Notebook

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## Classification Classwork

##### Importing Libraries

from sklearn.datasets import fetch\_openml  
import numpy as np  
import matplotlib.pyplot as plt  
from sklearn.linear\_model import SGDClassifier  
from sklearn.model\_selection import cross\_val\_predict  
from sklearn.metrics import confusion\_matrix, ConfusionMatrixDisplay  
from sklearn.metrics import accuracy\_score, precision\_score, recall\_score, f1\_score, roc\_auc\_score  
import pandas as pd  
from sklearn.svm import SVC  
from sklearn.preprocessing import StandardScaler

##### Importing MNIST Dataset

mnist = fetch\_openml('mnist\_784', as\_frame=False)  
  
X, y = mnist.data, mnist.target

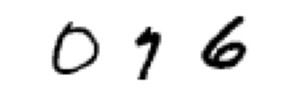
##### Choosign 3 Random Images

indices = np.random.randint(0, X.shape[0], 3)  
random\_images = X[indices]

##### Plotting the Images

def plot\_digit(image\_data):  
 image = image\_data.reshape(28, 28)  
 plt.imshow(image, cmap="binary")  
 plt.axis("off")

plt.figure(figsize=(3, 1))  
for idx in range(3):  
 plt.subplot(1, 3, idx + 1)  
 plot\_digit(random\_images[idx])  
plt.subplots\_adjust(wspace=0, hspace=0)  
plt.show()



##### Printing the labels

print(y[indices])

## ['0' '7' '6']

##### Binary Classification

X\_train, X\_test, y\_train, y\_test = X[:60000], X[60000:], y[:60000], y[60000:]

y\_train\_8 = (y\_train == '8')  
y\_test\_8 = (y\_test == '8')

sgd\_clf = SGDClassifier(random\_state=42)  
sgd\_clf.fit(X\_train, y\_train\_8)

## SGDClassifier(random\_state=42)

sgd\_clf.predict(random\_images)

## array([False, False, False])