Name : Devkumar Biswas

Class: BE(AI&DS)

Div: B

Subject : ML(CL-I Lab)

Roll no. : BEAD21267

**Assignment No. - 3**

**Problem Statement** : Classification Analysis (Any one)

1. Implementation of Support Vector Machines (SVM) for classifying images of handwritten digits into their respective numerical classes (0 to 9). B. Implement K-Nearest Neighbours‟ algorithm on Social network ad dataset. Compute confusion matrix, accuracy, error rate, precision and recall on the given dataset. Dataset link:https://www.kaggle.com/datasets/rakeshrau/social-network-ads

Code:

from sklearn.datasets import fetch\_openml

mnist = fetch\_openml('mnist\_784', version=1)

X, y = mnist.data, mnist.target.astype(int)

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

X\_train, X\_test, y\_train, y\_test = train\_test\_split(X, y, test\_size=0.2, random\_state=42)

from sklearn.preprocessing import StandardScaler

scaler = StandardScaler()

X\_train = scaler.fit\_transform(X\_train)

X\_test = scaler.transform(X\_test)

from sklearn.svm import SVC

svm\_classifier = SVC(kernel='linear')

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

from sklearn.metrics import accuracy\_score

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

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

print("Accuracy:", accuracy)

import matplotlib.pyplot as plt

import numpy as np

n\_samples\_to\_visualize = 10

random\_indices = np.random.randint(0, len(X\_test), n\_samples\_to\_visualize)

predicted\_labels = svm\_classifier.predict(X\_test[random\_indices])

plt.figure(figsize=(12, 6))

for i, idx in enumerate(random\_indices):

plt.subplot(2, 5, i + 1)

plt.imshow(X\_test[idx].reshape(28, 28), cmap='gray')

plt.axis('off')

plt.tight\_layout()

plt.show()

Output: -





