import pandas as pd

import numpy as np

import matplotlib.pyplot as plt

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

from sklearn.preprocessing import StandardScaler, LabelEncoder

from sklearn.linear\_model import LogisticRegression

from sklearn.metrics import confusion\_matrix, accuracy\_score, precision\_score, recall\_score

df = pd.read\_csv("Social\_Network\_Ads.csv")

df = df.drop(columns=["User ID"])

label\_encoder = LabelEncoder()

df["Gender"] = label\_encoder.fit\_transform(df["Gender"])

X = df[["Gender", "Age", "EstimatedSalary"]]

y = df["Purchased"]

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

scaler = StandardScaler()

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

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

log\_reg = LogisticRegression()

log\_reg.fit(X\_train\_scaled, y\_train)

y\_pred = log\_reg.predict(X\_test\_scaled)

cm = confusion\_matrix(y\_test, y\_pred)

TN, FP, FN, TP = cm.ravel()

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

error\_rate = 1 - accuracy

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

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

print("Confusion Matrix:")

print(cm)

print(f"True Negatives (TN): {TN}")

print(f"False Positives (FP): {FP}")

print(f"False Negatives (FN): {FN}")

print(f"True Positives (TP): {TP}")

print(f"Accuracy: {accuracy:.4f}")

print(f"Error Rate: {error\_rate:.4f}")

print(f"Precision: {precision:.4f}")

print(f"Recall: {recall:.4f}")