AUGMENTED EXPERIMENT

WORK ON A REAL DATASET

Implementation of Data Pre-processing on Real Dataset.

ABSTRACT :

A Real Dataset is so realistic to know and observe. Working on real dataset determines to know whether are there any missing values i.e. NULL values, or are there any outliers in it, is standardization and normalization required for the real dataset, does the encoding is applied or not for it. One of the real dataset is Student details. The dataset has 5 features with 40 entries. Before predication of the class variable, all the data pre-processing steps are to be preformed to make the dataset clean and neat. Working on real dataset is not easy as it have may entries with different kind of errors. Different plots can be visualized to know whether the dataset is noise free or not. After all this process, a real dataset is ready for further steps and for prediction of result. Data collection is one of the most important part while working on real dataset. It plays a great role in determining how well the analysis of data goes. Here, the dataset is collected by survey method.

DATASET : **student.csv**

Student.csv

Name	College Name	Age	Marks (1-100)	Result
V.Vineela	GMRIT	20	89	Pass
V.Swetha	GMRIT	20	90	Pass
Upparapalli Ramesh	GMRIT		90	Pass
Jyothi	AU	19		Pass
Ramu Yerramsetti	GMRIT	20	75	Pass
Rajana Sai Manikanta	GMRIT	20	84	Pass
Uma Shankar	AU	19	12	Pass
Michel	GMRIT	18	99	Pass
Dhamareshwarakumar Gandikota	GMRIT	21	70	Pass
MS Rizwan	GMRIT		92	Pass
Thota Prasanth	GMRIT	20	97	Pass
Jhansi	GMR IT	20		Pass
Sneha	AITAM	21	85	Pass
Bukkaptanam Narasimha Swami	AU	19	93	Pass
Renuka kola	GMRIT	19		Pass
M. Suryanarayana	AITAM	20	8.24	Pass
Revathi	GMRIT	20		Pass
P vamsi	GMRIT	21	0	Fail

Surya	GMRIT	21	91	Pass
Pakki Venkata Sai Manasa	GMRIT	19	90	Pass
VINJAMURI ARAVIND	GMRIT	19	46	Pass
Michel	AITAM	17	89	Fail
Paluri.Kali Halkesh	GMRIT	22	72	Pass
Yasin	GMRIT	20	63	Pass
Sharon Kota	GMRIT	18	20	Pass
Aadhya	AU	19	24	Fail
Deepika	GMRIT	19	78	pass
Sri	AU	21	29	fail
Charishma	AITAM	18	63	pass
Surya	AITAM	22	45	fail
Bhavani	AU	23	98	pass
Shyam	AU		23	fail
Laxmi	GMRIT	20	86	pass
Kiran	AU	19	85	pass
Mani	GMRIT	18		fail
Charan	AITAM	21	56	pass
Aravind	AU	20	33	fail
Nagaraj	AITAM	18	12	fail
Sweety	GMRIT	22		pass
Jahnavi	AU	19	39	pass

PROGRAM CODE:

```
#Importing the libraries

import numpy as np

import matplotlib.pyplot as plt

import pandas as pd


#Importing the dataset

dataset = pd.read_csv('student.csv')

X = dataset.iloc[:, :-1].values

y = dataset.iloc[:, -1].values


#Displaying the Rows as a Record

print(X)
```

OUTPUT :

```
[['V.Vineela' 'GMRIT' 20.0 89.0]
```

```
 ['V.Swetha' 'GMRIT' 20.0 90.0]
 ['Upparapalli Ramesh' 'GMRIT' nan 90.0]
 ['Jyothi' 'AU' 19.0 nan]
 ['Ramu Yerramsetti' 'GMRIT' 20.0 75.0]
 ['Rajana Sai Manikanta' 'GMRIT' 20.0 84.0]
 ['Uma Shankar' 'AU' 19.0 12.0]
 ['Michel' 'GMRIT' 18.0 99.0]
 ['Dhamareshwarakumar Gandikota' 'GMRIT' 21.0 70.0]
 ['MS Rizwan' 'GMRIT' nan 92.0]
 ['Thota Prasanth' 'GMRIT' 20.0 97.0]
 ['Jhansi' 'GMRIT' 20.0 nan]
 ['Sneha' 'AITAM' 21.0 85.0]
 ['Bukkaptanam Narasimha Swami' 'AU' 19.0 93.0]
 ['Renuka kola' 'GMRIT' 19.0 nan]
 ['M. Suryanarayana' 'AITAM' 20.0 8.24]
 ['Revathi' 'GMRIT' 20.0 nan]
 ['P vamsi' 'GMRIT' 21.0 0.0]
 ['Surya' 'GMRIT' 21.0 91.0]
 ['Pakki Venkata Sai Manasa' 'GMRIT' 19.0 90.0]
 ['VINJAMURI ARAVIND' 'GMRIT' 19.0 46.0]
 ['Michel' 'AITAM' 17.0 89.0]
 ['Paluri.Kali Halkesh' 'GMRIT' 22.0 72.0]
 ['Yasin' 'GMRIT' 20.0 63.0]
 ['Sharon Kota' 'GMRIT' 18.0 20.0]
 ['Aadhya' 'AU' 19.0 24.0]
 ['Deepika' 'GMRIT' 19.0 78.0]
 ['Sri' 'AU' 21.0 29.0]
 ['Charishma' 'AITAM' 18.0 63.0]
 ['Surya' 'AITAM' 22.0 45.0]
 ['Bhavani' 'AU' 23.0 98.0]
 ['Shyam' 'AU' nan 23.0]
 ['Laxmi' 'GMRIT' 20.0 86.0]
 ['Kiran' 'AU' 19.0 85.0]
 ['Mani' 'GMRIT' 18.0 nan]
 ['Charan' 'AITAM' 21.0 56.0]
 ['Aravind' 'AU' 20.0 33.0]
 ['Nagaraj' 'AITAM' 18.0 12.0]
 ['Sweety' 'GMRIT' 22.0 nan]
 ['Jahnavi' 'AU' 19.0 39.0]]
```

```
#Displaying the Column as a Record Field

print(y)
```

OUTPUT :

```
['Pass' 'Pass' 'Pass' 'Pass' 'Pass' 'Pass' 'Pass' 'Pass' 'Pass' 'Pass'
 'Pass' 'Pass' 'Pass' 'Pass' 'Pass' 'Pass' 'Pass' 'Fail' 'Pass' 'Pass'
 'Pass' 'Fail' 'Pass' 'Pass' 'Pass' 'Fail' 'Pass' 'Fail' 'Pass' 'Fail'
 'Pass' 'Fail' 'Pass' 'Pass' 'Fail' 'Pass' 'Fail' 'Fail' 'Pass' 'Pass']
```

```
#Tracing the Missing Data
```

```
from sklearn.impute import SimpleImputer

imputer = SimpleImputer(missing_values=np.nan, strategy='mean')

imputer.fit(X[:, 2:4])

X[:, 2:4] = imputer.transform(X[:, 2:4])


# Displaying the Rows as a Record with filled in Missing Values

print(X)
```

OUTPUT :

```
 [['V.Vineela' 'GMRIT' 20.0 89.0]
 ['V.Swetha' 'GMRIT' 20.0 90.0]
 ['Upparapalli Ramesh' 'GMRIT' 19.783783783783782 90.0]
 ['Jyothi' 'AU' 19.0 62.53647058823529]
 ['Ramu Yerramsetti' 'GMRIT' 20.0 75.0]
 ['Rajana Sai Manikanta' 'GMRIT' 20.0 84.0]
 ['Uma Shankar' 'AU' 19.0 12.0]
 ['Michel' 'GMRIT' 18.0 99.0]
 ['Dhamareshwarakumar Gandikota' 'GMRIT' 21.0 70.0]
 ['MS Rizwan' 'GMRIT' 19.783783783783782 92.0]
 ['Thota Prasanth' 'GMRIT' 20.0 97.0]
 ['Jhansi' 'GMRIT' 20.0 62.53647058823529]
 ['Sneha' 'AITAM' 21.0 85.0]
 ['Bukkaptanam Narasimha Swami' 'AU' 19.0 93.0]
 ['Renuka kola' 'GMRIT' 19.0 62.53647058823529]
 ['M. Suryanarayana' 'AITAM' 20.0 8.24]
 ['Revathi' 'GMRIT' 20.0 62.53647058823529]
 ['P vamsi' 'GMRIT' 21.0 0.0]
 ['Surya' 'GMRIT' 21.0 91.0]
 ['Pakki Venkata Sai Manasa' 'GMRIT' 19.0 90.0]
 ['VINJAMURI ARAVIND' 'GMRIT' 19.0 46.0]
 ['Michel' 'AITAM' 17.0 89.0]
 ['Paluri.Kali Halkesh' 'GMRIT' 22.0 72.0]
 ['Yasin' 'GMRIT' 20.0 63.0]
 ['Sharon Kota' 'GMRIT' 18.0 20.0]
 ['Aadhya' 'AU' 19.0 24.0]
 ['Deepika' 'GMRIT' 19.0 78.0]
 ['Sri' 'AU' 21.0 29.0]
 ['Charishma' 'AITAM' 18.0 63.0]
 ['Surya' 'AITAM' 22.0 45.0]
 ['Bhavani' 'AU' 23.0 98.0]
 ['Shyam' 'AU' 19.783783783783782 23.0]
 ['Laxmi' 'GMRIT' 20.0 86.0]
 ['Kiran' 'AU' 19.0 85.0]
 ['Mani' 'GMRIT' 18.0 62.53647058823529]
 ['Charan' 'AITAM' 21.0 56.0]
 ['Aravind' 'AU' 20.0 33.0]
 ['Nagaraj' 'AITAM' 18.0 12.0]
 ['Sweety' 'GMRIT' 22.0 62.53647058823529]
 ['Jahnavi' 'AU' 19.0 39.0]]
```

```
#Encoding the Independent Variable

from sklearn.compose import ColumnTransformer

from sklearn.preprocessing import OneHotEncoder

ct = ColumnTransformer(transformers=[('encoder', OneHotEncoder(), [1])], remainder='passthrough')

X = np.array(ct.fit_transform(X)) #fitting and encoding happens in parallel


#Displaying the Rows as a Record with Categorical Data 0'sand 1's

print(X)
```

OUTPUT :

```
 [[0.0 0.0 1.0 'V.Vineela' 20.0 89.0]
 [0.0 0.0 1.0 'V.Swetha' 20.0 90.0]
 [0.0 0.0 1.0 'Upparapalli Ramesh' 19.783783783783782 90.0]
 [0.0 1.0 0.0 'Jyothi' 19.0 62.53647058823529]
 [0.0 0.0 1.0 'Ramu Yerramsetti' 20.0 75.0]
 [0.0 0.0 1.0 'Rajana Sai Manikanta' 20.0 84.0]
 [0.0 1.0 0.0 'Uma Shankar' 19.0 12.0]
 [0.0 0.0 1.0 'Michel' 18.0 99.0]
 [0.0 0.0 1.0 'Dhamareshwarakumar Gandikota' 21.0 70.0]
 [0.0 0.0 1.0 'MS Rizwan' 19.783783783783782 92.0]
 [0.0 0.0 1.0 'Thota Prasanth' 20.0 97.0]
 [0.0 0.0 1.0 'Jhansi' 20.0 62.53647058823529]
 [1.0 0.0 0.0 'Sneha' 21.0 85.0]
 [0.0 1.0 0.0 'Bukkaptanam Narasimha Swami' 19.0 93.0]
 [0.0 0.0 1.0 'Renuka kola' 19.0 62.53647058823529]
 [1.0 0.0 0.0 'M. Suryanarayana' 20.0 8.24]
 [0.0 0.0 1.0 'Revathi' 20.0 62.53647058823529]
 [0.0 0.0 1.0 'P vamsi' 21.0 0.0]
 [0.0 0.0 1.0 'Surya' 21.0 91.0]
 [0.0 0.0 1.0 'Pakki Venkata Sai Manasa' 19.0 90.0]
 [0.0 0.0 1.0 'VINJAMURI ARAVIND' 19.0 46.0]
 [1.0 0.0 0.0 'Michel' 17.0 89.0]
 [0.0 0.0 1.0 'Paluri.Kali Halkesh' 22.0 72.0]
 [0.0 0.0 1.0 'Yasin' 20.0 63.0]
 [0.0 0.0 1.0 'Sharon Kota' 18.0 20.0]
 [0.0 1.0 0.0 'Aadhya' 19.0 24.0]
 [0.0 0.0 1.0 'Deepika' 19.0 78.0]
 [0.0 1.0 0.0 'Sri' 21.0 29.0]
 [1.0 0.0 0.0 'Charishma' 18.0 63.0]
 [1.0 0.0 0.0 'Surya' 22.0 45.0]
 [0.0 1.0 0.0 'Bhavani' 23.0 98.0]
 [0.0 1.0 0.0 'Shyam' 19.783783783783782 23.0]
 [0.0 0.0 1.0 'Laxmi' 20.0 86.0]
 [0.0 1.0 0.0 'Kiran' 19.0 85.0]
 [0.0 0.0 1.0 'Mani' 18.0 62.53647058823529]
 [1.0 0.0 0.0 'Charan' 21.0 56.0]
 [0.0 1.0 0.0 'Aravind' 20.0 33.0]
 [1.0 0.0 0.0 'Nagaraj' 18.0 12.0]
 [0.0 0.0 1.0 'Sweety' 22.0 62.53647058823529]
 [0.0 1.0 0.0 'Jahnavi' 19.0 39.0]]
```

```
#Encoding the Dependent Variable

from sklearn.preprocessing import LabelEncoder

le = LabelEncoder()

y = le.fit_transform(y)



# Displaying the Column as a Record Field

print(y)
```

OUTPUT :

```
 [1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 1 1 1 0 1 1 1 0 1 0 1 0 1 0 1 1 0 1 0
 0 1 1]
```

```
#Splitting the dataset into the Training set and Test set

from sklearn.model_selection import train_test_split

X_train,X_test,y_train,y_test=train_test_split(X,y,test_size=0.2,random_state=1)
```

OUTPUT :

```
 [[0.0 0.0 1.0 'Pakki Venkata Sai Manasa' 19.0 90.0]
 [0.0 0.0 1.0 'Deepika' 19.0 78.0]
 [0.0 0.0 1.0 'Laxmi' 20.0 86.0]
 [0.0 0.0 1.0 'P vamsi' 21.0 0.0]
 [0.0 1.0 0.0 'Bhavani' 23.0 98.0]
 [0.0 1.0 0.0 'Aravind' 20.0 33.0]
 [0.0 1.0 0.0 'Kiran' 19.0 85.0]
 [1.0 0.0 0.0 'Charishma' 18.0 63.0]
 [0.0 0.0 1.0 'Ramu Yerramsetti' 20.0 75.0]
 [0.0 0.0 1.0 'Renuka kola' 19.0 62.53647058823529]
 [0.0 0.0 1.0 'Thota Prasanth' 20.0 97.0]
 [1.0 0.0 0.0 'Charan' 21.0 56.0]
 [0.0 0.0 1.0 'Yasin' 20.0 63.0]
 [0.0 0.0 1.0 'Sharon Kota' 18.0 20.0]
 [0.0 0.0 1.0 'Mani' 18.0 62.53647058823529]
 [0.0 0.0 1.0 'VINJAMURI ARAVIND' 19.0 46.0]
 [0.0 0.0 1.0 'Surya' 21.0 91.0]
 [0.0 1.0 0.0 'Aadhya' 19.0 24.0]
 [0.0 1.0 0.0 'Uma Shankar' 19.0 12.0]
 [0.0 1.0 0.0 'Bukkaptanam Narasimha Swami' 19.0 93.0]
 [0.0 0.0 1.0 'Michel' 18.0 99.0]
 [0.0 0.0 1.0 'Sweety' 22.0 62.53647058823529]
 [0.0 0.0 1.0 'V.Swetha' 20.0 90.0]
 [0.0 0.0 1.0 'Revathi' 20.0 62.53647058823529]
 [0.0 0.0 1.0 'V.Vineela' 20.0 89.0]
 [1.0 0.0 0.0 'M. Suryanarayana' 20.0 8.24]
 [0.0 0.0 1.0 'Rajana Sai Manikanta' 20.0 84.0]
 [0.0 0.0 1.0 'Jhansi' 20.0 62.53647058823529]
 [0.0 0.0 1.0 'MS Rizwan' 19.783783783783782 92.0]
 [0.0 0.0 1.0 'Dhamareshwarakumar Gandikota' 21.0 70.0]
 [1.0 0.0 0.0 'Sneha' 21.0 85.0]
 [1.0 0.0 0.0 'Nagaraj' 18.0 12.0]]
```

```
#Displays X Test Set Info

print(X_test)
```

OUTPUT :

```
 [[0.0 0.0 1.0 'Upparapalli Ramesh' 19.783783783783782 90.0]
 [0.0 1.0 0.0 'Shyam' 19.783783783783782 23.0]
 [0.0 1.0 0.0 'Jyothi' 19.0 62.53647058823529]
 [1.0 0.0 0.0 'Michel' 17.0 89.0]
 [0.0 1.0 0.0 'Sri' 21.0 29.0]
 [1.0 0.0 0.0 'Surya' 22.0 45.0]
 [0.0 0.0 1.0 'Paluri.Kali Halkesh' 22.0 72.0]
 [0.0 1.0 0.0 'Jahnavi' 19.0 39.0]]
```

```
#Displays y Training Set Info

print(y_train)
```

OUTPUT :

```
 [1 1 1 0 1 0 1 1 1 1 1 1 1 1 0 1 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0]
```

```
#Displays y Test Set Info

print(y_test)
```

OUTPUT :

```
 [1 0 1 0 0 0 1 1]
```

```
#Feature Scaling

from sklearn.preprocessing import StandardScaler
```

```
sc=StandardScaler()

X_train[:,4:]=sc.fit_transform(X_train[:,4:])

X_test[:,4:]=sc.transform(X_test[:,4:])


#Displays X Training Set Info

print(X_train)
```

OUTPUT :

```
 [[0.0 0.0 1.0 'Pakki Venkata Sai Manasa' -0.63429292487538
  0.8838528186880219]
 [0.0 0.0 1.0 'Deepika' -0.63429292487538 0.47398849789433334]
 [0.0 0.0 1.0 'Laxmi' 0.2191193740478599 0.747231378423459]
 [0.0 0.0 1.0 'P vamsi' 1.0725316729710999 -2.190129587264642]
 [0.0 1.0 0.0 'Bhavani' 2.7793562708175794 1.1570956992171475]
 [0.0 1.0 0.0 'Aravind' 0.2191193740478599 -1.0630027050819986]
 [0.0 1.0 0.0 'Kiran' -0.63429292487538 0.7130760183573183]
 [1.0 0.0 0.0 'Charishma' -1.48770522379862 -0.0383419030977773]
 [0.0 0.0 1.0 'Ramu Yerramsetti' 0.2191193740478599 0.3715224176959112]
 [0.0 0.0 1.0 'Renuka kola' -0.63429292487538 -0.05417391705784739]
 [0.0 0.0 1.0 'Thota Prasanth' 0.2191193740478599 1.1229403391510069]
 [1.0 0.0 0.0 'Charan' 1.0725316729710999 -0.2774294235607623]
 [0.0 0.0 1.0 'Yasin' 0.2191193740478599 -0.0383419030977773]
 [0.0 0.0 1.0 'Sharon Kota' -1.48770522379862 -1.5070223859418277]
 [0.0 0.0 1.0 'Mani' -1.48770522379862 -0.05417391705784739]
 [0.0 0.0 1.0 'VINJAMURI ARAVIND' -0.63429292487538 -0.6189830242221693]
 [0.0 0.0 1.0 'Surya' 1.0725316729710999 0.9180081787541625]
 [0.0 1.0 0.0 'Aadhya' -0.63429292487538 -1.370400945677265]
 [0.0 1.0 0.0 'Uma Shankar' -0.63429292487538 -1.7802652664709535]
 [0.0 1.0 0.0 'Bukkaptanam Narasimha Swami' -0.63429292487538
  0.986318898886444]
 [0.0 0.0 1.0 'Michel' -1.48770522379862 1.1912510592832883]
 [0.0 0.0 1.0 'Sweety' 1.9259439718943396 -0.05417391705784739]
 [0.0 0.0 1.0 'V.Swetha' 0.2191193740478599 0.8838528186880219]
 [0.0 0.0 1.0 'Revathi' 0.2191193740478599 -0.05417391705784739]
 [0.0 0.0 1.0 'V.Vineela' 0.2191193740478599 0.8496974586218812]
 [1.0 0.0 0.0 'M. Suryanarayana' 0.2191193740478599 -1.9086894203196425]
 [0.0 0.0 1.0 'Rajana Sai Manikanta' 0.2191193740478599
  0.6789206582911776]
 [0.0 0.0 1.0 'Jhansi' 0.2191193740478599 -0.05417391705784739]
 [0.0 0.0 1.0 'MS Rizwan' 0.034597795902293345 0.9521635388203032]
 [0.0 0.0 1.0 'Dhamareshwarakumar Gandikota' 1.0725316729710999
  0.20074561736520766]
 [1.0 0.0 0.0 'Sneha' 1.0725316729710999 0.7130760183573183]
 [1.0 0.0 0.0 'Nagaraj' -1.48770522379862 -1.7802652664709535]]
```

```
#Displays X Test Set Info
```

```
print(X_test)
```

OUTPUT :

```
 [[0.0 0.0 1.0 'Upparapalli Ramesh' 0.034597795902293345
  0.8838528186880219]
 [0.0 1.0 0.0 'Shyam' 0.034597795902293345 -1.4045563057434056]
 [0.0 1.0 0.0 'Jyothi' -0.63429292487538 -0.05417391705784739]
 [1.0 0.0 0.0 'Michel' -2.3411175227218597 0.8496974586218812]
 [0.0 1.0 0.0 'Sri' 1.0725316729710999 -1.1996241453465615]
 [1.0 0.0 0.0 'Surya' 1.9259439718943396 -0.6531383842883101]
 [0.0 0.0 1.0 'Paluri.Kali Halkesh' 1.9259439718943396 0.2690563374974891]
 [0.0 1.0 0.0 'Jahnavi' -0.63429292487538 -0.8580705446851543]]
```

```
#Name,College Name,Age,Marks(1-100),Result

import seaborn as sns

data=pd.read_csv('student.csv')

data.head()
```

OUTPUT :

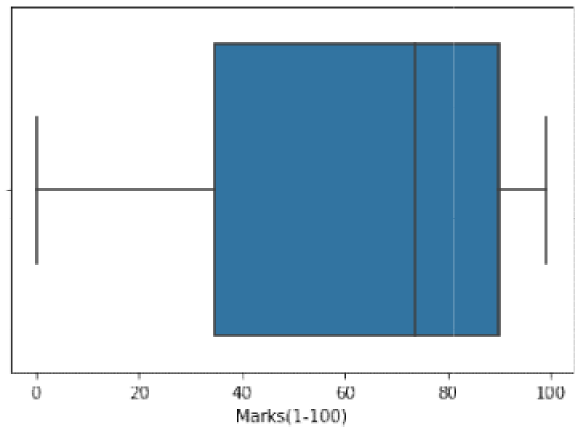
Name	**College Name**	**Age**	**Marks(1-100)**	**Result**	
0	V.Vineela	GMRIT	20.0	89.0	Pass
1	V.Swetha	GMRIT	20.0	90.0	Pass
2	Upparapalli Ramesh	GMRIT	NaN	90.0	Pass
3	Jyothi	AU	19.0	NaN	Pass
4	Ramu Yerramsetti	GMRIT	20.0	75.0	Pass

```
# Box Plot

import seaborn as sns

sns.boxplot(data['Marks(1-100)'])
```

OUTPUT :



# Position of the Outlier

```
print(np.where(data['Marks(1-100)']>95))
```

OUTPUT :

```
 (array([ 7, 10, 30], dtype=int64),)
```