In [ ]:

```

```

Students Marks Predication

In [255…

```python
#Import libraries
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
```

In [256…

```python
path = r"E:\Data Science & AI\Dataset files\student_info.csv"
df  = pd.read_csv(path)
```

In [257…

```python
df.head()
```

Out[257…

	study_hours	student_marks
0	6.83	78.50
1	6.56	76.74
2	NaN	78.68
3	5.67	71.82
4	8.67	84.19

In [258…

```python
df.tail()
```

Out[258…

	study_hours	student_marks
195	7.53	81.67
196	8.56	84.68
197	8.94	86.75
198	6.60	78.05
199	8.35	83.50

In [259…

```python
df.shape
```

Out[259…

```
(200, 2)
```

In [260…

```python
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 200 entries, 0 to 199
Data columns (total 2 columns):
 #   Column         Non-Null Count  Dtype  
---  ------         --------------  -----  
 0   study_hours    195 non-null    float64
 1   student_marks  200 non-null    float64
dtypes: float64(2)
memory usage: 3.2 KB
```

In [261…

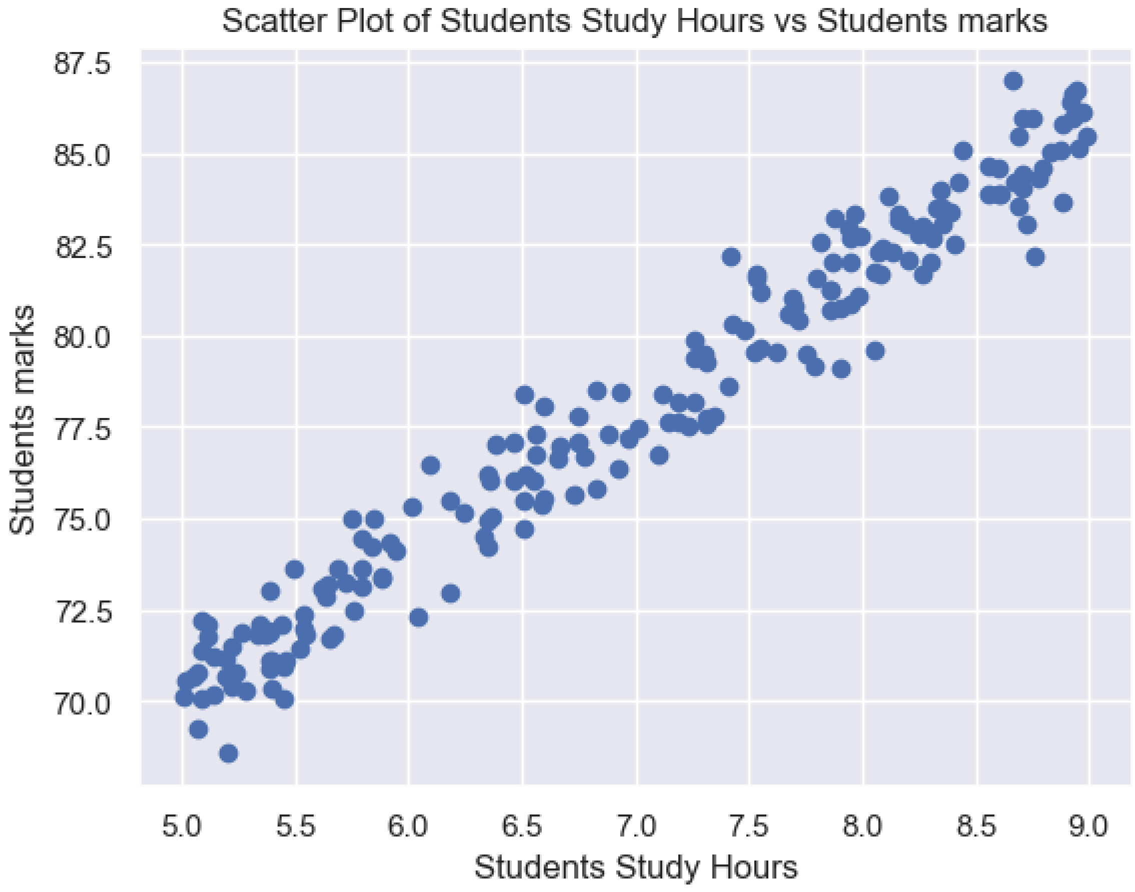
```
df.describe()
```

Out[261…

	study_hours	student_marks
count	195.000000	200.00000
mean	6.995949	77.93375
std	1.253060	4.92570
min	5.010000	68.57000
25%	5.775000	73.38500
50%	7.120000	77.71000
75%	8.085000	82.32000
max	8.990000	86.99000

In [262…

```
plt.scatter(x =df.study_hours, y = df.student_marks)
plt.xlabel("Students Study Hours")
plt.ylabel("Students marks")
plt.title("Scatter Plot of Students Study Hours vs Students marks")
plt.show()
```



In [263…

```
## Prepare the data for Machine Learning algorithms
# Data Cleaning

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

Out[263…

```
study_hours      5
student_marks    0
dtype: int64
```

In [264…

```
df.mean()
```

Out[264…

```
study_hours       6.995949
student_marks    77.933750
dtype: float64
```

In [265…

```
df2 = df.fillna(df.mean())
```

In [266…

```
df2.isnull().sum()
```

Out[266…

```
study_hours      0
student_marks    0
dtype: int64
```

In [267…

```
df2.head()
```

Out[267…

	study_hours	student_marks
0	6.830000	78.50
1	6.560000	76.74
2	6.995949	78.68
3	5.670000	71.82
4	8.670000	84.19

In [268…

```
# split dataset

X = df2.drop("student_marks", axis = "columns")
y = df2.drop("study_hours", axis = "columns")
print("shape of X = ", X.shape)
print("shape of y = ", y.shape)
```

```
shape of X =  (200, 1)
shape of y =  (200, 1)
```

In [269…

```
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_s
print("shape of X_train = ", X_train.shape)
print("shape of y_train = ", y_train.shape)
print("shape of X_test = ", X_test.shape)
print("shape of y_test = ", y_test.shape)
```

```
shape of X_train =  (160, 1)
shape of y_train =  (160, 1)
shape of X_test =  (40, 1)
shape of y_test =  (40, 1)
```

In [270…

```
# Select a model and train it

# y = m * x + c
from sklearn.linear_model import LinearRegression
lr = LinearRegression()
```

In [271…

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

Out[271…

```
▾ LinearRegression
LinearRegression()
```

In [272…

```
lr.coef_
```

Out[272…

```
array([[3.93571802]])
```

In [273…

```
lr.intercept_
```

Out[273…

```
array([50.44735504])
```

In [274…

```
m = 3.93
c = 50.44
y  = m * 4 + c
y
```

Out[274…

```
66.16
```

In [275…

```
lr.predict([[4]])[0][0].round(2)
```

Out[275…

```
66.19
```

In [276…

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

Out[276…

```
array([[83.11381458],
       [78.9025963 ],
       [84.57003024],
       [85.82946001],
       [84.72745896],
       [80.75238377],
       [72.84159055],
       [71.66087515],
       [73.23516235],
       [71.66087515],
       [73.47130543],
       [76.38373677],
       [73.23516235],
       [73.58937697],
       [82.95638585],
       [70.40144538],
       [73.23516235],
       [78.74516758],
       [75.55723598],
       [82.68088559],
       [76.65923703],
       [70.48015974],
       [74.77009238],
       [77.98143645],
       [85.59331693],
       [82.56281405],
       [76.42309395],
       [85.0423164 ],
       [78.39095296],
       [81.38209865],
       [81.73631327],
       [83.15317176],
       [82.20859943],
       [81.10659839],
       [73.58937697],
       [71.1492318 ],
       [71.89701823],
       [81.53952737],
       [72.60544747],
       [71.93637541]])
```

In [277…

```
pd.DataFrame(np.c_[X_test, y_test, y_pred], columns = ["study_hours", "student_m
```

Out[277…

	study_hours	student_marks_original	student_marks_predicted
0	8.300000	82.02	83.113815
1	7.230000	77.55	78.902596
2	8.670000	84.19	84.570030
3	8.990000	85.46	85.829460
4	8.710000	84.03	84.727459
5	7.700000	80.81	80.752384
6	5.690000	73.61	72.841591
7	5.390000	70.90	71.660875
8	5.790000	73.14	73.235162
9	5.390000	73.02	71.660875
10	5.850000	75.02	73.471305
11	6.590000	75.37	76.383737
12	5.790000	74.44	73.235162
13	5.880000	73.40	73.589377
14	8.260000	81.70	82.956386
15	5.070000	69.27	70.401445
16	5.790000	73.64	73.235162
17	7.190000	77.63	78.745168
18	6.380000	77.01	75.557236
19	8.190000	83.08	82.680886
20	6.660000	76.63	76.659237
21	5.090000	72.22	70.480160
22	6.180000	72.96	74.770092
23	6.995949	76.14	77.981436
24	8.930000	85.96	85.593317
25	8.160000	83.36	82.562814
26	6.600000	78.05	76.423094
27	8.790000	84.60	85.042316
28	7.100000	76.76	78.390953
29	7.860000	81.24	81.382099
30	7.950000	80.86	81.736313
31	8.310000	82.69	83.153172
32	8.070000	82.30	82.208599

	study_hours	student_marks_original	student_marks_predicted
33	7.790000	79.17	81.106598
34	5.880000	73.34	73.589377
35	5.260000	71.86	71.149232
36	5.450000	70.06	71.897018
37	7.900000	80.76	81.539527
38	5.630000	72.87	72.605447
39	5.460000	71.10	71.936375

In [278…

```
## Fine-tune your model

lr.score(X_test,y_test)
```

Out[278…

```
0.9514124242154464
```

In [279…

```
plt.scatter(X_train,y_train)
```

Out[279…

```
<matplotlib.collections.PathCollection at 0x1a7377d3a00>
```

In [280…

```
plt.scatter(X_test, y_test)
plt.plot(X_train, lr.predict(X_train), color = "r")
```

Out[280…

```
[<matplotlib.lines.Line2D at 0x1a737952aa0>]
```

In [281…

```
## Present your solution
# Save Ml Model

import joblib
joblib.dump(lr, "student_mark_predictor.pkl")
```

Out[281…

```
['student_mark_predictor.pkl']
```

In [282…

```
model = joblib.load("student_mark_predictor.pkl")
```

In [283…

```
model.predict([[5]])[0][0]
```

Out[283…

```
70.12594512018406
```

In [ ]:

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In [ ]: