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**19BCE0382**

**Mid Lab Exam**

**Aprill 22, 2022**

**Machine Learning WinterSem 2021-22**

**Slot: L29+L30**

**Question 1:**

**Code:**

import numpy as np

import pandas as pd

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

from sklearn.metrics import classification\_report, confusion\_matrix

from sklearn.linear\_model import LogisticRegression

from sklearn.svm import SVC

import matplotlib.pyplot as plt

data=pd.read\_csv("./dataset.csv")

df.to\_xarray

X=data[['CAT1','CAT2','FAT']]

y=data['Grade']

X=np.array(X)

y=np.array(y)

Xtrain,Xtest,Ytrain,Ytest=train\_test\_split(X,y,test\_size=0.2)

logreg = LogisticRegression(C=1.5,solver="lbfgs",multi\_class='ovr')

logreg.fit(Xtrain,Ytrain)

Ypred = logreg.predict(Xtest)

plt.scatter(Ytest,Ypred)

print(confusion\_matrix(Ytest,Ypred))

print(classification\_report(Ytest,Ypred))

Xtrain,Xtest,Ytrain,Ytest=train\_test\_split(X,y,test\_size=0.2)

model=SVC(random\_state=10,kernel='rbf',decision\_function\_shape='ovo')

model.fit(Xtrain,Ytrain)

Ypred = model.predict(Xtest)

print(confusion\_matrix(Ytest,Ypred))

print(classification\_report(Ytest,Ypred))

**OUTPUT**

**For Logistic Regression:**

[[ 1 4 0 0 0 0 0]

[ 1 12 0 0 0 0 0]

[ 0 2 0 0 0 0 0]

[ 0 1 0 0 0 0 0]

[ 0 1 0 0 0 0 0]

[ 0 0 0 0 0 2 0]

[ 1 0 0 0 0 0 0]]

precision recall f1-score support

A 0.33 0.20 0.25 5

B 0.60 0.92 0.73 13

C 0.00 0.00 0.00 2

D 0.00 0.00 0.00 1

E 0.00 0.00 0.00 1

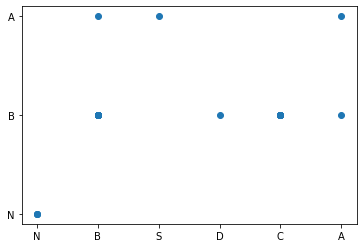
N 1.00 1.00 1.00 2

S 0.00 0.00 0.00 1

accuracy 0.60 25

macro avg 0.28 0.30 0.28 25

weighted avg 0.46 0.60 0.51 25



**For SVM:**

[[ 4 1 0 0 0 0 0 0]

[ 1 10 0 0 0 0 0 0]

[ 0 1 0 0 0 0 0 0]

[ 0 1 0 0 0 0 0 0]

[ 0 0 1 0 0 0 0 0]

[ 0 0 1 0 0 0 0 0]

[ 0 0 0 0 0 0 2 0]

[ 3 0 0 0 0 0 0 0]]

precision recall f1-score support

A 0.50 0.80 0.62 5

B 0.77 0.91 0.83 11

C 0.00 0.00 0.00 1

D 0.00 0.00 0.00 1

E 0.00 0.00 0.00 1

F 0.00 0.00 0.00 1

N 1.00 1.00 1.00 2

S 0.00 0.00 0.00 3

accuracy 0.64 25

macro avg 0.28 0.34 0.31 25

weighted avg 0.52 0.64 0.57 25