Submission Date-06.09.2023

ASSIGNMENT – 2

Artificial Intelligence & Machine Learning in collaboration with Google (Applied Data Science)

Name: RISHIKESH S

Regno: 21BME0159

Branch: Btech Mechanical Engineering

Campus: VIT Vellore

Tasks :

1. To download the dataset

   Dataset is downloaded – House Price India

2. Load the dataset

DATASET

```
import pandas as pd
import matplotlib.pyplot as plt
from matplotlib import rcParams
import seaborn as sns
df = pd.read_csv('/content/House Price India.csv')
df.head()
```

	id	Date	number of bedrooms	number of bathrooms	living area	lot area	number of floors
0	6762810145	42491	5	2.50	3650	9050	2.0
1	6762810635	42491	4	2.50	2920	4000	1.5
2	6762810998	42491	5	2.75	2910	9480	1.5
3	6762812605	42491	4	2.50	3310	42998	2.0
4	6762812919	42491	3	2.00	2710	4500	1.5

5 rows × 23 columns

waterfront present	number of views	condition of the house	...	Built Year	Renovation Year	Postal Code
0	4	5	...	1921	0	122003
0	0	5	...	1909	0	122004
0	0	3	...	1939	0	122004
0	0	3	...	2001	0	122005
0	0	4	...	1929	0	122006

Lattitude	Longitude	living_area_renov	lot_area_renov	Number of schools nearby	Distance from the airport	Price
52.8645	-114.557	2880	5400	2	58	2380000
52.8878	-114.470	2470	4000	2	51	1400000
52.8852	-114.468	2940	6600	1	53	1200000
52.9532	-114.321	3350	42847	3	76	838000
52.9047	-114.485	2060	4500	1	51	805000

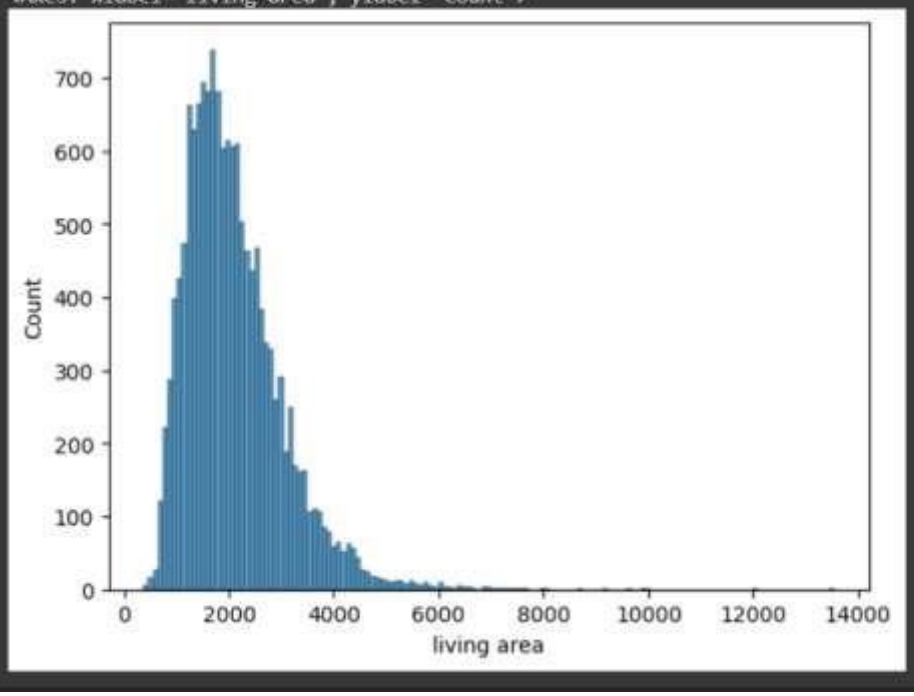
3. Perform the Below Visualizations.

- Univariate Analysis
- Bi - Variate Analysis
- Multivariate Analysis

QNO.3) Perform the below visualizations (a) UNIVARIATE ANALYSIS

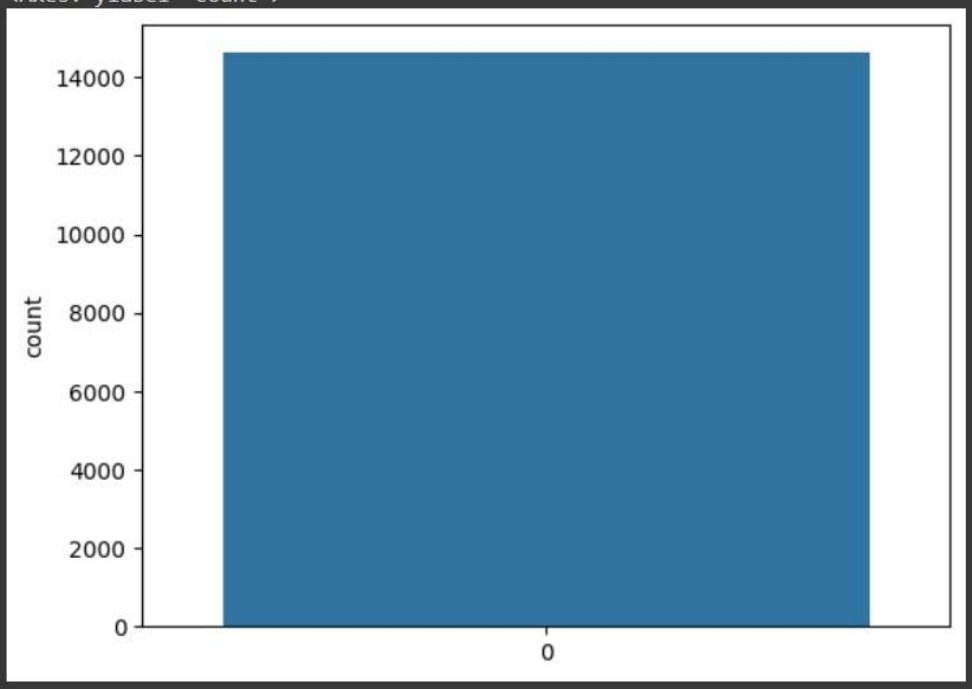
```
sns.histplot(df['living area'])
```

```
<Axes: xlabel='living area', ylabel='Count'>
```

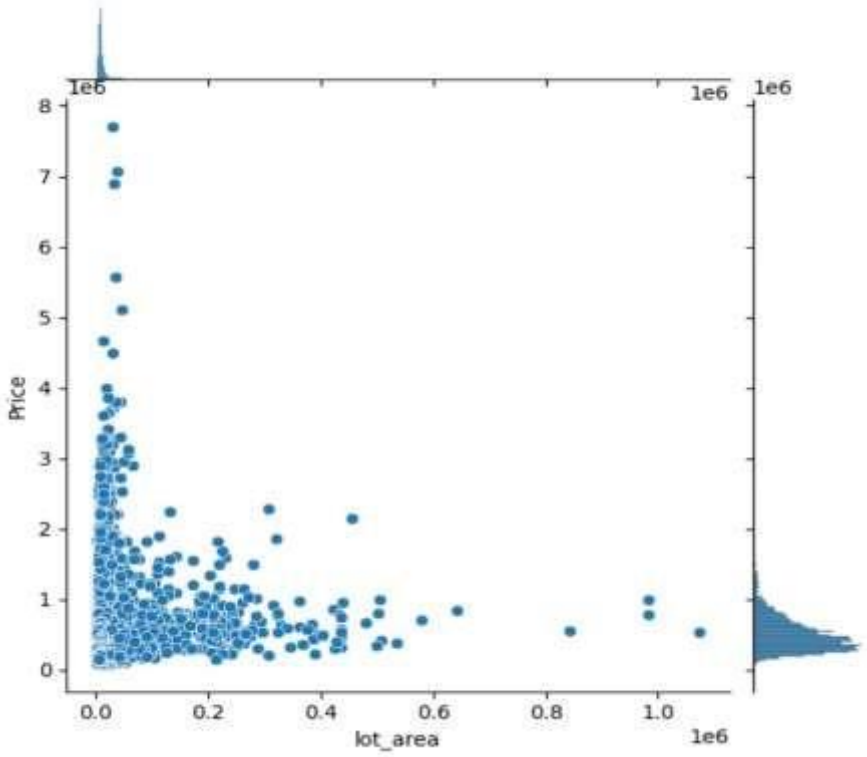


```
sns.countplot(df['lot area'])
```

```
<Axes: ylabel='count'>
```



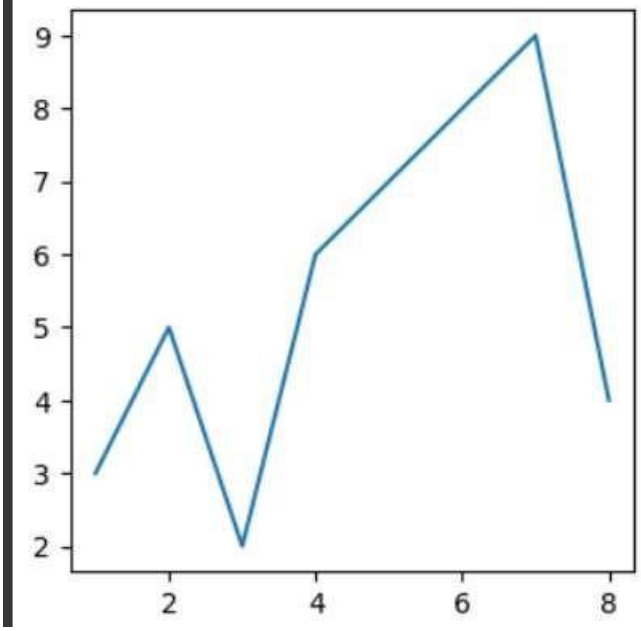

```
sns.jointplot(x='lot_area',y='Price',data=df)
```

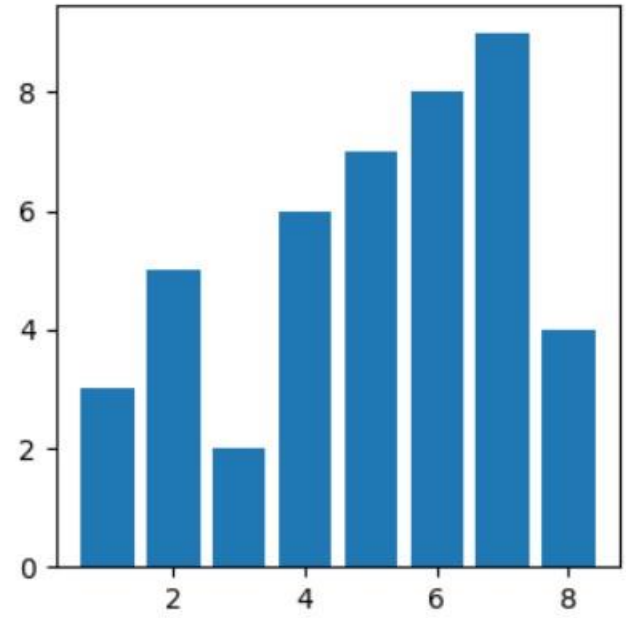


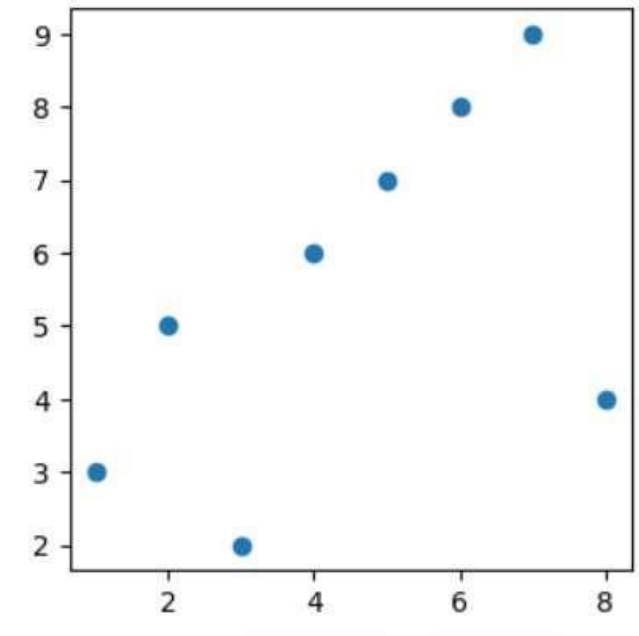
(b) BI-VARIATE ANALYSIS

```
rcParams['figure.figsize'] =8,8
x=[1,2,3,4,5,6,7,8,]
y= [3,5,2,6,7,8,9,4]
fig,ax = plt.subplots(2,2)
ax[0,0].plot(x,y)
ax[1,0].bar(x,y)
ax[1,1].scatter(x,y)
```

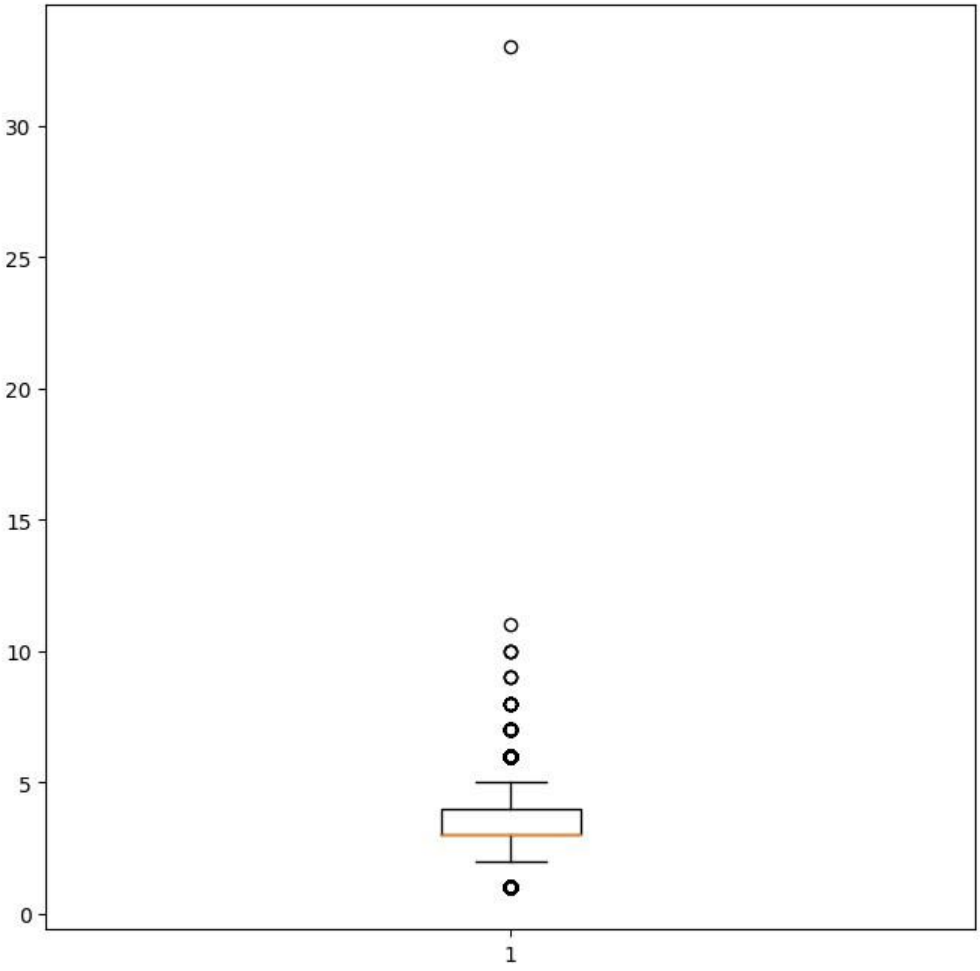
```
<matplotlib.collections.PathCollection at
```




0
2
4
6
8
2
4
6
8

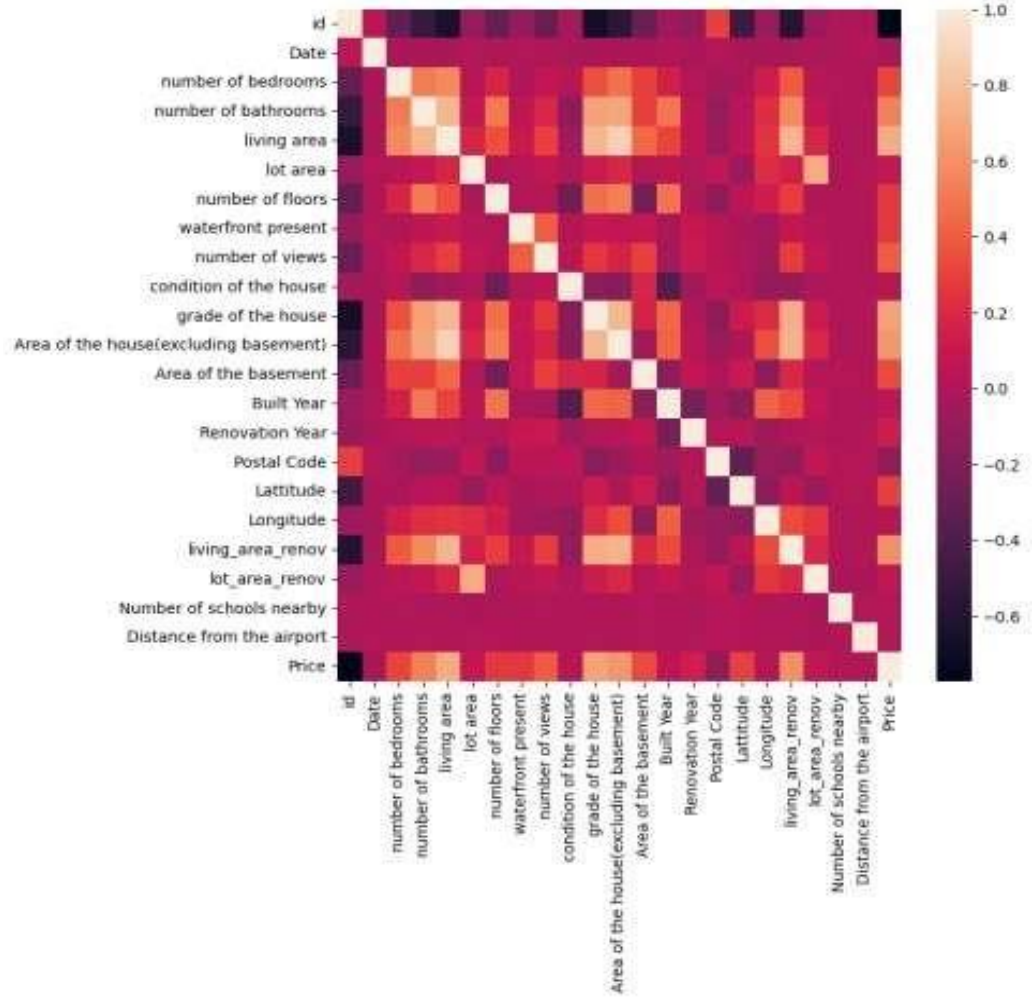

2
3
4
5
6
7
8
9
2
4
6
8

```
plt.boxplot(df['number of bedrooms'])
plt.show()
```



(c) MULTIVARIATE ANALYSIS

```
sns.heatmap(df.corr())
```



4. Perform descriptive statistics on the dataset.

```
stats = df.describe(include = 'all')
print(stats)
```

```
                 id          Date  number of bedrooms  number of bathrooms  \
count  1.462000e+04  14620.000000        14620.000000         14620.000000
mean   6.762821e+09  42604.538646            3.379343             2.129583
std    6.237575e+03     67.347991            0.938719             0.769934
min    6.762810e+09  42491.000000            1.000000             0.500000
25%    6.762815e+09  42546.000000            3.000000             1.750000
50%    6.762821e+09  42600.000000            3.000000             2.250000
75%    6.762826e+09  42662.000000            4.000000             2.500000
max    6.762832e+09  42734.000000           33.000000             8.000000

        living area      lot area  number of floors  waterfront present  \
count  14620.000000  1.462000e+04      14620.000000        14620.000000
mean    2098.262996  1.509328e+04          1.502360            0.007661
std      928.275721  3.791962e+04          0.540239            0.087193
min      370.000000  5.200000e+02          1.000000            0.000000
25%     1440.000000  5.010750e+03          1.000000            0.000000
50%     1930.000000  7.620000e+03          1.500000            0.000000
75%     2570.000000  1.080000e+04          2.000000            0.000000
max    13540.000000  1.074218e+06          3.500000            1.000000
```

	number of views	condition of the house	...	Built Year	\
count	14620.000000	14620.000000	...	14620.000000	
mean	0.233105	3.430506	...	1970.926402	
std	0.766259	0.664151	...	29.493625	
min	0.000000	1.000000	...	1900.000000	
25%	0.000000	3.000000	...	1951.000000	
50%	0.000000	3.000000	...	1975.000000	
75%	0.000000	4.000000	...	1997.000000	
max	4.000000	5.000000	...	2015.000000	

	Renovation Year	Postal Code	Lattitude	Longitude	\
count	14620.000000	14620.000000	14620.000000	14620.000000	
mean	90.924008	122033.062244	52.792848	-114.404007	
std	416.216661	19.082418	0.137522	0.141326	
min	0.000000	122003.000000	52.385900	-114.709000	
25%	0.000000	122017.000000	52.707600	-114.519000	
50%	0.000000	122032.000000	52.806400	-114.421000	
75%	0.000000	122048.000000	52.908900	-114.315000	
max	2015.000000	122072.000000	53.007600	-113.505000	

	living_area_renov	lot_area_renov	Number of schools nearby	\
count	14620.000000	14620.000000	14620.000000	
mean	1996.702257	12753.500068	2.012244	
std	691.093366	26058.414467	0.817284	
min	460.000000	651.000000	1.000000	
25%	1490.000000	5097.750000	1.000000	
50%	1850.000000	7620.000000	2.000000	
75%	2380.000000	10125.000000	3.000000	
max	6110.000000	560617.000000	3.000000	

	Distance from the airport	Price
count	14620.000000	1.462000e+04
mean	64.950958	5.389322e+05
std	8.936008	3.675324e+05
min	50.000000	7.800000e+04
25%	57.000000	3.200000e+05
50%	65.000000	4.500000e+05
75%	73.000000	6.450000e+05
max	80.000000	7.700000e+06

[8 rows x 23 columns]

5. Handle the missing values

Qno.5) Handle the missing values.

```
[ ]  df.isnull()
```

	id	Date	number of bedrooms	number of bathrooms	living area	lot area	number of floors	waterfront present	number of views
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
...	...	...	...	...	...	...	...	...	...
14615	False	False	False	False	False	False	False	False	False
14616	False	False	False	False	False	False	False	False	False
14617	False	False	False	False	False	False	False	False	False
14618	False	False	False	False	False	False	False	False	False
14619	False	False	False	False	False	False	False	False	False

14620 rows × 23 columns

condition of the house	...	Built Year	Renovation Year	Postal Code	Lattitude	Longitude	living_area_renov
False	...	False	False	False	False	False	False
False	...	False	False	False	False	False	False
False	...	False	False	False	False	False	False
False	...	False	False	False	False	False	False
False	...	False	False	False	False	False	False
...	...	...	...	...	...	...	...
False	...	False	False	False	False	False	False
False	...	False	False	False	False	False	False
False	...	False	False	False	False	False	False
False	...	False	False	False	False	False	False
False	...	False	False	False	False	False	False

lot_area_renov	Number of schools nearby	Distance from the airport	Price
False	False	False	False
False	False	False	False
False	False	False	False
False	False	False	False
False	False	False	False
...	...	...	...
False	False	False	False
False	False	False	False
False	False	False	False
False	False	False	False
False	False	False	False