Student Marks Predictor

1. Business Problem

predict the percentage of an student based on the no. of study hours.

1.1 Description

With the help of this predictor you can find out the marks of students according their study hours.

2. Machine learning problem

2.1 data

data file name :- student_info.csv

size of data :- 2.4 kB

source file's link:-

https://drive.google.com/file/d/1gebOloJzZSQbbfrsLKbTKaM6AFz3PPZ4/view?usp=sharing

3. Type of machine learning problem

It is a Regression problem where we find out real interger numbers.

4. Exploratory Data Analysis

In [1]:

```
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
from sklearn.linear_model import LinearRegression
from sklearn.model_selection import train_test_split
import joblib
from sklearn import svm
```

4.1 Reading data and basic stats

In [2]:

```
data=pd.read_csv("student_info.csv")
print("Number of data points:",data.shape[0])
```

```
Number of data points: 200
```

In [3]:

```
data.head(10)
```

Out[3]:

	study_hours	student_marks
0	6.83	78.50
1	6.56	76.74

	study_hours	student_marks
2	NaN	78.68
3	5.67	71.82
4	8.67	84.19
5	7.55	81.18
6	6.67	76.99
7	8.99	85.46
8	5.19	70.66
9	6.75	77.82

In [4]:

```
data.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 [5]:

```
data.describe()
```

Out[5]:

	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

checking for null values

In [6]:

```
data.isnull().sum()
```

Out[6]:

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

Replace all the null values with mean value.

In [7]:

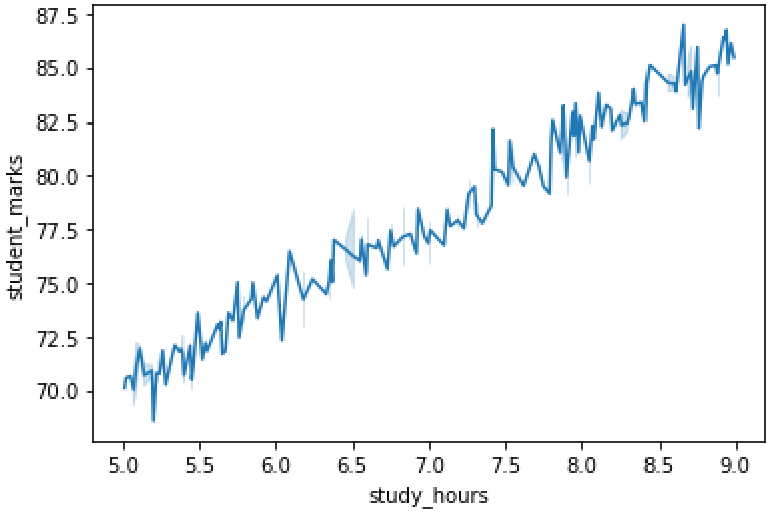
```
data2=data.fillna(data.mean())
```

In [8]:

```
 data2.isnull().sum()
```

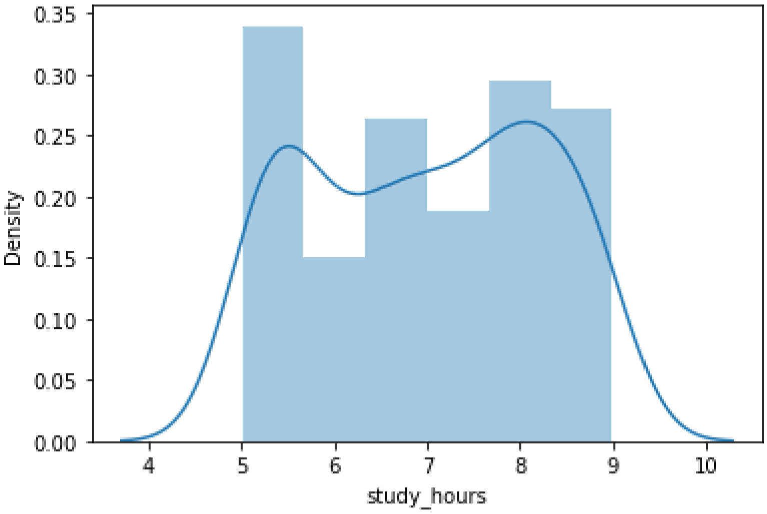
```
Out[8]: study_hours      0
        student_marks    0
        dtype: int64
```

```
In [9]:
sns.lineplot(x="study_hours",y="student_marks",data=data2)
plt.show()
```



```
In [10]:
sns.distplot(data2["study_hours"])
plt.show()
```

```
/home/sunil/anaconda3/lib/python3.8/site-packages/seaborn/distributions.py:25
57: FutureWarning: `distplot` is a deprecated function and will be removed in
a future version. Please adapt your code to use either `displot` (a figure-le
vel function with similar flexibility) or `histplot` (an axes-level function
for histograms).
  warnings.warn(msg, FutureWarning)
```



```
In [11]:
sns.distplot(data2["student_marks"])
plt.show()
```

```
/home/sunil/anaconda3/lib/python3.8/site-packages/seaborn/distributions.py:25
57: FutureWarning: `distplot` is a deprecated function and will be removed in
a future version. Please adapt your code to use either `displot` (a figure-le
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for histograms).
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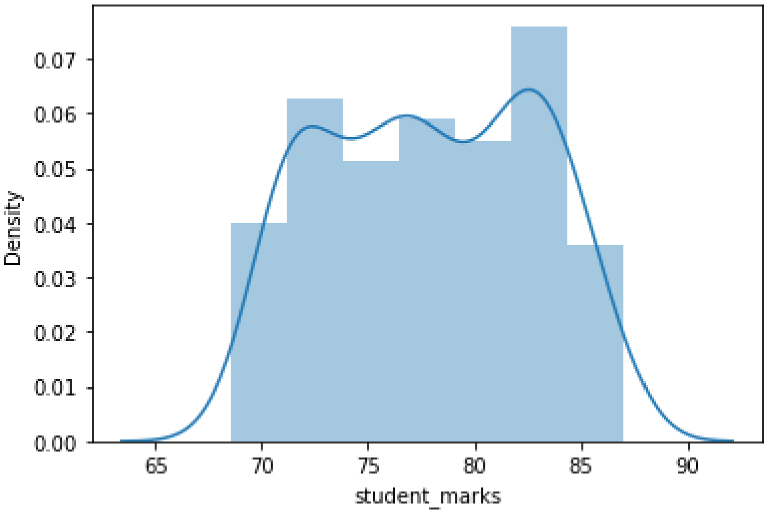
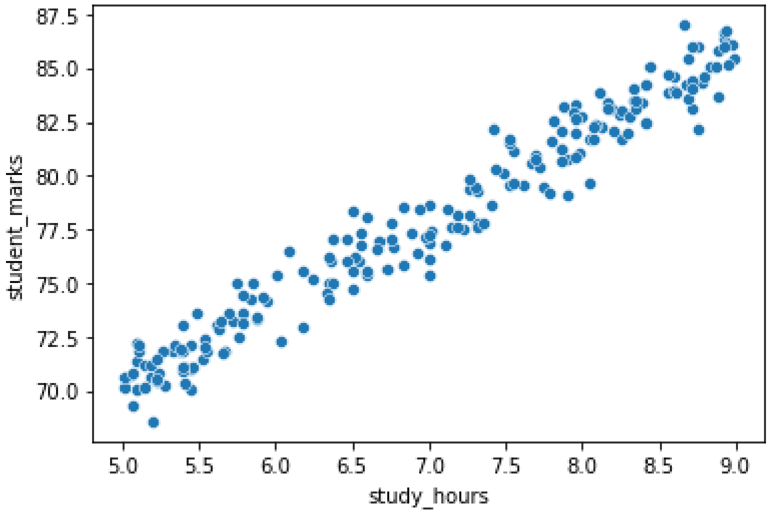


In [12]:
```
sns.scatterplot(x="study_hours",y="student_marks",data=data2)
```

Out[12]:
```
<AxesSubplot:xlabel='study_hours', ylabel='student_marks'>
```



split dataset for training

In [13]:
```
x=data2.drop("student_marks", axis="columns")
y=data2.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 [14]:
```
X_train,X_test,Y_train,Y_test=train_test_split(x,y,test_size=0.2, random_stat
```

In [15]:
```
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)
```

LinearRegression validation

In [16]:

```
lr=LinearRegression()
```

In [17]:

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

Out[17]:

```
LinearRegression()
```

I saved the model's coef_ and intercept in afile,so again i restart my program,and it will start from where it last time executed,and it will run till the last.

In [18]:

```
lr.coef_
```

Out[18]:

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

In [19]:

```
lr.intercept_
```

Out[19]:

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

In [20]:

```
 m= 3.93
 c= 50.44
 y= m*12+c
 y
```

Out[20]:

```
97.6
```

In [21]:

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

Out[21]:

```
66.19
```

In [22]:

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

Out[22]:

```
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 [23]:

```
feature_data=pd.DataFrame(np.c_[X_test,Y_test,y_pred], columns=["study_hours'
```

In [24]:

```
feature_data.head(10)
```

Out[24]:

	study_hours	student_marks_original	student_marks_predicted
0	8.30	82.02	83.113815
1	7.23	77.55	78.902596
2	8.67	84.19	84.570030
3	8.99	85.46	85.829460
4	8.71	84.03	84.727459
5	7.70	80.81	80.752384
6	5.69	73.61	72.841591
7	5.39	70.90	71.660875
8	5.79	73.14	73.235162
9	5.39	73.02	71.660875

Accuracy of model

In [25]:

```
print(f"{lr.score(X_test,Y_test)*100}%")
```

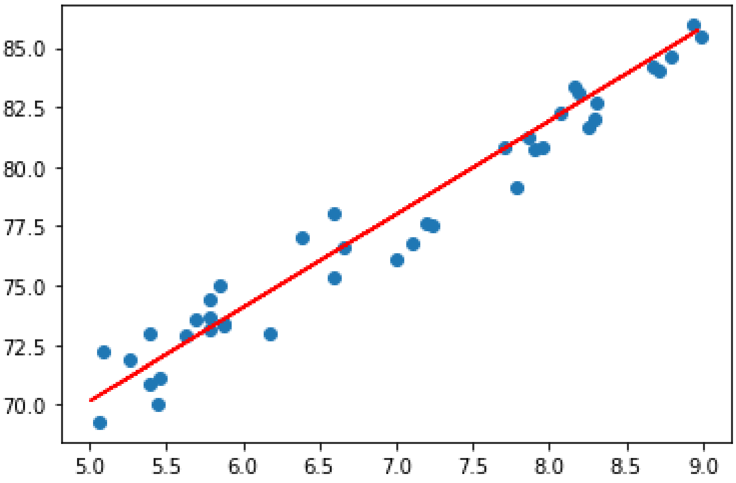
```
95.14124242154463%
```

In [26]:

```
plt.scatter(X_test,Y_test)
plt.plot(X_train,lr.predict(X_train),color="red")
```

Out[26]:

```
[<matplotlib.lines.Line2D at 0x7fdac07c9100>]
```



output / solution

In [27]:
```
joblib.dump(lr,"Student_Marks_Predictor.pkl")
```

Out[27]:
```
['Student_Marks_Predictor.pkl']
```

In [28]:
```
model=joblib.load("Student_Marks_Predictor.pkl")
```

In [29]:
```
model.predict([[12]]) #it is showing student's mark according to no. of stud
```

Out[29]:
```
array([[97.67597124]])
```