

```
+ Code + Text
[2] import numpy as np
import pandas as pd

[3] df=pd.read_csv('/content/House Price India.csv')
df.head()
```

	id	Date	number of bedrooms	number of bathrooms	living area	lot area	number of floors	waterfront present	number of views	condition of the house	...	Built Year	Renovation Year	Postal Code
0	6762810145	42491	5	2.50	3650	9050	2.0	0	4	5	...	1921	0	122003
1	6762810635	42491	4	2.50	2920	4000	1.5	0	0	5	...	1909	0	122004
2	6762810998	42491	5	2.75	2910	9480	1.5	0	0	3	...	1939	0	122004
3	6762812605	42491	4	2.50	3310	42998	2.0	0	0	3	...	2001	0	122005
4	6762812919	42491	3	2.00	2710	4500	1.5	0	0	4	...	1929	0	122006

5 rows x 23 columns

House Price India.csv

1 to 10 of 14620 entries

area	lot area	number of floors	w
9050	2	0	
4000	1.5	0	
9480	1.5	0	
42998	2	0	
4500	1.5	0	
4750	1	0	
11995	2	0	
10578	2	0	
6550	1	0	
11250	1.5	0	

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Assignment 2

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```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 14620 entries, 0 to 14619
Data columns (total 23 columns):
 #   Column                                Non-Null Count  Dtype
---  -
 0   id                                    14620 non-null  int64
 1   Date                                  14620 non-null  int64
 2   number of bedrooms                   14620 non-null  int64
 3   number of bathrooms                  14620 non-null  float64
 4   living area                           14620 non-null  int64
 5   lot area                              14620 non-null  int64
 6   number of floors                     14620 non-null  float64
 7   waterfront present                   14620 non-null  int64
 8   number of views                      14620 non-null  int64
 9   condition of the house               14620 non-null  int64
10   grade of the house                   14620 non-null  int64
11   Area of the house(excluding basement) 14620 non-null  int64
12   Area of the basement                 14620 non-null  int64
13   Built Year                           14620 non-null  int64
14   Renovation Year                      14620 non-null  int64
15   Postal Code                          14620 non-null  int64
16   Latitude                             14620 non-null  float64
17   Longitude                             14620 non-null  float64
18   living_area_renov                     14620 non-null  int64
19   lot_area_renov                       14620 non-null  int64
```

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House Price India.csv

1 to 10 of 14620 entries

area	lot area	number of floors	wa
9050	2	0	
4000	1.5	0	
9480	1.5	0	
42998	2	0	
4500	1.5	0	
4750	1	0	
11995	2	0	
10578	2	0	
6550	1	0	
11250	1.5	0	

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Assignment 2

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```
19 lot_area Renov
20 Number of schools nearby
21 Distance from the airport
22 Price
dtypes: float64(4), int64(19)
memory usage: 2.6 MB

df.isnull()
```

	id	Date	number of bedrooms	number of bathrooms	living area	lot area	number of floors	waterfront present	number of views	condition of the house	...	Built Year	Renovation Year	Postal Code	La
0	False	False	False	False	False	False	False	False	False	False	...	False	False	False	
1	False	False	False	False	False	False	False	False	False	False	...	False	False	False	
2	False	False	False	False	False	False	False	False	False	False	...	False	False	False	
3	False	False	False	False	False	False	False	False	False	False	...	False	False	False	
4	False	False	False	False	False	False	False	False	False	False	...	False	False	False	
...
14615	False	False	False	False	False	False	False	False	False	False	...	False	False	False	
14616	False	False	False	False	False	False	False	False	False	False	...	False	False	False	

House Price India.csv

1 to 10 of 14620 entries

area	lot area	number of floors	w
9050	2		0
4000	1.5		0
9480	1.5		0
42986	2		0
4500	1.5		0
4750	1		0
11995	2		0
10578	2		0
6550	1		0
11250	1.5		0

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Assignment 2

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[5] df.isnull()

	id	Date	number of bedrooms	number of bathrooms	living area	lot area	number of floors	waterfront present	number of views	condition of the house	...	Built Year	Renovation Year	Postal Code	La
0	False	False	False	False	False	False	False	False	False	False	...	False	False	False	
1	False	False	False	False	False	False	False	False	False	False	...	False	False	False	
2	False	False	False	False	False	False	False	False	False	False	...	False	False	False	
3	False	False	False	False	False	False	False	False	False	False	...	False	False	False	
4	False	False	False	False	False	False	False	False	False	False	...	False	False	False	
...
14615	False	False	False	False	False	False	False	False	False	False	...	False	False	False	
14616	False	False	False	False	False	False	False	False	False	False	...	False	False	False	
14617	False	False	False	False	False	False	False	False	False	False	...	False	False	False	
14618	False	False	False	False	False	False	False	False	False	False	...	False	False	False	
14619	False	False	False	False	False	False	False	False	False	False	...	False	False	False	
14620	False	False	False	False	False	False	False	False	False	False	...	False	False	False	

House Price India.csv

1 to 10 of 14620 entries

Filter

area	lot area	number of floors	w
9050	2		0
4000	1.5		0
9480	1.5		0
42998	2		0
4500	1.5		0
4750	1		0
11995	2		0
10578	2		0
6550	1		0
11250	1.5		0

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```
[8] df['number of bedrooms'].unique()

array([ 5,  4,  3,  2,  7,  6,  9,  1,  8, 33, 10, 11])
```

```
x=df.drop('Price',axis=1)
x.head()
```

condition of the house	Area of the basement	Built Year	Renovation Year	Postal Code	Latitude	Longitude	living_area_renov	lot_area_renov	Number of schools nearby	Distance from the airport
5	280	1921	0	122003	52.8645	-114.557	2880	5400	2	58
5	1010	1909	0	122004	52.8878	-114.470	2470	4000	2	51
3	0	1939	0	122004	52.8852	-114.468	2940	6600	1	53
3	0	2001	0	122005	52.9532	-114.321	3350	42847	3	76
4	830	1929	0	122005	52.9047	-114.485	2060	4500	1	51
4	0	1957	0	122066	52.6191	-114.472	2250	17286	3	76
4	0	1968	0	122072	52.5075	-114.393	1540	7480	3	59

House Price India.csv

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9050	2		0
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9480	1.5		0
42998	2		0
4500	1.5		0
4750	1		0
11995	2		0
10578	2		0
6550	1		0
11250	1.5		0

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Assignment 2

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▶

3 ... 0 1962 0 122056 52.7289 -114.507 1130 6120 2 64

4 ... 0 1955 0 122042 52.7157 -114.411 1420 6631 3 54

3 ... 0 1969 2009 122018 52.5338 -114.552 900 3480 2 55

✓ [10] y=df['Price']

y

0 2380000

1 1400000

2 1200000

3 838000

4 805000

...

14615 221700

14616 219200

14617 209000

14618 205000

14619 146000

Name: Price, Length: 14620, dtype: int64

House Price India.csv

1 to 10 of 14620 entries

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9050	2	0	
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42998	2	0	
4500	1.5	0	
4750	1	0	
11995	2	0	
10578	2	0	
6550	1	0	
11250	1.5	0	

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Assignment 2

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[11] from sklearn.model_selection import train_test_split

[13] xtrain,xtest,ytrain,ytest = train_test_split(x,y,test_size=0.2,random_state=12)

[14] xtest

	id	Date	number of bedrooms	number of bathrooms	living area	lot area	number of floors	waterfront present	number of views	condition of the house	...	Area of the basement	Built Year	Renov.
12149	6762815497	42683	3	1.00	1210	3720	2.0	0	0	4	...	0	1930	
13581	6762815303	42711	3	1.00	1430	4240	1.5	0	0	3	...	0	1924	
11595	6762826056	42671	3	1.00	1490	57381	1.5	0	0	4	...	0	1932	
2768	6762823995	42536	3	1.00	1770	5720	1.5	0	0	4	...	630	1926	
7393	6762824659	42601	4	2.50	2390	6775	2.0	0	0	3	...	0	2003	
...
7362	6762819318	42601	4	2.25	2250	3463	2.0	0	0	4	...	0	1968	
11132	6762822873	42664	3	1.75	1470	6682	1.0	0	0	3	...	0	1987	
142	6762824223	42494	3	3.00	1571	10800	3.0	0	0	3	...	0	2008	

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9050	2		0
4000	1.5		0
5480	1.5		0
42998	2		0
4500	1.5		0
4750	1		0
11995	2		0
10578	2		0
6550	1		0
11250	1.5		0

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Assignment 2

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[14] 142 6762824223 42494 3 3.00 1571 10800 3.0 0 0 3 ... 0 2008
1405 6762828140 42515 3 1.00 1140 5000 1.0 0 0 3 ... 0 1960
6184 6762817137 42582 4 1.75 2400 21196 1.0 0 0 5 ... 610 1956

2924 rows x 22 columns

[15] from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Dense

[16] reg=Sequential()
reg.add(Dense(4,activation='relu'))
reg.add(Dense(12,activation='relu'))
reg.add(Dense(32,activation='relu'))
reg.add(Dense(1,activation='linear'))

[17] reg.compile(optimizer='adam',loss='mse',metrics=['mse'])

reg.fit(xtrain,ytrain,batch_size=10,epochs=25,validation_data=(xtest,ytest))

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9050	2	0	0
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9480	1.5	0	0
42998	2	0	0
4500	1.5	0	0
4750	1	0	0
11995	2	0	0
10578	2	0	0
6550	1	0	0
11250	1.5	0	0

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Assignment 2

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```
reg.fit(xtrain,ytrain,batch_size=10,epochs=25,validation_data=(xtest,ytest))
```

Epoch 1/25
1170/1170 [=====] - 4s 3ms/step - loss: 8847640145952768.0000 - mse: 8847640145952768.0000 - val_loss: 1766638
Epoch 2/25
1170/1170 [=====] - 3s 2ms/step - loss: 126502330368.0000 - mse: 126502330368.0000 - val_loss: 1766638
Epoch 3/25
1170/1170 [=====] - 3s 2ms/step - loss: 127831687168.0000 - mse: 127831703552.0000 - val_loss: 1791695
Epoch 4/25
1170/1170 [=====] - 4s 3ms/step - loss: 130789957632.0000 - mse: 130789957632.0000 - val_loss: 1764025
Epoch 5/25
1170/1170 [=====] - 3s 2ms/step - loss: 139519901696.0000 - mse: 139519901696.0000 - val_loss: 3292828
Epoch 6/25
1170/1170 [=====] - 3s 2ms/step - loss: 144063447040.0000 - mse: 144063479808.0000 - val_loss: 1893935
Epoch 7/25
1170/1170 [=====] - 3s 2ms/step - loss: 150976905216.0000 - mse: 150976905216.0000 - val_loss: 3503810
Epoch 8/25
1170/1170 [=====] - 3s 3ms/step - loss: 198744948736.0000 - mse: 198744948736.0000 - val_loss: 2006810
Epoch 9/25
1170/1170 [=====] - 4s 3ms/step - loss: 233433792512.0000 - mse: 233433792512.0000 - val_loss: 3826971
Epoch 10/25
1170/1170 [=====] - 3s 2ms/step - loss: 362008477696.0000 - mse: 362008477696.0000 - val_loss: 8352687
Epoch 11/25
1170/1170 [=====] - 3s 2ms/step - loss: 387073605632.0000 - mse: 387073605632.0000 - val_loss: 4558642
Epoch 12/25
1170/1170 [=====] - 3s 2ms/step - loss: 456262090752.0000 - mse: 456262025216.0000 - val_loss: 4081766
Epoch 13/25
1170/1170 [=====] - 3s 3ms/step - loss: 342116499456.0000 - mse: 342116499456.0000 - val_loss: 9141895
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9050	2	0	0
4000	1.5	0	0
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42998	2	0	0
4500	1.5	0	0
4750	1	0	0
11995	2	0	0
10578	2	0	0
6550	1	0	0
11250	1.5	0	0

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Assignment 2

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```
1170/1170 [=====] - 3s 3ms/step - loss: 342116499456.0000 - mse: 34211645
Epoch 14/25
1170/1170 [=====] - 3s 2ms/step - loss: 343601414144.0000 - mse: 343601381376.0000 - val_loss: 3068485
Epoch 15/25
1170/1170 [=====] - 3s 2ms/step - loss: 282292322304.0000 - mse: 282292322304.0000 - val_loss: 3975255
Epoch 16/25
1170/1170 [=====] - 3s 2ms/step - loss: 266791862272.0000 - mse: 266791862272.0000 - val_loss: 2288728
Epoch 17/25
1170/1170 [=====] - 3s 3ms/step - loss: 191543459840.0000 - mse: 191543459840.0000 - val_loss: 1814496
Epoch 18/25
1170/1170 [=====] - 3s 3ms/step - loss: 141607501824.0000 - mse: 141607501824.0000 - val_loss: 1780783
Epoch 19/25
1170/1170 [=====] - 2s 2ms/step - loss: 129975615488.0000 - mse: 129975615488.0000 - val_loss: 1793674
Epoch 20/25
1170/1170 [=====] - 3s 2ms/step - loss: 130494693376.0000 - mse: 130494693376.0000 - val_loss: 1749718
Epoch 21/25
1170/1170 [=====] - 3s 2ms/step - loss: 131552575488.0000 - mse: 131552575488.0000 - val_loss: 1815027
Epoch 22/25
1170/1170 [=====] - 4s 3ms/step - loss: 133322694656.0000 - mse: 133322694656.0000 - val_loss: 1905483
Epoch 23/25
1170/1170 [=====] - 3s 2ms/step - loss: 134910951424.0000 - mse: 134910951424.0000 - val_loss: 1748518
Epoch 24/25
1170/1170 [=====] - 3s 2ms/step - loss: 137600892928.0000 - mse: 137600892928.0000 - val_loss: 1780985
Epoch 25/25
1170/1170 [=====] - 3s 2ms/step - loss: 137602498560.0000 - mse: 137602498560.0000 - val_loss: 2117262
<keras.callbacks.History at 0x7f96f4fd5b40>
```

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area	lot area	number of floors	w
9050	2		0
4000	1.5		0
9480	1.5		0
42998	2		0
4500	1.5		0
4750	1		0
11995	2		0
10578	2		0
6550	1		0
11250	1.5		0

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