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*    Batch: C22
*    Branch: Computer Engineering
*    Course: Machine Learning
*    Experiment 8: SVM
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CODE:
from sklearn import datasets
from sklearn.model_selection import train_test_split
from sklearn.svm import SVC
from sklearn.metrics import accuracy_score, confusion_matrix,
classification_report

# Load dataset
iris = datasets.load_iris()

X = iris.data
y = iris.target

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

# Define kernels
kernels = ['linear', 'poly', 'rbf', 'sigmoid']

# Iterate over each kernel
for kernel in kernels:

    print("Kernel:", kernel)

    # SVM model with current kernel
    svm_model = SVC(kernel=kernel)
    svm_model.fit(X_train, y_train)
    y_pred = svm_model.predict(X_test)

    # Accuracy
    accuracy = accuracy_score(y_test, y_pred)
    print("Accuracy:", accuracy)

    # Confusion Matrix
    confusion_mat = confusion_matrix(y_test, y_pred)
    print("Confusion Matrix:")
    print(confusion_mat)

    # Classification Report
    class_report = classification_report(y_test, y_pred)
    print("Classification Report:")
    print(class_report)

    print("-------------------------\n")
```

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OUTPUT:
Kernel: linear
Accuracy: 1.0
Confusion Matrix:
[[19  0  0]
 [ 0 13  0]
 [ 0  0 13]]
Classification Report:
             precision    recall  f1-score   support

          0       1.00      1.00      1.00        19
          1       1.00      1.00      1.00        13
          2       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

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Kernel: poly
Accuracy: 0.9777777777777777
Confusion Matrix:
[[19  0  0]
 [ 0 12  1]
 [ 0  0 13]]
Classification Report:
             precision    recall  f1-score   support

          0       1.00      1.00      1.00        19
          1       1.00      0.92      0.96        13
          2       0.93      1.00      0.96        13

   accuracy                           0.98        45
  macro avg       0.98      0.97      0.97        45
weighted avg       0.98      0.98      0.98        45

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Kernel: rbf
Accuracy: 1.0
Confusion Matrix:
[[19  0  0]
 [ 0 13  0]
 [ 0  0 13]]
Classification Report:
             precision    recall  f1-score   support

          0       1.00      1.00      1.00        19
          1       1.00      1.00      1.00        13
          2       1.00      1.00      1.00        13
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    accuracy                                       1.00         45
   macro avg           1.00         1.00           1.00         45
weighted avg           1.00         1.00           1.00         45


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Kernel: sigmoid
Accuracy: 0.2222222222222222
Confusion Matrix:
[[ 0   0 19]
 [ 0 10   3]
 [ 0 13   0]]
Classification Report:
              precision     recall    f1-score     support

           0       0.00        0.00        0.00          19
           1       0.43        0.77        0.56          13
           2       0.00        0.00        0.00          13

    accuracy                                 0.22          45
   macro avg        0.14        0.26        0.19          45
weighted avg        0.13        0.22        0.16          45


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CODE:
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.svm import SVC
from sklearn.metrics import accuracy_score, confusion_matrix,
classification_report

# Load the dataset
data = pd.read_csv("../content/UniversalBank (1).csv")

# Drop irrelevant columns if necessary and split features and target
variable
X = data.drop(['ID', 'ZIP Code', 'Personal Loan'], axis=1)
y = data['Personal Loan']

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

# Define kernels
kernels = ['linear', 'poly', 'rbf', 'sigmoid']

# Iterate over each kernel
for kernel in kernels:

    print("Kernel:", kernel)
```

```python
    # SVM model with current kernel
    svm_model = SVC(kernel=kernel)
    svm_model.fit(X_train, y_train)

    y_pred = svm_model.predict(X_test)

    # Accuracy
    accuracy = accuracy_score(y_test, y_pred)
    print("Accuracy:", accuracy)

    # Confusion Matrix
    confusion_mat = confusion_matrix(y_test, y_pred)
    print("Confusion Matrix:")
    print(confusion_mat)

    # Classification Report
    class_report = classification_report(y_test, y_pred)
    print("Classification Report:")
    print(class_report)
    print("------------------------\n")
```

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OUTPUT:
Kernel: linear
Accuracy: 0.9473333333333334
Confusion Matrix:
[[1334    9]
 [  70   87]]
Classification Report:
              precision    recall  f1-score   support

           0       0.95      0.99      0.97      1343
           1       0.91      0.55      0.69       157

    accuracy                           0.95      1500
   macro avg       0.93      0.77      0.83      1500
weighted avg       0.95      0.95      0.94      1500


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Kernel: poly
Accuracy: 0.904
Confusion Matrix:
[[1343    0]
 [ 144   13]]
Classification Report:
              precision    recall  f1-score   support

           0       0.90      1.00      0.95      1343
           1       1.00      0.08      0.15       157

    accuracy                           0.90      1500
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   macro avg      0.95        0.54     0.55       1500
weighted avg      0.91        0.90     0.87       1500


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Kernel: rbf
Accuracy: 0.8993333333333333
Confusion Matrix:
[[1336    7]
 [ 144   13]]
Classification Report:
             precision     recall  f1-score    support

          0       0.90       0.99      0.95       1343
          1       0.65       0.08      0.15        157

   accuracy                            0.90       1500
   macro avg      0.78       0.54      0.55       1500
weighted avg      0.88       0.90      0.86       1500


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Kernel: sigmoid
Accuracy: 0.8626666666666667
Confusion Matrix:
[[1244   99]
 [ 107   50]]
Classification Report:
             precision     recall  f1-score    support

          0       0.92       0.93      0.92       1343
          1       0.34       0.32      0.33        157

   accuracy                            0.86       1500
   macro avg      0.63       0.62      0.63       1500
weighted avg      0.86       0.86      0.86       1500


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