

#Importing necessary Libraries

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
from sklearn.datasets import load_boston
import seaborn as sns
%matplotlib inline
```

#Importing the dataset

```
df =
pd.read_csv('https://raw.githubusercontent.com/srinivasav22/Graduate-
Admission-Prediction/master/Admission_Predict_Ver1.1.csv')
df.head()
```

	Serial No.	GRE Score	TOEFL Score	University Rating	SOP	LOR
CGPA \						
0	1	337	118	4	4.5	4.5
9.65						
1	2	324	107	4	4.0	4.5
8.87						
2	3	316	104	3	3.0	3.5
8.00						
3	4	322	110	3	3.5	2.5
8.67						
4	5	314	103	2	2.0	3.0
8.21						

	Research	Chance of Admit
0	1	0.92
1	1	0.76
2	1	0.72
3	1	0.80
4	0	0.65

```
df.keys
```

<bound method NDFrame.keys of				Serial No.	GRE Score	TOEFL Score
University Rating	SOP	LOR	CGPA \			
0	1	337	118	4	4.5	4.5
9.65						
1	2	324	107	4	4.0	4.5
8.87						
2	3	316	104	3	3.0	3.5
8.00						
3	4	322	110	3	3.5	2.5
8.67						
4	5	314	103	2	2.0	3.0
8.21						
..

```

...
495          496          332          108          5  4.5  4.0
9.02
496          497          337          117          5  5.0  5.0
9.87
497          498          330          120          5  4.5  5.0
9.56
498          499          312          103          4  4.0  5.0
8.43
499          500          327          113          4  4.5  4.5
9.04

```

```

      Research  Chance of Admit
0             1             0.92
1             1             0.76
2             1             0.72
3             1             0.80
4             0             0.65
..          ...          ...
495          1             0.87
496          1             0.96
497          1             0.93
498          0             0.73
499          0             0.84

```

```
[500 rows x 9 columns]>
```

```
df.columns
```

```

Index(['Serial No.', 'GRE Score', 'TOEFL Score', 'University Rating',
'SOP',
      'LOR ', 'CGPA', 'Research', 'Chance of Admit '],
      dtype='object')

```

```
df.drop('Serial No.',axis=1,inplace=True)
```

```
df.describe().T
```

```

count      mean      std      min      25%
50% \
GRE Score  500.0  316.47200  11.295148  290.00  308.0000
317.00
TOEFL Score  500.0  107.19200   6.081868   92.00  103.0000
107.00
University Rating  500.0    3.11400   1.143512    1.00    2.0000
3.00
SOP          500.0    3.37400   0.991004    1.00    2.5000
3.50
LOR          500.0    3.48400   0.925450    1.00    3.0000
3.50
CGPA        500.0    8.57644   0.604813    6.80    8.1275

```

```

8.56
Research          500.0    0.56000  0.496884    0.00    0.0000
1.00
Chance of Admit   500.0    0.72174  0.141140    0.34    0.6300
0.72

```

```

              75%    max
GRE Score      325.00  340.00
TOEFL Score    112.00  120.00
University Rating  4.00    5.00
SOP            4.00    5.00
LOR            4.00    5.00
CGPA           9.04    9.92
Research       1.00    1.00
Chance of Admit  0.82    0.97

```

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
```

```
RangeIndex: 500 entries, 0 to 499
```

```
Data columns (total 8 columns):
```

#	Column	Non-Null Count	Dtype
0	GRE Score	500 non-null	int64
1	TOEFL Score	500 non-null	int64
2	University Rating	500 non-null	int64
3	SOP	500 non-null	float64
4	LOR	500 non-null	float64
5	CGPA	500 non-null	float64
6	Research	500 non-null	int64
7	Chance of Admit	500 non-null	float64

```
dtypes: float64(4), int64(4)
```

```
memory usage: 31.4 KB
```

```
#Finding out the null values
```

```
df.isnull().sum()
```

```

GRE Score      0
TOEFL Score    0
University Rating  0
SOP            0
LOR            0
CGPA           0
Research       0
Chance of Admit  0
dtype: int64

```

```
df.isnull().sum()
```

```

GRE Score      0
TOEFL Score    0

```

```

University Rating    0
SOP                  0
LOR                  0
CGPA                 0
Research             0
Chance of Admit      0
dtype: int64

```

```
df.corr()
```

\	GRE Score	TOEFL Score	University Rating	SOP
GRE Score	1.000000	0.827200	0.635376	0.613498
TOEFL Score	0.827200	1.000000	0.649799	0.644410
University Rating	0.635376	0.649799	1.000000	0.728024
SOP	0.613498	0.644410	0.728024	1.000000
LOR	0.524679	0.541563	0.608651	0.663707
CGPA	0.825878	0.810574	0.705254	0.712154
Research	0.563398	0.467012	0.427047	0.408116
Chance of Admit	0.810351	0.792228	0.690132	0.684137

	LOR	CGPA	Research	Chance of Admit
GRE Score	0.524679	0.825878	0.563398	0.810351
TOEFL Score	0.541563	0.810574	0.467012	0.792228
University Rating	0.608651	0.705254	0.427047	0.690132
SOP	0.663707	0.712154	0.408116	0.684137
LOR	1.000000	0.637469	0.372526	0.645365
CGPA	0.637469	1.000000	0.501311	0.882413
Research	0.372526	0.501311	1.000000	0.545871
Chance of Admit	0.645365	0.882413	0.545871	1.000000

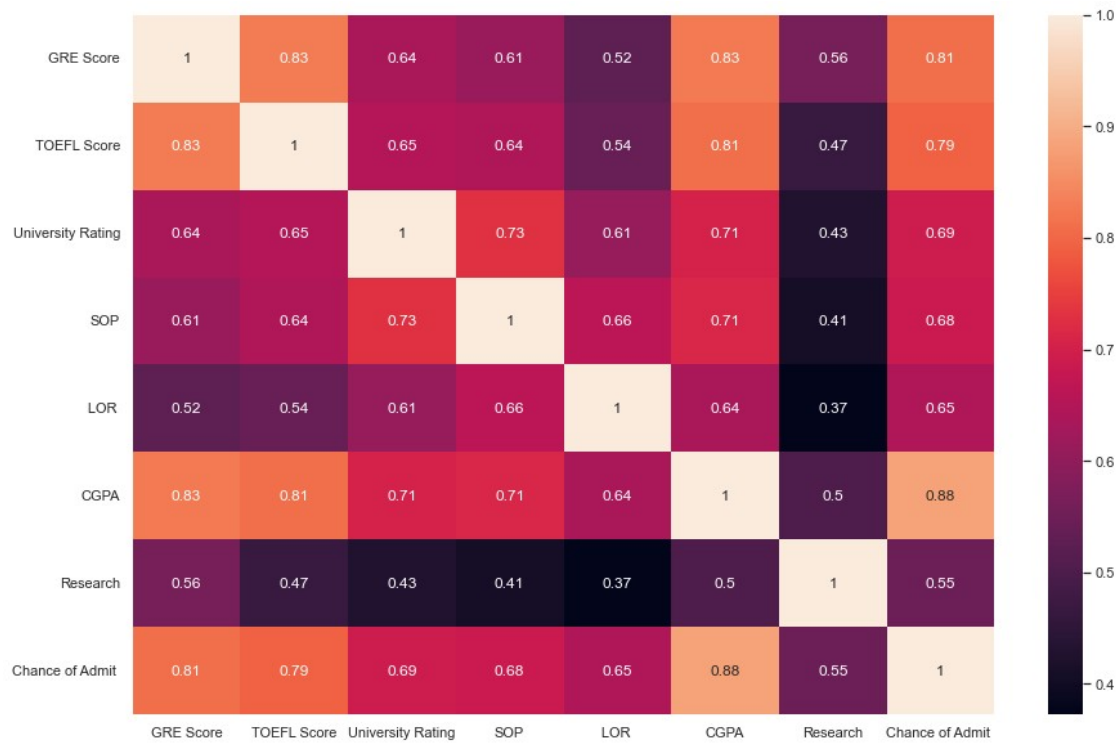
```
#Heatmap
```

```

sns.set(rc={'figure.figsize':(15,10)})
sns.heatmap(df.corr(),annot=True)

```

```
<AxesSubplot:>
```



```
sns.pairplot(df)
```

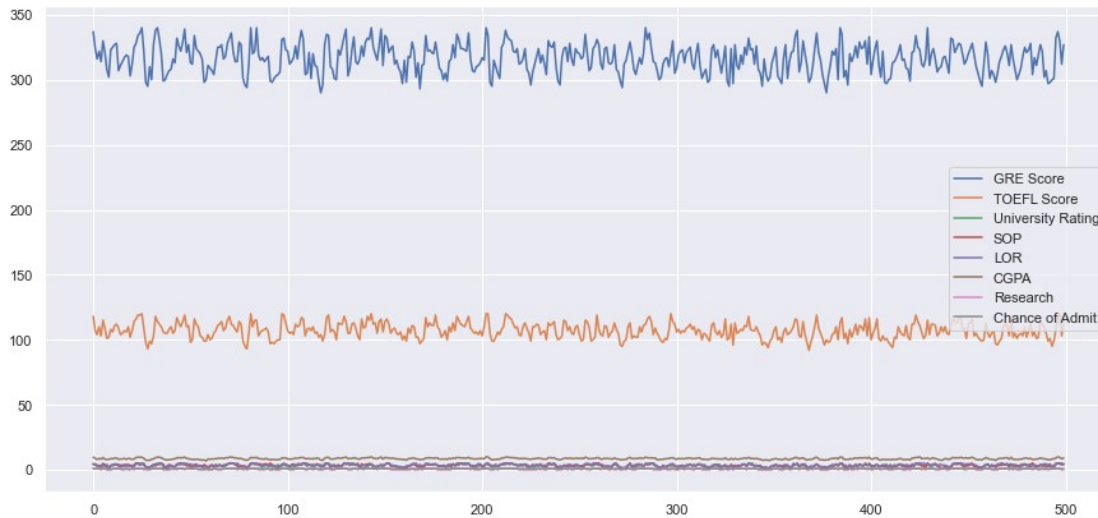
```
<seaborn.axisgrid.PairGrid at 0x17169546230>
```



```
df.rename({'Chance of Admit ': 'Chance of Admit', 'LOR ':'LOR'},
axis=1, inplace=True)
```

```
#graph all the data set - just for looking
df.plot(figsize=(15,7))
```

```
<AxesSubplot:>
```

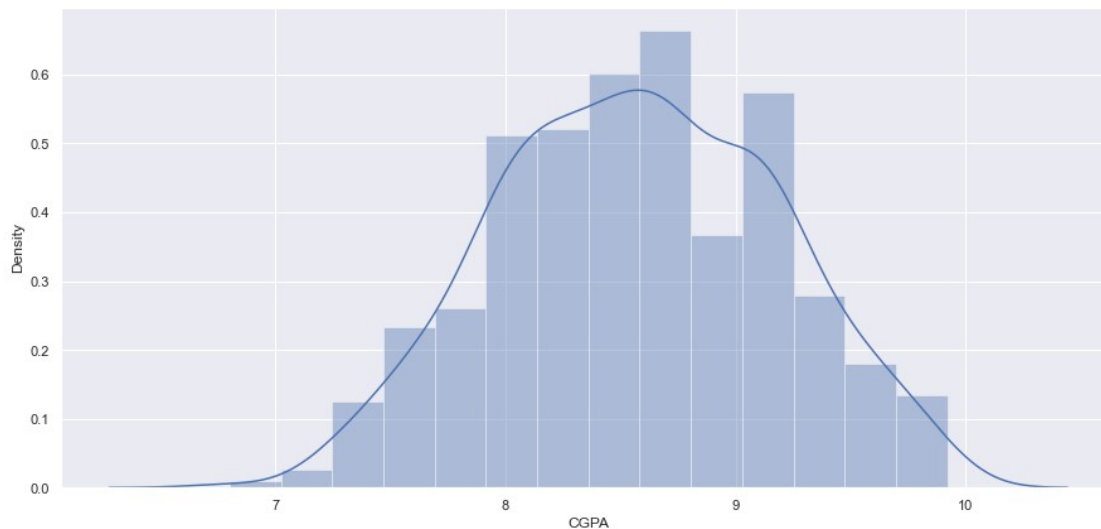


```
plt.figure(figsize=(15,7))
sns.distplot(df['CGPA'])
```

C:\Users\Shobhandeb\AppData\Local\Programs\Python\Python310\lib\site-packages\seaborn\distributions.py:2619: FutureWarning: `distplot` is a deprecated function and will be removed in a future version. Please adapt your code to use either `displot` (a figure-level function with similar flexibility) or `histplot` (an axes-level function for histograms).

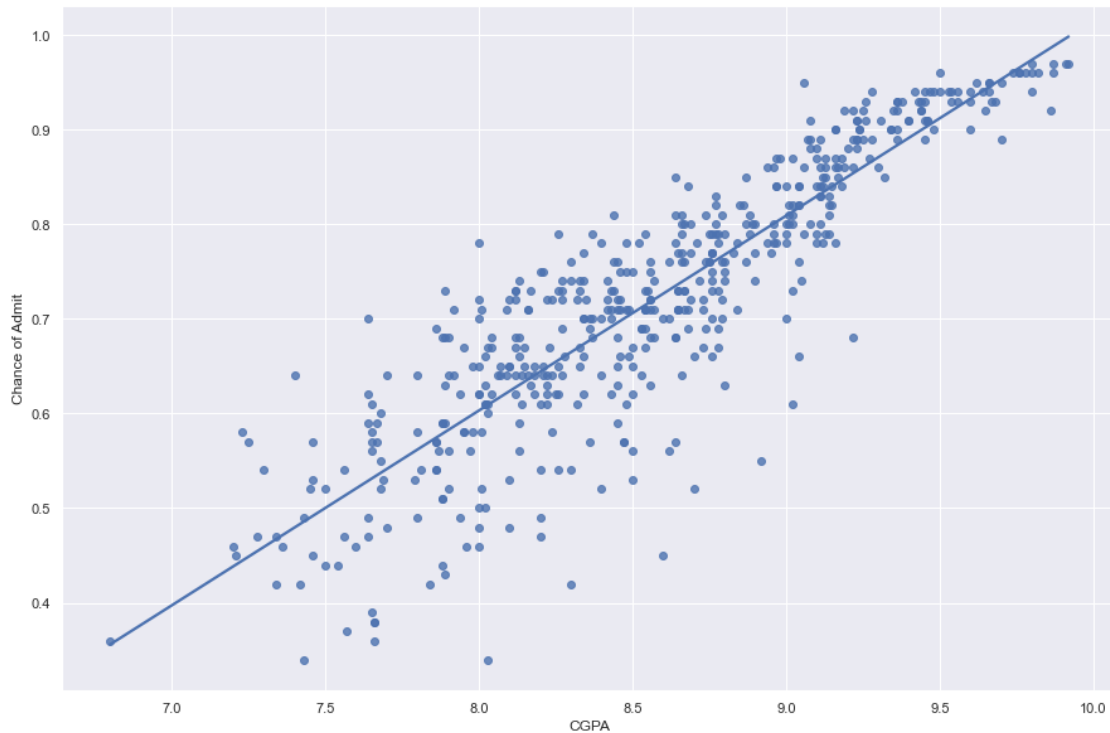
```
warnings.warn(msg, FutureWarning)
```

```
<AxesSubplot:xlabel='CGPA', ylabel='Density'>
```

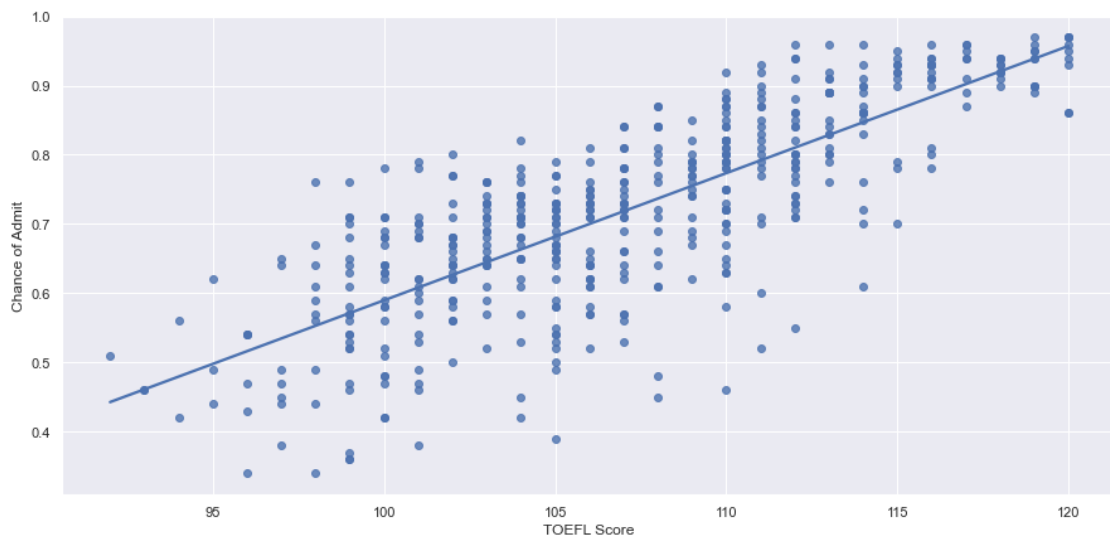


```
sns.regplot(x='CGPA',y='Chance of Admit',data=df,ci=None)
```

```
<AxesSubplot:xlabel='CGPA', ylabel='Chance of Admit'>
```



```
plt.figure(figsize=(15,7))
sns.regplot(x='TOEFL Score',y='Chance of Admit',data=df,ci=None)
<AxesSubplot:xlabel='TOEFL Score', ylabel='Chance of Admit'>
```



```
import plotly.graph_objects as go
import plotly.express as px

px.scatter(df, x="TOEFL Score", y="GRE Score",animation_frame="Chance
of Admit")
```



```

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```



```

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```

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```

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```

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```

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```

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```



```
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```

```
from sklearn.svm import SVC, SVR  
from sklearn.model_selection import train_test_split  
from sklearn.metrics import mean_absolute_error, mean_squared_error,  
median_absolute_error, confusion_matrix, accuracy_score
```

```
# Defined X value and y value, and split the data train  
X = df[['CGPA', 'GRE Score', 'TOEFL Score', 'Research']]  
y = df[['Chance of Admit']]
```

```
# Split data for test and train the model.  
X_train, X_test, y_train, y_test =  
train_test_split(X, y, random_state=0, test_size=.20)
```

```
# x shape  
X.shape
```

```
(500, 4)
```

```
# x_train shape 80% of data from x - 20% other data for test  
X_train.shape
```

```
(400, 4)
```

```
# x_train first five rows:  
X_train.head()
```

	CGPA	GRE Score	TOEFL Score	Research
107	9.46	338	117	1
336	8.79	319	110	0
71	9.76	336	112	1
474	7.95	308	105	1
6	8.20	321	109	1

```
# split the data train and test  
X_train, X_test, y_train, y_test = train_test_split(X, y,  
test_size=0.25, random_state=42)
```

```
print("X Train : ", X_train.shape)  
print("X Test : ", X_test.shape)  
print("Y Train : ", y_train.shape)  
print("Y Test : ", y_test.shape)
```

```
X Train : (375, 4)  
X Test : (125, 4)  
Y Train : (375, 1)  
Y Test : (125, 1)
```

```
from sklearn.preprocessing import  
MinMaxScaler, StandardScaler, LabelEncoder  
scaler = StandardScaler()
```

```
X_train_scaled = scaler.fit_transform(X_train)
```

```
X_test_scaled = scaler.transform(X_test)
```

```
svr = SVR()
```

```
svr.fit(X_train, y_train)
```

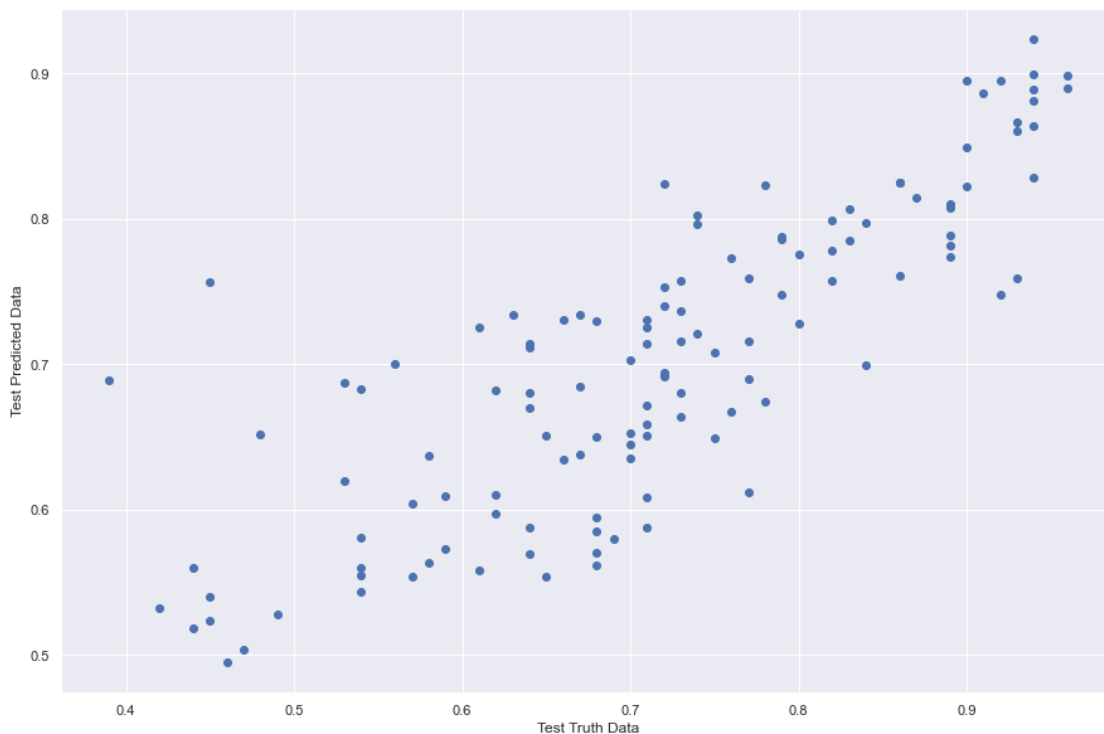
```
y_pred = svr.predict(X_test)
```

C:\Users\Shobhandeb\AppData\Local\Programs\Python\Python310\lib\site-packages\sklearn\utils\validation.py:1111: DataConversionWarning:

A column-vector y was passed when a 1d array was expected. Please change the shape of y to (n_samples,), for example using ravel().

```
plt.scatter(y_test,y_pred)
plt.xlabel("Test Truth Data")
plt.ylabel("Test Predicted Data")
```

```
Text(0, 0.5, 'Test Predicted Data')
```



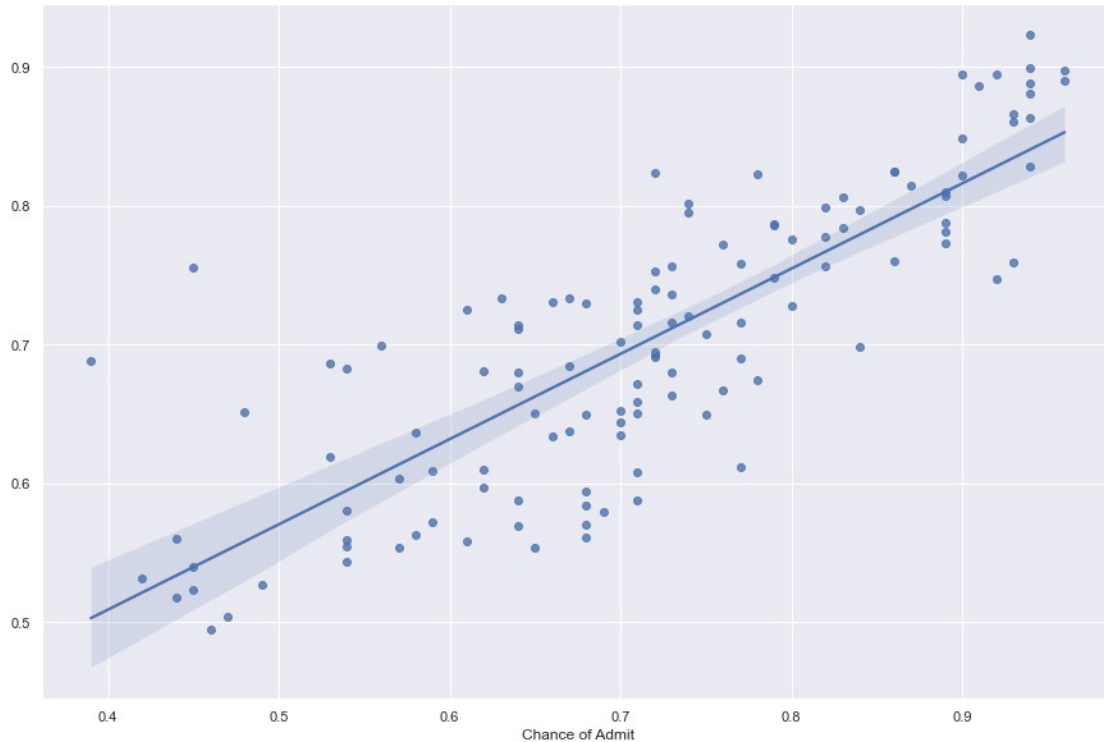
```
sns.regplot(y_test,y_pred)
```

C:\Users\Shobhandeb\AppData\Local\Programs\Python\Python310\lib\site-packages\seaborn_decorators.py:36: FutureWarning:

Pass the following variables as keyword args: x, y. From version 0.12, the only valid positional argument will be `data`, and passing other

arguments without an explicit keyword will result in an error or misinterpretation.

<AxesSubplot:xlabel='Chance of Admit'>



```
from sklearn.metrics import mean_squared_error
from sklearn.metrics import mean_absolute_error
print(mean_squared_error(y_test,y_pred))
print(mean_absolute_error(y_test,y_pred))
print(np.sqrt(mean_squared_error(y_test,y_pred)))

0.00663873199363157
0.06353916445318326
0.08147841428029617

print('-----Without Scaled Data-----')
from sklearn.metrics import r2_score
svr_score=r2_score(y_test,y_pred)
print(svr_score)

-----Without Scaled Data-----
0.659931575325714

## Adjusted R square
#display adjusted R-squared
1 - (1-svr_score)*(len(y_test)-1)/(len(y_test)-X_test.shape[1]-1)

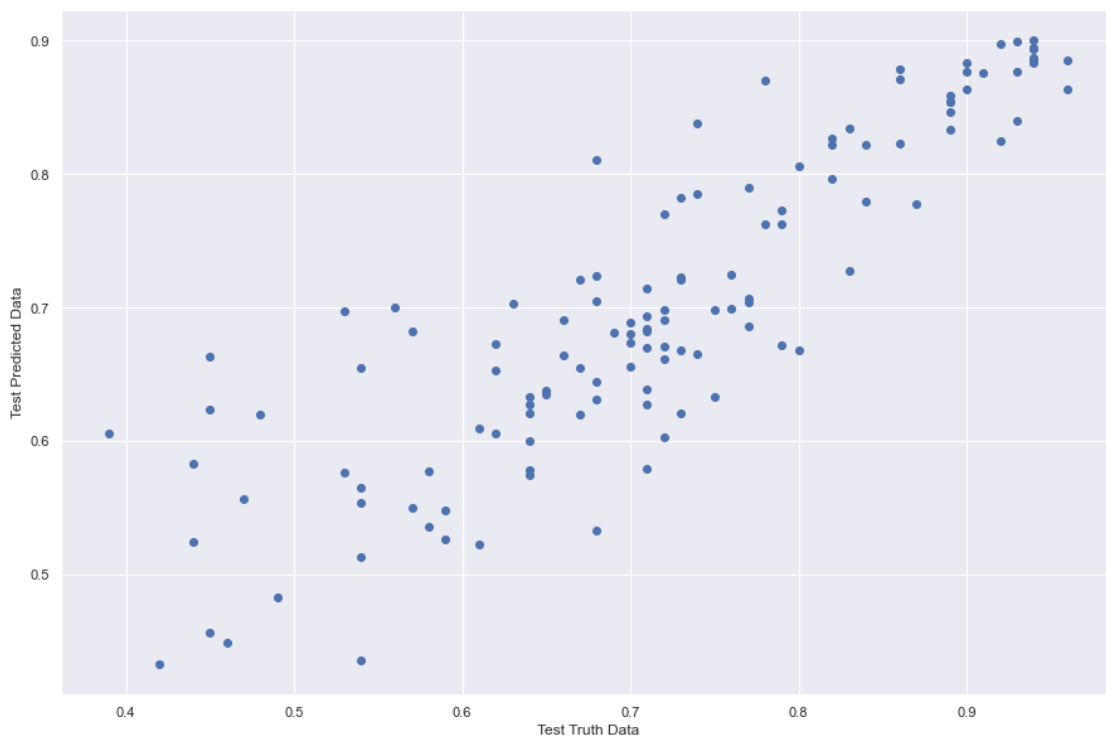
0.6485959611699045
```

```
svr.fit(X_train_scaled, y_train)
y_pred_scaled = svr.predict(X_test_scaled)
```

C:\Users\Shobhandeb\AppData\Local\Programs\Python\Python310\lib\site-packages\sklearn\utils\validation.py:1111: DataConversionWarning:

A column-vector y was passed when a 1d array was expected. Please change the shape of y to (n_samples,), for example using ravel().

```
plt.scatter(y_test,y_pred_scaled)
plt.xlabel("Test Truth Data")
plt.ylabel("Test Predicted Data")
Text(0, 0.5, 'Test Predicted Data')
```

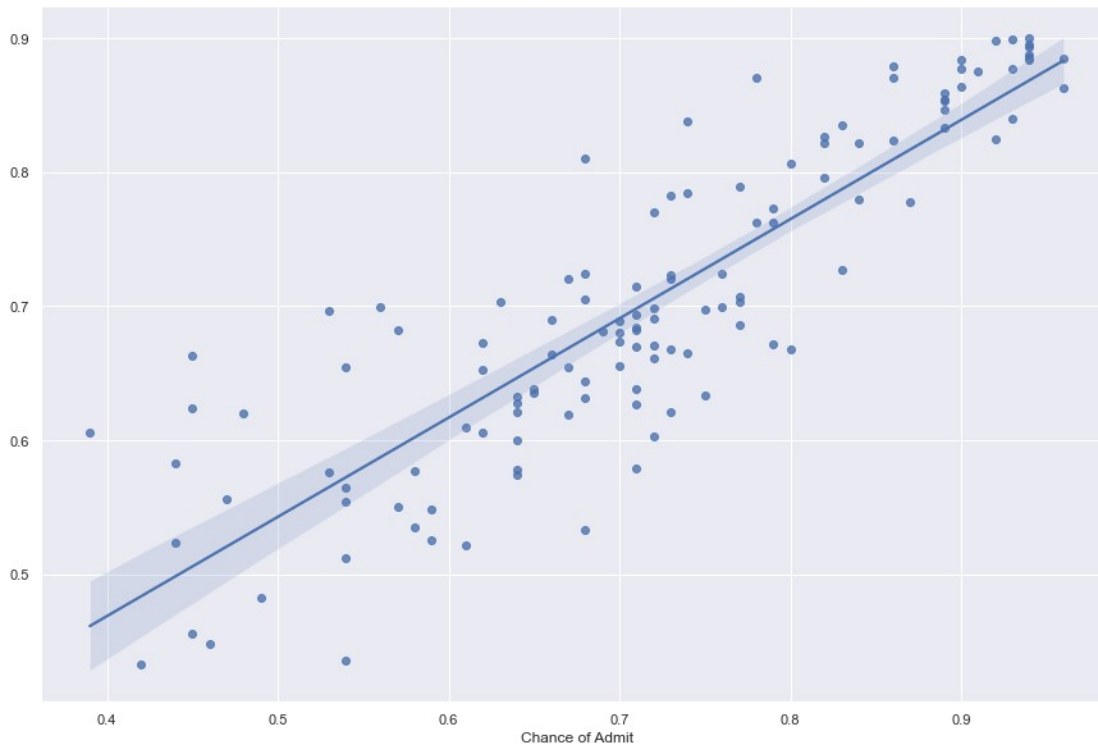


```
sns.regplot(y_test,y_pred_scaled)
```

C:\Users\Shobhandeb\AppData\Local\Programs\Python\Python310\lib\site-packages\seaborn_decorators.py:36: FutureWarning:

Pass the following variables as keyword args: x, y. From version 0.12, the only valid positional argument will be `data`, and passing other arguments without an explicit keyword will result in an error or misinterpretation.

```
<AxesSubplot:xlabel='Chance of Admit'>
```



```

from sklearn.metrics import mean_squared_error
from sklearn.metrics import mean_absolute_error
print(mean_squared_error(y_test,y_pred_scaled))
print(mean_absolute_error(y_test,y_pred_scaled))
print(np.sqrt(mean_squared_error(y_test,y_pred_scaled)))

0.0049102705508261985
0.05395611691372177
0.0700733226757958

print('-----With Scaled Data-----')
from sklearn.metrics import r2_score
svr_score_scaled=r2_score(y_test,y_pred_scaled)
print(svr_score_scaled)

-----With Scaled Data-----
0.7484718508676291

## Adjusted R square
#display adjusted R-squared
1 - (1-svr_score_scaled)*(len(y_test)-1)/(len(y_test)-X_test.shape[1]-
1)

0.7400875792298834

```