EXPERIMENT 08

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

data = datasets.load\_breast\_cancer()

X = data.data

y = data.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")

Output:

Kernel: linear

Accuracy: 0.9649122807017544

Confusion Matrix:

[[ 59 4]

[ 2 106]]

Classification Report:

precision recall f1-score support

0 0.97 0.94 0.95 63

1 0.96 0.98 0.97 108

accuracy 0.96 171

macro avg 0.97 0.96 0.96 171

weighted avg 0.96 0.96 0.96 171

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Kernel: poly

Accuracy: 0.9415204678362573

Confusion Matrix:

[[ 54 9]

[ 1 107]]

Classification Report:

precision recall f1-score support

0 0.98 0.86 0.92 63

1 0.92 0.99 0.96 108

accuracy 0.94 171

macro avg 0.95 0.92 0.94 171

weighted avg 0.94 0.94 0.94 171

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Kernel: rbf

Accuracy: 0.935672514619883

Confusion Matrix:

[[ 52 11]

[ 0 108]]

Classification Report:

precision recall f1-score support

0 1.00 0.83 0.90 63

1 0.91 1.00 0.95 108

accuracy 0.94 171

macro avg 0.95 0.91 0.93 171

weighted avg 0.94 0.94 0.93 171

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Kernel: sigmoid

Accuracy: 0.4678362573099415

Confusion Matrix:

[[ 8 55]

[36 72]]

Classification Report:

precision recall f1-score support

0 0.18 0.13 0.15 63

1 0.57 0.67 0.61 108

accuracy 0.47 171

macro avg 0.37 0.40 0.38 171

weighted avg 0.43 0.47 0.44 171

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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)

# 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")

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

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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