Date: 17-10-2023

Project Title: Credit Card Fraudlent Detection

Team ID: 3890

Importing required libraries

In [1]:
```
import pandas as pd
import numpy as np
import seaborn as sns
from matplotlib import pyplot as plt
```

Set the jupyter notebook to show maximum number of columns

In [2]:
```
pd.options.display.max_columns = None
```

Loading the datasets

In [3]:
```
ccfd = pd.read_excel("C:\\Users\Mohamed Safthar\\OneDrive\\Documents\\IBM\\creditcard.csv\\CreditCardFraudDataset.xlsx
```

Displaying top 5 rows

In [4]:
```
ccfd.head()
```

Out[4]:

	Time	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13
0	0	-1.359807	-0.072781	2.536347	1.378155	-0.338321	0.462388	0.239599	0.098698	0.363787	0.090794	-0.551600	-0.617801	-0.991390
1	0	1.191857	0.266151	0.166480	0.448154	0.060018	-0.082361	-0.078803	0.085102	-0.255425	-0.166974	1.612727	1.065235	0.489095
2	1	-1.358354	-1.340163	1.773209	0.379780	-0.503198	1.800499	0.791461	0.247676	-1.514654	0.207643	0.624501	0.066084	0.717293
3	1	-0.966272	-0.185226	1.792993	-0.863291	-0.010309	1.247203	0.237609	0.377436	-1.387024	-0.054952	-0.226487	0.178228	0.507757
4	2	-1.158233	0.877737	1.548718	0.403034	-0.407193	0.095921	0.592941	-0.270533	0.817739	0.753074	-0.822843	0.538196	1.345852

Displaying bottom 5 rows

In [5]:
```
ccfd.tail()
```

Out[5]:

	Time	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12
284802	172786	-11.881118	10.071785	-9.834783	-2.066656	-5.364473	-2.606837	-4.918215	7.305334	1.914428	4.356170	-1.593105	2.711941
284803	172787	-0.732789	-0.055080	2.035030	-0.738589	0.868229	1.058415	0.024330	0.294869	0.584800	-0.975926	-0.150189	0.915802
284804	172788	1.919565	-0.301254	-3.249640	-0.557828	2.630515	3.031260	-0.296827	0.708417	0.432454	-0.484782	0.411614	0.063119
284805	172788	-0.240440	0.530483	0.702510	0.689799	-0.377961	0.623708	-0.686180	0.679145	0.392087	-0.399126	-1.933849	-0.962886
284806	172792	-0.533413	-0.189733	0.703337	-0.506271	-0.012546	-0.649617	1.577006	-0.414650	0.486180	-0.915427	-1.040458	-0.031513

Shows number of rows and columns

In [7]:
```
print("Number of rows in given dataset ",ccfd.shape[0])
print("Number of columns in the given dataset ",ccfd.shape[1])
```

```
Number of rows in given dataset  284807
Number of columns in the given dataset  31
```

Getting basis information

In [8]:
```
ccfd.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 284807 entries, 0 to 284806
Data columns (total 31 columns):
 #   Column  Non-Null Count   Dtype  
---  ------  --------------   -----  
 0   Time    284807 non-null  int64  
 1   V1      284807 non-null  float64
 2   V2      284807 non-null  float64
 3   V3      284807 non-null  float64
 4   V4      284807 non-null  float64
 5   V5      284807 non-null  float64
 6   V6      284807 non-null  float64
 7   V7      284807 non-null  float64
 8   V8      284807 non-null  float64
 9   V9      284807 non-null  float64
 10  V10     284807 non-null  float64
 11  V11     284807 non-null  float64
 12  V12     284807 non-null  float64
 13  V13     284807 non-null  float64
 14  V14     284807 non-null  float64
 15  V15     284807 non-null  float64
 16  V16     284807 non-null  float64
 17  V17     284807 non-null  float64
 18  V18     284807 non-null  float64
 19  V19     284807 non-null  float64
 20  V20     284807 non-null  float64
 21  V21     284807 non-null  float64
 22  V22     284807 non-null  float64
 23  V23     284807 non-null  float64
 24  V24     284807 non-null  float64
 25  V25     284807 non-null  float64
 26  V26     284807 non-null  float64
 27  V27     284807 non-null  float64
 28  V28     284807 non-null  float64
 29  Amount  284807 non-null  float64
 30  Class   284807 non-null  int64  
dtypes: float64(29), int64(2)
memory usage: 67.4 MB
```

Checking null values in the given data

In [9]:
```
ccfd.isnull().sum()
```

Out[9]:
```
Time      0
V1        0
V2        0
V3        0
V4        0
V5        0
V6        0
V7        0
V8        0
V9        0
V10       0
V11       0
V12       0
V13       0
V14       0
V15       0
V16       0
V17       0
V18       0
V19       0
V20       0
V21       0
V22       0
V23       0
V24       0
V25       0
V26       0
V27       0
V28       0
Amount    0
Class     0
dtype: int64
```

Scaling the Amount features, removing the independent columns

In [10]:
```
#removing the column name Time, it is unnecessary to our training purposes
ccfd.head(2)
```

Out[10]:

	Time	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13
0	0	-1.359807	-0.072781	2.536347	1.378155	-0.338321	0.462388	0.239599	0.098698	0.363787	0.090794	-0.551600	-0.617801	-0.991390
1	0	1.191857	0.266151	0.166480	0.448154	0.060018	-0.082361	-0.078803	0.085102	-0.255425	-0.166974	1.612727	1.065235	0.489095

In [13]:
```
#time features is unnecessary here
ccfd.drop('Time',axis=1,inplace=True).head()
```

Out[13]:

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	
0	-1.359807	-0.072781	2.536347	1.378155	-0.338321	0.462388	0.239599	0.098698	0.363787	0.090794	-0.551600	-0.617801	-0.991390	-0.31
1	1.191857	0.266151	0.166480	0.448154	0.060018	-0.082361	-0.078803	0.085102	-0.255425	-0.166974	1.612727	1.065235	0.489095	-0.14
2	-1.358354	-1.340163	1.773209	0.379780	-0.503198	1.800499	0.791461	0.247676	-1.514654	0.207643	0.624501	0.066084	0.717293	-0.16
3	-0.966272	-0.185226	1.792993	-0.863291	-0.010309	1.247203	0.237609	0.377436	-1.387024	-0.054952	-0.226487	0.178228	0.507757	-0.28
4	-1.158233	0.877737	1.548718	0.403034	-0.407193	0.095921	0.592941	-0.270533	0.817739	0.753074	-0.822843	0.538196	1.345852	-1.11

In [17]:
```python
ccfd.head()
```

Out[17]:

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	
0	-1.359807	-0.072781	2.536347	1.378155	-0.338321	0.462388	0.239599	0.098698	0.363787	0.090794	-0.551600	-0.617801	-0.991390	-0.31
1	1.191857	0.266151	0.166480	0.448154	0.060018	-0.082361	-0.078803	0.085102	-0.255425	-0.166974	1.612727	1.065235	0.489095	-0.14
2	-1.358354	-1.340163	1.773209	0.379780	-0.503198	1.800499	0.791461	0.247676	-1.514654	0.207643	0.624501	0.066084	0.717293	-0.16
3	-0.966272	-0.185226	1.792993	-0.863291	-0.010309	1.247203	0.237609	0.377436	-1.387024	-0.054952	-0.226487	0.178228	0.507757	-0.28
4	-1.158233	0.877737	1.548718	0.403034	-0.407193	0.095921	0.592941	-0.270533	0.817739	0.753074	-0.822843	0.538196	1.345852	-1.11

Scaling the Amount column data

In [18]:
```python
from sklearn.preprocessing import StandardScaler
```

In [19]:
```python
ss = StandardScaler()
```

In [23]:
```python
ccfd['Amounts'] = ss.fit_transform(pd.DataFrame(ccfd['Amount']))
```

In [24]:
```python
ccfd.head()
```

Out[24]:

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	
0	-1.359807	-0.072781	2.536347	1.378155	-0.338321	0.462388	0.239599	0.098698	0.363787	0.090794	-0.551600	-0.617801	-0.991390	-0.31
1	1.191857	0.266151	0.166480	0.448154	0.060018	-0.082361	-0.078803	0.085102	-0.255425	-0.166974	1.612727	1.065235	0.489095	-0.14
2	-1.358354	-1.340163	1.773209	0.379780	-0.503198	1.800499	0.791461	0.247676	-1.514654	0.207643	0.624501	0.066084	0.717293	-0.16
3	-0.966272	-0.185226	1.792993	-0.863291	-0.010309	1.247203	0.237609	0.377436	-1.387024	-0.054952	-0.226487	0.178228	0.507757	-0.28
4	-1.158233	0.877737	1.548718	0.403034	-0.407193	0.095921	0.592941	-0.270533	0.817739	0.753074	-0.822843	0.538196	1.345852	-1.11

In [25]:
```
ccfd.shape
```
Out[25]:
```
(284807, 31)
```
In [26]:
```
ccfd.drop('Amount',axis=1,inplace=True)
```
In [27]:
```
ccfd.shape
```
Out[27]:
```
(284807, 30)
```

Dropping the duplicate records

In [31]:
```
ccfd.duplicated().any()
```
Out[31]:
```
True
```
In [34]:
```
ccfd.drop_duplicates(inplace=True)
```
In [35]:
```
ccfd.shape
```
Out[35]:
```
(275663, 30)
```
In [36]:
```
284807 - 275663
```
Out[36]:
```
9144
```

Exploring Class columns

In [38]:
```
ccfd['Class'].unique()
```
Out[38]:
```
array([0, 1], dtype=int64)
```

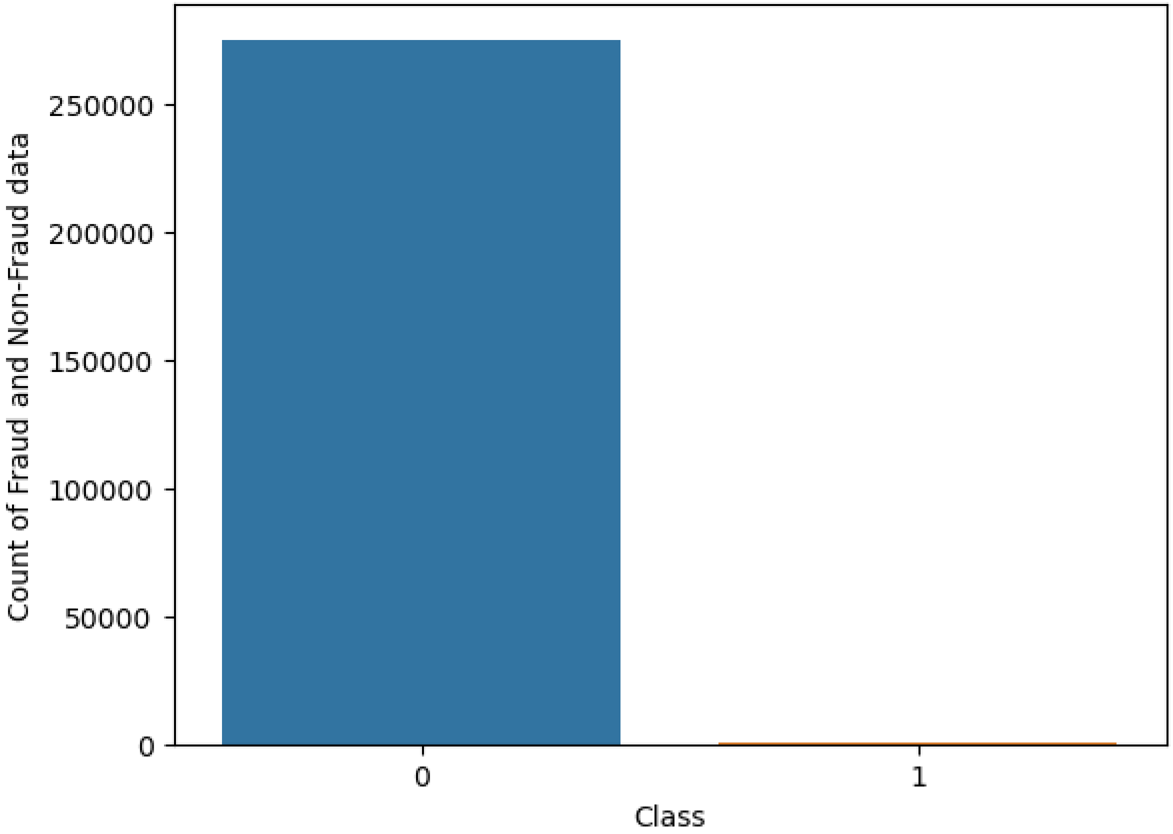
In [39]:
```
ccfd['Class'].nunique()
```

Out[39]:
```
2
```

In [40]:
```
ccfd['Class'].value_counts()
```

Out[40]:
```
Class
0    275190
1       473
Name: count, dtype: int64
```

In [46]:
```
#visualizing the distribution of 0 and 1 using seaborn countplot
sns.countplot(ccfd,x = ccfd['Class'])
plt.xlabel('Class')
plt.ylabel('Count of Fraud and Non-Fraud data')
plt.show()
```



From the above information, We can say that our data is high imbalanced, so need to apply oversampling and undersampling technique to train our model

In [ ]: