**Practical No.: 8**

**Practical Name: Write a Program for Confusion Matrix and calculate Precision, Recall, F-Measure**

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from sklearn.datasets import load\_iris, load\_breast\_cancer

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

from sklearn.neighbors import KNeighborsClassifier

from sklearn.metrics import confusion\_matrix, precision\_score, recall\_score, f1\_score

# Load the Irish dataset

iris = load\_iris()

X\_iris = iris.data

y\_iris = iris.target

# Split the Irish dataset into training and testing sets

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

# Train the KNN classifier on the Irish d3ataset

knn\_iris = KNeighborsClassifier()

knn\_iris.fit(X\_train\_iris, y\_train\_iris)

# Make predictions on the Irish testing set

y\_pred\_iris = knn\_iris.predict(X\_test\_iris)

# Calculate the confusion matrix for Irish dataset

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

print("Confusion Matrix (Irish Dataset):")

print(cm\_iris)

# Calculate precision, recall, and F-measure for Irish dataset

precision\_iris = precision\_score(y\_test\_iris, y\_pred\_iris, average='macro')

recall\_iris = recall\_score(y\_test\_iris, y\_pred\_iris, average='macro')

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

print("Precision (Irish Dataset):", precision\_iris)

print("Recall (Irish Dataset):", recall\_iris)

print("F-measure (Irish Dataset):", f1\_iris)

# Load the Breast Cancer dataset

cancer = load\_breast\_cancer()

X\_cancer = cancer.data

y\_cancer = cancer.target

# Split the Breast Cancer dataset into training and testing sets

X\_train\_cancer, X\_test\_cancer, y\_train\_cancer, y\_test\_cancer = train\_test\_split(X\_cancer, y\_cancer,

test\_size=0.2, random\_state=42)

# Train the KNN classifier on the Breast Cancer dataset

knn\_cancer = KNeighborsClassifier()

knn\_cancer.fit(X\_train\_cancer, y\_train\_cancer)

# Make predictions on the Breast Cancer testing set

y\_pred\_cancer = knn\_cancer.predict(X\_test\_cancer)

# Calculate the confusion matrix for Breast Cancer dataset

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

print("\nConfusion Matrix (Breast Cancer Dataset):")

print(cm\_cancer)

# Calculate precision, recall, and F-measure for Breast Cancer dataset

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

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

f1\_cancer = f1\_score(y\_test\_cancer, y\_pred\_cancer)

print("Precision (Breast Cancer Dataset):", precision\_cancer)

print("Recall (Irish Dataset):", recall\_cancer)

print("F-measure (Irish Dataset):", f1\_cancer)

**OUTPUT:**

Confusion Matrix (Irish Dataset):

[[10 0 0]

[ 0 9 0]

[ 0 0 11]]

Precision (Irish Dataset): 1.0

Recall (Irish Dataset): 1.0

F-measure (Irish Dataset): 1.0

Confusion Matrix (Breast Cancer Dataset):

[[38 5]

[ 0 71]]

Precision (Breast Cancer Dataset): 0.9342105263157895

Recall (Irish Dataset): 1.0

F-measure (Irish Dataset): 0.9659863945578232