In [1]:
```
import pandas as pd
```

In [3]:
```
data=pd.read_csv("/home/placement/Downloads/fiat1.csv")
```

In [4]:
```
data
```

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
 ...   ...     ...           ...          ...     ...              ...        ...        ...    ...
1533  1534   sport            51         3712  115280                1  45.069679   7.704920   5200
1534  1535  lounge            74         3835  112000                1  45.845692   8.666870   4600
1535  1536     pop            51         2223   60457                1  45.481541   9.413480   7500
1536  1537  lounge            51         2557   80750                1  45.000702   7.682270   5990
1537  1538     pop            51         1766   54276                1  40.323410  17.568270   7900

1538 rows × 9 columns
```

In [12]:

```
data1=data.loc[(data.previous_owners==1)]
data1
```

Out[12]:

	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
...	...	...	...	...	...	...	...	...	...
1533	1534	sport	51	3712	115280	1	45.069679	7.704920	5200
1534	1535	lounge	74	3835	112000	1	45.845692	8.666870	4600
1535	1536	pop	51	2223	60457	1	45.481541	9.413480	7500
1536	1537	lounge	51	2557	80750	1	45.000702	7.682270	5990
1537	1538	pop	51	1766	54276	1	40.323410	17.568270	7900

1389 rows × 9 columns

In [13]:
```
data1=data1.drop(['ID','lat','lon'],axis=1)
data1
```

Out[13]:

	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
...	...	...	...	...	...	...
1533	sport	51	3712	115280	1	5200
1534	lounge	74	3835	112000	1	4600
1535	pop	51	2223	60457	1	7500
1536	lounge	51	2557	80750	1	5990
1537	pop	51	1766	54276	1	7900

1389 rows × 6 columns

In [14]:

```
data1=pd.get_dummies(data1)
data1
```

Out[14]:

	engine_power	age_in_days	km	previous_owners	price	model_lounge	model_pop	model_sport
0	51	882	25000	1	8900	1	0	0
1	51	1186	32500	1	8800	0	1	0
2	74	4658	142228	1	4200	0	0	1
3	51	2739	160000	1	6000	1	0	0
4	73	3074	106880	1	5700	0	1	0
...	...	...	...	...	...	...	...	...
1533	51	3712	115280	1	5200	0	0	1
1534	74	3835	112000	1	4600	1	0	0
1535	51	2223	60457	1	7500	0	1	0
1536	51	2557	80750	1	5990	1	0	0
1537	51	1766	54276	1	7900	0	1	0

1389 rows × 8 columns

In [15]:

```
y=data1['price']
X=data1.drop(['price'],axis=1)
```

In [16]:
```
y
```

Out[16]:
```
0       8900
1       8800
2       4200
3       6000
4       5700
        ... 
1533    5200
1534    4600
1535    7500
1536    5990
1537    7900
Name: price, Length: 1389, dtype: int64
```

In [18]:
```
X
```

Out[18]:

	engine_power	age_in_days	km	previous_owners	model_lounge	model_pop	model_sport
0	51	882	25000	1	1	0	0
1	51	1186	32500	1	0	1	0
2	74	4658	142228	1	0	0	1
3	51	2739	160000	1	1	0	0
4	73	3074	106880	1	0	1	0
...	...	...	...	...	...	...	...
1533	51	3712	115280	1	0	0	1
1534	74	3835	112000	1	1	0	0
1535	51	2223	60457	1	0	1	0
1536	51	2557	80750	1	1	0	0
1537	51	1766	54276	1	0	1	0

1389 rows × 7 columns

In [19]:

```
from sklearn.model_selection import train_test_split
X_train,X_test,y_train,y_test=train_test_split(X,y,test_size=0.1,random_state=42)
```

In [20]:

```
X_train
```

Out[20]:

	engine_power	age_in_days	km	previous_owners	model_lounge	model_pop	model_sport
956	51	790	26210	1	1	0	0
1411	51	1461	46108	1	1	0	0
333	51	456	26526	1	1	0	0
1452	51	1247	75000	1	1	0	0
1369	51	701	36500	1	1	0	0
...	...	...	...	...	...	...	...
1201	51	790	50740	1	0	1	0
1239	51	4383	107600	1	0	1	0
1432	51	701	42095	1	1	0	0
951	51	3684	78000	1	1	0	0
1235	51	1613	45000	1	1	0	0

1250 rows × 7 columns

```
In [21]: y_train

Out[21]: 956     8750
         1411    8000
         333     9980
         1452    8000
         1369    9990
                 ...
         1201    8300
         1239    3950
         1432    8900
         951     6500
         1235    8800
         Name: price, Length: 1250, dtype: int64
```

```
In [26]: y_test

Out[26]: 625      5400
         187      5399
         279      4900
         734     10500
         315      9300
                 ...
         1507     9950
         806      9700
         1090    10400
         436      7950
         937      7100
         Name: price, Length: 139, dtype: int64
```

```
In [27]: from sklearn.model_selection import GridSearchCV
```

In [28]:
```
from sklearn.linear_model import ElasticNet

elastic = ElasticNet()

parameters = {'alpha': [1e-15, 1e-10, 1e-8, 1e-4, 1e-3,1e-2, 1, 5, 10, 20]}

elastic_regressor = GridSearchCV(elastic, parameters)

elastic_regressor.fit(X_train, y_train)
```

```
onvergenceWarning: Objective did not converge. You might want to increase the number of iterations, check
the scale of the features or consider increasing regularisation. Duality gap: 2.750e+08, tolerance: 3.611
e+05
  model = cd_fast.enet_coordinate_descent(
/home/placement/anaconda3/lib/python3.10/site-packages/sklearn/linear_model/_coordinate_descent.py:631: C
onvergenceWarning: Objective did not converge. You might want to increase the number of iterations, check
the scale of the features or consider increasing regularisation. Duality gap: 2.703e+08, tolerance: 3.517
e+05
  model = cd_fast.enet_coordinate_descent(
/home/placement/anaconda3/lib/python3.10/site-packages/sklearn/linear_model/_coordinate_descent.py:631: C
onvergenceWarning: Objective did not converge. You might want to increase the number of iterations, check
the scale of the features or consider increasing regularisation. Duality gap: 2.854e+08, tolerance: 3.711
e+05
  model = cd_fast.enet_coordinate_descent(
/home/placement/anaconda3/lib/python3.10/site-packages/sklearn/linear_model/_coordinate_descent.py:631: C
onvergenceWarning: Objective did not converge. You might want to increase the number of iterations, check
the scale of the features or consider increasing regularisation. Duality gap: 2.909e+08, tolerance: 3.576
e+05
  model = cd_fast.enet_coordinate_descent(
/home/placement/anaconda3/lib/python3.10/site-packages/sklearn/linear_model/_coordinate_descent.py:631: C
```

In [35]:
```
elastic_regressor.best_params_
```

Out[35]:
```
{'alpha': 0.01}
```

In [36]:
```
elastic=ElasticNet(alpha=0.1)
elastic.fit(X_train,y_train)
y_pred_elastic=elastic.predict(X_test)
```

```
In [37]: from sklearn.metrics import r2_score
         r2_score(y_test,y_pred_elastic)

Out[37]: 0.8488205369102257
```

```
In [38]: from sklearn.metrics import mean_squared_error
         elastic_Error=mean_squared_error(y_pred_elastic,y_test)
         elastic_Error

Out[38]: 604156.8414511626
```

```
In [ ]:
```