problem statement

A re4al estate want help to predict the house price for regions USA. He gave us the dataset to work on the lineat regression model create a model that heps to estimate of what the house would sell for

In [6]:

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

In [10]:
```
s=pd.read_csv(r"C:\Users\user\Downloads\10_USA_Housing - 10_USA_Housing.csv")
s
```

Out[10]:

	Avg. Area Income	Avg. Area House Age	Avg. Area Number of Rooms	Avg. Area Number of Bedrooms	Area Population	Price	Addre
0	79545.45857	5.682861	7.009188	4.09	23086.80050	1.059034e+06	208 Michael Ferry A 674\nLaurabury, 370
1	79248.64245	6.002900	6.730821	3.09	40173.07217	1.505891e+06	188 Johnson Vie Suite 079\nLa Kathleen, C
2	61287.06718	5.865890	8.512727	5.13	36882.15940	1.058988e+06	9127 Elizab Stravenue\nDanielto WI 0648
3	63345.24005	7.188236	5.586729	3.26	34310.24283	1.260617e+06	USS Barnett\nFPO 448
4	59982.19723	5.040555	7.839388	4.23	26354.10947	6.309435e+05	USNS Raymond\nF AE 093
...	...	...	...	...	...	...	
4995	60567.94414	7.830362	6.137356	3.46	22837.36103	1.060194e+06	USNS Williams\nF AP 30153-76
4996	78491.27543	6.999135	6.576763	4.02	25616.11549	1.482618e+06	PSC 9258, E 8489\nAPO AA 429 33
4997	63390.68689	7.250591	4.805081	2.13	33266.14549	1.030730e+06	4215 Tracy Garc Suite 076\nJoshuala VA 0
4998	68001.33124	5.534388	7.130144	5.44	42625.62016	1.198657e+06	USS Wallace\nFPO 733
4999	65510.58180	5.992305	6.792336	4.07	46501.28380	1.298950e+06	37778 George Ridg Apt. 509\nEast Hc NV

5000 rows × 7 columns

In [11]:
```
# to find
s.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 5000 entries, 0 to 4999
Data columns (total 7 columns):
 #   Column                        Non-Null Count  Dtype  
---  ------                        --------------  -----  
 0   Avg. Area Income              5000 non-null   float64
 1   Avg. Area House Age           5000 non-null   float64
 2   Avg. Area Number of Rooms     5000 non-null   float64
 3   Avg. Area Number of Bedrooms  5000 non-null   float64
 4   Area Population               5000 non-null   float64
 5   Price                         5000 non-null   float64
 6   Address                       5000 non-null   object 
dtypes: float64(6), object(1)
memory usage: 273.6+ KB
```

In [13]:
```
# to display summary of the statistic
s.describe()
```

Out[13]:

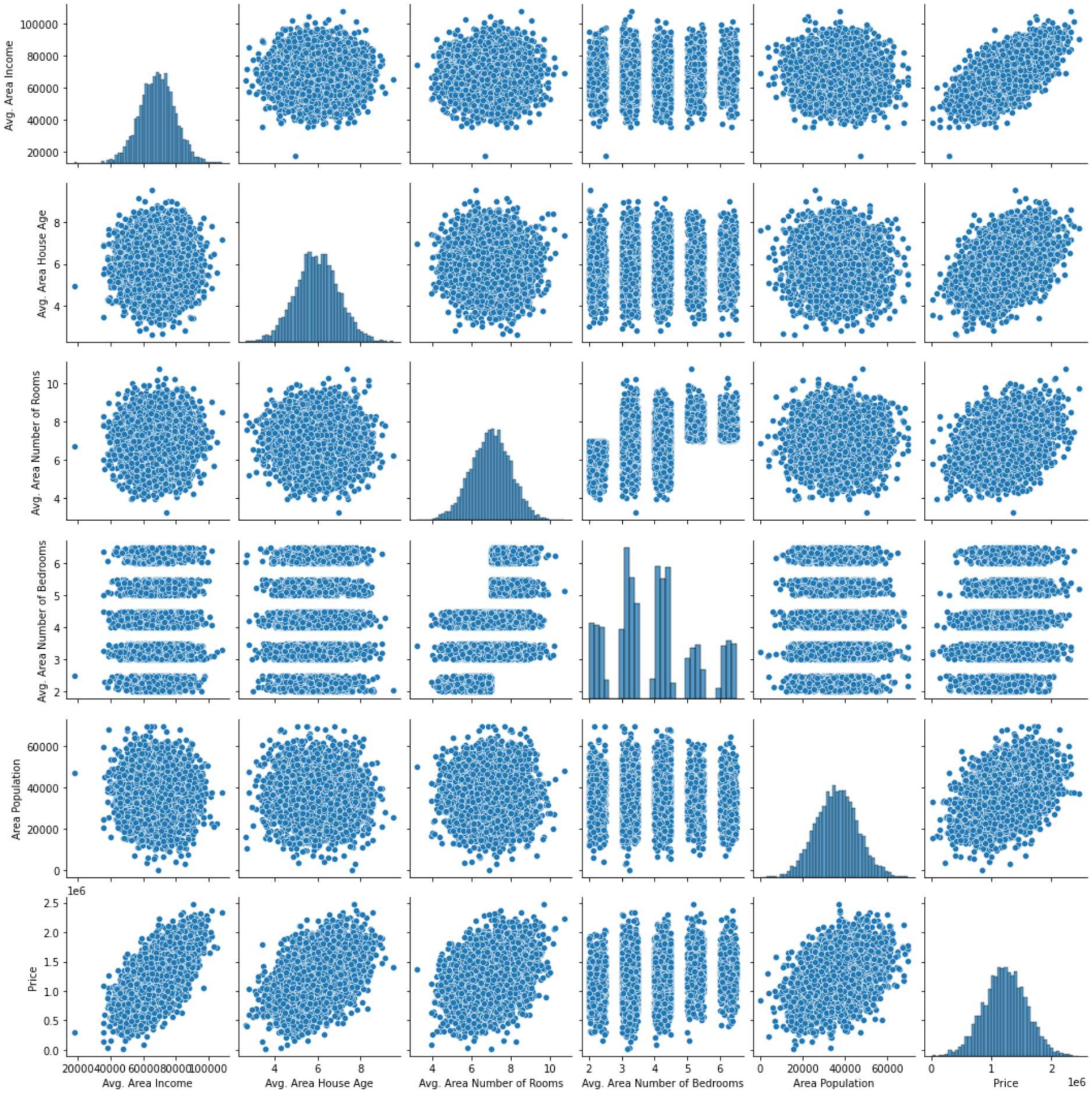
	Avg. Area Income	Avg. Area House Age	Avg. Area Number of Rooms	Avg. Area Number of Bedrooms	Area Population	Price
count	5000.000000	5000.000000	5000.000000	5000.000000	5000.000000	5.000000e+03
mean	68583.108984	5.977222	6.987792	3.981330	36163.516039	1.232073e+06
std	10657.991214	0.991456	1.005833	1.234137	9925.650114	3.531176e+05
min	17796.631190	2.644304	3.236194	2.000000	172.610686	1.593866e+04
25%	61480.562390	5.322283	6.299250	3.140000	29403.928700	9.975771e+05
50%	68804.286405	5.970429	7.002902	4.050000	36199.406690	1.232669e+06
75%	75783.338665	6.650808	7.665871	4.490000	42861.290770	1.471210e+06
max	107701.748400	9.519088	10.759588	6.500000	69621.713380	2.469066e+06

In [16]:
```
# to display columns
s.columns
```

Out[16]:
```
Index(['Avg. Area Income', 'Avg. Area House Age', 'Avg. Area Number of Room
s',
       'Avg. Area Number of Bedrooms', 'Area Population', 'Price', 'Addres
s'],
      dtype='object')
```

In [17]:
```
# EDA and VISUALIZATION
sns.pairplot(s)
```

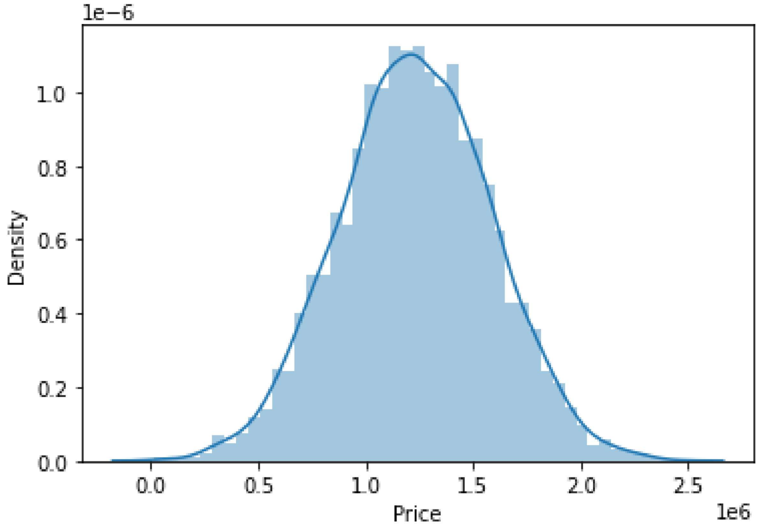
Out[17]:
```
<seaborn.axisgrid.PairGrid at 0x21dbd992d90>
```



In [19]:
```
sns.distplot(s['Price'])
```

```
C:\ProgramData\Anaconda3\lib\site-packages\seaborn\distributions.py:2557: Fut
ureWarning: `distplot` is a deprecated function and will be removed in a futu
re version. Please adapt your code to use either `displot` (a figure-level fu
nction with similar flexibility) or `histplot` (an axes-level function for hi
stograms).
  warnings.warn(msg, FutureWarning)
```

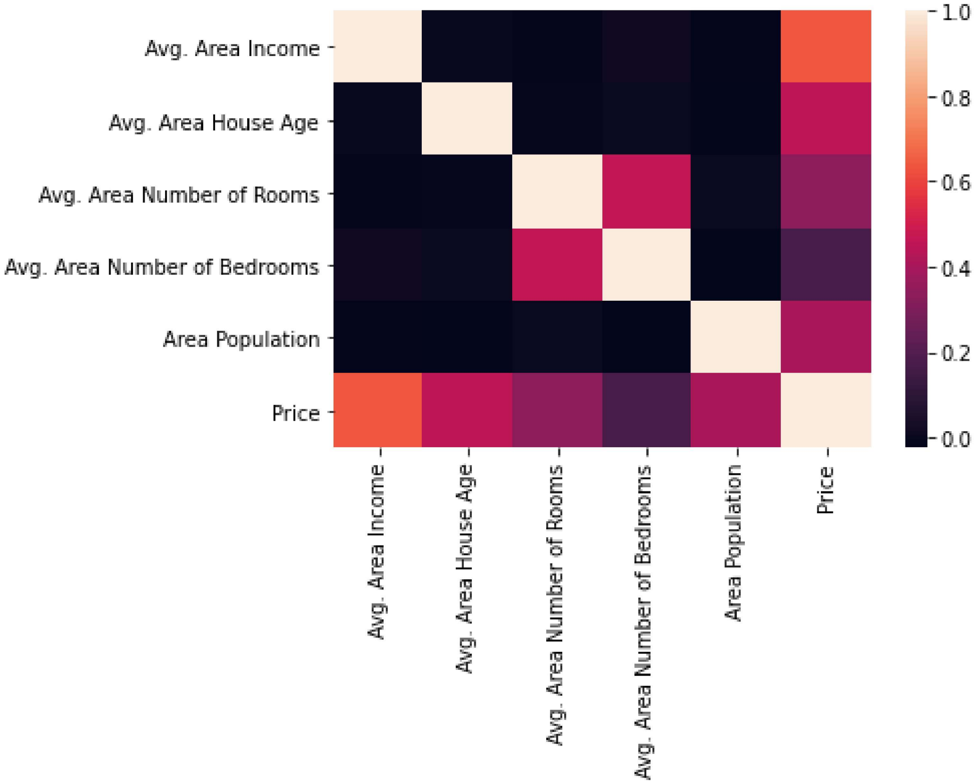
Out[19]:
```
<AxesSubplot:xlabel='Price', ylabel='Density'>
```



In [22]:
```
s1=s[['Avg. Area Income', 'Avg. Area House Age', 'Avg. Area Number of Rooms',
       'Avg. Area Number of Bedrooms', 'Area Population', 'Price']]
```

In [23]:
```
sns.heatmap(s1.corr())
```

Out[23]:
```
<AxesSubplot:>
```



to train the model -model buildings

we are going to train linear regression model we need to split out data into two variables x and y where x is independent variable and y is dependent on x we could address columns as it not required for our model.

In [29]:
```
x=s1[['Avg. Area Income', 'Avg. Area House Age', 'Avg. Area Number of Rooms',
       'Avg. Area Number of Bedrooms', 'Area Population']]
y=s1['Price']
```

In [30]:
```
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 [31]:
```
from sklearn.linear_model import LinearRegression
lr=LinearRegression()
lr.fit(x_train,y_train)
```

Out[31]:
```
LinearRegression()
```

In [33]:
```
lr.intercept_
```

Out[33]:
```
-2625622.6073200237
```

In [35]:

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

Out[35]:

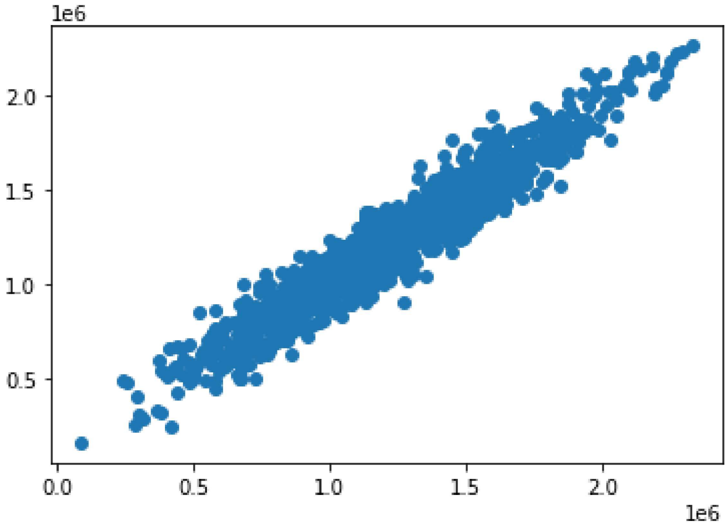
	Co-efficient
Avg. Area Income	21.661025
Avg. Area House Age	163276.682040
Avg. Area Number of Rooms	121294.679351
Avg. Area Number of Bedrooms	595.787164
Area Population	15.132371

In [38]:

```
prediction=lr.predict(x_test)
plt.scatter(y_test,prediction)
```

Out[38]:

```
<matplotlib.collections.PathCollection at 0x21dc2553b80>
```



In [39]:

```
print(lr.score(x_test,y_test))
```

```
0.9163230706720301
```

In [ ]: