Neural Networks & Deep Learning - ICP-5

CS 5720 (CRN 23216)

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1. To implement the Naïve Bayes method for the give dataset, glass.csv. Split the given dataset into training set and testing set. Train the model with the training data set. Predict the model for the test input and evaluate it.

In [180]:

```
#Importing the libraries
import pandas as pd
import numpy as np
import random as rnd

from sklearn.naive_bayes import GaussianNB
from sklearn.model_selection import train_test_split
from sklearn.metrics import accuracy_score
from sklearn import metrics

from sklearn.svm import SVC, LinearSVC
from sklearn.neighbors import KNeighborsClassifier

# reading the dataset file
df = pd.read_csv('glass.csv')

X = df.drop(['Type'], axis=1)
Y = df["Type"]

#splitting the dataset into training set and testing set
X_Train, X_Test, Y_Train, Y_Test = train_test_split(X, Y, test_size=0.25,random_state = 0)

#instantiating the Naive Bayes model and fitting it with traning set
gnb = GaussianNB()
gnb.fit(X_Train,Y_Train)

# Predicting the Test set result
Y_Pred = gnb.predict(X_Test)
```

```
#evaluating the model
print("Gaussian Naive Bayers Accuracy is:",round(accuracy_score(Y_Test,Y_Pred) * 100,2))
print("\nClassification Report:\n\n",metrics.classification_report(Y_Test,Y_Pred,zero_division=0))
```

```
Gaussian Naive Bayers Accuracy is: 46.3

Classification Report:

               precision    recall  f1-score   support

           1       0.32      0.64      0.43        14
           2       0.45      0.21      0.29        24
           3       0.50      0.40      0.44         5
           5       0.00      0.00      0.00         2
           6       0.67      1.00      0.80         2
           7       1.00      1.00      1.00         7

    accuracy                           0.46        54
   macro avg       0.49      0.54      0.49        54
weighted avg       0.49      0.46      0.44        54
```

2. To implement the linear SVM method for the same dataset. Predicting the outputs for the test set and evaluating the model.

In [188]:

```
#instantiating the linear SVM model and fitting it with traning set
svc = SVC(kernel='linear')
svc.fit(X_Train, Y_Train)

# Predicting the Test set result
Y_pred = svc.predict(X_Test)

#evaluating the model
print("SVM accuracy is:", round(accuracy_score(Y_Test,Y_pred) * 100, 2))
print("\nClassification Report:\n\n",metrics.classification_report(Y_Test,Y_pred,zero_division=0))
```

```
SVM accuracy is: 55.56

Classification Report:

              precision    recall  f1-score   support

           1       0.43      0.86      0.57        14
           2       0.60      0.38      0.46        24
           3       0.00      0.00      0.00         5
           5       0.67      1.00      0.80         2
           6       0.00      0.00      0.00         2
           7       1.00      1.00      1.00         7

    accuracy                           0.56        54
   macro avg       0.45      0.54      0.47        54
weighted avg       0.53      0.56      0.51        54
```

From the above evaluation reports, for test set (25% of the data set), the accuracy of the Linear SVM method is more compared to the Naïve Bayes method. Hence, in this case, the Linear SVM method has better accuracy.