PHASE 3 ASSIGNMENT

PROJECT TITLE: PREPROCESSING THE DATASET

PROBLEM DEFINITION: The problem is to predict house prices using machine learning techniques. The objective is to develop a model that accurately predicts the prices of houses based on a set of features such as location, square footage, number of bedrooms and bathrooms, and other relevant factors. This project involves data preprocessing, feature engineering, model selection, training, and evaluation.

GITHUB LINK:

https://github.com/durga161122/Predicting-House-Prices-using-Machine-Learning.git

https://github.com/durga161122/Innovation.git

DOCUMENT:

Building the project by preprocessing the data

DATASET LINK ON: Predicting House Prices

https://www.kaggle.com/datasets/vedavyasv/usa-housing

Preprocessing a dataset is a crucial step in preparing data for machine learning models. The specific steps can vary depending on the nature of your data and the problem you're trying to solve. However, here's a general set of steps you might follow:

1. **Import Libraries:**

- Import the necessary libraries for data manipulation and analysis such as Pandas, NumPy, and others.

```python
import pandas as pd
import numpy as np
```

Data Exploration

In [3]:
```
dataset
```

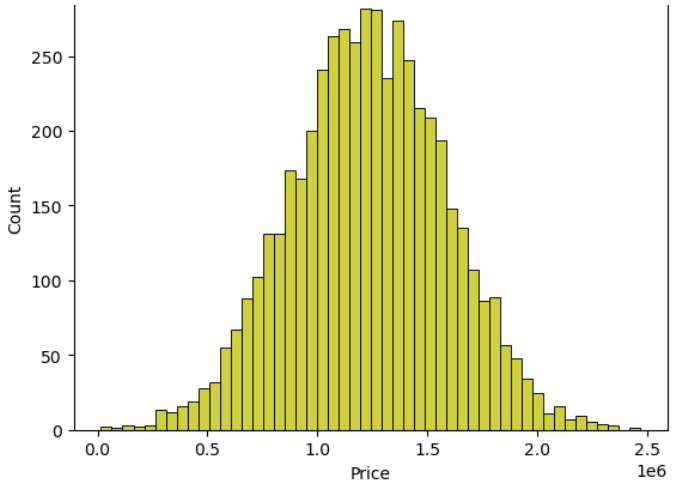
Out[3]:

	Avg. Area Income	Avg. Area House Age	Avg. Area Number of Rooms	Avg. Area Number of Bedrooms	Area Population	Price	Address
0	79545.458574	5.682861	7.009188	4.09	23086.800503	1.059034e+06	208 Michael Ferry Apt. 674\nLaurabury, NE 3701...
1	79248.642455	6.002900	6.730821	3.09	40173.072174	1.505891e+06	188 Johnson Views Suite 079\nLake Kathleen, CA...
2	61287.067179	5.865890	8.512727	5.13	36882.159400	1.058988e+06	9127 Elizabeth Stravenue\nDanieltown, WI 06482...
3	63345.240046	7.188236	5.586729	3.26	34310.242831	1.260617e+06	USS Barnett\nFPO AP 44820
4	59982.197226	5.040555	7.839388	4.23	26354.109472	6.309435e+05	USNS Raymond\nFPO AE 09386
...	...	...	...	...	...	...	...
4995	60567.944140	7.830362	6.137356	3.46	22837.361035	1.060194e+06	USNS Williams\nFPO AP 30153-7653

2. **Load the Dataset:**

- Read the dataset into a Pandas DataFrame.

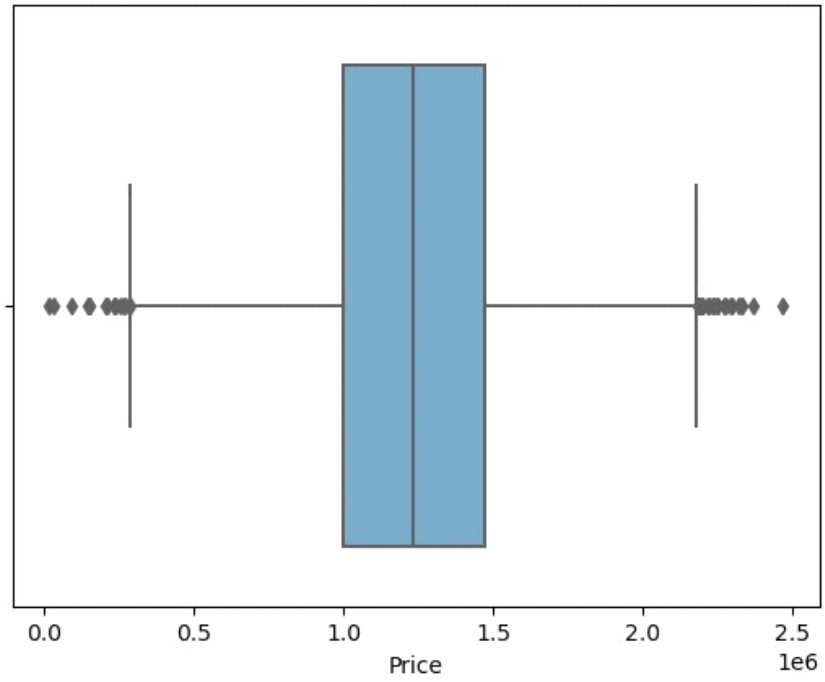
```python
data = pd.read_csv('your_dataset.csv')
```



3. **Explore the Data:**

- Check for missing values, understand the structure of the data, and explore basic statistics.

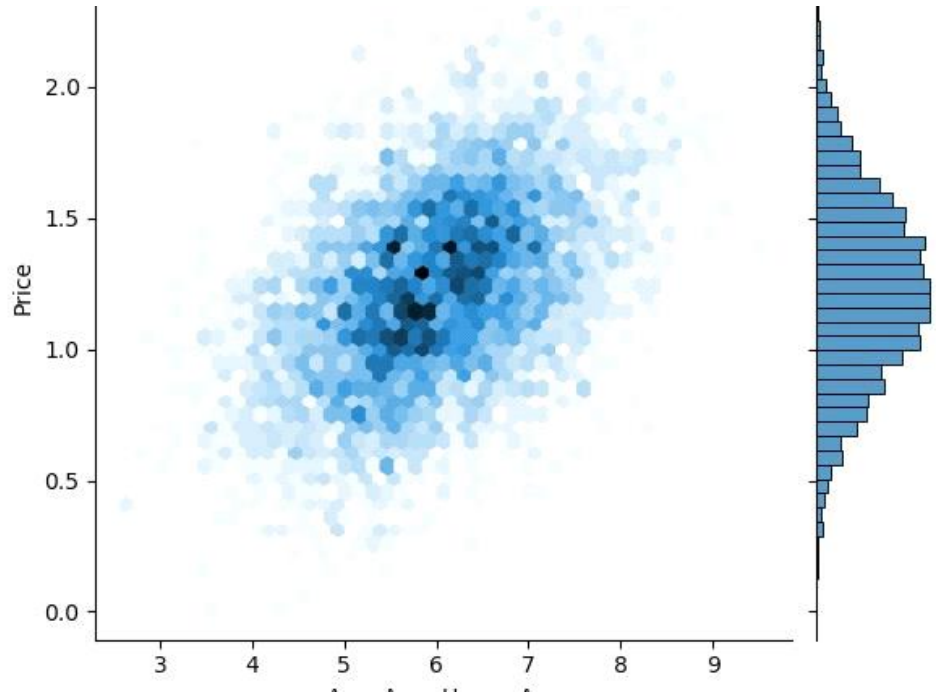
```python
# Check for missing values
print(data.isnull().sum())
# Basic statistics
print(data.describe())
```



4. **Handle Missing Values:**

- Decide on a strategy for handling missing data. Options include dropping missing values, filling them with mean or median, or using more advanced imputation techniques.

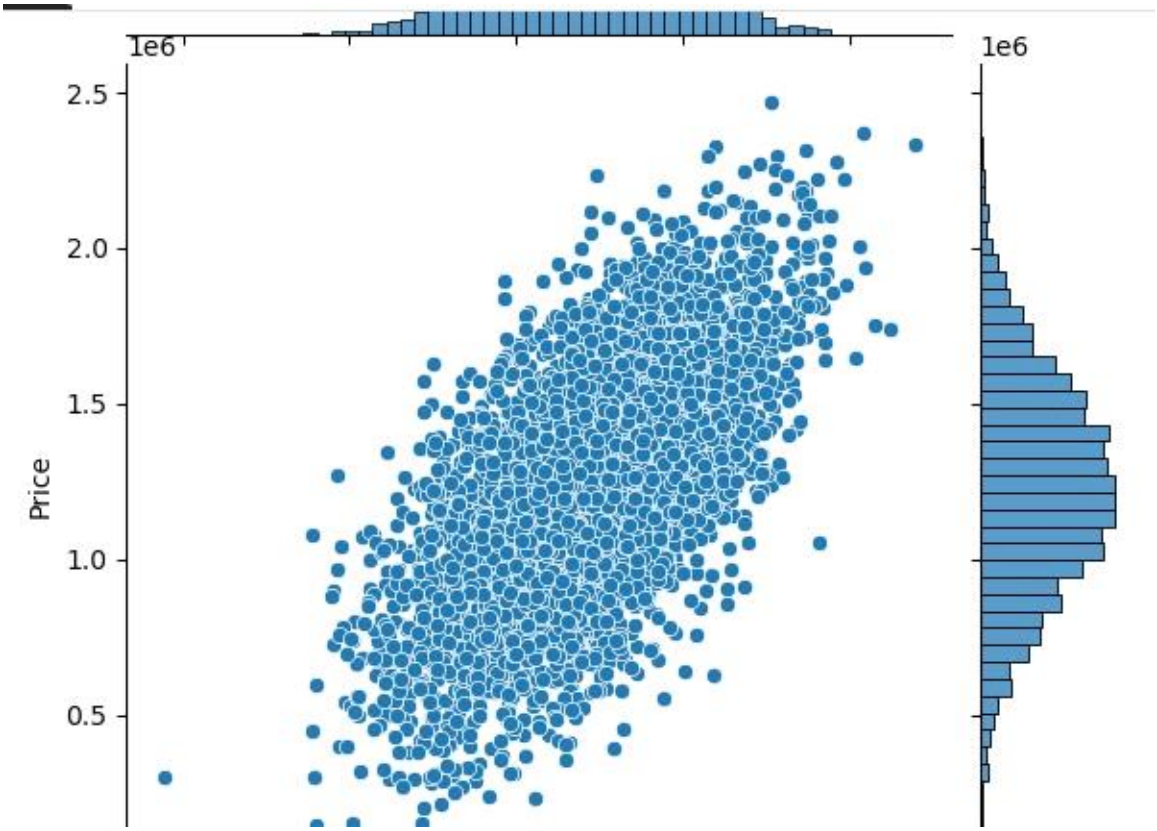
```python
# Drop rows with missing values
data = data.dropna()

# Fill missing values with mean
data = data.fillna(data.mean())
```



5. **Remove Duplicates:**

- Check for and remove duplicate rows.

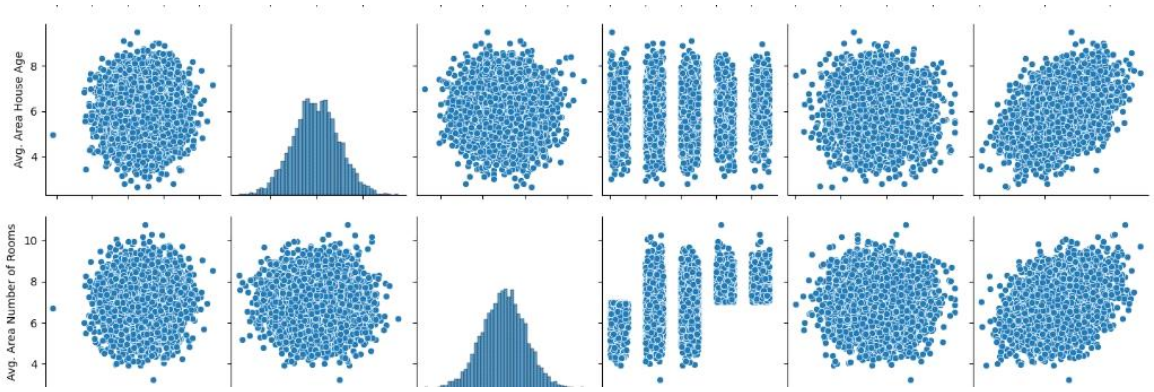
```python
data = data.drop_duplicates()
```



6. **Handle Categorical Data:**

- Convert categorical variables into numerical format, using techniques like one-hot encoding or label encoding.

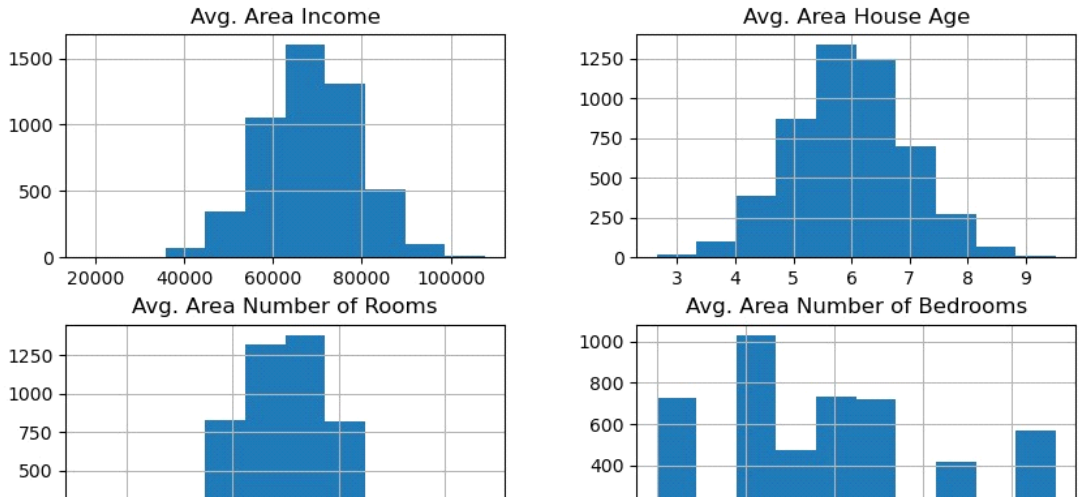
```python
# One-hot encoding
data = pd.get_dummies(data, columns=['categorical_column'])
```



7. **Feature Scaling:**

- Standardize or normalize numerical features to ensure they are on similar scales.

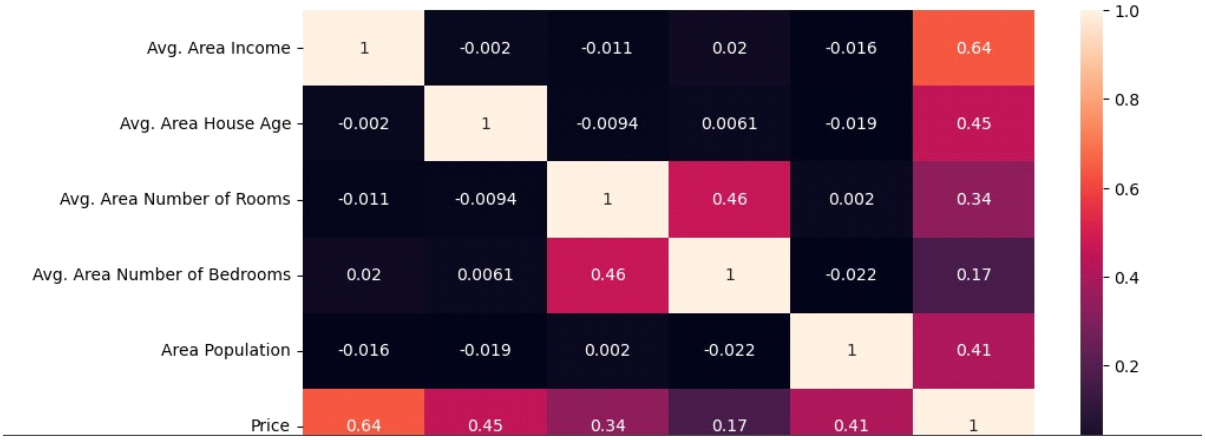
```python
from sklearn.preprocessing import StandardScaler

scaler = StandardScaler()
data[['numerical_column']] = scaler.fit_transform(data[['numerical_column']])
```



8. **Feature Engineering:**

- Create new features or transform existing ones to better represent the underlying patterns in the data.

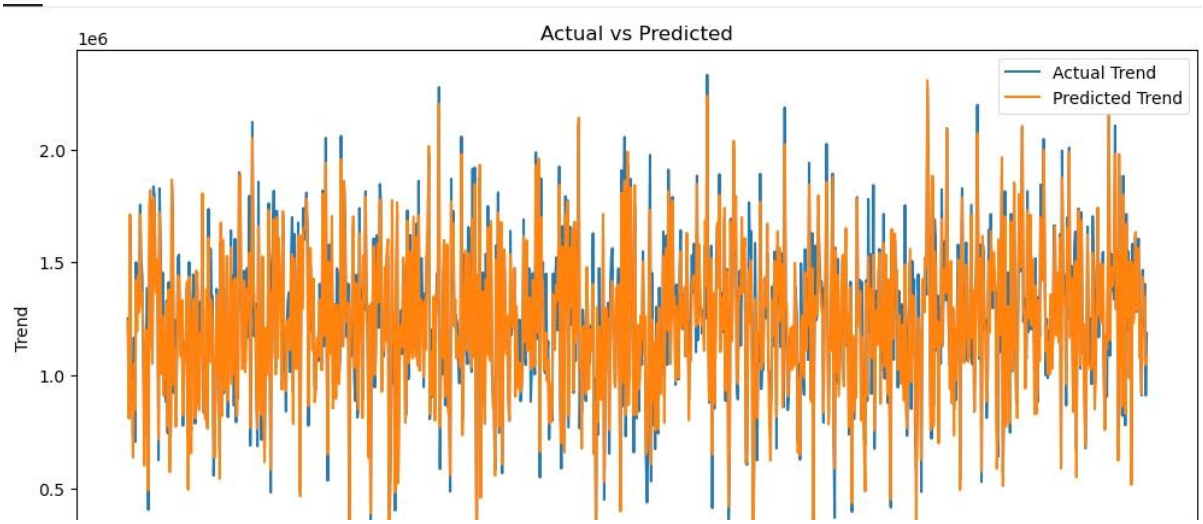
```python

# Example: Create a new feature

data['new_feature'] = data['feature1'] * data['feature2']

```



9. **Split the Dataset:**

- Split the dataset into training and testing sets.

```python

from sklearn.model_selection import train_test_split

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)

```



10. **Save Preprocessed Data (Optional):**

- Save the preprocessed data to a new file for future use.

```python
data.to_csv('preprocessed_data.csv', index=False)
```

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