housing-price-prediction

August 3, 2023

[1]:
```
from google.colab import files
upload=files.upload()
```

```
<IPython.core.display.HTML object>
```

```
Saving Housing.csv to Housing.csv
```

[2]:
```
#import Library

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

[3]:
```
#import Data_Sets
df=pd.read_csv('Housing.csv')
```

[4]:
```
df.head()
```

[4]:

	price	area	bedrooms	bathrooms	stories	mainroad	guestroom	basement	hotwaterheating	airconditioning	parking	prefarea	furnishingstatus
0	13300000	7420	4	2	3	yes	no	no	no	yes	2	yes	furnished
1	12250000	8960	4	4	4	yes	no	no	no	yes	3	no	furnished
2	12250000	9960	3	2	2	yes	no	yes	no	no	2	yes	semi-furnished
3	12215000	7500	4	2	2	yes	no	yes	no	yes	3	yes	furnished
4	11410000	7420	4	1	2	yes	yes	yes	no	yes	2	no	furnished

[5]:
```
#Housing Prices Data set info
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 545 entries, 0 to 544
```

```
Data columns (total 13 columns):
 #   Column            Non-Null Count  Dtype
---  ------            --------------  -----
 0   price             545 non-null    int64
 1   area              545 non-null    int64
 2   bedrooms          545 non-null    int64
 3   bathrooms         545 non-null    int64
 4   stories           545 non-null    int64
 5   mainroad          545 non-null    object
 6   guestroom         545 non-null    object
 7   basement          545 non-null    object
 8   hotwaterheating   545 non-null    object
 9   airconditioning   545 non-null    object
 10  parking           545 non-null    int64
 11  prefarea          545 non-null    object
 12  furnishingstatus  545 non-null    object
dtypes: int64(6), object(7)
memory usage: 55.5+ KB
```

[6]:
```
#Data Describes
df.describe(include=object)
```

[6]:

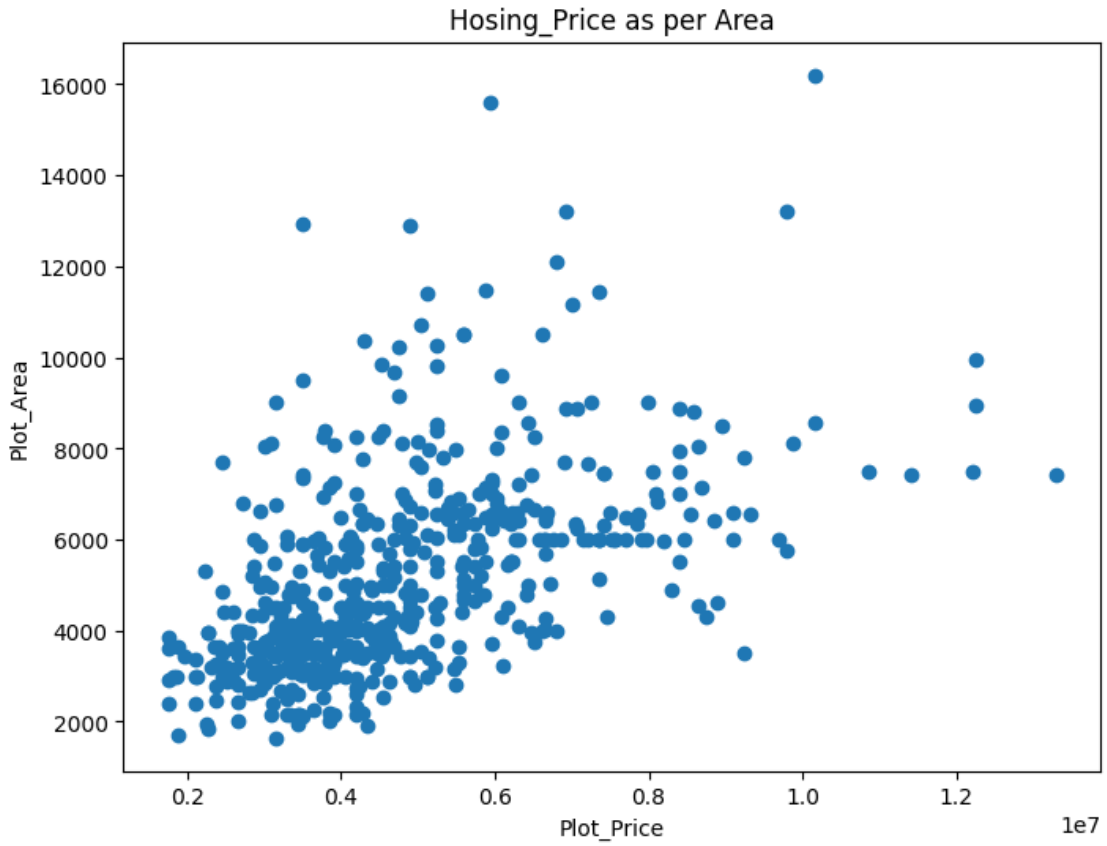
	mainroad	guestroom	basement	hotwaterheating	airconditioning	prefarea	furnishingstatus
count	545	545	545	545	545	545	545
unique	2	2	2	2	2	2	3
top	yes	no	no	no	no	no	semi-furnished
freq	468	448	354	520	373	417	227

[7]:
```
#Checking Missing Values
df.isna().sum()
```

[7]:
```
price               0
area                0
bedrooms            0
bathrooms           0
stories             0
mainroad            0
guestroom           0
basement            0
hotwaterheating     0
airconditioning     0
```

```
parking             0
prefarea            0
furnishingstatus    0
dtype: int64
```

[8]:
```
plt.figure(figsize=(8,6))
plt.scatter(x='price',y='area',data=df)
plt.xlabel("Plot_Price")
plt.ylabel("Plot_Area")
plt.title("Hosing_Price as per Area")
plt.show()
```



[9]:
```
df.columns
```

[9]:
```
Index(['price', 'area', 'bedrooms', 'bathrooms', 'stories', 'mainroad',
       'guestroom', 'basement', 'hotwaterheating', 'airconditioning',
       'parking', 'prefarea', 'furnishingstatus'],
      dtype='object')
```

[10]:
```
Categorical_Col = []
Numerical_Col = []
```

[11]:
```
for col in df.columns:
  if df[col].dtype=='object':
    Categorical_Col.append(col)
  else:
    Numerical_Col.append(col)
```

[12]:
```
print(Categorical_Col)
print(Numerical_Col)
```

```
['mainroad', 'guestroom', 'basement', 'hotwaterheating', 'airconditioning',
'prefarea', 'furnishingstatus']
['price', 'area', 'bedrooms', 'bathrooms', 'stories', 'parking']
```

[13]:
```
#Encoding
from sklearn.preprocessing import LabelEncoder
```

[14]:
```
le=LabelEncoder()
df['furnishingstatus']=le.fit_transform(df['furnishingstatus'])
```

[15]:
```
#OneHotEncoder
df=pd.get_dummies(df)
```

[16]:
```
df.head()
```

[16]:

	price	area	bedrooms	bathrooms	stories	parking	furnishingstatus	\
0	13300000	7420	4	2	3	2	0	
1	12250000	8960	4	4	4	3	0	
2	12250000	9960	3	2	2	2	1	
3	12215000	7500	4	2	2	3	0	
4	11410000	7420	4	1	2	2	0	

	mainroad_no	mainroad_yes	guestroom_no	guestroom_yes	basement_no	\
0	0	1	1	0	1	
1	0	1	1	0	1	
2	0	1	1	0	0	
3	0	1	1	0	0	
4	0	1	0	1	0	

	basement_yes	hotwaterheating_no	hotwaterheating_yes	airconditioning_no	\
0	0	1	0	0	
1	0	1	0	0	
2	1	1	0	1	
3	1	1	0	0	
4	1	1	0	0	

```
   airconditioning_yes  prefarea_no  prefarea_yes
0                    1            0             1
1                    1            1             0
2                    0            0             1
3                    1            0             1
4                    1            1             0
```

[17]:
```
df.shape
```

[17]:
```
(545, 19)
```

"""Column Name: mainroad Unique Values: ['yes' 'no']

Column Name: guestroom Unique Values: ['no' 'yes']

Column Name: basement Unique Values: ['no' 'yes']

Column Name: hotwaterheating Unique Values: ['no' 'yes']

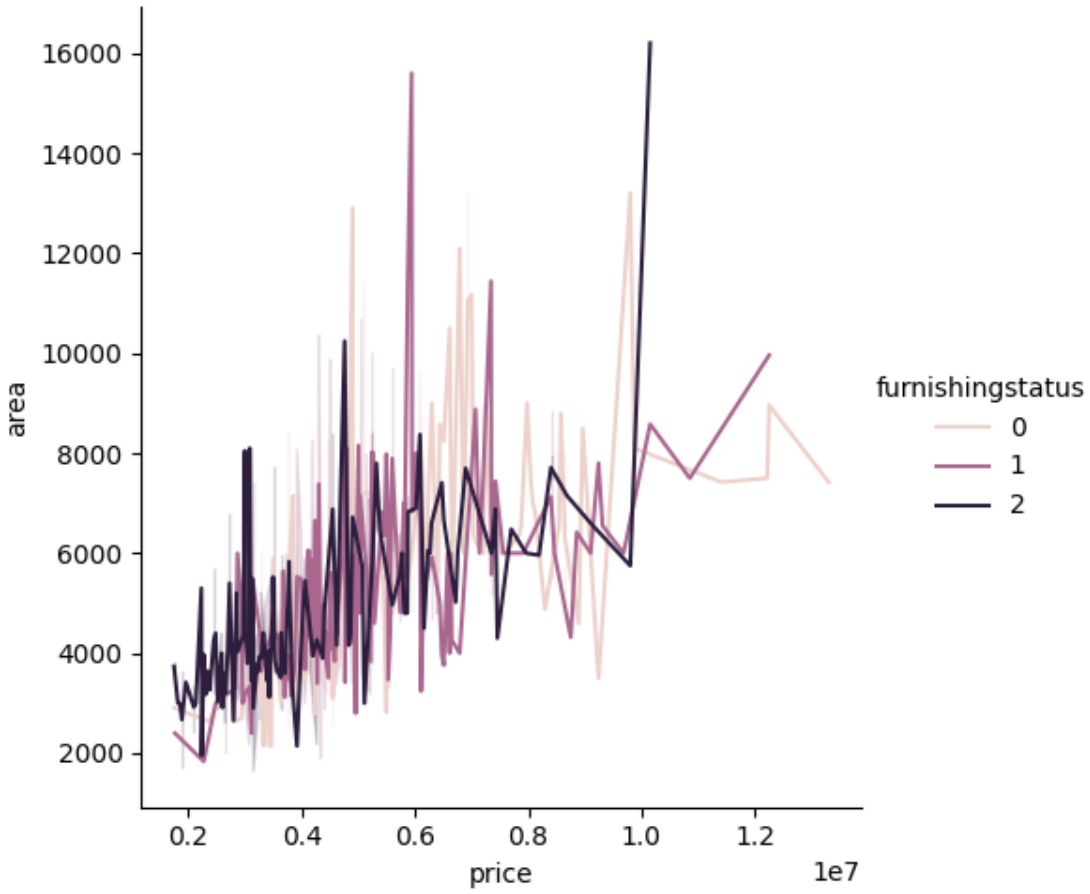
Column Name: airconditioning Unique Values: ['yes' 'no']

Column Name: prefarea Unique Values: ['yes' 'no']

Column Name: furnishingstatus Unique Values: ['furnished' 'semi-furnished' 'unfurnished']"""

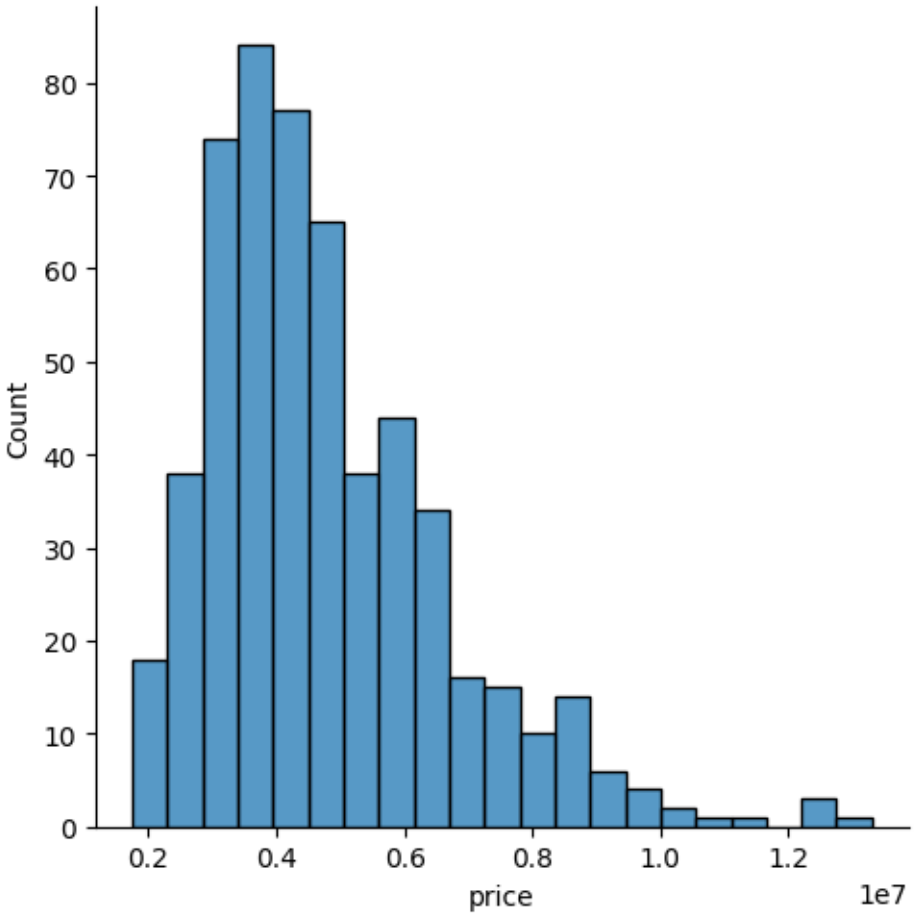
[18]:
```
sns.relplot(
    data=df, kind="line",
    x="price", y="area",
    hue="furnishingstatus")
```

[18]:
```
<seaborn.axisgrid.FacetGrid at 0x7ed8e8254ac0>
```



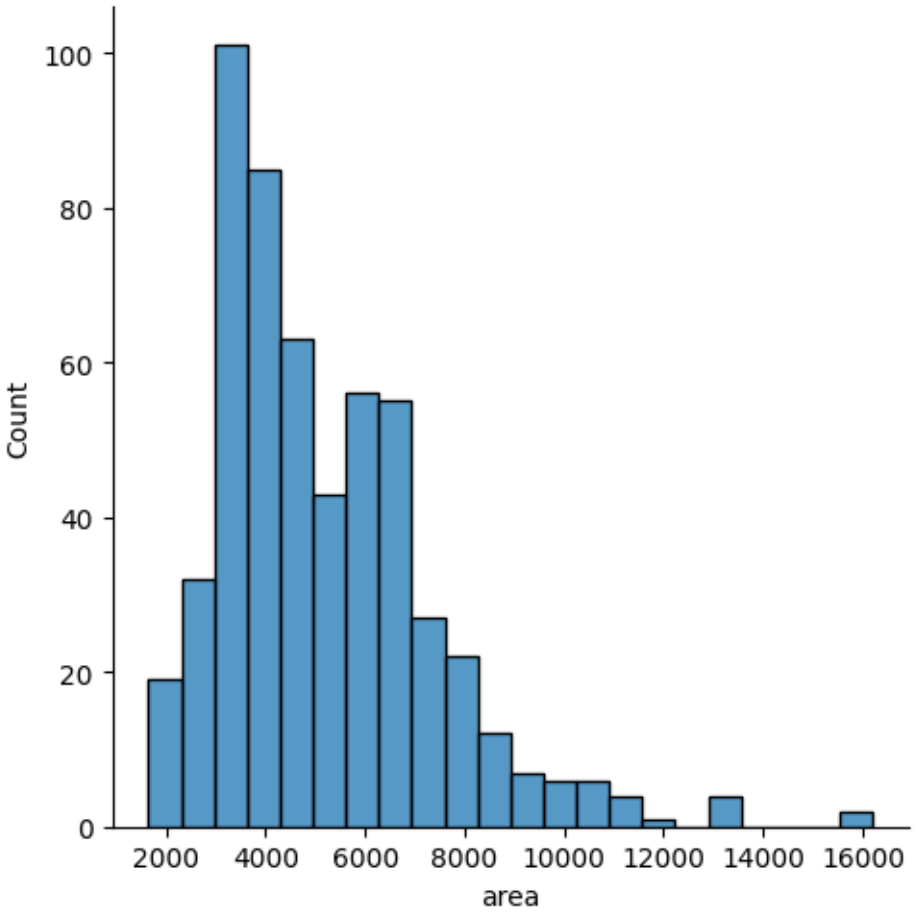
[21]:
```
sns.displot(df['price'])
```

[21]: <seaborn.axisgrid.FacetGrid at 0x7ed8e5deba00>



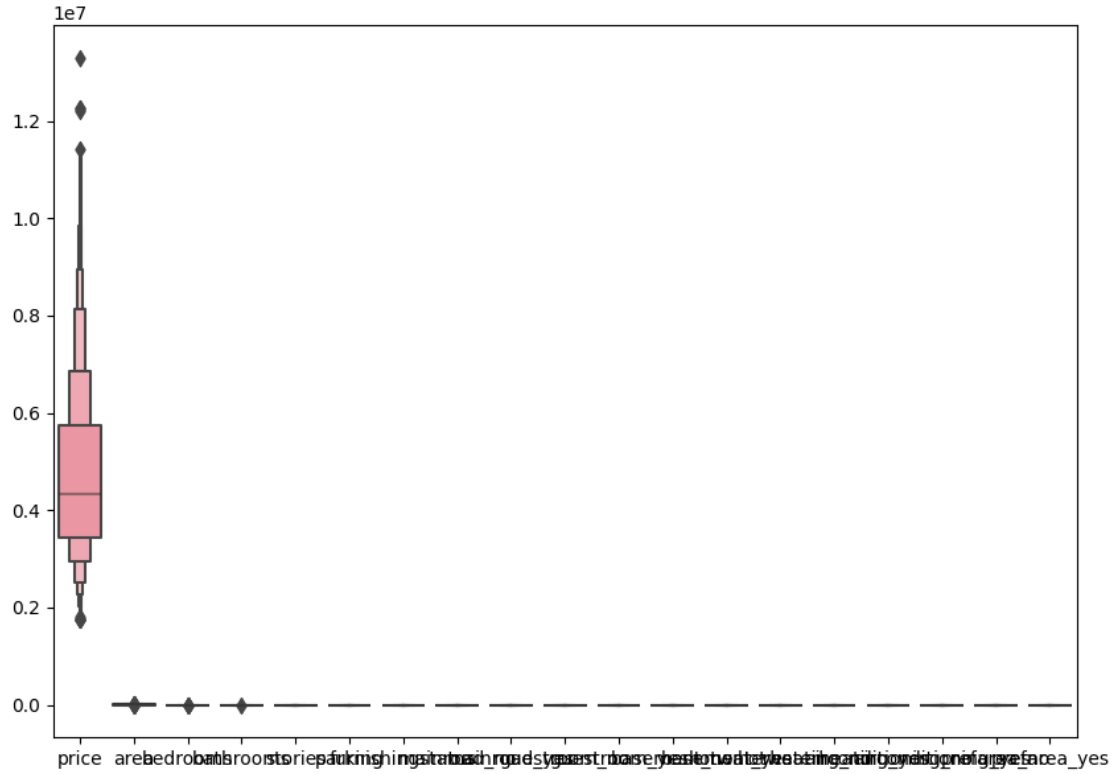
[23]:
```
sns.displot(df['area'])
```

[23]: <seaborn.axisgrid.FacetGrid at 0x7ed8e80d5db0>

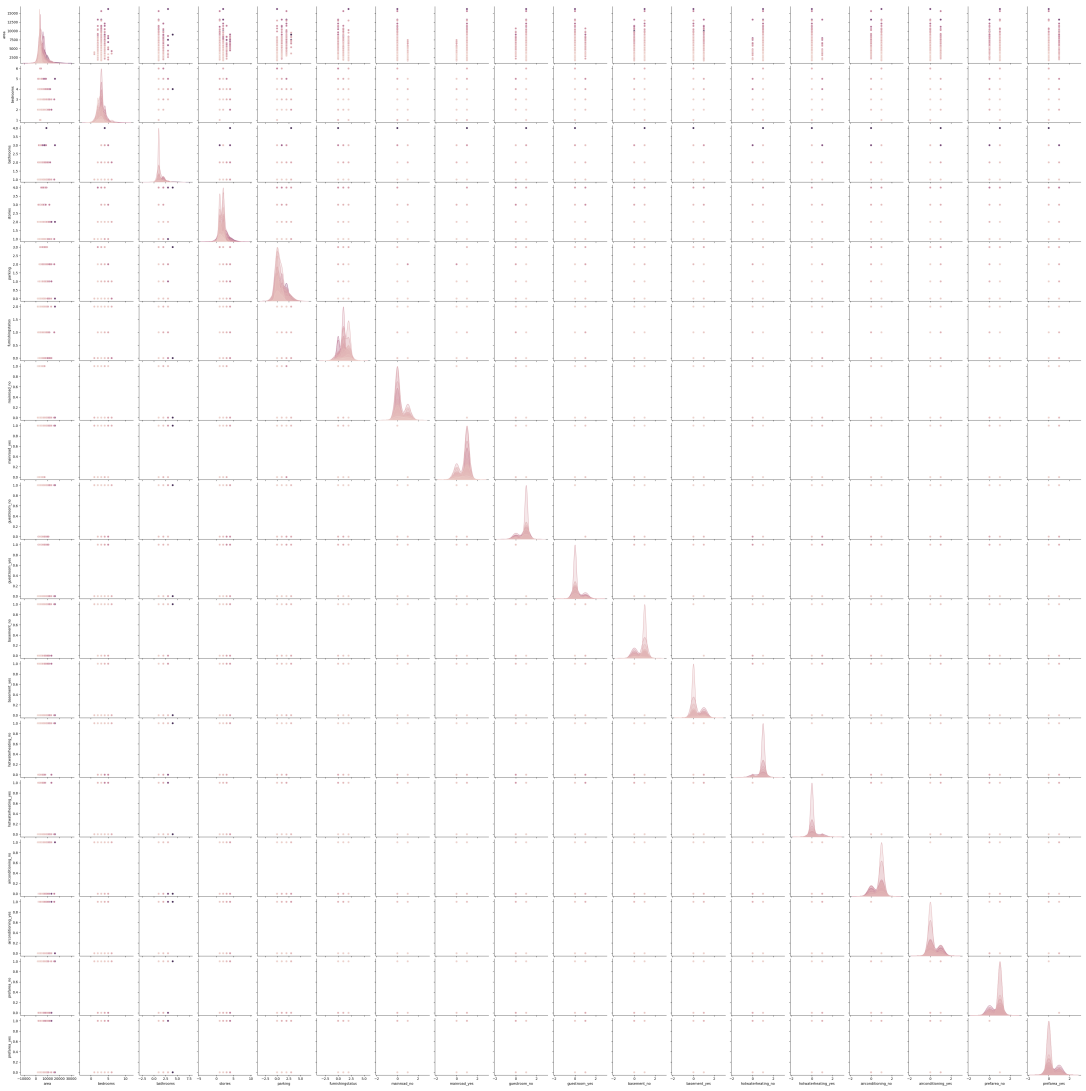


[24]:
```
plt.figure(figsize=(10,7))
sns.boxenplot(df)
```

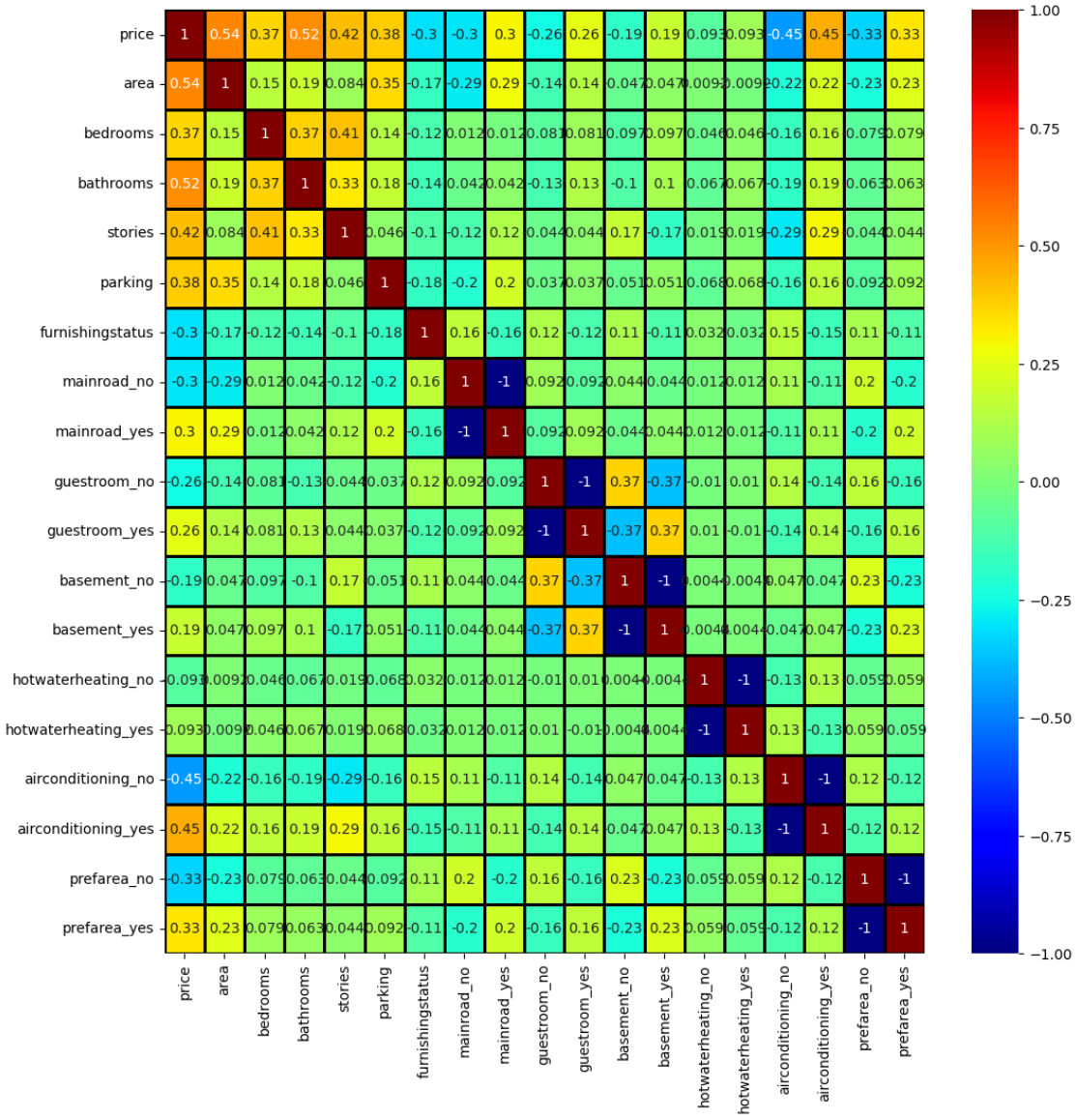
[24]: <Axes: >



[25]:
```
sns.pairplot(data=df, hue='price')
plt.show()
```



[26]:
```
plt.figure(figsize=(12,12))
sns.heatmap(df.corr(), annot=True, linecolor='black', linewidths=1, cmap='jet')
plt.show()
```



[27]:
```
#Train&Test Split

from sklearn.model_selection import train_test_split
```

[28]:
```
features =df.drop(['price'],axis=1)
y=df['price']
```

[29]:
```
x_train,x_test,y_train,y_test=train_test_split(features,y,train_size=0.
↪80,random_state=889)
```

[30]:
```
x_train.shape,y_train.shape,x_test.shape,y_test.shape
```

[30]:
```
((436, 18), (436,), (109, 18), (109,))
```

*Feature Scaling¶

[32]:
```
#Scaling
from sklearn.preprocessing import StandardScaler
```

[33]:
```
sc=StandardScaler()
```

[34]:
```
x_train=sc.fit_transform(x_train)
x_test=sc.fit(x_test)
```

[37]:
```
from sklearn.linear_model import LinearRegression
model_lr=LinearRegression()
```

[38]:
```
model_lr=LinearRegression()
model_lr.fit(x_train,y_train)
```

[38]:
```
LinearRegression()
```

[39]:
```
pred_lr=model_lr.predict(x_train)
```

[40]:
```
#Model Evaluation
from sklearn.metrics import mean_absolute_error,mean_squared_error
```

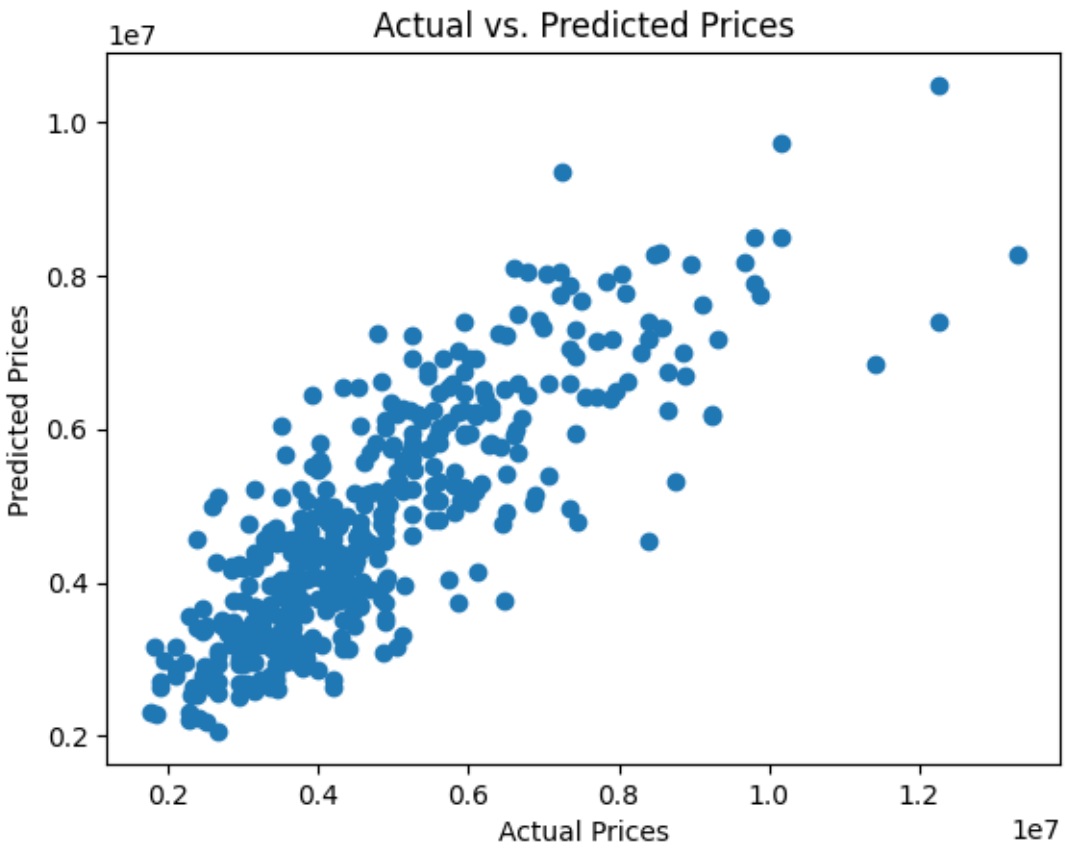
[41]:
```
mean_absolute_error(pred_lr,y_train)
```

[41]:
```
774272.115083333
```

[42]:
```
mean_squared_error(pred_lr,y_train)
```

[42]:
```
1110157649242.0427
```

[46]:
```
plt.scatter(y_train,pred_lr)
plt.xlabel('Actual Prices')
plt.ylabel('Predicted Prices')
plt.title('Actual vs. Predicted Prices')
plt.show()
```


Actual vs. Predicted Prices
1e7
1.0
0.8
0.6
0.4
0.2
Predicted Prices
0.2
0.4
0.6
0.8
1.0
1.2
Actual Prices
1e7

[ ]: