, test_size=0.25, random_state=4
```

In [85]:

```
scaler = StandardScaler()

X_train_scaled = scaler.fit_transform(X_train)
X_test_scaled = scaler.transform(X_test)
```

In [86]:

```
encoder = LabelEncoder()

Y_train_enc = encoder.fit_transform(Y_train)
Y_test_enc = encoder.transform(Y_test)
```

In [87]:
```
knn = KNeighborsClassifier(n_neighbors=3)

knn.fit(X_train_scaled, Y_train_enc)
```

Out[87]:
```
▾     KNeighborsClassifier        i  ?

KNeighborsClassifier(n_neighbors=3)
```

In [88]:
```
Y_pred = knn.predict(X_test_scaled)
```

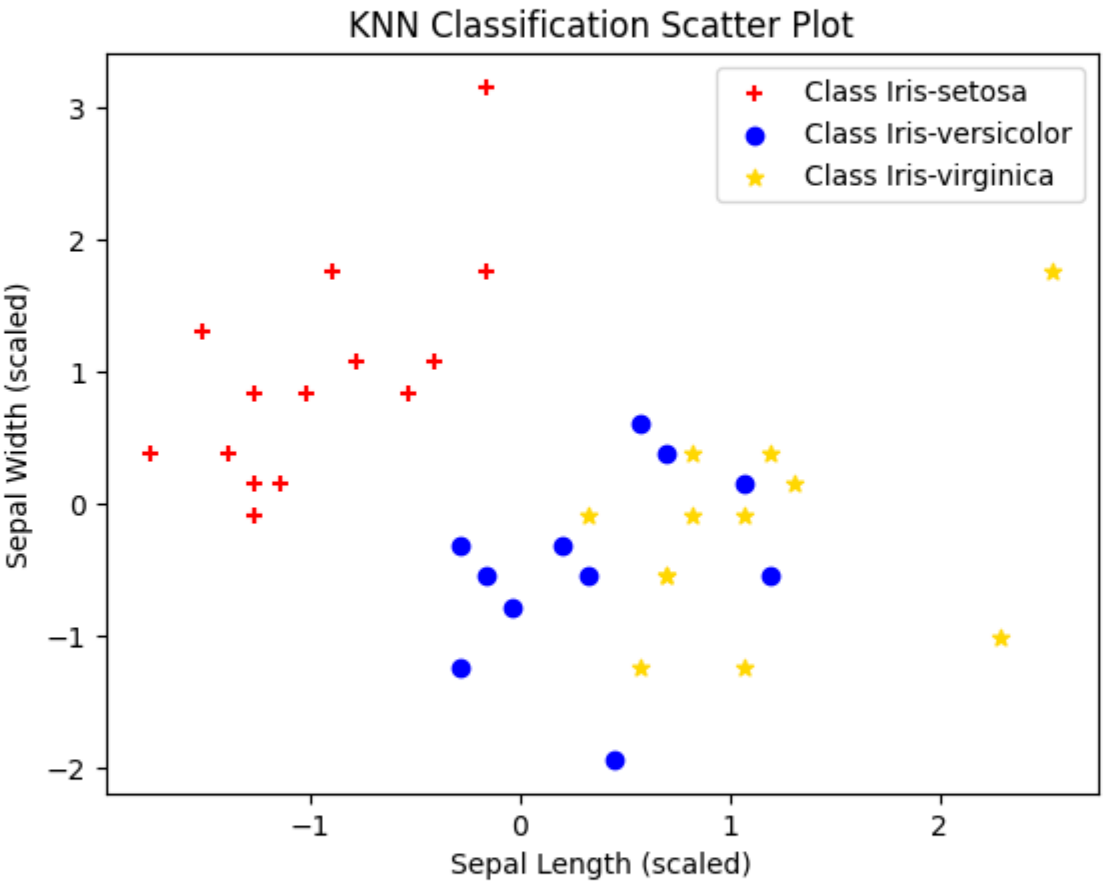
In [89]:
```
accuracy = accuracy_score(Y_test_enc, Y_pred)
print(f"The KNN Classifier is {accuracy * 100:.0f}% accurate")
```

```
The KNN Classifier is 100% accurate
```

In [90]:
```
labels = encoder.classes_

markers = ["+", "o", "*"]
colors = ["red", "blue", "gold"]

for i, label in enumerate(labels):
    class_points = (Y_pred == i)
    plt.scatter(X_test_scaled[class_points, 0], X_test_scaled[class_points, 1], label=f'
    plt.title("KNN Classification Scatter Plot")
    plt.xlabel("Sepal Length (scaled)")
    plt.ylabel("Sepal Width (scaled)")
    plt.legend()
```


KNN Classification Scatter Plot
Class Iris-setosa
Class Iris-versicolor
Class Iris-virginica
Sepal Width (scaled)
Sepal Length (scaled)