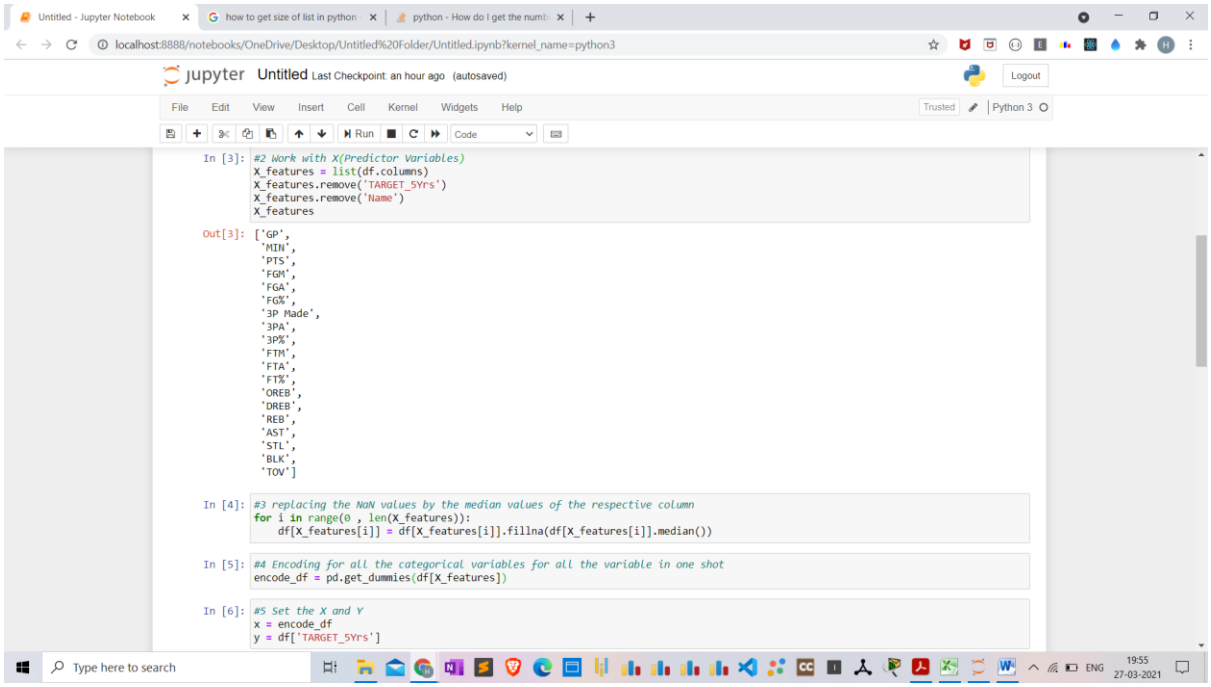
18BCE0165 MACHINE LEARNING ASSIGNMENT

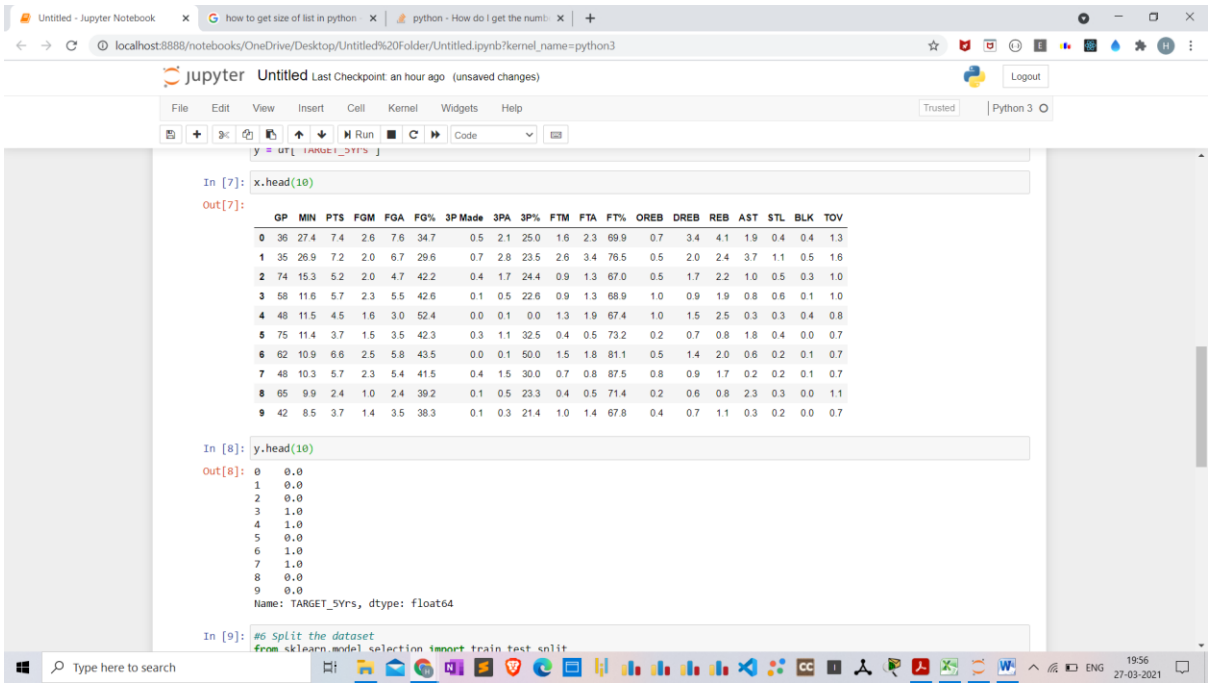
Decision Tree Classifier :-

Predictor Variable and Response Variable :-



```
In [3]: #2 Work with X(Predictor Variables)
        X_features = list(df.columns)
        X_features.remove('TARGET_5Yrs')
        X_features.remove('Name')
        X_features

Out[3]: ['GP',
         'MIN',
         'PTS',
         'FGM',
         'FGA',
         'FG%',
         '3P Made',
         '3PA',
         '3P%',
         'FTM',
         'FTA',
         'FT%',
         'OREB',
         'DREB',
         'REB',
         'AST',
         'STL',
         'BLK',
         'TOV']

In [4]: #3 replacing the NaN values by the median values of the respective column
        for i in range(0 , len(X_features)):
            df[X_features[i]] = df[X_features[i]].fillna(df[X_features[i]].median())

In [5]: #4 Encoding for all the categorical variables for all the variable in one shot
        encode_df = pd.get_dummies(df[X_features])

In [6]: #5 Set the X and Y
        x = encode_df
        y = df['TARGET_5Yrs']
```

Minimum 10 records :-



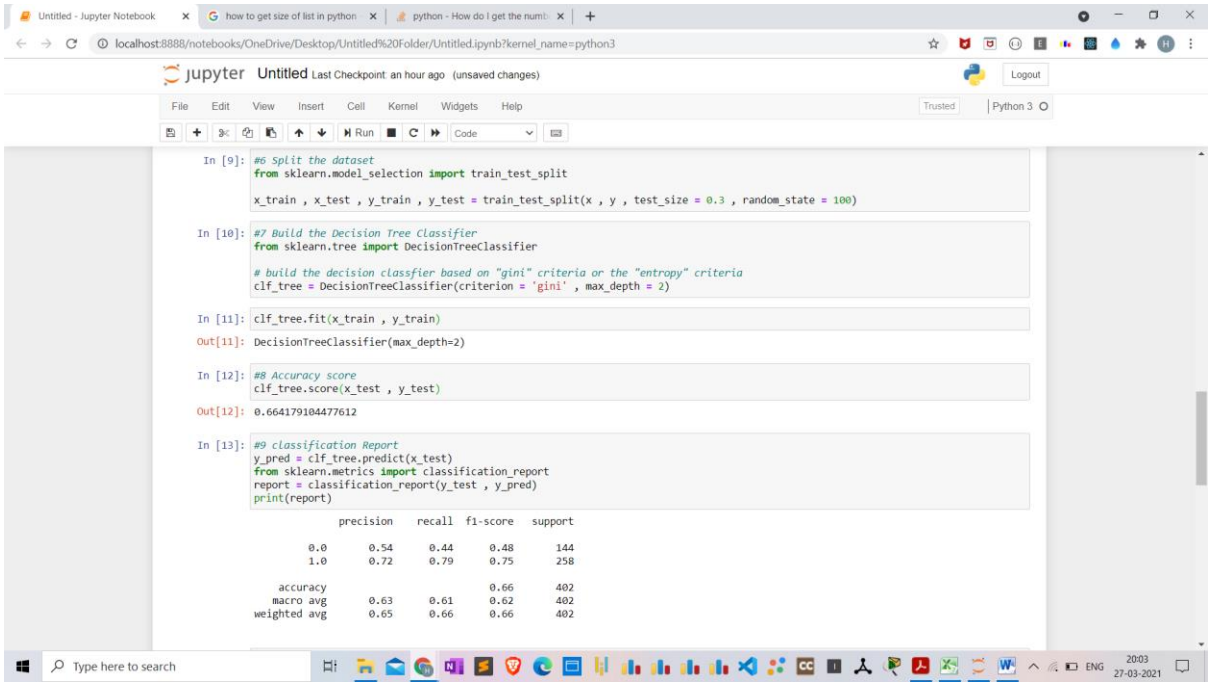
```
In [7]: x.head(10)

Out[7]:
```

	GP	MIN	PTS	FGM	FGA	FG%	3P Made	3PA	3P%	FTM	FTA	FT%	OREB	DREB	REB	AST	STL	BLK	TOV
0	36	27.4	7.4	2.6	7.6	34.7	0.5	2.1	25.0	1.6	2.3	69.9	0.7	3.4	4.1	1.9	0.4	0.4	1.3
1	35	26.9	7.2	2.0	6.7	29.6	0.7	2.8	23.5	2.6	3.4	76.5	0.5	2.0	2.4	3.7	1.1	0.5	1.6
2	74	15.3	5.2	2.0	4.7	42.2	0.4	1.7	24.4	0.9	1.3	67.0	0.5	1.7	2.2	1.0	0.5	0.3	1.0
3	58	11.6	5.7	2.3	5.5	42.6	0.1	0.5	22.6	0.9	1.3	68.9	1.0	0.9	1.9	0.8	0.6	0.1	1.0
4	48	11.5	4.5	1.6	3.0	52.4	0.0	0.1	0.0	1.3	1.9	67.4	1.0	1.5	2.5	0.3	0.3	0.4	0.8
5	75	11.4	3.7	1.5	3.5	42.3	0.3	1.1	32.5	0.4	0.5	73.2	0.2	0.7	0.8	1.8	0.4	0.0	0.7
6	62	10.9	6.6	2.5	5.8	43.5	0.0	0.1	50.0	1.5	1.8	81.1	0.5	1.4	2.0	0.6	0.2	0.1	0.7
7	48	10.3	5.7	2.3	5.4	41.5	0.4	1.5	30.0	0.7	0.8	87.5	0.8	0.9	1.7	0.2	0.2	0.1	0.7
8	65	9.9	2.4	1.0	2.4	39.2	0.1	0.5	23.3	0.4	0.5	71.4	0.2	0.6	0.8	2.3	0.3	0.0	1.1
9	42	8.5	3.7	1.4	3.5	38.3	0.1	0.3	21.4	1.0	1.4	67.8	0.4	0.7	1.1	0.3	0.2	0.0	0.7

```
In [8]: y.head(10)

Out[8]: 0    0.0
        1    0.0
        2    0.0
        3    1.0
        4    1.0
        5    0.0
        6    1.0
        7    1.0
        8    0.0
        9    0.0
        Name: TARGET_5Yrs, dtype: float64

In [9]: #6 Split the dataset
        from sklearn.model_selection import train_test_split
```

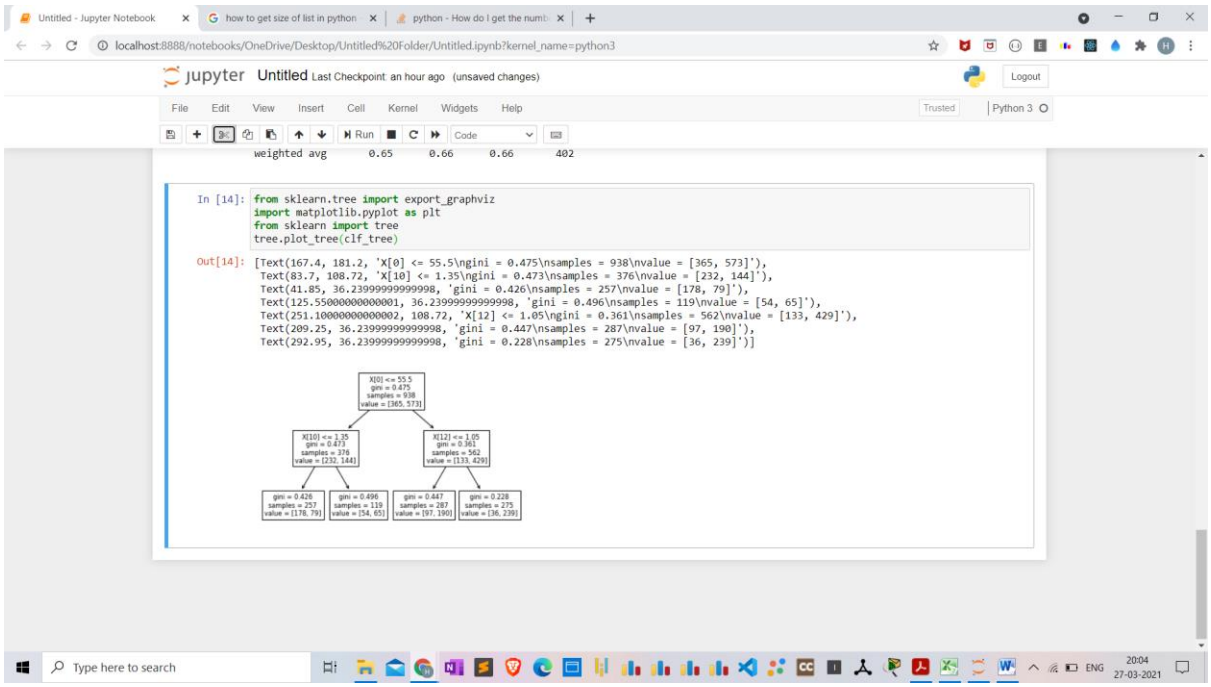
18BCE0165 MACHINE LEARNING ASSIGNMENT

Train the Model :-



```
In [9]: #6 Split the dataset
        from sklearn.model_selection import train_test_split

        x_train , x_test , y_train , y_test = train_test_split(x , y , test_size = 0.3 , random_state = 100)

In [10]: #7 Build the Decision Tree Classifier
         from sklearn.tree import DecisionTreeClassifier

         # build the decision classfier based on "gini" criteria or the "entropy" criteria
         clf_tree = DecisionTreeClassifier(criterion = 'gini' , max_depth = 2)

In [11]: clf_tree.fit(x_train , y_train)
Out[11]: DecisionTreeClassifier(max_depth=2)

In [12]: #8 Accuracy score
         clf_tree.score(x_test , y_test)
Out[12]: 0.664179104477612

In [13]: #9 classification Report
         y_pred = clf_tree.predict(x_test)
         from sklearn.metrics import classification_report
         report = classification_report(y_test , y_pred)
         print(report)
```

	precision	recall	f1-score	support
0.0	0.54	0.44	0.48	144
1.0	0.72	0.79	0.75	258
accuracy			0.66	402
macro avg	0.63	0.61	0.62	402
weighted avg	0.65	0.66	0.66	402



```
In [14]: from sklearn.tree import export_graphviz
         import matplotlib.pyplot as plt
         from sklearn import tree
         tree.plot_tree(clf_tree)
Out[14]: [Text(167.4, 181.2, 'X[0] <= 55.5\ngini = 0.475\nsamples = 938\nvalue = [365, 573]'),
          Text(83.7, 108.72, 'X[10] <= 1.35\ngini = 0.473\nsamples = 376\nvalue = [232, 144]'),
          Text(41.85, 36.23999999999998, 'gini = 0.426\nsamples = 257\nvalue = [178, 79]'),
          Text(125.55000000000001, 36.23999999999998, 'gini = 0.496\nsamples = 119\nvalue = [54, 65]'),
          Text(251.10000000000002, 108.72, 'X[12] <= 1.05\ngini = 0.361\nsamples = 562\nvalue = [133, 429]'),
          Text(209.25, 36.23999999999998, 'gini = 0.447\nsamples = 287\nvalue = [97, 190]'),
          Text(292.95, 36.23999999999998, 'gini = 0.228\nsamples = 275\nvalue = [36, 239]')]
```

18BCE0165 MACHINE LEARNING ASSIGNMENT

Accuracy Score Metric :-

1) Classification report

In [13]:
```
#9 classification Report
y_pred = clf_tree.predict(x_test)
from sklearn.metrics import classification_report
report = classification_report(y_test , y_pred)
print(report)
```

```
              precision    recall  f1-score   support

         0.0       0.54      0.44      0.48       144
         1.0       0.72      0.79      0.75       258

    accuracy                           0.66       402
   macro avg       0.63      0.61      0.62       402
weighted avg       0.65      0.66      0.66       402
```

Data Description :-

Based on NBA rookie stats, we are predicting which players have 5 year or more career longevity.

DataSet link :-

1) https://data.world/ssaudz/ml-classification-predicting-5-year-career-longevity-for-nb/workspace
2) https://data.world/ssaudz/ml-classification-predicting-5-year-career-longevity-for-nb