Neural Network and Deep Learning

Assignment 1

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1.Implementation of  Naïve Bayes method using scikit-learn library Using dataset available with name glass and train_test_split to create training and testing part .

Naïve Bayes methods are a set of supervised learning algorithms based on applying Bayes' theorem with a strong assumption that all the predictors are independent to each other i.e. the presence of a feature in a class is independent to the presence of any other feature in the same class. This is naïve assumption that is why these methods are called Naïve Bayes methods.

```
              precision    recall  f1-score   support

           1       0.19      0.44      0.27         9
           2       0.33      0.16      0.21        19
           3       0.33      0.20      0.25         5
           5       0.00      0.00      0.00         2
           6       0.67      1.00      0.80         2
           7       1.00      1.00      1.00         6

    accuracy                           0.37        43
   macro avg       0.42      0.47      0.42        43
weighted avg       0.40      0.37      0.36        43

Naive Bayes accuracy is:  37.2093023255814
```

2.Implementation of  linear SVM method using scikit-learn ,Using train_test_split to create training and testing part and using the test data

The objective of a Linear SVC (Support Vector Classifier) is to fit to the data you provide, returning a "best fit" hyperplane that divides, or categorizes, your data. From there, after getting the hyperplane, you can then feed some features to your classifier to see what the "predicted" class is

```
              precision    recall  f1-score   support

           1       0.21      1.00      0.35         9
           2       0.00      0.00      0.00        19
           3       0.00      0.00      0.00         5
           5       0.00      0.00      0.00         2
           6       0.00      0.00      0.00         2
           7       0.00      0.00      0.00         6

    accuracy                           0.21        43
   macro avg       0.03      0.17      0.06        43
weighted avg       0.04      0.21      0.07        43

SVM accuracy is:  20.930232558139537
```

## 3.Implement Linear Regression using scikit-learn

Linear regression is a data analysis technique that predicts the value of unknown data by using another related and known data value. It mathematically models the unknown or dependent variable and the known or independent variable as a linear equation. For instance, suppose that you have data about your expenses and income for last year. Linear regression techniques analyze this data and determine that your expenses are half your income. They then calculate an unknown future expense by halving a future known income.

**Mean Squrae error :**Mean squared error (MSD) measures the amount of error in statistical models. It assesses the average squared difference between the observed and predicted values. When a model has no error, the MSE equals zero. As model error increases, its value increases. The mean squared error is also known as the mean squared deviation (MSD).

```
dst_Sal.head()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 30 entries, 0 to 29
Data columns (total 2 columns):
 #   Column           Non-Null Count  Dtype  
---  ------           --------------  -----  
 0   YearsExperience  30 non-null     float64
 1   Salary           30 non-null     float64
dtypes: float64(2)
memory usage: 608.0 bytes
```

ıt[9]:

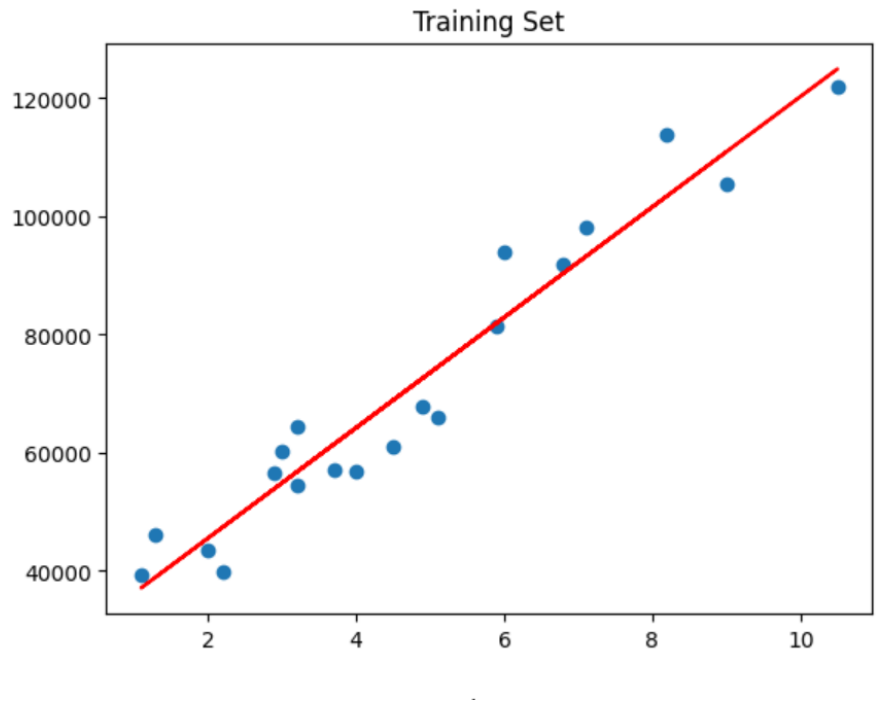
| | YearsExperience | Salary |
|---|---|---|
| **0** | 1.1 | 39343.0 |
| **1** | 1.3 | 46205.0 |
| **2** | 1.5 | 37731.0 |
| **3** | 2.0 | 43525.0 |
| **4** | 2.2 | 39891.0 |

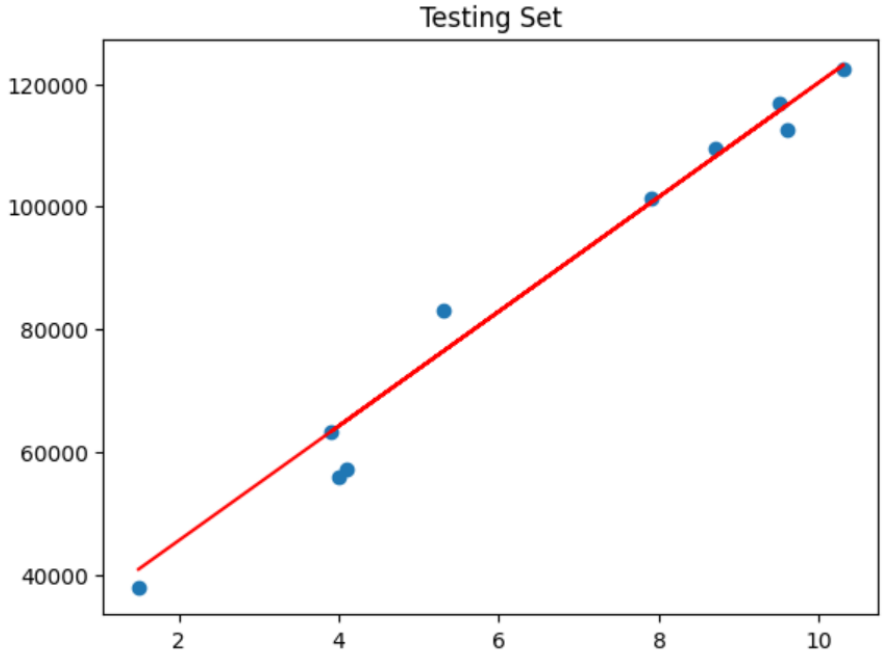
```python
# (c) Train and predict the model.
from sklearn.linear_model import LinearRegression
reg = LinearRegression()
reg.fit(A_train, B_train)
B_Pred = reg.predict(A_test)
B_Pred
```

```
array([ 40835.10590871, 123079.39940819,  65134.55626083,  63265.36777221,
       115602.64545369, 108125.8914992 , 116537.23969801,  64199.96201652,
        76349.68719258, 100649.1375447 ])
```

```python
# (d) Calculate the mean_squared error
S_error = (B_Pred - B_test) ** 2
Sum_Serror = np.sum(S_error)
mean_squared_error = Sum_Serror / B_test.size
mean_squared_error
```

```
21026037.329511303
```




Testing Set
120000
100000
80000
60000
40000
2
4
6
8
10