# HEAMNATH

# 20104028

In [1]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

In [2]:
```
df=pd.read_csv("fiat.csv")
df
```

Out[2]:

| | ID | model | engine_power | age_in_days | km | previous_owners | lat | lon |
|---|---|---|---|---|---|---|---|---|
| **0** | 1.0 | lounge | 51.0 | 882.0 | 25000.0 | 1.0 | 44.907242 | 8.611559868 |
| **1** | 2.0 | pop | 51.0 | 1186.0 | 32500.0 | 1.0 | 45.666359 | 12.24188995 |
| **2** | 3.0 | sport | 74.0 | 4658.0 | 142228.0 | 1.0 | 45.503300 | 11.41784 |
| **3** | 4.0 | lounge | 51.0 | 2739.0 | 160000.0 | 1.0 | 40.633171 | 17.63460922 |
| **4** | 5.0 | pop | 73.0 | 3074.0 | 106880.0 | 1.0 | 41.903221 | 12.49565029 |
| **...** | ... | ... | ... | ... | ... | ... | ... | ... |
| **1544** | NaN | NaN | NaN | NaN | NaN | NaN | NaN | length |
| **1545** | NaN | NaN | NaN | NaN | NaN | NaN | NaN | concat |
| **1546** | NaN | NaN | NaN | NaN | NaN | NaN | NaN | Null values |
| **1547** | NaN | NaN | NaN | NaN | NaN | NaN | NaN | find |
| **1548** | NaN | NaN | NaN | NaN | NaN | NaN | NaN | search |

1549 rows × 11 columns

In [3]:
```
df.head()
```

Out[3]:

| | ID | model | engine_power | age_in_days | km | previous_owners | lat | lon | price |
|---|---|---|---|---|---|---|---|---|---|
| **0** | 1.0 | lounge | 51.0 | 882.0 | 25000.0 | 1.0 | 44.907242 | 8.611559868 | 8900 |
| **1** | 2.0 | pop | 51.0 | 1186.0 | 32500.0 | 1.0 | 45.666359 | 12.24188995 | 8800 |
| **2** | 3.0 | sport | 74.0 | 4658.0 | 142228.0 | 1.0 | 45.503300 | 11.41784 | 4200 |
| **3** | 4.0 | lounge | 51.0 | 2739.0 | 160000.0 | 1.0 | 40.633171 | 17.63460922 | 6000 |
| **4** | 5.0 | pop | 73.0 | 3074.0 | 106880.0 | 1.0 | 41.903221 | 12.49565029 | 5700 |

# DATA CLEANING AND DATA PREPROCESSING

In [4]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1549 entries, 0 to 1548
Data columns (total 11 columns):
 #   Column           Non-Null Count  Dtype  
---  ------           --------------  -----  
 0   ID               1538 non-null   float64
 1   model            1538 non-null   object 
 2   engine_power     1538 non-null   float64
 3   age_in_days      1538 non-null   float64
 4   km               1538 non-null   float64
 5   previous_owners  1538 non-null   float64
 6   lat              1538 non-null   float64
 7   lon              1549 non-null   object 
 8   price            1549 non-null   object 
 9   Unnamed: 9       0 non-null      float64
 10  Unnamed: 10      1 non-null      object 
dtypes: float64(7), object(4)
memory usage: 133.2+ KB
```

In [5]:
```
df.describe()
```

Out[5]:

| | ID | engine_power | age_in_days | km | previous_owners | lat | Unnam |
|---|---|---|---|---|---|---|---|
| **count** | 1538.000000 | 1538.000000 | 1538.000000 | 1538.000000 | 1538.000000 | 1538.000000 | |
| **mean** | 769.500000 | 51.904421 | 1650.980494 | 53396.011704 | 1.123537 | 43.541361 | N |
| **std** | 444.126671 | 3.988023 | 1289.522278 | 40046.830723 | 0.416423 | 2.133518 | N |
| **min** | 1.000000 | 51.000000 | 366.000000 | 1232.000000 | 1.000000 | 36.855839 | N |
| **25%** | 385.250000 | 51.000000 | 670.000000 | 20006.250000 | 1.000000 | 41.802990 | N |
| **50%** | 769.500000 | 51.000000 | 1035.000000 | 39031.000000 | 1.000000 | 44.394096 | N |
| **75%** | 1153.750000 | 51.000000 | 2616.000000 | 79667.750000 | 1.000000 | 45.467960 | N |
| **max** | 1538.000000 | 77.000000 | 4658.000000 | 235000.000000 | 4.000000 | 46.795612 | N |

In [6]:
```
df.columns
```

Out[6]:
```
Index(['ID', 'model', 'engine_power', 'age_in_days', 'km', 'previous_owners',
       'lat', 'lon', 'price', 'Unnamed: 9', 'Unnamed: 10'],
      dtype='object')
```

In [7]:
```
df1=df[0:1500]
```

In [8]:
```
df1=df1.dropna(axis=1)
df1
```

Out[8]:

| | ID | model | engine_power | age_in_days | km | previous_owners | lat | lon |
|---|---|---|---|---|---|---|---|---|
| **0** | 1.0 | lounge | 51.0 | 882.0 | 25000.0 | 1.0 | 44.907242 | 8.611559868 |
| **1** | 2.0 | pop | 51.0 | 1186.0 | 32500.0 | 1.0 | 45.666359 | 12.24188995 |
| **2** | 3.0 | sport | 74.0 | 4658.0 | 142228.0 | 1.0 | 45.503300 | 11.41784 |
| **3** | 4.0 | lounge | 51.0 | 2739.0 | 160000.0 | 1.0 | 40.633171 | 17.63460922 |
| **4** | 5.0 | pop | 73.0 | 3074.0 | 106880.0 | 1.0 | 41.903221 | 12.49565029 |
| **...** | ... | ... | ... | ... | ... | ... | ... | ... |
| **1495** | 1496.0 | pop | 62.0 | 3347.0 | 80000.0 | 3.0 | 44.283878 | 11.88813972 |
| **1496** | 1497.0 | pop | 51.0 | 1461.0 | 91055.0 | 3.0 | 44.508839 | 11.46907997 |
| **1497** | 1498.0 | lounge | 51.0 | 397.0 | 15840.0 | 3.0 | 38.122070 | 13.36112022 |
| **1498** | 1499.0 | sport | 51.0 | 1400.0 | 60000.0 | 1.0 | 45.802021 | 9.187789917 |
| **1499** | 1500.0 | pop | 51.0 | 1066.0 | 53100.0 | 1.0 | 38.122070 | 13.36112022 |

1500 rows × 9 columns

In [9]:
```
df1.columns
```

Out[9]:
```
Index(['ID', 'model', 'engine_power', 'age_in_days', 'km', 'previous_owners',
       'lat', 'lon', 'price'],
      dtype='object')
```

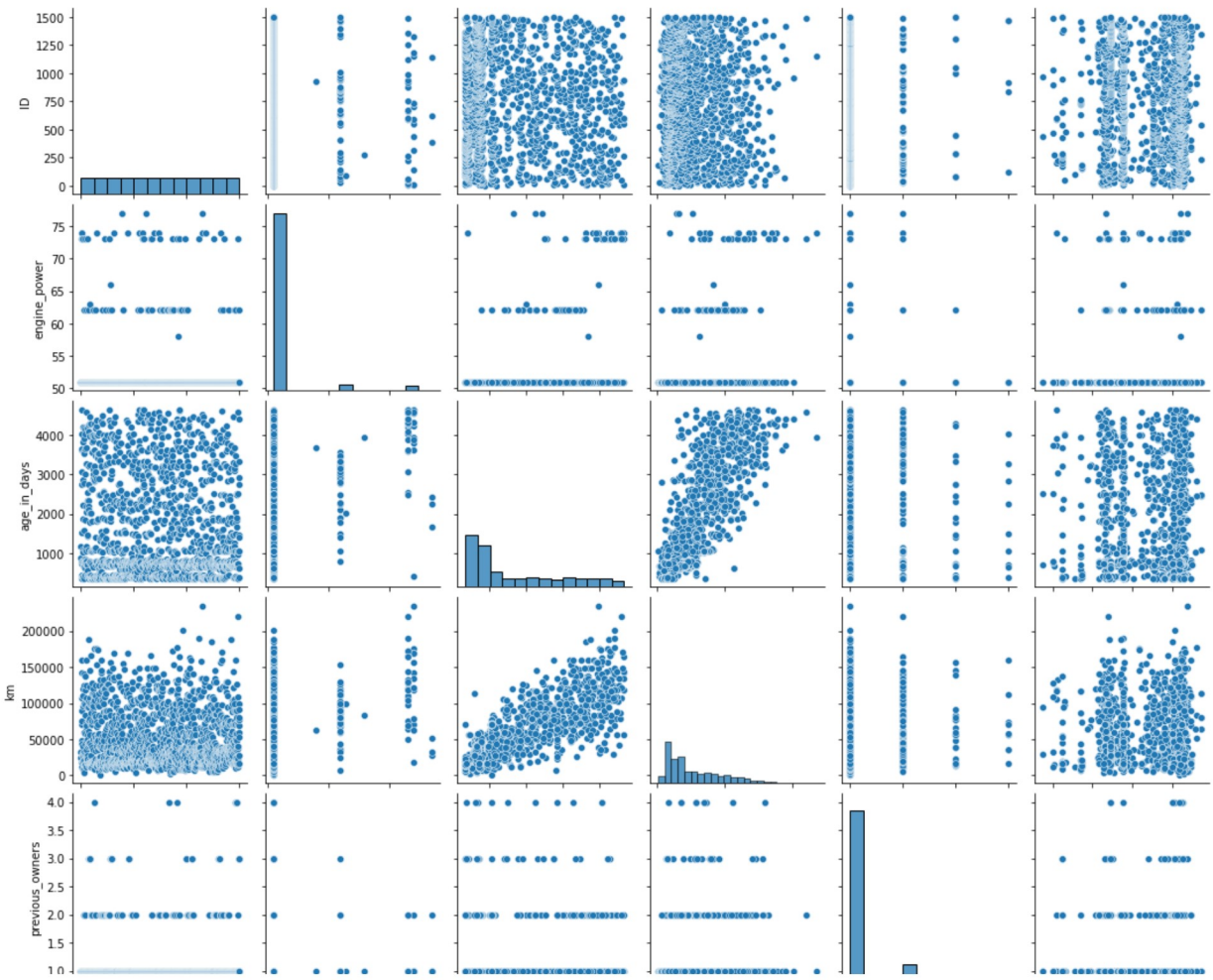
In [ ]:
```

```

In [10]:
```
df1=df1[['ID',  'engine_power', 'age_in_days', 'km', 'previous_owners',
       'lat']]
```

# EDA AND VISUALIZATION

In [11]:
```
sns.pairplot(df1)
```

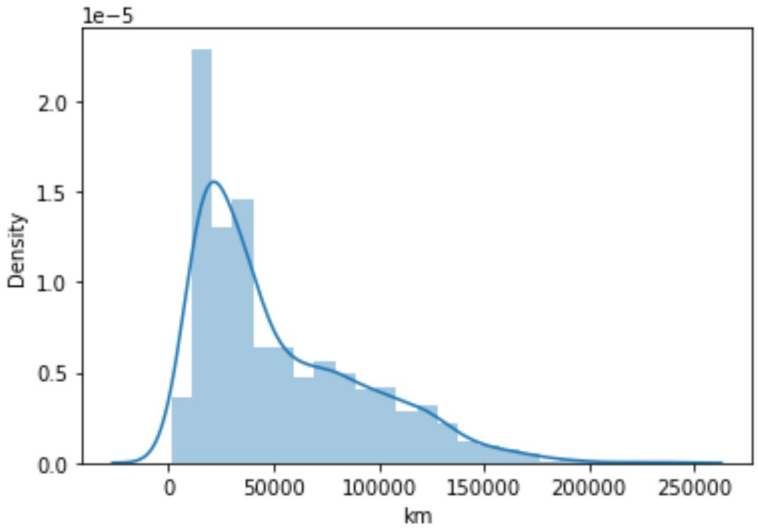
Out[11]:
```
<seaborn.axisgrid.PairGrid at 0x2040d72e7c0>
```




In [12]:
```
sns.distplot(df1['km'])
```

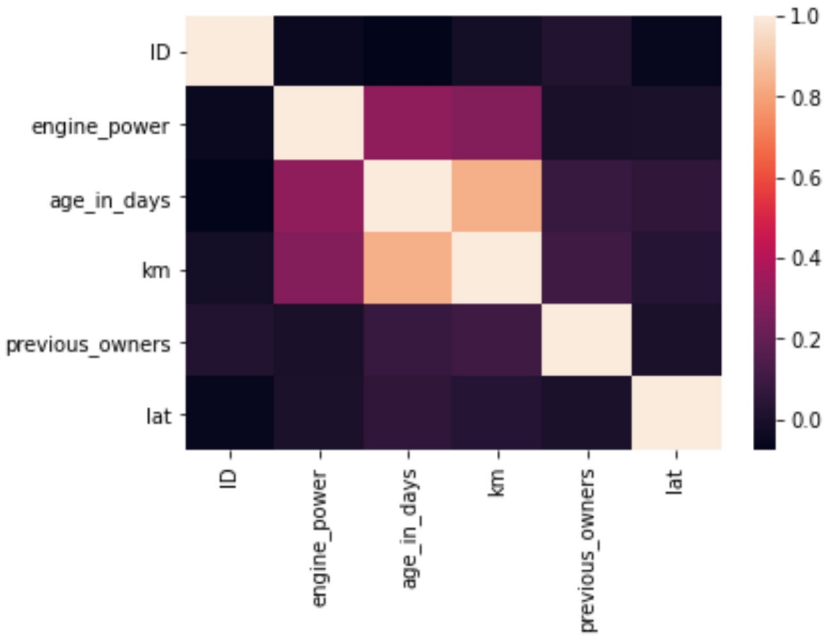
```
C:\ProgramData\Anaconda3\lib\site-packages\seaborn\distributions.py:2557: FutureWarni
ng: `distplot` is a deprecated function and will be removed in a future version. Plea
se adapt your code to use either `displot` (a figure-level function with similar flex
ibility) or `histplot` (an axes-level function for histograms).
  warnings.warn(msg, FutureWarning)
```

Out[12]: <AxesSubplot:xlabel='km', ylabel='Density'>



In [13]:
```
sns.heatmap(df1.corr())
```

Out[13]: <AxesSubplot:>




# TO TRAIN THE MODEL AND MODEL BULDING

In [14]:
```
df1.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1500 entries, 0 to 1499
Data columns (total 6 columns):
 #   Column           Non-Null Count  Dtype  
---  ------           --------------  -----  
 0   ID               1500 non-null   float64
 1   engine_power     1500 non-null   float64
 2   age_in_days      1500 non-null   float64
 3   km               1500 non-null   float64
 4   previous_owners  1500 non-null   float64
 5   lat              1500 non-null   float64
dtypes: float64(6)
memory usage: 70.4 KB
```

In [15]:
```
x=df1[['ID', 'age_in_days', 'km','previous_owners',
       'lat']]
y=df1['engine_power']
```

In [16]:
```
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)
```

In [17]:
```
from sklearn.linear_model import LinearRegression
lr=LinearRegression()
lr.fit(x_train,y_train)
```

Out[17]:
```
LinearRegression()
```

In [18]:
```
lr.intercept_
```

Out[18]:
```
49.178542405036666
```

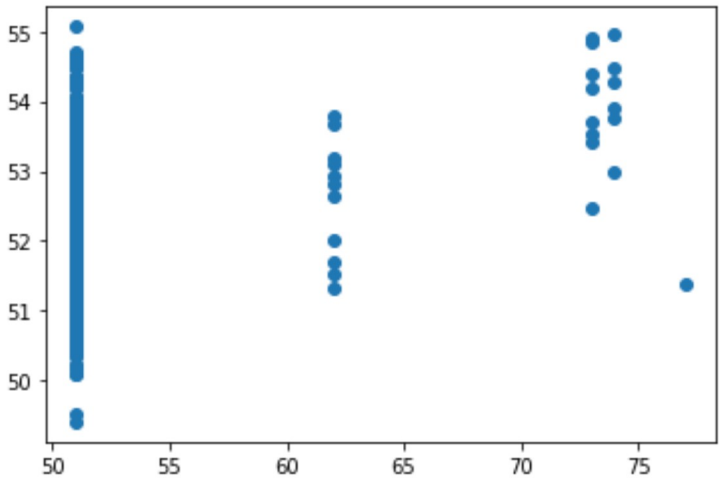
In [19]:
```
coeff=pd.DataFrame(lr.coef_,x.columns,columns=['Co-efficient'])
coeff
```

Out[19]:

| | Co-efficient |
|---|---|
| **ID** | -0.000329 |
| **age_in_days** | 0.000482 |
| **km** | 0.000014 |
| **previous_owners** | -0.443883 |
| **lat** | 0.042773 |

In [20]:
```
prediction =lr.predict(x_test)
plt.scatter(y_test,prediction)
```

Out[20]:
```
<matplotlib.collections.PathCollection at 0x2040fdf79d0>
```




# ACCURACY

In [21]:
```
lr.score(x_test,y_test)
```

Out[21]: 0.09424528464855597