# Real Estate Price prediction Based on Age

1. Load the basic libraries and packages

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

2. Load the dataset

```
dataset = pd.read_excel('/content/Post_Lab_Dataset.xlsx')
dataset.head()
```

| | House_Age | Price_Per_Unit_Area |
|---|---|---|
| **0** | 32.0 | 37.9 |
| **1** | 19.5 | 42.2 |
| **2** | 13.3 | 47.3 |
| **3** | 13.3 | 54.8 |
| **4** | 5.0 | 43.1 |

Next steps: Generate code with dataset View recommended plots New interactive sheet

3. Analyse the dataset

```
dataset.describe()
```

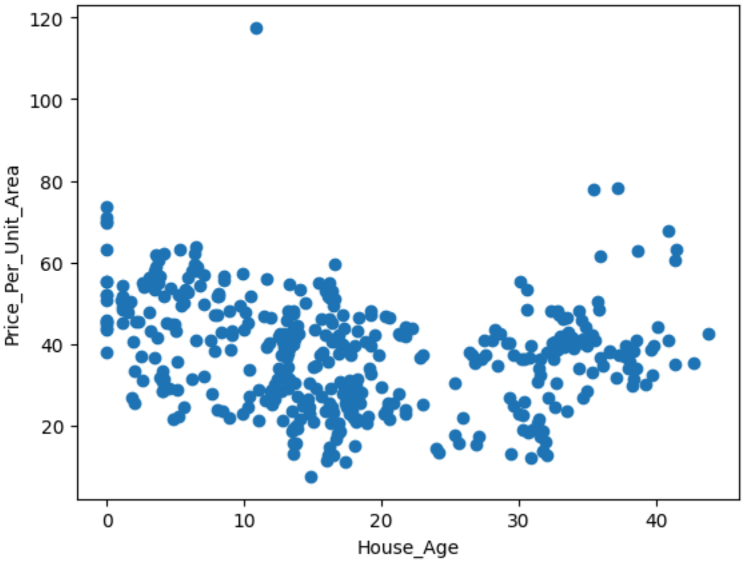
| | House_Age | Price_Per_Unit_Area |
|---|---|---|
| **count** | 414.000000 | 414.000000 |
| **mean** | 17.712560 | 37.980193 |
| **std** | 11.392485 | 13.606488 |
| **min** | 0.000000 | 7.600000 |
| **25%** | 9.025000 | 27.700000 |
| **50%** | 16.100000 | 38.450000 |
| **75%** | 28.150000 | 46.600000 |
| **max** | 43.800000 | 117.500000 |

4. Pre-process the data

```
dataset = dataset.dropna()
```

5. Visualize the Data

```
plt.scatter(dataset['House_Age'],dataset['Price_Per_Unit_Area'])
plt.xlabel('House_Age')
plt.ylabel('Price_Per_Unit_Area')
plt.show()
```



6. Separate the feature and prediction value columns

```
x_feature = np.array(dataset['House_Age'])
y_feature = np.array(dataset['Price_Per_Unit_Area'])
```

7.Write the Hypothesis Function

```
def Hypothesis(theta_array , x) :
  return theta_array[0] + theta_array[1]*x
```

8. Write the Cost Function

```
def  Cost_Function(theta_array,x,y , m):
  total_cost = 0
  for i in range(m):
    total_cost += (Hypothesis(theta_array,x[i]) - y[i])**2
  return total_cost/(2*m)
```

9. Write the Gradient Descent optimization algorithm

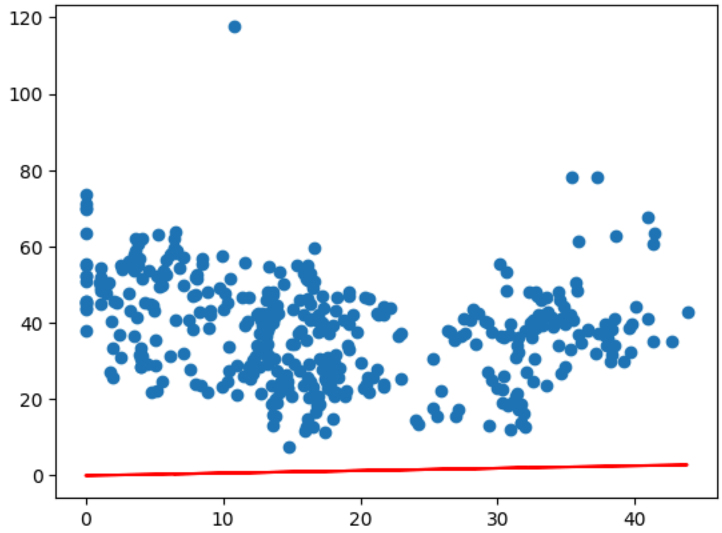
```
def Gradient_Descent(theta_array , x, y , m ,alpha) :
  summation_0 = 0
  summation_1 = 0

  for i in range(m):
    summation_0 += (Hypothesis(theta_array,x[i]) - y[i])
    summation_1 += ((Hypothesis(theta_array,x[i]) - y[i])*x[i])

  new_theta0 = theta_array[0] - (alpha/m)*summation_0
  new_theta1 = theta_array[1] - (alpha/m)*summation_1

  new_theta = [new_theta0 , new_theta1]

  return new_theta
```

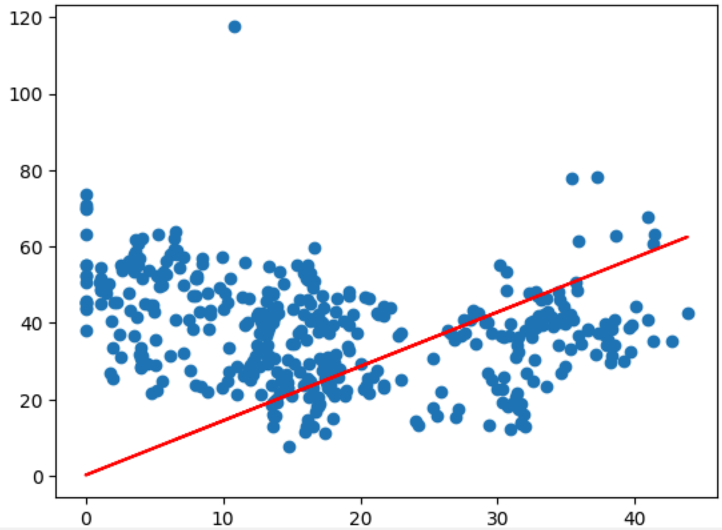
10. Apply the training over the dataset to minimize the loss

```
def Training(x, y, alpha, epochs):
    theta_0 = 0
    theta_1 = 0
    theta_array = [theta_0, theta_1]
    m = len(x)
    cost_values = []

    for i in range(epochs):
        theta_array = Gradient_Descent(theta_array, x, y, m, alpha)
        loss = Cost_Function(theta_array, x, y, m)
        cost_values.append(loss)
        y_new = theta_array[0] + theta_array[1]*x

        if(i == epochs-1 or i == 0):
          plt.plot(x, y_new , 'r')
          plt.scatter(x, y)
          plt.show()


    return cost_values , theta_array
```

11. Find the best fit line to the given dataset

```
alpha = 0.0001
epochs = 100
costs , theta_array = Training(x_feature  , y_feature , alpha , epochs)
```

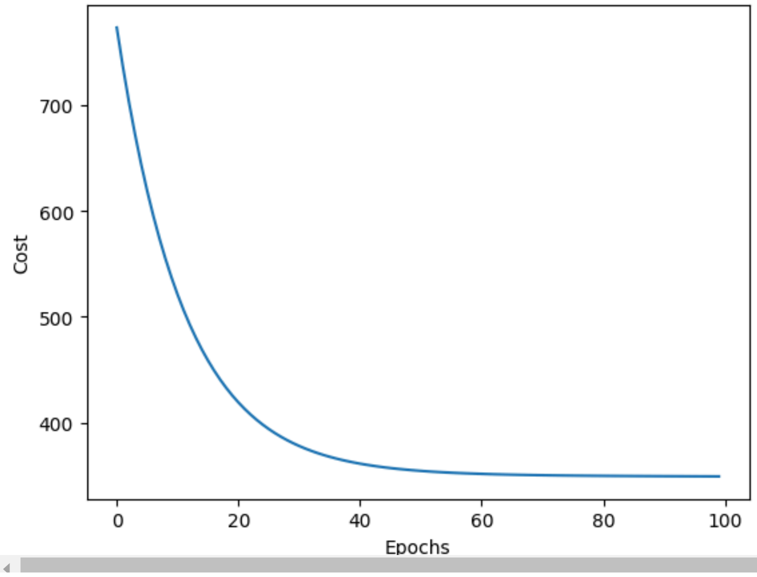




12 . Plot the Learning Curve

```
print(theta_array)
x = np.arange(0, epochs)
plt.plot(x, costs)
plt.xlabel('Epochs')
plt.ylabel('Cost')
plt.show()
plt.show()
```

```
[0.18051884024449297, 1.4228634841862595]
```


Cost
Epochs