WorkFlow

1. Car Price dataset
2. Data preprocessing
3. Data Analysis
4. Train and Test Spitting
5. Linear and Lasso Regression models
6. Evaluation (By Testing Dataset)

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

```
# importing Boston Car Price Dataset
car_dataset = pd.read_csv('/content/drive/MyDrive/car data.csv')
```

```
car_dataset.shape
```

```
(301, 9)
```

```
car_dataset.head()
```

	Car_Name	Year	Selling_Price	Present_Price	Kms_Driven	Fuel_Type	Seller_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

```
car_dataset.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   Kms_Driven     301 non-null    int64  
 5   Fuel_Type      301 non-null    object 
 6   Seller_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
```

```
# checking for the nul values
car_dataset.isnull().sum()
```

	0
Car_Name	0
Year	0
Selling_Price	0
Present_Price	0
Kms_Driven	0
Fuel_Type	0
Seller_Type	0
Transmission	0
Owner	0

dtype: int64

```
# checking the distribution of categoritical data
print(car_dataset.Fuel_Type.value_counts())
print(car_dataset.Seller_Type.value_counts())
print(car_dataset.Transmission.value_counts())
```

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

```
# Encoding the Categorical data for Fuel_Type
car_dataset.replace({'Fuel_Type':{'Petrol':0, 'Diesel':1, 'CNG':2}},inplace=True)


# Encoding the Categorical data for Seller_Type
car_dataset.replace({'Seller_Type': {'Dealer':0, 'Individual':1}}, inplace = True)


# Encoding the Categorical data for Transmission
car_dataset.replace({'Transmission':{'Manual':0, 'Automatic':1}}, inplace=True)
```

```
car_dataset.head()
```

	Car_Name	Year	Selling_Price	Present_Price	Kms_Driven	Fuel_Type	Seller_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

```
#splitting training and testing data

X = car_dataset.drop(['Car_Name','Selling_Price'], axis = 1)
Y = car_dataset['Selling_Price']
```

```
print(X)
```

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

```
        Owner
0           0
1           0
2           0
3           0
4           0
..        ...
296         0
297         0
298         0
299         0
300         0

[301 rows x 7 columns]
```

```
print(Y)
```

```
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
```

```
#splitting the dataset to training and testing
x_train, x_test, y_train, y_test = train_test_split(X, Y, test_size = 0.1, random_state = 3)
```

```
# loading the model
lr = LinearRegression()
```

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

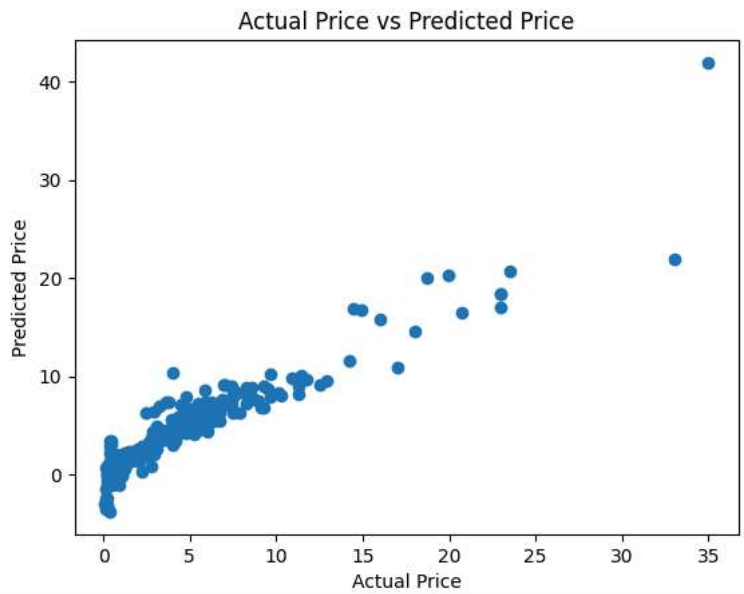
```
▾ LinearRegression
LinearRegression()
```

```
# model Evaluation
train_data_prediction = lr.predict(x_train)
```

```
# R square error
error_score = metrics.r2_score(y_train, train_data_prediction)
print("R square error : ", error_score)
```

```
R square error :  0.8849815853900536
```

```
#lets plot a graph and check
plt.scatter(y_train, train_data_prediction)
plt.xlabel("Actual Price")
plt.ylabel("Predicted Price")
plt.title("Actual Price vs Predicted Price")
plt.show()
```

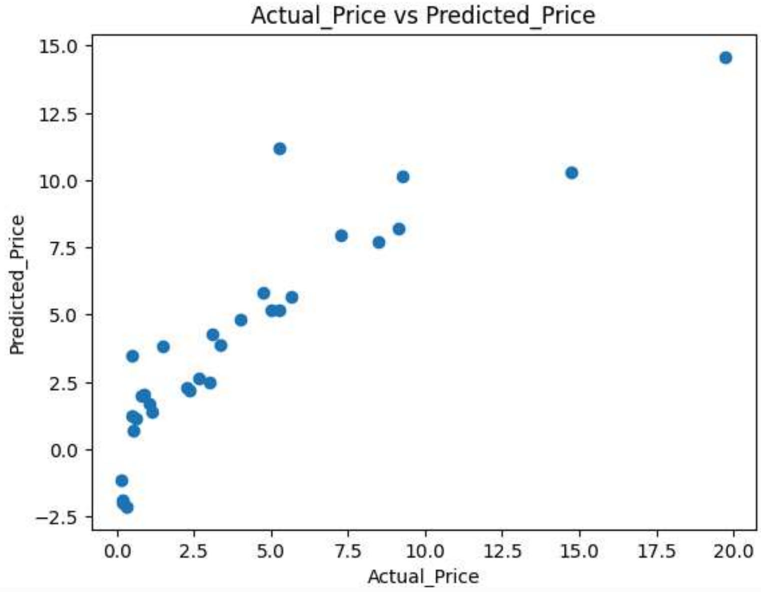


```
# check for testing data
test_data_prediction = lr.predict(x_test)
```

```
# R square error
error_score = metrics.r2_score(y_test, test_data_prediction)
print("R square error : ", error_score)
```

```
R square error :  0.7979072218427206
```

```
plt.scatter(y_test, test_data_prediction)
plt.xlabel("Actual_Price")
plt.ylabel("Predicted_Price")
plt.title("Actual_Price vs Predicted_Price")
plt.show()
```



```
from sklearn.linear_model import Lasso
```

```
# loading the model
lassso_mod = Lasso()
```

```
lassso_mod.fit(x_train, y_train)
```

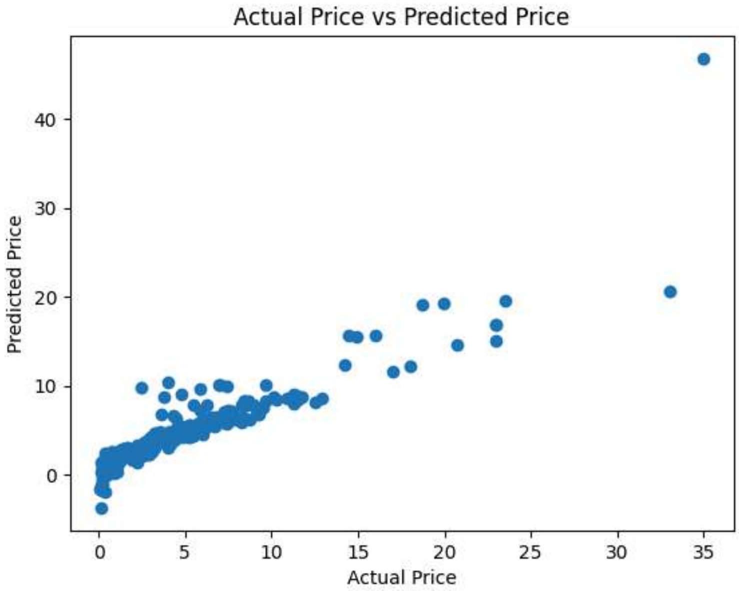
```
▾ Lasso
Lasso()
```

```
#evaluation
```

```
# R square error
error_score = metrics.r2_score(y_train, train_data_prediction)
print("R square error : ", error_score)
```

```
R square error :  0.8469788692279795
```

```
#lets plot a graph and check
plt.scatter(y_train, train_data_prediction)
plt.xlabel("Actual Price")
plt.ylabel("Predicted Price")
plt.title("Actual Price vs Predicted Price")
plt.show()
```



```
lassso_mod.fit(x_test, y_test)
```

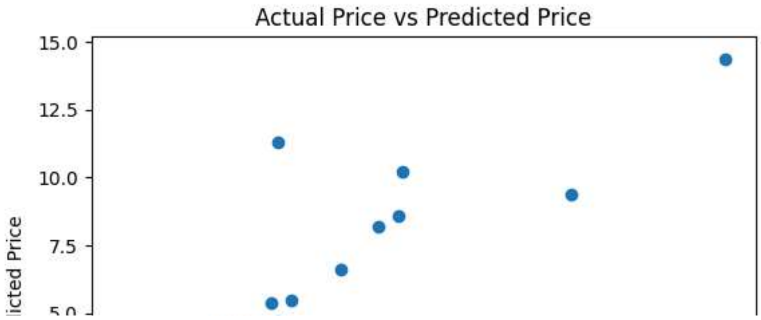
```
▾ Lasso
Lasso()
```

```
#evaluation
test_data_prediction = lassso_mod.predict(x_test)
```

```
# R square error
error_score = metrics.r2_score(y_test, test_data_prediction)
print("R square error : ", error_score)
```

```
R square error :  0.8018872456220607
```

```
#lets plot a graph and check
plt.scatter(y_test, test_data_prediction)
plt.xlabel("Actual Price")
plt.ylabel("Predicted Price")
plt.title("Actual Price vs Predicted Price")
plt.show()
```


Actual Price vs Predicted Price
icted Price