**LAB EXERCISE – 18**

**SUPPORT VECTOR MACHINES**

Aim of the Experiment

The main aim of this experiment is to implement support vector machine for the Iris dataset. he objectives of this experiment are

1. Implement SVM for Iris Dataset
2. Find confusion matrix and evaluation metrics for SVM

**Reference to the Textbook**

All the fundamentals of SVM are given in Chapter 11 and Appendix 2.

SVM model can be constructed using sklearn command,

model = SVC(kernel='linear',random\_state=0)

Similarly, by changing the flag ‘linear’ with ‘rbf’, one can construct the Gaussian RBF kernel also.

model.fit and model.predict can be used to fit the data and to make prediction.

**Program Listing - 1**

import pandas as pd

from sklearn.svm import SVC

from sklearn.model\_selection import train\_test\_split

from sklearn.metrics import confusion\_matrix

from sklearn.metrics import classification\_report

from sklearn.metrics import accuracy\_score

# Reading the csv Iris dataset file

df = pd.read\_csv("iris1.csv")

print(df.head(10))

# Conditioning the data

array = df.values

X = array[:,0:4]

y = array[:,4]

# Condition the training and Testing data

# The number of samples can be tuned with the test\_size parameter.

# Here, 95% of the data is used.

X\_train, X\_test, y\_train, y\_test = train\_test\_split( \

X, y,test\_size=0.95,random\_state=0)

# Construct the Linear model

model = SVC(kernel='linear',random\_state=0)

model.fit(X\_train,y\_train)

# Test the model with Linear kernel

pred = model.predict(X\_test)

# Prepare confusion matrix

print("\n\nThe confusion matrix is \n\n")

conf = confusion\_matrix(y\_test,pred)

print(conf)

# pepare Classification Report

print("\n\nAccuracy is")

accuracy = accuracy\_score(y\_test,pred)

print(accuracy)

# Or report can be obtained as follows

print('\n Classification Report')

report = classification\_report(y\_test,pred)

print(report)

# RBF kernel

model1 = SVC(kernel='rbf',random\_state=0)

model1.fit(X\_train,y\_train)

# Test the model

pred = model1.predict(X\_test)

# Prepare confusion matrix

print("\n\nThe confusion matrix for RBF kernel is \n\n")

conf = confusion\_matrix(y\_test,pred)

print(conf)

# pepare Classification Report

print("\n\nAccuracy for RBF kernel is")

accuracy = accuracy\_score(y\_test,pred)

print(accuracy)

**Output**

**The following screenshot shows the first ten records of Iris Dataset.**

**A close up of a keyboard

Description automatically generated**

**The following screenshot shows the confusion matrix of SVM with linear kernel.**

**A picture containing text

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**The following screenshot shows the classification report of SVM with linear kernel.**

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**The following screenshot shows the confusion matrix of SVM with Gaussian RBF kernel.**

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