Machine learning
Assignment 4
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A1 09

Problem Statement
Write a program to implement Support Vector Machine Algorithm to solve classification problems on Iris dataset.

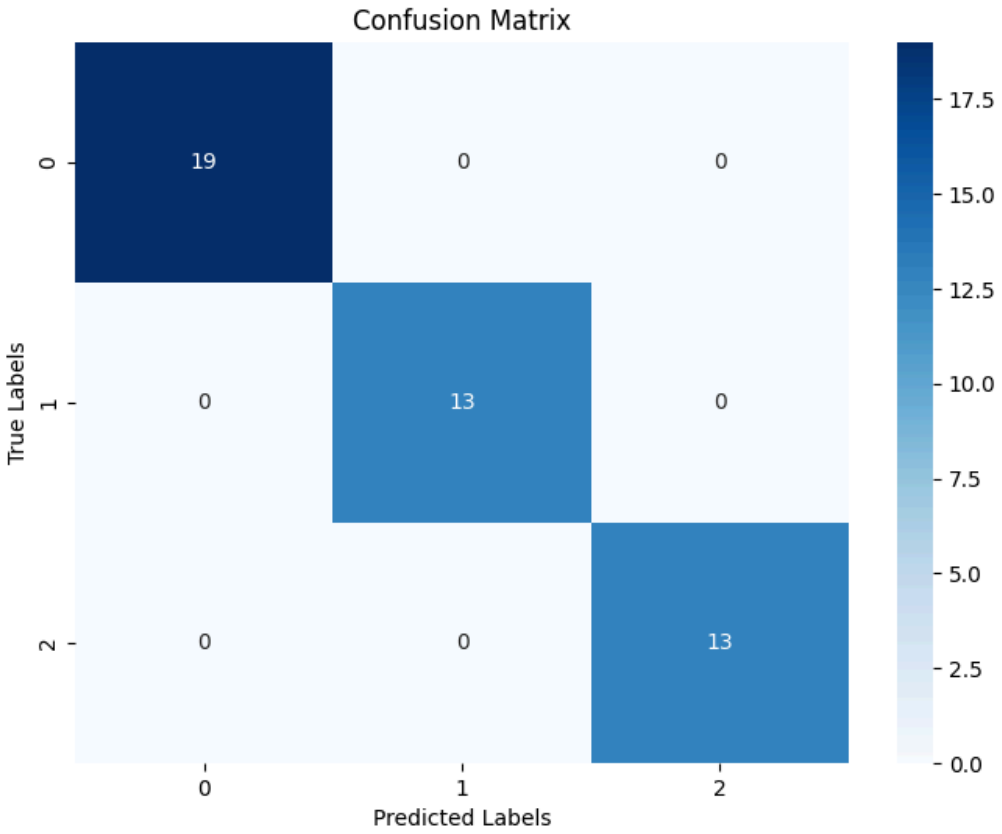
Program:

```
import pandas as pd
import numpy as np
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.svm import SVC
from sklearn.metrics import classification_report, accuracy_score, confusion_matrix
import matplotlib.pyplot as plt
import seaborn as sns

iris = pd.read_csv('C:/Users/Maithili/Downloads/Iris (1).csv')

X = iris.iloc[:, :-1].values  # Assuming the last column is the target
y = iris.iloc[:, -1].values

# Split the dataset into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.3, random_state=42)

scaler = StandardScaler()
X_train = scaler.fit_transform(X_train)
X_test = scaler.transform(X_test)

svm_model = SVC(kernel='linear')
svm_model.fit(X_train, y_train)

if svm_model:
    # Make predictions
    y_pred = svm_model.predict(X_test)
```

```
    # Evaluate the model
    accuracy = accuracy_score(y_test, y_pred)
    conf_matrix = confusion_matrix(y_test, y_pred)
    report = classification_report(y_test, y_pred)

    print(f"Accuracy: {accuracy:.2f}")
    print("Confusion Matrix:")
    print(conf_matrix)
    print("Classification Report:")
    print(report)

    # Visualize the confusion matrix
    plt.figure(figsize=(8, 6))
    sns.heatmap(conf_matrix, annot=True, cmap='Blues', fmt='g')
    plt.title('Confusion Matrix')
    plt.xlabel('Predicted Labels')
    plt.ylabel('True Labels')
    plt.show()
else:
    print("Error: The SVM model has not been defined.")
```

Output:

```
C:\Users\admin\Onedrive\Desktop\6SEM\ML\ass4.py:10: SyntaxWarning: invalid escape sequence '\M'
  iris = pd.read_csv('C:/Users/admin/OneDrive/Desktop/6SEM\ML/Iris.csv')
Accuracy: 1.00
Confusion Matrix:
[[19  0  0]
 [ 0 13  0]
 [ 0  0 13]]
Classification Report:
                precision    recall  f1-score   support

    Iris-setosa       1.00      1.00      1.00        19
Iris-versicolor       1.00      1.00      1.00        13
 Iris-virginica       1.00      1.00      1.00        13

       accuracy                           1.00        45
      macro avg       1.00      1.00      1.00        45
   weighted avg       1.00      1.00      1.00        45
```


Confusion Matrix
19
0
0
0
13
0
0
0
13
True Labels
Predicted Labels
0
1
2
17.5
15.0
12.5
10.0
7.5
5.0
2.5
0.0