Oasis Infobyte - Intership Project

Task 3 - CAR PRICE PREDICTION WITH MACHINE LEARNING

The price of a car depends on a lot of factors like the goodwill of the brand of the car, features of the car, horsepower and the mileage it gives and many more. Car price prediction is one of the major research areas in machine learning. So if you want to learn how to train a car price prediction model then this project.

In [1]:

```
#import libarary
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

In [2]:

```
cd = pd.read_csv('C:/Users/cws/Downloads/car data.csv')
cd.head()
```

Out[2]:

	Car_Name	Year	Selling_Price	Present_Price	Driven_kms	Fuel_Type	Selling_type	Transmission	Owner
0	ritz	2014	3.35	5.59	27000	Petrol	Dealer	Manual	0
1	sx4	2013	4.75	9.54	43000	Diesel	Dealer	Manual	0
2	ciaz	2017	7.25	9.85	6900	Petrol	Dealer	Manual	0
3	wagon r	2011	2.85	4.15	5200	Petrol	Dealer	Manual	0
4	swift	2014	4.60	6.87	42450	Diesel	Dealer	Manual	0

In [3]:

```
cd.shape
```

Out[3]:

```
(301, 9)
```

In [4]:

```
cd.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 301 entries, 0 to 300
Data columns (total 9 columns):
 #   Column         Non-Null Count  Dtype  
---  ------         --------------  -----  
 0   Car_Name       301 non-null    object 
 1   Year           301 non-null    int64  
 2   Selling_Price  301 non-null    float64
 3   Present_Price  301 non-null    float64
 4   Driven_kms     301 non-null    int64  
 5   Fuel_Type      301 non-null    object 
 6   Selling_type   301 non-null    object 
 7   Transmission   301 non-null    object 
 8   Owner          301 non-null    int64  
dtypes: float64(2), int64(3), object(4)
memory usage: 21.3+ KB
```

In [5]:

```
#missing value
cd.isna()
```

Out[5]:

	Car_Name	Year	Selling_Price	Present_Price	Driven_kms	Fuel_Type	Selling_type	Transmission	Owner
0	False	False	False	False	False	False	False	False	False
1	False	False	False	False	False	False	False	False	False
2	False	False	False	False	False	False	False	False	False
3	False	False	False	False	False	False	False	False	False
4	False	False	False	False	False	False	False	False	False
...	...	...	...	...	...	...	...	...	...
296	False	False	False	False	False	False	False	False	False
297	False	False	False	False	False	False	False	False	False
298	False	False	False	False	False	False	False	False	False
299	False	False	False	False	False	False	False	False	False
300	False	False	False	False	False	False	False	False	False

301 rows × 9 columns

In [6]:

```
cd.isna().sum()
```

Out[6]:

```
Car_Name         0
Year             0
Selling_Price    0
Present_Price    0
Driven_kms       0
Fuel_Type        0
Selling_type     0
Transmission     0
Owner            0
dtype: int64
```

In [7]:

```
cd.describe()
```

Out[7]:

	Year	Selling_Price	Present_Price	Driven_kms	Owner
count	301.000000	301.000000	301.000000	301.000000	301.000000
mean	2013.627907	4.661296	7.628472	36947.205980	0.043189
std	2.891554	5.082812	8.642584	38886.883882	0.247915
min	2003.000000	0.100000	0.320000	500.000000	0.000000
25%	2012.000000	0.900000	1.200000	15000.000000	0.000000
50%	2014.000000	3.600000	6.400000	32000.000000	0.000000
75%	2016.000000	6.000000	9.900000	48767.000000	0.000000
max	2018.000000	35.000000	92.600000	500000.000000	3.000000

In [8]:

```
cd.corr()
```

```
C:\Users\cws\AppData\Local\Temp\ipykernel_11552\1529341566.py:1: FutureWarning: The default value of numeric_on
ly in DataFrame.corr is deprecated. In a future version, it will default to False. Select only valid columns or
specify the value of numeric_only to silence this warning.
  cd.corr()
```

Out[8]:

	Year	Selling_Price	Present_Price	Driven_kms	Owner
Year	1.000000	0.236141	-0.047192	-0.524342	-0.182104
Selling_Price	0.236141	1.000000	0.878914	0.029187	-0.088344
Present_Price	-0.047192	0.878914	1.000000	0.203618	0.008058
Driven_kms	-0.524342	0.029187	0.203618	1.000000	0.089216
Owner	-0.182104	-0.088344	0.008058	0.089216	1.000000

In [9]:

```
cd.cov()
```

```
C:\Users\cws\AppData\Local\Temp\ipykernel_11552\225911690.py:1: FutureWarning: The default value of numeric_onl
y in DataFrame.cov is deprecated. In a future version, it will default to False. Select only valid columns or s
pecify the value of numeric_only to silence this warning.
  cd.cov()
```

Out[9]:

	Year	Selling_Price	Present_Price	Driven_kms	Owner
Year	8.361085	3.470617	-1.179364	-5.895887e+04	-0.130543
Selling_Price	3.470617	25.834973	38.609504	5.768966e+03	-0.111323
Present_Price	-1.179364	38.609504	74.694264	6.843250e+04	0.017266
Driven_kms	-58958.869767	5768.965732	68432.499616	1.512190e+09	860.101074
Owner	-0.130543	-0.111323	0.017266	8.601011e+02	0.061462

In [10]:

```
print(cd.Fuel_Type.value_counts())
print(cd.Selling_type.value_counts())
print(cd.Transmission.value_counts())
```

```
Petrol    239
Diesel     60
CNG         2
Name: Fuel_Type, dtype: int64
Dealer        195
Individual    106
Name: Selling_type, dtype: int64
Manual       261
Automatic     40
Name: Transmission, dtype: int64
```

In [11]:

```
cd.replace({'Fuel_Type':{'Petrol':0,'Diesel':1,'CNG':2}},inplace=True)
cd.replace({'Selling_type':{'Dealer':0,'Individual':1}},inplace=True)
cd.replace({'Transmission':{'Manual':0,'Automatic':1}},inplace=True)

cd
```

Out[11]:

	Car_Name	Year	Selling_Price	Present_Price	Driven_kms	Fuel_Type	Selling_type	Transmission	Owner
0	ritz	2014	3.35	5.59	27000	0	0	0	0
1	sx4	2013	4.75	9.54	43000	1	0	0	0
2	ciaz	2017	7.25	9.85	6900	0	0	0	0
3	wagon r	2011	2.85	4.15	5200	0	0	0	0
4	swift	2014	4.60	6.87	42450	1	0	0	0
...	...	...	...	...	...	...	...	...	...
296	city	2016	9.50	11.60	33988	1	0	0	0
297	brio	2015	4.00	5.90	60000	0	0	0	0
298	city	2009	3.35	11.00	87934	0	0	0	0
299	city	2017	11.50	12.50	9000	1	0	0	0
300	brio	2016	5.30	5.90	5464	0	0	0	0

301 rows × 9 columns

In [12]:

```
x = cd.drop(['Car_Name','Selling_Price'], axis = 1)
y = cd['Selling_Price']
```

In [13]:

```
x
```

Out[13]:

	Year	Present_Price	Driven_kms	Fuel_Type	Selling_type	Transmission	Owner
0	2014	5.59	27000	0	0	0	0
1	2013	9.54	43000	1	0	0	0
2	2017	9.85	6900	0	0	0	0
3	2011	4.15	5200	0	0	0	0
4	2014	6.87	42450	1	0	0	0
...	...	...	...	...	...	...	...
296	2016	11.60	33988	1	0	0	0
297	2015	5.90	60000	0	0	0	0
298	2009	11.00	87934	0	0	0	0
299	2017	12.50	9000	1	0	0	0
300	2016	5.90	5464	0	0	0	0

301 rows × 7 columns

In [14]:

```
y
```

Out[14]:

```
0       3.35
1       4.75
2       7.25
3       2.85
4       4.60
       ...
296     9.50
297     4.00
298     3.35
299    11.50
300     5.30
Name: Selling_Price, Length: 301, dtype: float64
```

Linear Model

In [15]:

```
pip install scikit-learn==1.3.0rc1
```

```
Requirement already satisfied: scikit-learn==1.3.0rc1 in c:\users\cws\anaconda3\lib\site-packages (1.3.0rc1)Not
e: you may need to restart the kernel to use updated packages.

Requirement already satisfied: numpy>=1.17.3 in c:\users\cws\anaconda3\lib\site-packages (from scikit-learn==1.
3.0rc1) (1.24.3)
Requirement already satisfied: scipy>=1.5.0 in c:\users\cws\anaconda3\lib\site-packages (from scikit-learn==1.3
.0rc1) (1.10.1)
Requirement already satisfied: joblib>=1.1.1 in c:\users\cws\anaconda3\lib\site-packages (from scikit-learn==1.
3.0rc1) (1.2.0)
Requirement already satisfied: threadpoolctl>=2.0.0 in c:\users\cws\anaconda3\lib\site-packages (from scikit-le
arn==1.3.0rc1) (2.2.0)
```

In [17]:

```
from sklearn.model_selection import train_test_split
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.3,random_state=2)
x_train.shape
```

Out[17]:

```
(210, 7)
```

In [18]:

```
from sklearn import linear_model
regr=linear_model.LinearRegression()
regr.fit(x_train,y_train)
```

Out[18]:

```
▾ LinearRegression
LinearRegression()
```

In [20]:

```
y_head = regr.predict(x_train)
```

In [21]:

```
from sklearn.metrics import r2_score
rsq = r2_score(y_train,y_head)
print('R square Error :',rsq)
```

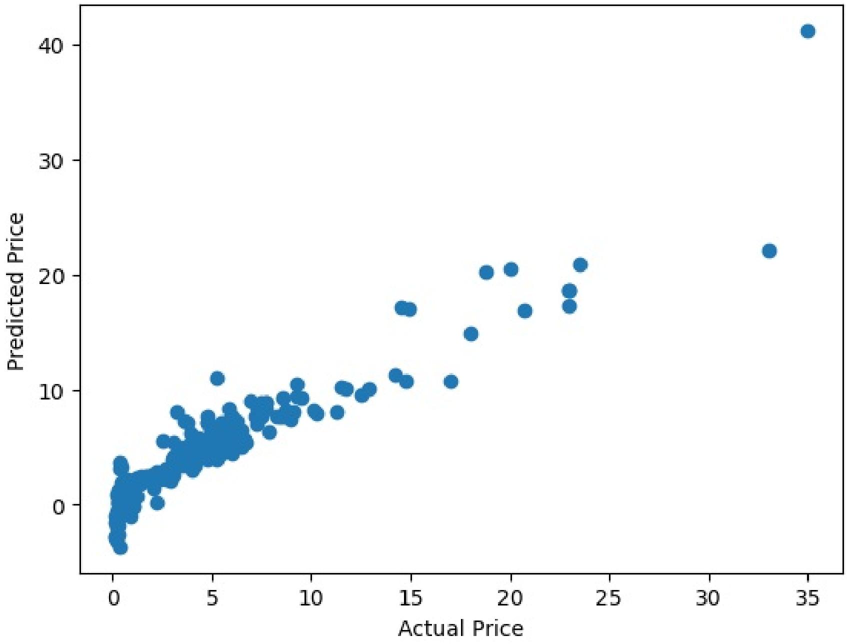
```
R square Error : 0.8860116999099481
```

In [22]:

```
plt.scatter(y_train,y_head)
plt.xlabel("Actual Price")
plt.ylabel("Predicted Price")
```

Out[22]:

```
Text(0, 0.5, 'Predicted Price')
```



In [23]:

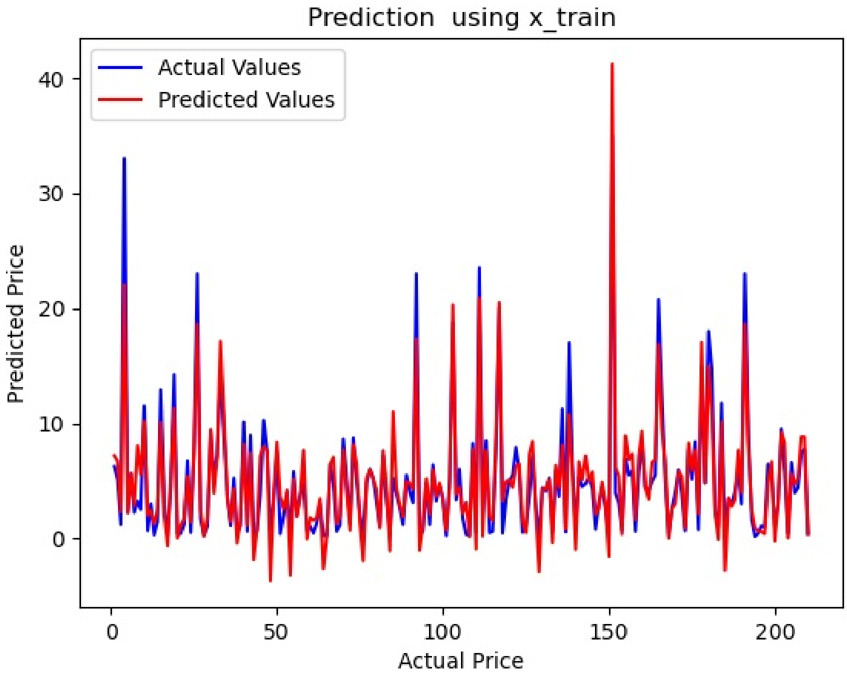
```
cd.describe()
```

Out[23]:

	Year	Selling_Price	Present_Price	Driven_kms	Fuel_Type	Selling_type	Transmission	Owner
count	301.000000	301.000000	301.000000	301.000000	301.000000	301.000000	301.000000	301.000000
mean	2013.627907	4.661296	7.628472	36947.205980	0.212625	0.352159	0.132890	0.043189
std	2.891554	5.082812	8.642584	38886.883882	0.425801	0.478439	0.340021	0.247915
min	2003.000000	0.100000	0.320000	500.000000	0.000000	0.000000	0.000000	0.000000
25%	2012.000000	0.900000	1.200000	15000.000000	0.000000	0.000000	0.000000	0.000000
50%	2014.000000	3.600000	6.400000	32000.000000	0.000000	0.000000	0.000000	0.000000
75%	2016.000000	6.000000	9.900000	48767.000000	0.000000	1.000000	0.000000	0.000000
max	2018.000000	35.000000	92.600000	500000.000000	2.000000	1.000000	1.000000	3.000000

In [27]:

```
d = [i for i in range (1,len(y_train)+1,1)]
plt.plot(d,y_train,color='b',linestyle='-',label="Actual Values")
plt.plot(d,y_head,color='r',linestyle='-',label="Predicted Values")
plt.xlabel('Actual Price')
plt.ylabel('Predicted Price')
plt.title('Prediction  using x_train')
plt.legend()
plt.show()
```



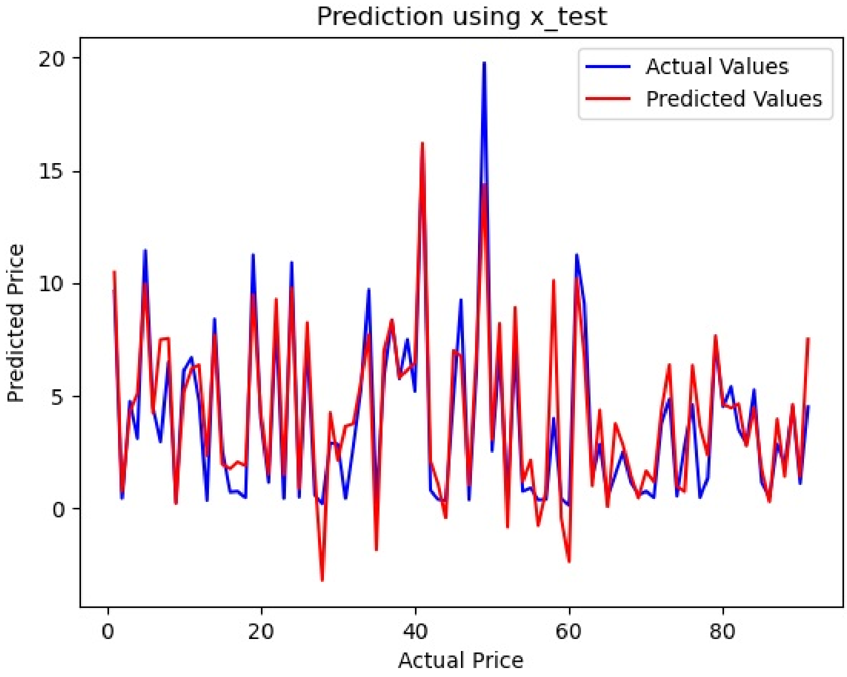
In [29]:

```
sy_head = regr.predict(x_test)

rsq = r2_score(y_test,sy_head)
print('R square Error y_test :',rsq)

d = [i for i in range (1,len(y_test)+1,1)]
plt.plot(d,y_test,color='b',linestyle='-',label="Actual Values")
plt.plot(d,sy_head,color='r',linestyle='-',label="Predicted Values")
plt.xlabel('Actual Price')
plt.ylabel('Predicted Price')
plt.title('Prediction using x_test')
plt.legend()
plt.show()
```

```
R square Error y_test : 0.8191491844929043
```



Thanks