

```
In [2]: import pandas as pd
```

```
In [3]: data=pd.read_csv("/home/placement/Downloads/fiat500.csv")
```

```
In [4]: data.head()
```

```
Out[4]:
```

	ID	model	engine_power	age_in_days	km	previous_owners	lat	lon	price
0	1	lounge	51	882	25000	1	44.907242	8.611560	8900
1	2	pop	51	1186	32500	1	45.666359	12.241890	8800
2	3	sport	74	4658	142228	1	45.503300	11.417840	4200
3	4	lounge	51	2739	160000	1	40.633171	17.634609	6000
4	5	pop	73	3074	106880	1	41.903221	12.495650	5700

```
In [5]: data1=data.drop(['lat','lon','ID'],axis=1)
```

```
In [6]: data1.head()
```

```
Out[6]:
```

	model	engine_power	age_in_days	km	previous_owners	price
0	lounge	51	882	25000	1	8900
1	pop	51	1186	32500	1	8800
2	sport	74	4658	142228	1	4200
3	lounge	51	2739	160000	1	6000
4	pop	73	3074	106880	1	5700

```
In [7]: data=pd.get_dummies(data)
```

```
In [8]: data.shape
```

```
Out[8]: (1538, 11)
```

```
In [ ]:
```

```
In [9]: y=data['price']
```

```
In [10]: x=data.drop('price',axis=1)
```

```
In [ ]:
```

```
In [11]: y
```

```
Out[11]: 0      8900
         1      8800
         2      4200
         3      6000
         4      5700
         ...
        1533    5200
        1534    4600
        1535    7500
        1536    5990
        1537    7900
        Name: price, Length: 1538, dtype: int64
```

```
In [12]: from sklearn.model_selection import train_test_split
```

```
In [13]: x_train, x_test, y_train, y_test = train_test_split(x, y, test_size=0.33,random_state=42)
```

```
In [14]: x_test.head(5)
```

```
Out[14]:
```

	ID	engine_power	age_in_days	km	previous_owners	lat	lon	model_lounge	model_pop	model_sport
481	482	51	3197	120000	2	40.174702	18.167629	0	1	0
76	77	62	2101	103000	1	45.797859	8.644440	0	1	0
1502	1503	51	670	32473	1	41.107880	14.208810	1	0	0
669	670	51	913	29000	1	45.778591	8.946250	1	0	0
1409	1410	51	762	18800	1	45.538689	9.928310	1	0	0

```
In [15]: x_train.shape
```

```
Out[15]: (1030, 10)
```

```
In [16]: x_train.head()
```

```
Out[16]:
```

	ID	engine_power	age_in_days	km	previous_owners	lat	lon	model_lounge	model_pop	model_sport
527	528	51	425	13111	1	45.022388	7.58602	1	0	0
129	130	51	1127	21400	1	44.332531	7.54592	1	0	0
602	603	51	2039	57039	1	40.748241	14.52835	0	1	0
331	332	51	1155	40700	1	42.143860	12.54016	1	0	0
323	324	51	425	16783	1	41.903221	12.49565	1	0	0

```
In [17]: y_train.shape
```

```
Out[17]: (1030,)
```

```
In [18]: y_train.head()
```

```
Out[18]: 527    9990  
        129    9500  
        602    7590  
        331    8750  
        323    9100  
        Name: price, dtype: int64
```

```
In [19]: from sklearn.linear_model import LinearRegression  
        reg=LinearRegression()  
        reg.fit(x_train,y_train)
```

```
Out[19]: LinearRegression()
```

**In a Jupyter environment, please rerun this cell to show the HTML representation or trust the notebook.
On GitHub, the HTML representation is unable to render, please try loading this page with nbviewer.org.**

```
In [20]: ypred=reg.predict(x_test)
```

In [21]: ypred

```
Out[21]: array([ 5819.19308764,  7248.82914161,  9741.8936974 ,  9798.98033074,
        10055.00624601,  9551.4955679 ,  9758.01743879, 10122.9778365 ,
        9654.9661814 ,  9251.1403257 , 10478.09512253,  7807.3005255 ,
        7705.15873781,  6295.63244894,  9545.40486313, 10422.92177704,
        9616.90811615,  7756.9171161 ,  4893.88454414, 10581.46142719,
        10465.24078346, 10443.29318231,  7518.43696046, 10028.21911459,
        6990.73118896,  8989.86900819,  4823.51364349,  6989.03118684,
        7822.83203734,  9683.17944083,  7344.21343132,  5341.43860798,
        5420.78405336,  5092.38401339,  8971.44357515,  5702.81242412,
        9920.16285466,  8334.58448277,  6220.93323723,  8389.23958511,
        9695.84208061,  6859.59630725,  9101.22635456, 10063.22592995,
        8621.83915759, 10175.06753933,  9063.21918346,  8867.24865352,
        7094.44228184,  9058.37693565,  9474.82390731, 10406.09102832,
        10112.65006224,  6820.90463865,  9700.36507783,  9382.18149429,
        9632.57617775, 10553.81356008,  9847.21129432,  7247.16814789,
        9990.23331336,  7084.23300123,  9977.34233656,  7245.01115798,
        6490.89305576,  9737.86785115,  9853.54349825,  8568.7125607 ,
        8506.81438703,  6484.69051659,  7883.1895563 ,  6870.28308427,
        8263.36833348, 10551.03496347,  7434.71134313,  8637.85174602,
        8762.87817027, 10010.47800077,  7324.68888828,  8527.73426022])
```

In [22]: `from sklearn.metrics import r2_score`
`r2_score(y_test,ypred)`

Out[22]: 0.8428319728488683

In [23]: `from sklearn.metrics import mean_squared_error`
`mean_squared_error(ypred,y_test)`

Out[23]: 577189.6736608233

In [24]: `import math`
`a=577189.6736608233`
`print(math.sqrt(a))`

759.7300005007195

```
In [25]: Results=pd.DataFrame(columns=['price','predicate'])
Results['price']=y_test
Results['predicate']=ypred
Results=Results.reset_index()
Results['Id']=Results.index
Results.head(15)
```

```
Out[25]:
```

	index	price	predicate	Id
0	481	7900	5819.193088	0
1	76	7900	7248.829142	1
2	1502	9400	9741.893697	2
3	669	8500	9798.980331	3
4	1409	9700	10055.006246	4
5	1414	9900	9551.495568	5
6	1089	9900	9758.017439	6
7	1507	9950	10122.977837	7
8	970	10700	9654.966181	8
9	1198	8999	9251.140326	9
10	1088	9890	10478.095123	10
11	576	7990	7807.300526	11
12	965	7380	7705.158738	12
13	1488	6800	6295.632449	13
14	1432	8900	9545.404863	14

```
In [26]: Results['diff_price']=Results.apply(lambda row:row.price-row.predicate,axis=1)
```

In [27]: `Results.head(15)`

Out[27]:

	index	price	predicate	ld	diff_price
0	481	7900	5819.193088	0	2080.806912
1	76	7900	7248.829142	1	651.170858
2	1502	9400	9741.893697	2	-341.893697
3	669	8500	9798.980331	3	-1298.980331
4	1409	9700	10055.006246	4	-355.006246
5	1414	9900	9551.495568	5	348.504432
6	1089	9900	9758.017439	6	141.982561
7	1507	9950	10122.977837	7	-172.977837
8	970	10700	9654.966181	8	1045.033819
9	1198	8999	9251.140326	9	-252.140326
10	1088	9890	10478.095123	10	-588.095123
11	576	7990	7807.300526	11	182.699474
12	965	7380	7705.158738	12	-325.158738
13	1488	6800	6295.632449	13	504.367551
14	1432	8900	9545.404863	14	-645.404863

In []: