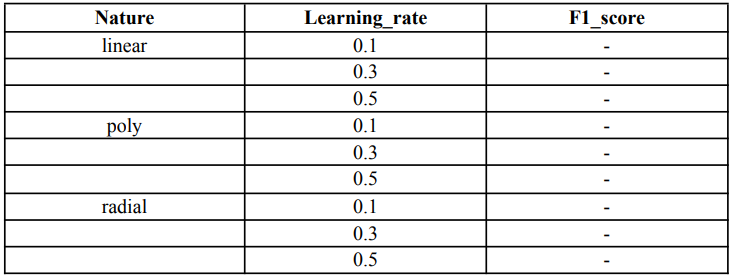
Grp 7 :- CSE214034, CSE214035, CSE214036

Suppose using the "Optical Recognition of Handwritten Digits" database SVM classifier gives better performance, then list the tabular form such as:



Justify what will be the best nature of the SVM classifier for that database.

Code: -

# Import necessary libraries

from sklearn import datasets

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

from sklearn.svm import SVC

from sklearn.metrics import f1\_score

import pandas as pd

# Load the dataset

digits = datasets.load\_digits()

X, y = digits.data, digits.target

# Split the data 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)

# Define kernel types and C (learning\_rate) values

kernels = ['linear', 'poly', 'rbf']

C\_values = [0.1, 0.3, 0.5]

results = []

# Train and evaluate the model for each kernel and C value

for kernel in kernels:

for C in C\_values:

svm = SVC(kernel=kernel, C=C)

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

# Predict and evaluate the model

y\_pred = svm.predict(X\_test)

f1 = f1\_score(y\_test, y\_pred, average='weighted')

# Append results

results.append({'Nature': kernel, 'Learning\_rate': C, 'F1\_score': f1})

# Create a DataFrame to display results in tabular format

results\_df = pd.DataFrame(results)

print(results\_df)

Output: -

