University of Anybody Can Learn Datascience

Requirement

Description:

Given dataset is a dummy dataset containing infor related to Grades from a PG course at ABCCD University.

Attributes:

There are total 5 attributes Sem_enrolled,Tests,Coursera,GroupActivity and FinalExam.
FinalExam is the target variable.

The recorded values are the average of sub-components:

e.g The Tests, coursera and group activity variables are the average of all tests, coursera courses and group activities taken by students.
The FinalExam variable is the average of all questions in the final, written exam.

The Sem_enrolled column is the year in which the student first enrolled at the university and is a crude approximation of the student's age (maturity).

This particular course permitted students to work in groups for assignments, tutorials and the take-home exam. The groups were self-selected, and varied during the semester.

Of interest is whether the assignments, tutorials, midterms or take-home exam are a good predictor of the student's performance in the final exam.
Also, findout whether the sem_enrolled variable show any promise as a prediction variable?

Data shape: 100 rows and 5 columns
Missing Values: YES
Task to be performed: Missing value imputation and Regression.

Importing Packages

In [2]:

```
import pandas as pd
import numpy as np
import seaborn as sns

import matplotlib.pyplot as plt
from matplotlib import style

import sklearn
from sklearn import linear_model
from sklearn.utils import shuffle
import pickle
```

Academic score of the University of Anybody Can Learn Datascience - ABCLD

In [3]:

```
D= pd.read_excel('AcademicScoreDataset.xlsx')
Data =pd.DataFrame(D)
e = Data[(Data['Final'] >= 100) | (Data['Final'] <= 0)]
extereme =pd.DataFrame(e)
#i = Data[[(Data.Sem_enrolled == extereme['Sem_enrolled']) &( Data.Tests == extereme['Tests']) & (Data.Coursera == exter
#Data.drop(i)
```

In [4]:

```
extereme
```

Out[4]:

	Sem_enrolled	Tests	Coursera	GroupActivity	Final
33	2	85.42	91.03	NaN	107.78

In [5]:

```
AcademicScoreDataset= pd.read_excel('AcademicScoreDataset.xlsx')
```

Understanding and examine the given academic dataset to perform the effective 'EDULYTICS'

```
In [6]: AcademicScoreDataset
```

```
Out[6]:
     Sem_enrolled  Tests  Coursera  GroupActivity  Final
 0              5  95.05     34.09          51.48  52.50
 1              1  83.70    100.00          99.07  68.33
 2              1  81.22     83.17          63.15  48.89
 3              2  91.32     96.06         100.00  80.56
 4              1  95.00     93.64         100.00  73.89
...           ...    ...       ...            ...    ...
95              2  89.94     80.54          93.70  39.72
96              1  95.60    100.00          90.74  87.78
97              2  63.40     76.13          99.81  85.56
98              1  75.35     97.37          72.78  77.22
99              5    NaN     63.39          93.70  50.83

100 rows × 5 columns
```

In [7]:

```
AcademicScoreDataset.describe()
```

Out[7]:

```
       Sem_enrolled       Tests    Coursera  GroupActivity       Final
count    100.000000   97.000000   97.000000      93.000000   94.000000
 mean      1.710000   85.084639   88.217938      78.777957   66.959149
  std      0.956583   14.960500   13.934439      22.984082   17.704176
  min      1.000000    0.000000   34.090000      16.910000   28.060000
  25%      1.000000   81.220000   83.170000      63.890000   51.877500
  50%      1.000000   89.940000   92.800000      87.590000   65.420000
  75%      2.000000   95.000000   99.000000      97.410000   82.850000
  max      5.000000  100.000000  100.000000     100.000000  107.780000
```

IMPUTATION

In [8]:

```
Replace_DataFrame      = AcademicScoreDataset.fillna(0)
ForwardFill_DataFrame  = AcademicScoreDataset.fillna(method = 'ffill')
BackwardFill_DataFrame = AcademicScoreDataset.fillna(method = 'bfill')
```

Method 1 - replacing null by zero

In method one we're making sure that every Tests, coursera and group activity fields NaN values get replaced by ZERO.

In [9]:

```
Replace_DataFrame[Replace_DataFrame.notnull()]
```

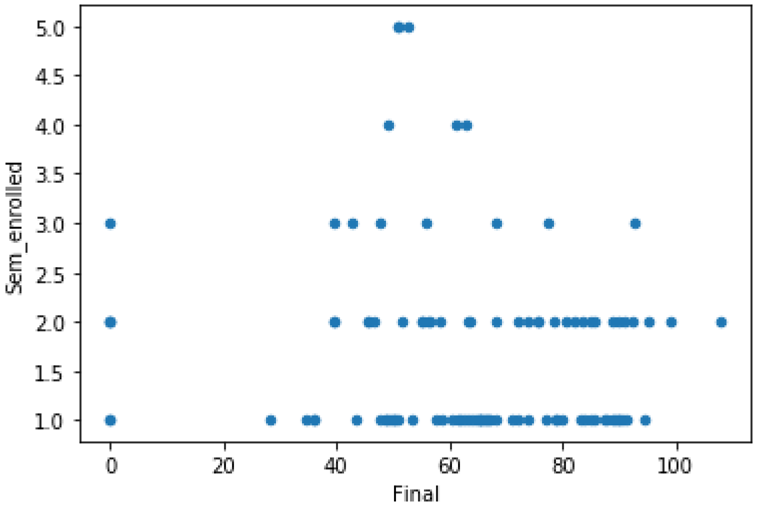
Out[9]:

	Sem_enrolled	Tests	Coursera	GroupActivity	Final
0	5	95.05	34.09	51.48	52.50
1	1	83.70	100.00	99.07	68.33
2	1	81.22	83.17	63.15	48.89
3	2	91.32	96.06	100.00	80.56
4	1	95.00	93.64	100.00	73.89
...	...	...	...	...	...
95	2	89.94	80.54	93.70	39.72
96	1	95.60	100.00	90.74	87.78
97	2	63.40	76.13	99.81	85.56
98	1	75.35	97.37	72.78	77.22
99	5	0.00	63.39	93.70	50.83

100 rows × 5 columns

```
In [10]: # Relations on enrollment
         Replace_DataFrame.plot(x = 'Final', y = 'Sem_enrolled', kind = 'scatter')
```

```
Out[10]: <matplotlib.axes._subplots.AxesSubplot at 0x1ca6cc362c8>
```



Method 2 - backward fill imputation

```
   In method three - backward fill imputation, we're filling our NaN value by propagated next valid entry from
respective columns Tests, coursera and group activity.

   NOTE:
       - For the last row, NaN values remains unchange.
       - In order to handle that, we're using the convenience methods,
               -> dropna() (which removes NA values)
```

In [16]:

```
BackwardFill_DataFrame[BackwardFill_DataFrame.notnull()]
```

Out[16]:

	Sem_enrolled	Tests	Coursera	GroupActivity	Final
0	5	95.05	34.09	51.48	52.50
1	1	83.70	100.00	99.07	68.33
2	1	81.22	83.17	63.15	48.89
3	2	91.32	96.06	100.00	80.56
4	1	95.00	93.64	100.00	73.89
...	...	...	...	...	...
95	2	89.94	80.54	93.70	39.72
96	1	95.60	100.00	90.74	87.78
97	2	63.40	76.13	99.81	85.56
98	1	75.35	97.37	72.78	77.22
99	5	NaN	63.39	93.70	50.83

100 rows × 5 columns

In [17]:

```
# calculating correlation
BackwardFill_DataFrame = BackwardFill_DataFrame.dropna()
```

Method 3 - KNN sklearn

In [20]:

```
import sklearn
from sklearn.impute import SimpleImputer

imputer = SimpleImputer(missing_values=np.nan, strategy='mean')
sklearn_Data = imputer.fit_transform(AcademicScoreDataset)
sklearn_DataFrame = pd.DataFrame(sklearn_Data, columns = ['Sem_enrolled','Tests','Coursera','GroupActivity','Final'])
sklearn_DataFrame
```

Out[20]:

	Sem_enrolled	Tests	Coursera	GroupActivity	Final
0	5.0	95.050000	34.09	51.48	52.50
1	1.0	83.700000	100.00	99.07	68.33
2	1.0	81.220000	83.17	63.15	48.89
3	2.0	91.320000	96.06	100.00	80.56
4	1.0	95.000000	93.64	100.00	73.89
...	...	...	...	...	...
95	2.0	89.940000	80.54	93.70	39.72
96	1.0	95.600000	100.00	90.74	87.78
97	2.0	63.400000	76.13	99.81	85.56
98	1.0	75.350000	97.37	72.78	77.22
99	5.0	85.084639	63.39	93.70	50.83

100 rows × 5 columns

In [ ]: