


```
1 import numpy as np
2 import pandas as pd
3 import matplotlib.pyplot as plt
4 import seaborn as sns
5 sns.set(color_codes=True)

1 data = pd.read_csv('/content/raw_house_data - raw_house_data.csv')
2 data.head(10)
```



|   | MLS      | sold_price | zipcode | longitude   | latitude  | lot_acres | taxes    | year_built | bedrooms | bathrooms | sqrft_ft | garage | kitchen_fi                     |
|---|----------|------------|---------|-------------|-----------|-----------|----------|------------|----------|-----------|----------|--------|--------------------------------|
| 0 | 21530491 | 5300000.0  | 85637   | -110.378200 | 31.356362 | 2154.00   | 5272.00  | 1941       | 13       | 10.0      | 10500.0  | 0.0    | Dist<br>Refrigerat             |
| 1 | 21529082 | 4200000.0  | 85646   | -111.045371 | 31.594213 | 1707.00   | 10422.36 | 1997       | 2        | 2.0       | 7300.0   | 0.0    | Dist<br>Garbage I              |
| 2 | 3054672  | 4200000.0  | 85646   | -111.040707 | 31.594844 | 1707.00   | 10482.00 | 1997       | 2        | 3.0       | NaN      | NaN    | Dist<br>Garbage I<br>Ref       |
| 3 | 21919321 | 4500000.0  | 85646   | -111.035925 | 31.645878 | 636.67    | 8418.58  | 1930       | 7        | 5.0       | 9019.0   | 4.0    | Dishwashe<br>Sink, Pantr       |
| 4 | 21306357 | 3411450.0  | 85750   | -110.813768 | 32.285162 | 3.21      | 15393.00 | 1995       | 4        | 6.0       | 6396.0   | 3.0    | Dist<br>Garbage I<br>Refrigerz |
| 5 | 21528016 | 3250000.0  | 85718   | -110.910593 | 32.339090 | 1.67      | 27802.84 | 1999       | 3        | 4.0       | 6842.0   | 3.0    | Dist<br>Garbage I<br>Refrigerz |
| 6 | 21610478 | 2400000.0  | 85712   | -110.883315 | 32.261069 | 2.10      | 19038.42 | 2001       | 9        | 8.0       | 12025.0  | 4.0    | Dist<br>Garbage I              |
| 7 | 21211741 | 2500000.0  | 85750   | -110.861002 | 32.331603 | 1.07      | 21646.00 | 2011       | 6        | 8.0       | 8921.0   | 4.0    | Cor<br>Dist<br>Freezer,<br>I   |
| 8 | 21324646 | 3700000.0  | 85718   | -110.912156 | 32.343601 | 6.73      | 25094.39 | 2002       | 5        | 7.0       | 5238.0   | 3.0    | Cor<br>Dist<br>Freezer,<br>I   |
| 9 | 21812010 | 3250000.0  | 85750   | -110.837950 | 32.327575 | 3.53      | 18936.11 | 2007       | 5        | 6.0       | 6480.0   | 3.0    | Dishwashe<br>Sink<br>Range     |


Next steps:

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```
1 data.shape

 (5000, 16)

1 data.dtypes
```



|                         | 0       |
|-------------------------|---------|
| <b>MLS</b>              | int64   |
| <b>sold_price</b>       | float64 |
| <b>zipcode</b>          | int64   |
| <b>longitude</b>        | float64 |
| <b>latitude</b>         | float64 |
| <b>lot_acres</b>        | float64 |
| <b>taxes</b>            | float64 |
| <b>year_built</b>       | int64   |
| <b>bedrooms</b>         | int64   |
| <b>bathrooms</b>        | float64 |
| <b>sqrt_ft</b>          | float64 |
| <b>garage</b>           | float64 |
| <b>kitchen_features</b> | object  |
| <b>fireplaces</b>       | float64 |
| <b>floor_covering</b>   | object  |
| <b>HOA</b>              | object  |

**dtype:** object

```
1 data.isnull().any()
```




|                         | 0     |
|-------------------------|-------|
| <b>MLS</b>              | False |
| <b>sold_price</b>       | False |
| <b>zipcode</b>          | False |
| <b>longitude</b>        | False |
| <b>latitude</b>         | False |
| <b>lot_acres</b>        | True  |
| <b>taxes</b>            | False |
| <b>year_built</b>       | False |
| <b>bedrooms</b>         | False |
| <b>bathrooms</b>        | True  |
| <b>sqrt_ft</b>          | True  |
| <b>garage</b>           | True  |
| <b>kitchen_features</b> | True  |
| <b>fireplaces</b>       | True  |
| <b>floor_covering</b>   | True  |
| <b>HOA</b>              | True  |

**dtype:** bool

```
1 median_garage = data['garage'].median()
2 data['garage']=data['garage'].fillna(median_garage)
3 median_garage
```

 3.0

```
1 data['garage'] = data['garage'].astype(int)
2 print(data['garage'].dtype)
```

 int64

```

1  bathrooms = data['bedrooms']
2  data['bathrooms'] = data['bathrooms'].fillna(bathrooms)
3  data['bathrooms'] = data.apply(lambda row: row['bedrooms'] if row['bathrooms'] > row['bedrooms'] else row['bathrooms'], axis=1)

```

```

1  data['bathrooms'] = data['bathrooms'].astype(int)
2  print(data['bathrooms'].dtype)

```

int64

```
1  data['floor_covering'] = data['floor_covering'].fillna(0)
```

```
1  data['kitchen_features'] = data['kitchen_features'].fillna(0)
```

```

1  median_sqrt_ft = data['sqrt_ft'].median()
2  data['sqrt_ft'] = data['sqrt_ft'].fillna(median_sqrt_ft)
3
4  median_sqrt_ft

```

3512.0

```

1  median_lot_acres = data['lot_acres'].median()
2  data['lot_acres'] = data['lot_acres'].fillna(median_lot_acres)
3
4  median_lot_acres

```

0.99

```

1  median_fireplaces = data['fireplaces'].median()
2  data['fireplaces'] = data['fireplaces'].fillna(median_fireplaces)

```

```

1  data['fireplaces'] = pd.to_numeric(data['fireplaces'], errors='coerce').fillna(0).astype(int)
2  print(data['fireplaces'].dtype)

```

int64

```

1  data['HOA'] = pd.to_numeric(data['HOA'], errors='coerce')
2  median_hoa = data['HOA'].median()
3  data['HOA'] = data['HOA'].fillna(median_hoa)

```


```
1  data.isnull().sum()
```

0

|                  |   |
|------------------|---|
| MLS              | 0 |
| sold_price       | 0 |
| zipcode          | 0 |
| longitude        | 0 |
| latitude         | 0 |
| lot_acres        | 0 |
| taxes            | 0 |
| year_built       | 0 |
| bedrooms         | 0 |
| bathrooms        | 0 |
| sqrt_ft          | 0 |
| garage           | 0 |
| kitchen_features | 0 |
| fireplaces       | 0 |
| floor_covering   | 0 |
| HOA              | 0 |

dtype: int64


```
1 data.dtypes
```



|                  | 0       |
|------------------|---------|
| MLS              | int64   |
| sold_price       | float64 |
| zipcode          | int64   |
| longitude        | float64 |
| latitude         | float64 |
| lot_acres        | float64 |
| taxes            | float64 |
| year_built       | int64   |
| bedrooms         | int64   |
| bathrooms        | int64   |
| sqrt_ft          | float64 |
| garage           | int64   |
| kitchen_features | object  |
| fireplaces       | int64   |
| floor_covering   | object  |
| HOA              | float64 |

dtype: object

```
1 data.to_csv('file2.csv', header=False, index=False)
2 data.head()
```



|   | MLS      | sold_price | zipcode | longitude   | latitude  | lot_acres | taxes    | year_built | bedrooms | bathrooms | sqrt_ft | garage | kitchen_features              |
|---|----------|------------|---------|-------------|-----------|-----------|----------|------------|----------|-----------|---------|--------|-------------------------------|
| 0 | 21530491 | 5300000.0  | 85637   | -110.378200 | 31.356362 | 2154.00   | 5272.00  | 1941       | 13       | 10        | 10500.0 | 0      | Dist<br>Refrigerat            |
| 1 | 21529082 | 4200000.0  | 85646   | -111.045371 | 31.594213 | 1707.00   | 10422.36 | 1997       | 2        | 2         | 7300.0  | 0      | Dist<br>Garbage I             |
| 2 | 3054672  | 4200000.0  | 85646   | -111.040707 | 31.594844 | 1707.00   | 10482.00 | 1997       | 2        | 2         | 3512.0  | 3      | Dist<br>Garbage I<br>Ref      |
| 3 | 21919321 | 4500000.0  | 85646   | -111.035925 | 31.645878 | 636.67    | 8418.58  | 1930       | 7        | 5         | 9019.0  | 4      | Dishwasher<br>Sink, Pantr     |
| 4 | 21306357 | 3411450.0  | 85750   | -110.813768 | 32.285162 | 3.21      | 15393.00 | 1995       | 4        | 4         | 6396.0  | 3      | Dist<br>Garbage I<br>Refriger |

Next steps:

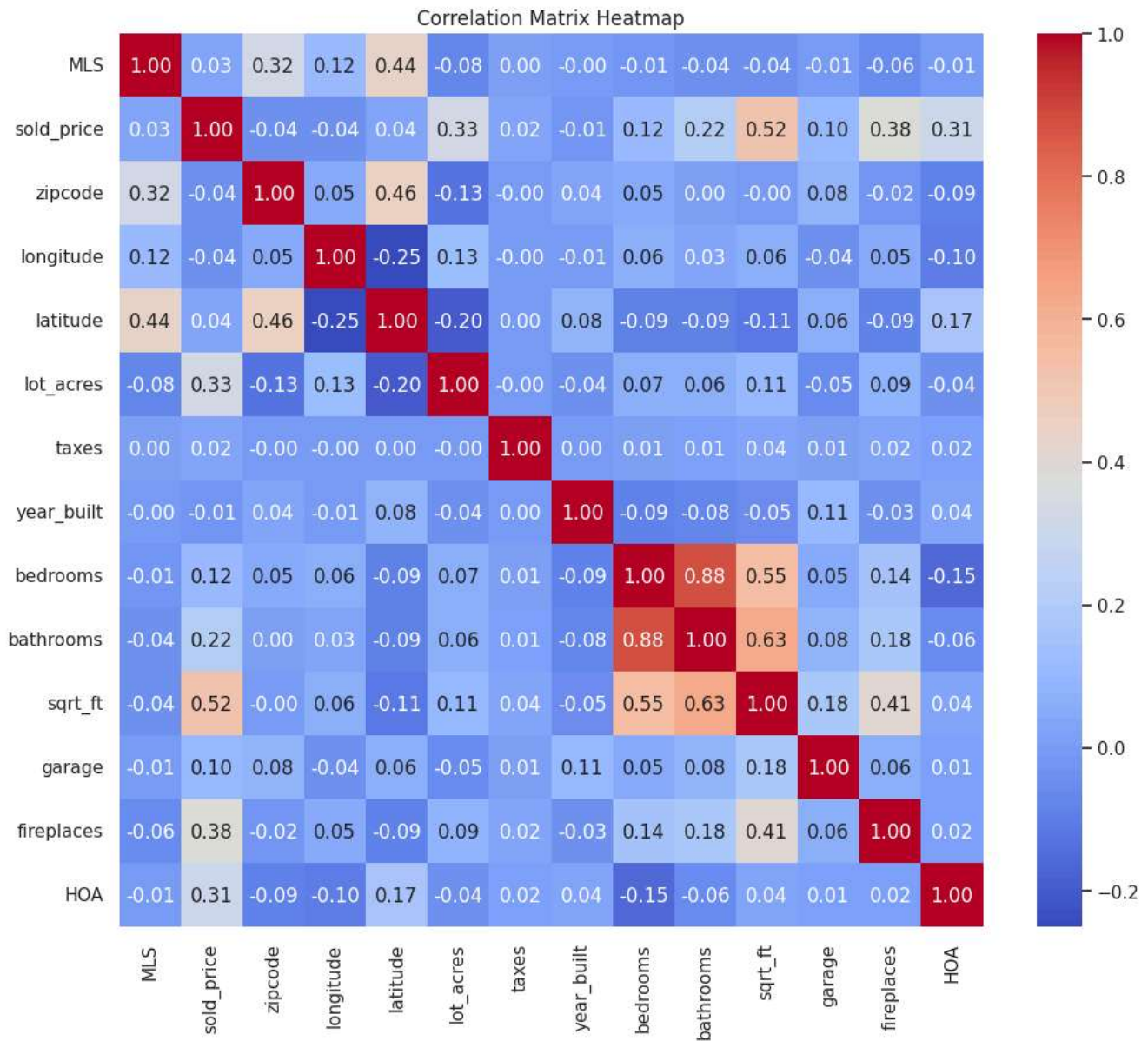
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```
1 numeric_data = data.select_dtypes(include=[np.number])
2 correlation_matrix = numeric_data.corr()

1 plt.figure(figsize=(12, 10)) # Adjust figure size as needed
2 sns.heatmap(correlation_matrix, annot=True, cmap='coolwarm', fmt=".2f")
3 plt.title('Correlation Matrix Heatmap')
4 plt.show()
```



```
1 data['price_per_sqft'] = data['sold_price'] / data['sqrt_ft']
```

```
1 data
```



|      | MLS      | sold_price | zipcode | longitude   | latitude  | lot_acres | taxes    | year_built | bedrooms | bathrooms | sqrft_ft | garage | kitchen             |
|------|----------|------------|---------|-------------|-----------|-----------|----------|------------|----------|-----------|----------|--------|---------------------|
| 0    | 21530491 | 5300000.0  | 85637   | -110.378200 | 31.356362 | 2154.00   | 5272.00  | 1941       | 13       | 10        | 10500.0  | 0      | Refrig              |
| 1    | 21529082 | 4200000.0  | 85646   | -111.045371 | 31.594213 | 1707.00   | 10422.36 | 1997       | 2        | 2         | 7300.0   | 0      | Garba               |
| 2    | 3054672  | 4200000.0  | 85646   | -111.040707 | 31.594844 | 1707.00   | 10482.00 | 1997       | 2        | 2         | 3512.0   | 3      | Garba               |
| 3    | 21919321 | 4500000.0  | 85646   | -111.035925 | 31.645878 | 636.67    | 8418.58  | 1930       | 7        | 5         | 9019.0   | 4      | Dishwa<br>Sink, P   |
| 4    | 21306357 | 3411450.0  | 85750   | -110.813768 | 32.285162 | 3.21      | 15393.00 | 1995       | 4        | 4         | 6396.0   | 3      | Garba<br>Refri      |
| ...  | ...      | ...        | ...     | ...         | ...       | ...       | ...      | ...        | ...      | ...       | ...      | ...    |                     |
| 4995 | 21810382 | 495000.0   | 85641   | -110.661829 | 31.907917 | 4.98      | 2017.00  | 2005       | 5        | 3         | 3601.0   | 3      | Dishwa<br>Si<br>Dis |
| 4996 | 21908591 | 550000.0   | 85750   | -110.858556 | 32.316373 | 1.42      | 4822.01  | 1990       | 4        | 3         | 2318.0   | 3      | Dishwa<br>&<br>Rai  |
| 4997 | 21832452 | 475000.0   | 85192   | -110.755428 | 32.964708 | 12.06     | 1000.00  | 1969       | 3        | 2         | 1772.0   | 0      | Ele<br>Island,      |
| 4998 | 21900515 | 550000.0   | 85745   | -111.055528 | 32.296871 | 1.01      | 5822.93  | 2009       | 4        | 4         | 3724.0   | 3      | Dishwa<br>Si<br>Dis |
| 4999 | 4111490  | 450000.0   | 85621   | -110.913054 | 31.385259 | 4.16      | 2814.48  | 1988       | 4        | 4         | 4317.0   | 3      | Dishwa<br>Sink,     |

5000 rows x 17 columns

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```
1 data['Cat_price_per_sqft'] = pd.qcut(data['price_per_sqft'], q=20, labels=False, duplicates='drop')
```

```
1 data
```

|      | MLS      | sold_price | zipcode | longitude   | latitude  | lot_acres | taxes    | year_built | bedrooms | bathrooms | sqrft_ft | garage | kitchen             |
|------|----------|------------|---------|-------------|-----------|-----------|----------|------------|----------|-----------|----------|--------|---------------------|
| 0    | 21530491 | 5300000.0  | 85637   | -110.378200 | 31.356362 | 2154.00   | 5272.00  | 1941       | 13       | 10        | 10500.0  | 0      | Refrig              |
| 1    | 21529082 | 4200000.0  | 85646   | -111.045371 | 31.594213 | 1707.00   | 10422.36 | 1997       | 2        | 2         | 7300.0   | 0      | Garba               |
| 2    | 3054672  | 4200000.0  | 85646   | -111.040707 | 31.594844 | 1707.00   | 10482.00 | 1997       | 2        | 2         | 3512.0   | 3      | Garba               |
| 3    | 21919321 | 4500000.0  | 85646   | -111.035925 | 31.645878 | 636.67    | 8418.58  | 1930       | 7        | 5         | 9019.0   | 4      | Dishwa<br>Sink, P   |
| 4    | 21306357 | 3411450.0  | 85750   | -110.813768 | 32.285162 | 3.21      | 15393.00 | 1995       | 4        | 4         | 6396.0   | 3      | Garba<br>Refri      |
| ...  | ...      | ...        | ...     | ...         | ...       | ...       | ...      | ...        | ...      | ...       | ...      | ...    | ...                 |
| 4995 | 21810382 | 495000.0   | 85641   | -110.661829 | 31.907917 | 4.98      | 2017.00  | 2005       | 5        | 3         | 3601.0   | 3      | Dishwa<br>Si<br>Dis |
| 4996 | 21908591 | 550000.0   | 85750   | -110.858556 | 32.316373 | 1.42      | 4822.01  | 1990       | 4        | 3         | 2318.0   | 3      | Dishwa<br>'<br>Rai  |
| 4997 | 21832452 | 475000.0   | 85192   | -110.755428 | 32.964708 | 12.06     | 1000.00  | 1969       | 3        | 2         | 1772.0   | 0      | Ele<br>Island,      |
| 4998 | 21900515 | 550000.0   | 85745   | -111.055528 | 32.296871 | 1.01      | 5822.93  | 2009       | 4        | 4         | 3724.0   | 3      | Dishwa<br>Si<br>Dis |
| 4999 | 4111490  | 450000.0   | 85621   | -110.913054 | 31.385259 | 4.16      | 2814.48  | 1988       | 4        | 4         | 4317.0   | 3      | Dishwa<br>Sink,     |

5000 rows × 18 columns

Next steps:

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## ✓ KNN Classifier

```

1 # Prepare the Data
2 X_train = data[['longitude', 'latitude']].values
3 y_knn = data['Cat_price_per_sqft'].values

1 class KNNClassifier:
2     def fit(self, X, y):
3         self.X = X
4         self.y = y
5
6     def predict(self, X, K=3, epsilon=1e-5):
7         N = len(X)
8         y_hat = np.zeros(N)
9
10        for i in range(N):
11            dist2 = np.sum((self.X - X[i]) ** 2, axis=1)
12            idxt = np.argsort(dist2)[:K]
13            gamma_k = 1 / (np.sqrt(dist2[idxt] + epsilon))
14            y_hat[i] = np.bincount(self.y[idxt].astype(int), weights=gamma_k).argmax()
15
16        return y_hat

1 def accuracy(y, y_hat):
2     return np.mean(y==y_hat)

1 knn = KNNClassifier()

```

```
1 knn.fit(X_train,y_knn)

1 y_hat = knn.predict(X_train,K=3)

1 accuracy = np.mean(y_hat==y_knn)
2 accuracy
```

0.9078

```
1 data['Category_price_per_sqft'] = y_hat
```

1 data

|      | MLS      | sold_price | zipcode | longitude   | latitude  | lot_acres | taxes    | year_built | bedrooms | bathrooms | sqrft_ft | garage | kitchen                        |
|------|----------|------------|---------|-------------|-----------|-----------|----------|------------|----------|-----------|----------|--------|--------------------------------|
| 0    | 21530491 | 5300000.0  | 85637   | -110.378200 | 31.356362 | 2154.00   | 5272.00  | 1941       | 13       | 10        | 10500.0  | 0      | Refrigerator                   |
| 1    | 21529082 | 4200000.0  | 85646   | -111.045371 | 31.594213 | 1707.00   | 10422.36 | 1997       | 2        | 2         | 7300.0   | 0      | Garbage disposal               |
| 2    | 3054672  | 4200000.0  | 85646   | -111.040707 | 31.594844 | 1707.00   | 10482.00 | 1997       | 2        | 2         | 3512.0   | 3      | Garbage disposal               |
| 3    | 21919321 | 4500000.0  | 85646   | -111.035925 | 31.645878 | 636.67    | 8418.58  | 1930       | 7        | 5         | 9019.0   | 4      | Dishwasher, Sink, Pot          |
| 4    | 21306357 | 3411450.0  | 85750   | -110.813768 | 32.285162 | 3.21      | 15393.00 | 1995       | 4        | 4         | 6396.0   | 3      | Garbage disposal, Refrigerator |
| ...  | ...      | ...        | ...     | ...         | ...       | ...       | ...      | ...        | ...      | ...       | ...      | ...    | ...                            |
| 4995 | 21810382 | 495000.0   | 85641   | -110.661829 | 31.907917 | 4.98      | 2017.00  | 2005       | 5        | 3         | 3601.0   | 3      | Dishwasher, Sink, Disposal     |
| 4996 | 21908591 | 550000.0   | 85750   | -110.858556 | 32.316373 | 1.42      | 4822.01  | 1990       | 4        | 3         | 2318.0   | 3      | Dishwasher, Sink, Refrigerator |
| 4997 | 21832452 | 475000.0   | 85192   | -110.755428 | 32.964708 | 12.06     | 1000.00  | 1969       | 3        | 2         | 1772.0   | 0      | Electric Island, Sink          |
| 4998 | 21900515 | 550000.0   | 85745   | -111.055528 | 32.296871 | 1.01      | 5822.93  | 2009       | 4        | 4         | 3724.0   | 3      | Dishwasher, Sink, Disposal     |
| 4999 | 4111490  | 450000.0   | 85621   | -110.913054 | 31.385259 | 4.16      | 2814.48  | 1988       | 4        | 4         | 4317.0   | 3      | Dishwasher, Sink, Disposal     |

5000 rows x 19 columns

Next steps:

Generate code with data

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```
1 data['rooms'] = data['bedrooms'] + data['bathrooms']
```

1 data





|      | MLS      | sold_price | zipcode | longitude   | latitude  | lot_acres | taxes    | year_built | bedrooms | bathrooms | sqrft_ft | garage | kitchen             |
|------|----------|------------|---------|-------------|-----------|-----------|----------|------------|----------|-----------|----------|--------|---------------------|
| 0    | 21530491 | 5300000.0  | 85637   | -110.378200 | 31.356362 | 2154.00   | 5272.00  | 1941       | 13       | 10        | 10500.0  | 0      | Refrig              |
| 1    | 21529082 | 4200000.0  | 85646   | -111.045371 | 31.594213 | 1707.00   | 10422.36 | 1997       | 2        | 2         | 7300.0   | 0      | Garba               |
| 2    | 3054672  | 4200000.0  | 85646   | -111.040707 | 31.594844 | 1707.00   | 10482.00 | 1997       | 2        | 2         | 3512.0   | 3      | Garba               |
| 3    | 21919321 | 4500000.0  | 85646   | -111.035925 | 31.645878 | 636.67    | 8418.58  | 1930       | 7        | 5         | 9019.0   | 4      | Dishwa<br>Sink, P   |
| 4    | 21306357 | 3411450.0  | 85750   | -110.813768 | 32.285162 | 3.21      | 15393.00 | 1995       | 4        | 4         | 6396.0   | 3      | Garba<br>Refri      |
| ...  | ...      | ...        | ...     | ...         | ...       | ...       | ...      | ...        | ...      | ...       | ...      | ...    |                     |
| 4995 | 21810382 | 495000.0   | 85641   | -110.661829 | 31.907917 | 4.98      | 2017.00  | 2005       | 5        | 3         | 3601.0   | 3      | Dishwa<br>Si<br>Dis |
| 4996 | 21908591 | 550000.0   | 85750   | -110.858556 | 32.316373 | 1.42      | 4822.01  | 1990       | 4        | 3         | 2318.0   | 3      | Dishwa<br>'<br>Rai  |
| 4997 | 21832452 | 475000.0   | 85192   | -110.755428 | 32.964708 | 12.06     | 1000.00  | 1969       | 3        | 2         | 1772.0   | 0      | Ele<br>Island,      |
| 4998 | 21900515 | 550000.0   | 85745   | -111.055528 | 32.296871 | 1.01      | 5822.93  | 2009       | 4        | 4         | 3724.0   | 3      | Dishwa<br>Si<br>Dis |
| 4999 | 4111490  | 450000.0   | 85621   | -110.913054 | 31.385259 | 4.16      | 2814.48  | 1988       | 4        | 4         | 4317.0   | 3      | Dishwa<br>Sink,     |

5000 rows x 20 columns

Next steps:

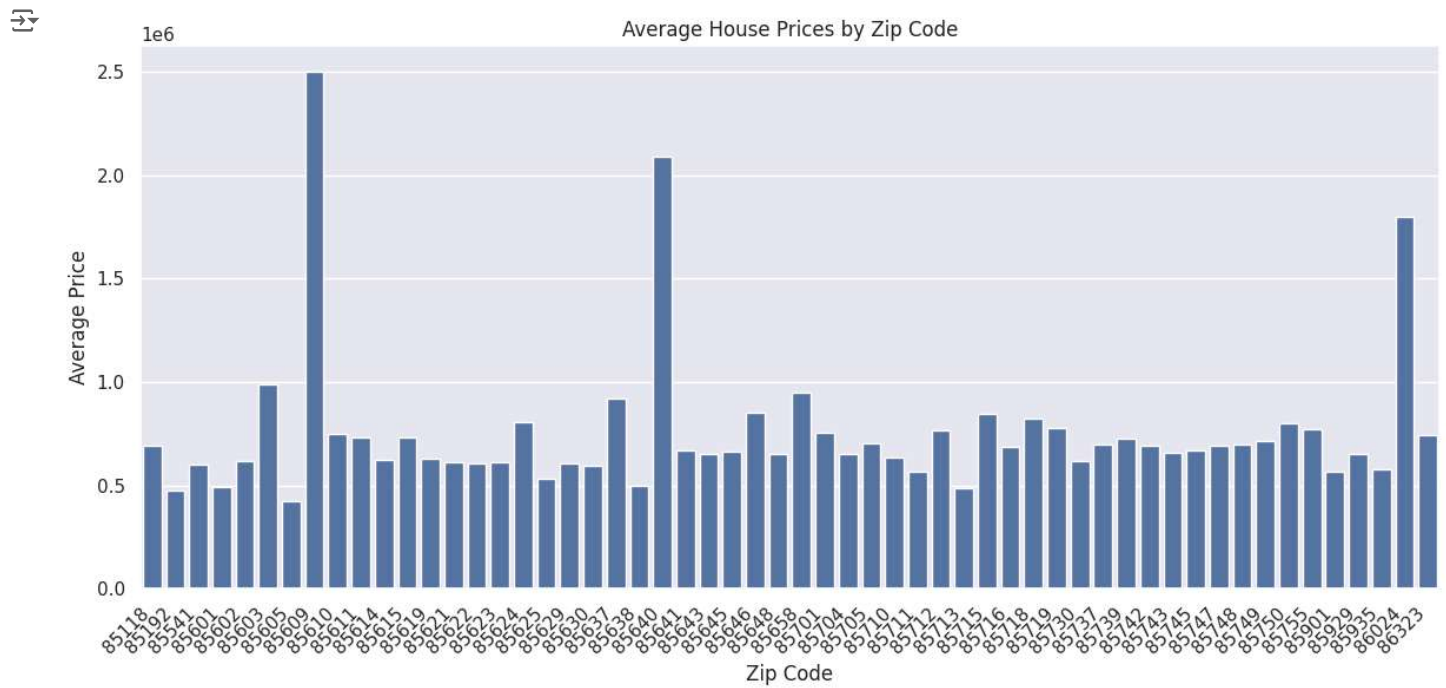
Generate code with data

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```
1 average_prices = data.groupby('zipcode')['sold_price'].mean().reset_index()

1 plt.figure(figsize=(12, 6)) # Adjust figure size as needed
2 sns.barplot(x='zipcode', y='sold_price', data=average_prices)
3 plt.title('Average House Prices by Zip Code')
4 plt.xlabel('Zip Code')
5 plt.ylabel('Average Price')
6 plt.xticks(rotation=45, ha='right') # Rotate x-axis labels for better readability
7 plt.tight_layout()
8 plt.show()
```



```

1 #zipcode_of_interest = 85266 # Replace with your desired zip code #85750
2 #filtered_data = data[data['zipcode'] == zipcode_of_interest]

1 zipcode_of_interest = 85750 # Replace with your desired zip code #85750
2 filtered_data = data[data['zipcode'] == zipcode_of_interest]

1 median_with_garage = filtered_data[filtered_data['garage'] > 0]['sold_price'].median()
2 median_without_garage = filtered_data[filtered_data['garage'] == 0]['sold_price'].median()

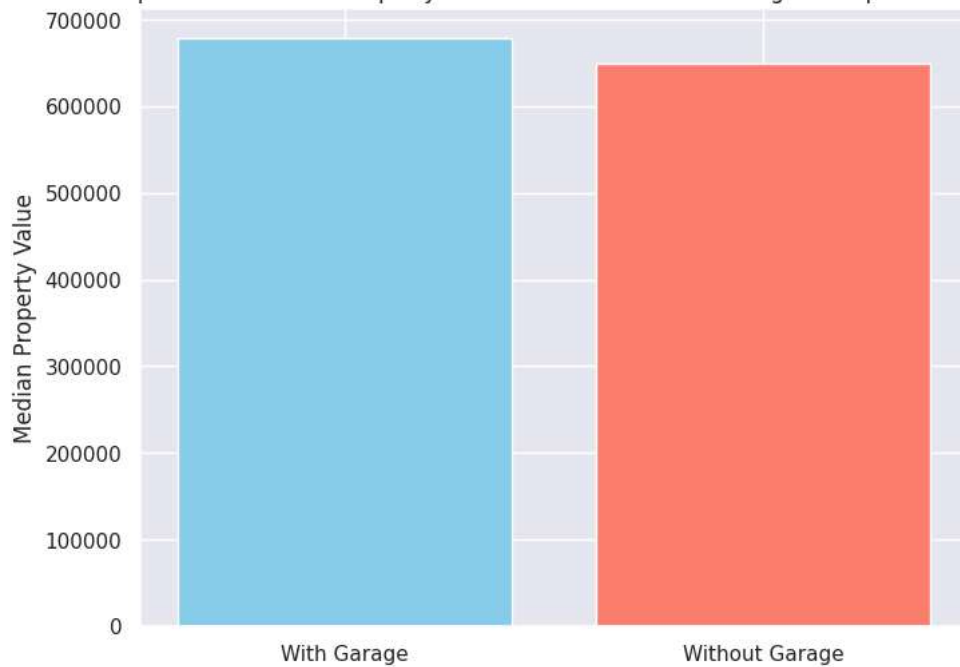
1 median_with_garage = data[data['garage'] > 0]['sold_price'].median()
2 median_without_garage = data[data['garage'] == 0]['sold_price'].median()

1 categories = ['With Garage', 'Without Garage']
2 median_values = [median_with_garage, median_without_garage]
3
4 plt.figure(figsize=(8, 6))
5 plt.bar(categories, median_values, color=['skyblue', 'salmon'])
6 plt.title(f'Comparison of Median Property Values with and without Garages in Zip Code {zipcode_of_interest}')
7 plt.ylabel('Median Property Value')
8 plt.show()

```



Comparison of Median Property Values with and without Garages in Zip Code 85750

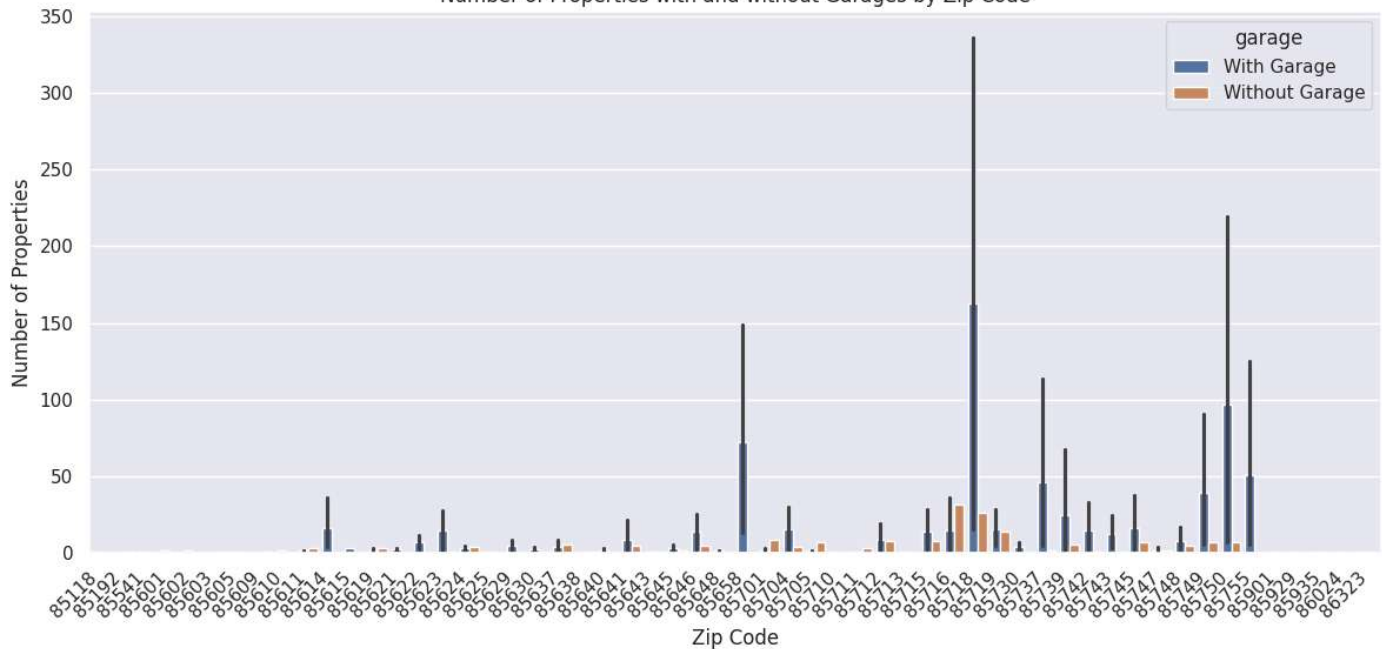


```
1 garage_counts = data.groupby(['zipcode', 'garage'])['sold_price'].count().reset_index()
2 garage_counts = garage_counts.rename(columns={'sold_price': 'count'})
3 garage_counts['garage'] = garage_counts['garage'].apply(lambda x: 'With Garage' if x > 0 else 'Without Garage')
```

```
1 plt.figure(figsize=(12, 6))
2 sns.barplot(x='zipcode', y='count', hue='garage', data=garage_counts)
3 plt.title('Number of Properties with and without Garages by Zip Code')
4 plt.xlabel('Zip Code')
5 plt.ylabel('Number of Properties')
6 plt.xticks(rotation=45, ha='right')
7 plt.tight_layout()
8 plt.show()
```



Number of Properties with and without Garages by Zip Code

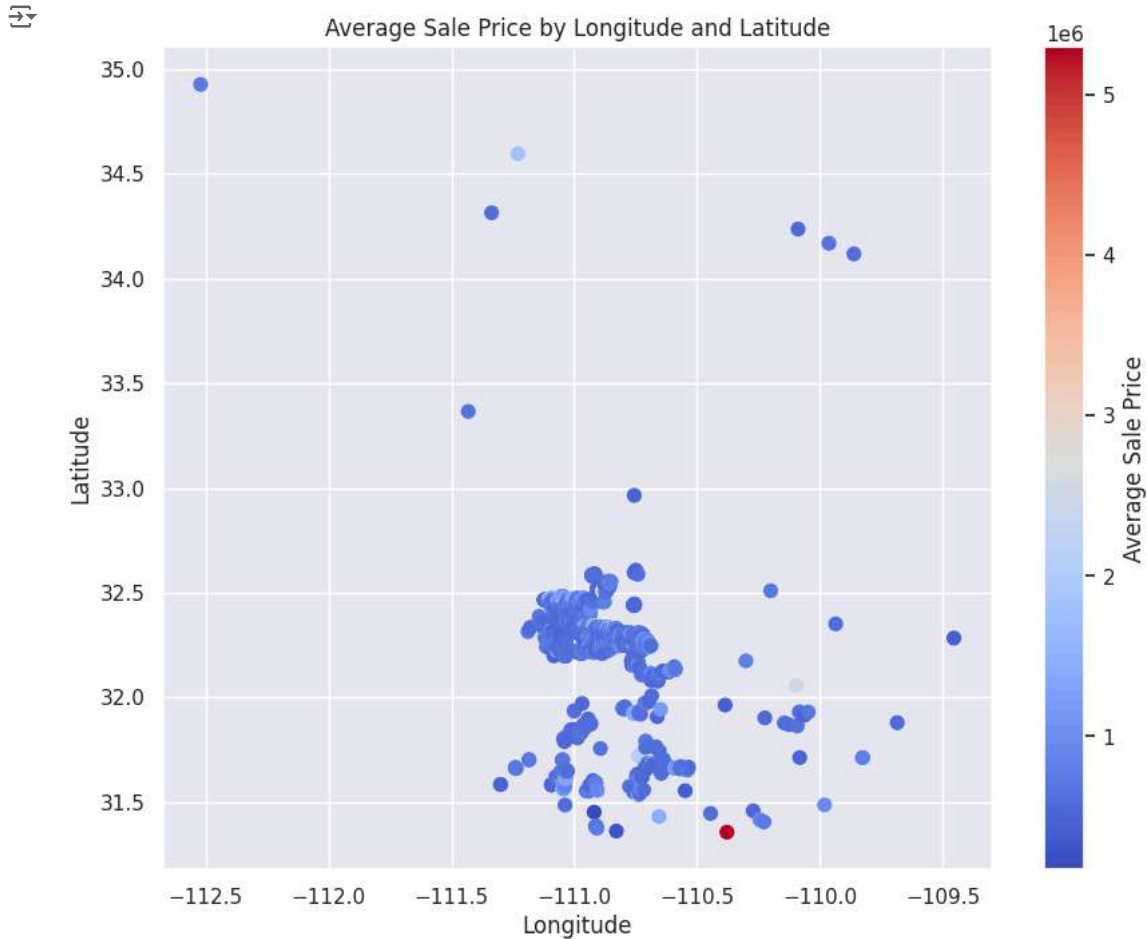


```

1 average_prices = data.groupby(['longitude', 'latitude'])['sold_price'].mean().reset_index()

2 plt.figure(figsize=(10, 8))
3 plt.scatter(average_prices['longitude'], average_prices['latitude'],
4             c=average_prices['sold_price'], cmap='coolwarm', s=50) # Adjust 's' for marker size
5 plt.colorbar(label='Average Sale Price')
6 plt.title('Average Sale Price by Longitude and Latitude')
7 plt.xlabel('Longitude')
8 plt.ylabel('Latitude')
9 plt.show()

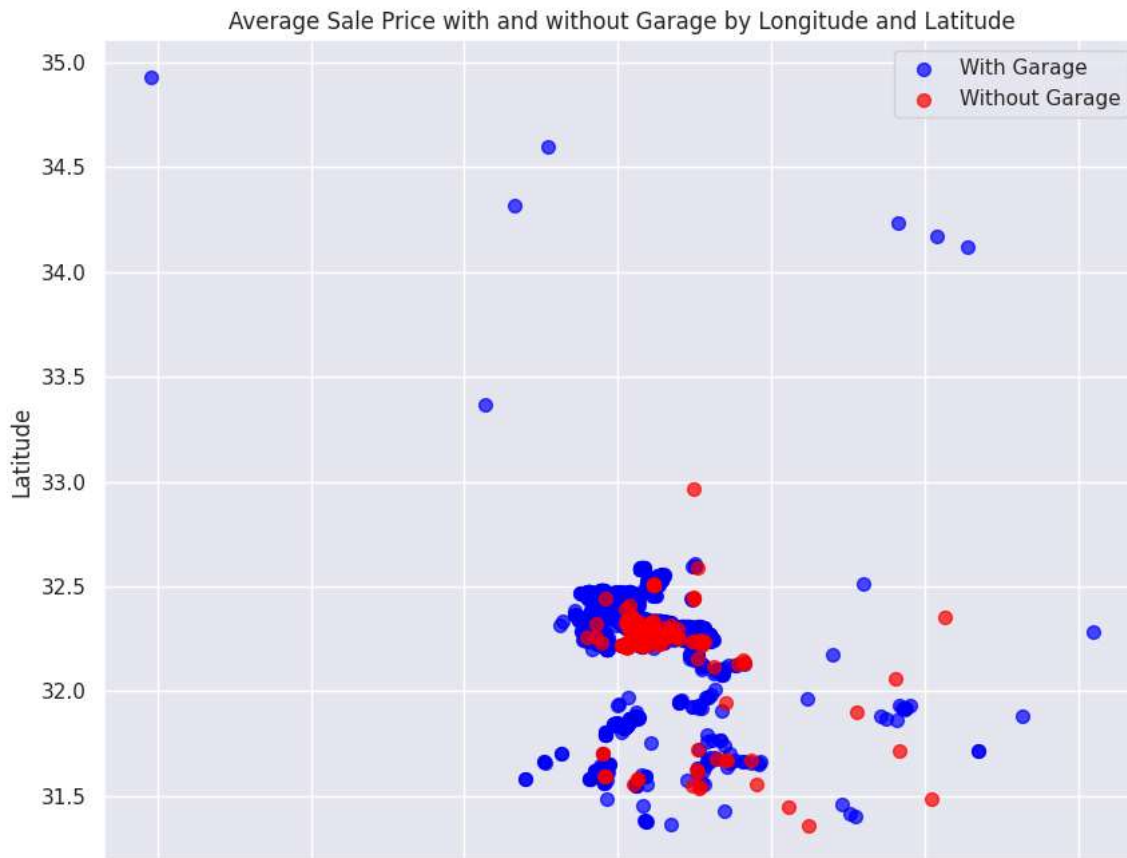
```



```

1 average_prices = data.groupby(['longitude', 'latitude', (data['garage'] > 0)])['sold_price'].mean().reset_index()
2 average_prices.rename(columns={'(data[\'garage\'] > 0)': 'has_garage', 'sold_price': 'avg_price'}, inplace=True)
3
4 # Create a scatter plot with color-coded points and legend
5 plt.figure(figsize=(10, 8))
6
7 # Separate data for houses with and without garages
8 with_garage = average_prices[average_prices['garage'] == True]
9 without_garage = average_prices[average_prices['garage'] == False]
10
11 # Plot points with different colors and labels
12 plt.scatter(with_garage['longitude'], with_garage['latitude'],
13             c='blue', label='With Garage', s=50, alpha=0.7)
14 plt.scatter(without_garage['longitude'], without_garage['latitude'],
15             c='red', label='Without Garage', s=50, alpha=0.7)
16
17 plt.legend() # Add the legend
18 plt.title('Average Sale Price with and without Garage by Longitude and Latitude')
19 plt.xlabel('Longitude')
20 plt.ylabel('Latitude')
21 plt.show()

```



## ✓ KNN Regressor

```

1 # Prepare the Data
2 X_train = data[['longitude', 'latitude', 'garage', 'lot_acres', 'rooms', 'price_per_sqft', 'Category_price_per_sqft']].values
3 y_knnr = data['sold_price'].values

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