

ASSIGNMENT2

```
import pandas as pd
import numpy as np
import random as rnd
import seaborn as sns
import matplotlib.pyplot as plt
%matplotlib inline
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import MinMaxScaler
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Dense, Activation
from tensorflow.keras.optimizers import Adam
from sklearn.metrics import mean_squared_error, mean_absolute_error, explained_variance_score
from sklearn.metrics import classification_report, confusion_matrix

ds=pd.read_csv("/dataset.csv")
print(ds.info())
```

```
-----
-----
NameError                                Traceback (most recent call
last)
<ipython-input-1-d78edf7ee584> in <module>
----> 1 ds=pd.read_csv("/dataset.csv")
      2 print(ds.info())
```

NameError: name 'pd' is not defined

1. Preprocessing the dataset:

```
cols = ['id', 'Date']
ds= ds.drop(cols, axis=1)
print(ds.info())
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 14620 entries, 0 to 14619
Data columns (total 21 columns):
```

#	Column	Non-Null Count	Dtype
0	number of bedrooms	14620 non-null	int64
1	number of bathrooms	14620 non-null	float64
2	living area	14620 non-null	int64
3	lot area	14620 non-null	int64
4	number of floors	14620 non-null	float64
5	waterfront present	14620 non-null	int64
6	number of views	14620 non-null	int64
7	condition of the house	14620 non-null	int64

8	grade of the house	14620	non-null	int64
9	Area of the house(excluding basement)	14620	non-null	int64
10	Area of the basement	14620	non-null	int64
11	Built Year	14620	non-null	int64
12	Renovation Year	14620	non-null	int64
13	Postal Code	14620	non-null	int64
14	Lattitude	14620	non-null	float64
15	Longitude	14620	non-null	float64
16	living_area_renov	14620	non-null	int64
17	lot_area_renov	14620	non-null	int64
18	Number of schools nearby	14620	non-null	int64
19	Distance from the airport	14620	non-null	int64
20	Price	14620	non-null	int64

dtypes: float64(4), int64(17)
memory usage: 2.3 MB
None

```
ds.isnull().sum()
```

number of bedrooms	0
number of bathrooms	0
living area	0
lot area	0
number of floors	0
waterfront present	0
number of views	0
condition of the house	0
grade of the house	0
Area of the house(excluding basement)	0
Area of the basement	0
Built Year	0
Renovation Year	0
Postal Code	0
Lattitude	0
Longitude	0
living_area_renov	0
lot_area_renov	0
Number of schools nearby	0
Distance from the airport	0
Price	0

dtype: int64

Price correlation

- This allow us to explore labels that are highly correlated to the price.
- Living area looks like a highly correlated label to the price, as well as grade of the house , rea of the house(excluding basement), living_area_renov and number of bathrooms .

```
price_corr = ds.corr()['Price'].sort_values(ascending=False)
print(price_corr)
```

Price	1.000000
living area	0.712169
grade of the house	0.671814
Area of the house(excluding basement)	0.615220
living_area_renov	0.584924
number of bathrooms	0.531735
number of views	0.395973
Area of the basement	0.330202
number of bedrooms	0.308460
Lattitude	0.297490
waterfront present	0.263687
number of floors	0.262732
Renovation Year	0.133173
lot area	0.081992
lot_area_renov	0.075535
Built Year	0.050307
condition of the house	0.041376
Longitude	0.024414
Number of schools nearby	0.009890
Distance from the airport	0.003804
Postal Code	-0.115908

Name: Price, dtype: float64

Scaling and train test split

```
X = ds.drop(['Price'],axis=1)
y = ds['Price']
X_train, X_test, y_train, y_test =
train_test_split(X,y,test_size=0.3,random_state=101)
```

```
print(X_train.shape)
print(X_test.shape)
print(y_train.shape)
print(y_test.shape)
```

```
(10234, 20)
(4386, 20)
(10234,)
(4386,)
```

Normalizing / scaling the data

```
scaler = MinMaxScaler()
X_train = scaler.fit_transform(X_train)
X_test = scaler.transform(X_test)
print('Max: ',X_train.max())
print('Min: ', X_train.min())
```

```
Max: 1.0000000000000002
Min: 0.0
```

2. ANN Model

```
model = Sequential()

# input layer
model.add(Dense(19,activation='relu'))

# hidden layers
model.add(Dense(19,activation='relu'))
model.add(Dense(19,activation='relu'))
model.add(Dense(19,activation='relu'))

# output layer
model.add(Dense(1))

model.compile(optimizer='adam',loss='mse')
```

3. Test the Model

```
model.fit(x=X_train,y=y_train.values,
          validation_data=(X_test,y_test.values),
          batch_size=128,epochs=400)
```

```
Epoch 1/400
80/80 [=====] - 3s 10ms/step - loss:
425403187200.0000 - val_loss: 425768124416.0000
Epoch 2/400
80/80 [=====] - 0s 3ms/step - loss:
425294266368.0000 - val_loss: 425419767808.0000
Epoch 3/400
80/80 [=====] - 0s 3ms/step - loss:
423905132544.0000 - val_loss: 422135300096.0000
Epoch 4/400
80/80 [=====] - 0s 3ms/step - loss:
416035897344.0000 - val_loss: 407354900480.0000
Epoch 5/400
80/80 [=====] - 0s 3ms/step - loss:
389201100800.0000 - val_loss: 365021233152.0000
Epoch 6/400
80/80 [=====] - 0s 3ms/step - loss:
326818496512.0000 - val_loss: 281625853952.0000
Epoch 7/400
80/80 [=====] - 0s 3ms/step - loss:
230063849472.0000 - val_loss: 178150637568.0000
Epoch 8/400
80/80 [=====] - 0s 3ms/step - loss:
142482046976.0000 - val_loss: 116310745088.0000
Epoch 9/400
80/80 [=====] - 0s 3ms/step - loss:
108288155648.0000 - val_loss: 104359870464.0000
```

Epoch 10/400
80/80 [=====] - 0s 3ms/step - loss:
103473643520.0000 - val_loss: 102754140160.0000
Epoch 11/400
80/80 [=====] - 0s 3ms/step - loss:
102116835328.0000 - val_loss: 101509603328.0000
Epoch 12/400
80/80 [=====] - 0s 3ms/step - loss:
100827406336.0000 - val_loss: 100306722816.0000
Epoch 13/400
80/80 [=====] - 0s 3ms/step - loss:
99521462272.0000 - val_loss: 99018924032.0000
Epoch 14/400
80/80 [=====] - 0s 3ms/step - loss:
98201747456.0000 - val_loss: 97760829440.0000
Epoch 15/400
80/80 [=====] - 0s 3ms/step - loss:
96832233472.0000 - val_loss: 96462266368.0000
Epoch 16/400
80/80 [=====] - 0s 3ms/step - loss:
95454076928.0000 - val_loss: 95161442304.0000
Epoch 17/400
80/80 [=====] - 1s 8ms/step - loss:
94047862784.0000 - val_loss: 93747412992.0000
Epoch 18/400
80/80 [=====] - 1s 7ms/step - loss:
92615344128.0000 - val_loss: 92364865536.0000
Epoch 19/400
80/80 [=====] - 1s 6ms/step - loss:
91134844928.0000 - val_loss: 90938834944.0000
Epoch 20/400
80/80 [=====] - 0s 3ms/step - loss:
89630801920.0000 - val_loss: 89468870656.0000
Epoch 21/400
80/80 [=====] - 0s 3ms/step - loss:
88083046400.0000 - val_loss: 87962681344.0000
Epoch 22/400
80/80 [=====] - 0s 3ms/step - loss:
86459572224.0000 - val_loss: 86446071808.0000
Epoch 23/400
80/80 [=====] - 0s 3ms/step - loss:
84841136128.0000 - val_loss: 84804771840.0000
Epoch 24/400
80/80 [=====] - 0s 3ms/step - loss:
83157082112.0000 - val_loss: 83180339200.0000
Epoch 25/400
80/80 [=====] - 0s 3ms/step - loss:
81400201216.0000 - val_loss: 81519869952.0000
Epoch 26/400
80/80 [=====] - 0s 3ms/step - loss:

79641575424.0000 - val_loss: 79766585344.0000
Epoch 27/400
80/80 [=====] - 0s 3ms/step - loss:
77827383296.0000 - val_loss: 77987586048.0000
Epoch 28/400
80/80 [=====] - 0s 3ms/step - loss:
75918417920.0000 - val_loss: 76208988160.0000
Epoch 29/400
80/80 [=====] - 0s 3ms/step - loss:
74035191808.0000 - val_loss: 74340933632.0000
Epoch 30/400
80/80 [=====] - 0s 3ms/step - loss:
72107311104.0000 - val_loss: 72523472896.0000
Epoch 31/400
80/80 [=====] - 0s 3ms/step - loss:
70201663488.0000 - val_loss: 70618251264.0000
Epoch 32/400
80/80 [=====] - 0s 3ms/step - loss:
68178833408.0000 - val_loss: 68764565504.0000
Epoch 33/400
80/80 [=====] - 0s 3ms/step - loss:
66258706432.0000 - val_loss: 66901012480.0000
Epoch 34/400
80/80 [=====] - 0s 3ms/step - loss:
64372150272.0000 - val_loss: 65125421056.0000
Epoch 35/400
80/80 [=====] - 0s 3ms/step - loss:
62512431104.0000 - val_loss: 63481999360.0000
Epoch 36/400
80/80 [=====] - 0s 4ms/step - loss:
60817182720.0000 - val_loss: 61790793728.0000
Epoch 37/400
80/80 [=====] - 0s 5ms/step - loss:
59180265472.0000 - val_loss: 60288331776.0000
Epoch 38/400
80/80 [=====] - 0s 5ms/step - loss:
57700200448.0000 - val_loss: 58958188544.0000
Epoch 39/400
80/80 [=====] - 0s 5ms/step - loss:
56376258560.0000 - val_loss: 57769959424.0000
Epoch 40/400
80/80 [=====] - 0s 5ms/step - loss:
55250436096.0000 - val_loss: 56791367680.0000
Epoch 41/400
80/80 [=====] - 0s 5ms/step - loss:
54226677760.0000 - val_loss: 55793868800.0000
Epoch 42/400
80/80 [=====] - 0s 5ms/step - loss:
53345234944.0000 - val_loss: 55031902208.0000
Epoch 43/400

80/80 [=====] - 0s 4ms/step - loss:
52572635136.0000 - val_loss: 54299967488.0000
Epoch 44/400
80/80 [=====] - 0s 3ms/step - loss:
51849379840.0000 - val_loss: 53678571520.0000
Epoch 45/400
80/80 [=====] - 0s 3ms/step - loss:
51259727872.0000 - val_loss: 53049479168.0000
Epoch 46/400
80/80 [=====] - 0s 3ms/step - loss:
50698354688.0000 - val_loss: 52519776256.0000
Epoch 47/400
80/80 [=====] - 0s 3ms/step - loss:
50221285376.0000 - val_loss: 52050993152.0000
Epoch 48/400
80/80 [=====] - 0s 3ms/step - loss:
49751683072.0000 - val_loss: 51707813888.0000
Epoch 49/400
80/80 [=====] - 0s 3ms/step - loss:
49309294592.0000 - val_loss: 51152650240.0000
Epoch 50/400
80/80 [=====] - 0s 3ms/step - loss:
48922107904.0000 - val_loss: 50739281920.0000
Epoch 51/400
80/80 [=====] - 0s 3ms/step - loss:
48464158720.0000 - val_loss: 50391130112.0000
Epoch 52/400
80/80 [=====] - 0s 3ms/step - loss:
48172175360.0000 - val_loss: 49938427904.0000
Epoch 53/400
80/80 [=====] - 0s 3ms/step - loss:
47846158336.0000 - val_loss: 49659928576.0000
Epoch 54/400
80/80 [=====] - 0s 3ms/step - loss:
47472877568.0000 - val_loss: 49293225984.0000
Epoch 55/400
80/80 [=====] - 0s 3ms/step - loss:
47149178880.0000 - val_loss: 48901545984.0000
Epoch 56/400
80/80 [=====] - 0s 3ms/step - loss:
46837129216.0000 - val_loss: 48541433856.0000
Epoch 57/400
80/80 [=====] - 0s 3ms/step - loss:
46557270016.0000 - val_loss: 48232058880.0000
Epoch 58/400
80/80 [=====] - 0s 3ms/step - loss:
46226112512.0000 - val_loss: 47916072960.0000
Epoch 59/400
80/80 [=====] - 0s 3ms/step - loss:
45954281472.0000 - val_loss: 47609147392.0000

Epoch 60/400
80/80 [=====] - 0s 3ms/step - loss:
45672820736.0000 - val_loss: 47274131456.0000
Epoch 61/400
80/80 [=====] - 0s 3ms/step - loss:
45367934976.0000 - val_loss: 46999879680.0000
Epoch 62/400
80/80 [=====] - 0s 3ms/step - loss:
45080268800.0000 - val_loss: 46674841600.0000
Epoch 63/400
80/80 [=====] - 0s 3ms/step - loss:
44843257856.0000 - val_loss: 46393028608.0000
Epoch 64/400
80/80 [=====] - 0s 3ms/step - loss:
44566933504.0000 - val_loss: 46131310592.0000
Epoch 65/400
80/80 [=====] - 0s 3ms/step - loss:
44336414720.0000 - val_loss: 45822517248.0000
Epoch 66/400
80/80 [=====] - 0s 3ms/step - loss:
44097155072.0000 - val_loss: 45561397248.0000
Epoch 67/400
80/80 [=====] - 0s 3ms/step - loss:
43833683968.0000 - val_loss: 45264900096.0000
Epoch 68/400
80/80 [=====] - 0s 3ms/step - loss:
43583598592.0000 - val_loss: 44983508992.0000
Epoch 69/400
80/80 [=====] - 0s 3ms/step - loss:
43323576320.0000 - val_loss: 44721598464.0000
Epoch 70/400
80/80 [=====] - 0s 3ms/step - loss:
43108810752.0000 - val_loss: 44462280704.0000
Epoch 71/400
80/80 [=====] - 0s 3ms/step - loss:
42834583552.0000 - val_loss: 44182675456.0000
Epoch 72/400
80/80 [=====] - 0s 3ms/step - loss:
42621329408.0000 - val_loss: 43961020416.0000
Epoch 73/400
80/80 [=====] - 0s 3ms/step - loss:
42386776064.0000 - val_loss: 43691425792.0000
Epoch 74/400
80/80 [=====] - 0s 3ms/step - loss:
42145366016.0000 - val_loss: 43408392192.0000
Epoch 75/400
80/80 [=====] - 0s 3ms/step - loss:
41933312000.0000 - val_loss: 43175034880.0000
Epoch 76/400
80/80 [=====] - 0s 3ms/step - loss:

41701109760.0000 - val_loss: 42941923328.0000
Epoch 77/400
80/80 [=====] - 0s 3ms/step - loss:
41476587520.0000 - val_loss: 42687389696.0000
Epoch 78/400
80/80 [=====] - 0s 3ms/step - loss:
41304842240.0000 - val_loss: 42451390464.0000
Epoch 79/400
80/80 [=====] - 0s 3ms/step - loss:
41065803776.0000 - val_loss: 42211147776.0000
Epoch 80/400
80/80 [=====] - 0s 3ms/step - loss:
40852463616.0000 - val_loss: 41998512128.0000
Epoch 81/400
80/80 [=====] - 0s 3ms/step - loss:
40622088192.0000 - val_loss: 41758728192.0000
Epoch 82/400
80/80 [=====] - 0s 5ms/step - loss:
40436805632.0000 - val_loss: 41541275648.0000
Epoch 83/400
80/80 [=====] - 0s 5ms/step - loss:
40309936128.0000 - val_loss: 41323872256.0000
Epoch 84/400
80/80 [=====] - 0s 5ms/step - loss:
40080400384.0000 - val_loss: 41140465664.0000
Epoch 85/400
80/80 [=====] - 0s 4ms/step - loss:
39887441920.0000 - val_loss: 40934637568.0000
Epoch 86/400
80/80 [=====] - 0s 6ms/step - loss:
39712161792.0000 - val_loss: 40729858048.0000
Epoch 87/400
80/80 [=====] - 0s 6ms/step - loss:
39536529408.0000 - val_loss: 40522297344.0000
Epoch 88/400
80/80 [=====] - 0s 5ms/step - loss:
39350849536.0000 - val_loss: 40345722880.0000
Epoch 89/400
80/80 [=====] - 0s 3ms/step - loss:
39232139264.0000 - val_loss: 40144060416.0000
Epoch 90/400
80/80 [=====] - 0s 3ms/step - loss:
39004684288.0000 - val_loss: 39946592256.0000
Epoch 91/400
80/80 [=====] - 0s 3ms/step - loss:
38828929024.0000 - val_loss: 39749386240.0000
Epoch 92/400
80/80 [=====] - 0s 3ms/step - loss:
38706188288.0000 - val_loss: 39549812736.0000
Epoch 93/400

80/80 [=====] - 0s 3ms/step - loss:
38493036544.0000 - val_loss: 39350255616.0000
Epoch 94/400
80/80 [=====] - 0s 3ms/step - loss:
38347763712.0000 - val_loss: 39218249728.0000
Epoch 95/400
80/80 [=====] - 0s 3ms/step - loss:
38131617792.0000 - val_loss: 39041064960.0000
Epoch 96/400
80/80 [=====] - 0s 3ms/step - loss:
37976809472.0000 - val_loss: 38886117376.0000
Epoch 97/400
80/80 [=====] - 0s 3ms/step - loss:
37850267648.0000 - val_loss: 38673260544.0000
Epoch 98/400
80/80 [=====] - 0s 3ms/step - loss:
37679554560.0000 - val_loss: 38456553472.0000
Epoch 99/400
80/80 [=====] - 0s 3ms/step - loss:
37570539520.0000 - val_loss: 38287552512.0000
Epoch 100/400
80/80 [=====] - 0s 3ms/step - loss:
37407801344.0000 - val_loss: 38092533760.0000
Epoch 101/400
80/80 [=====] - 0s 3ms/step - loss:
37216333824.0000 - val_loss: 37934694400.0000
Epoch 102/400
80/80 [=====] - 0s 3ms/step - loss:
37091069952.0000 - val_loss: 37770878976.0000
Epoch 103/400
80/80 [=====] - 0s 3ms/step - loss:
36907823104.0000 - val_loss: 37599739904.0000
Epoch 104/400
80/80 [=====] - 0s 3ms/step - loss:
36783173632.0000 - val_loss: 37430177792.0000
Epoch 105/400
80/80 [=====] - 0s 3ms/step - loss:
36648144896.0000 - val_loss: 37290287104.0000
Epoch 106/400
80/80 [=====] - 0s 3ms/step - loss:
36483006464.0000 - val_loss: 37101867008.0000
Epoch 107/400
80/80 [=====] - 0s 3ms/step - loss:
36345634816.0000 - val_loss: 36972576768.0000
Epoch 108/400
80/80 [=====] - 0s 3ms/step - loss:
36225040384.0000 - val_loss: 36824244224.0000
Epoch 109/400
80/80 [=====] - 0s 3ms/step - loss:
36088029184.0000 - val_loss: 36786151424.0000

Epoch 110/400
80/80 [=====] - 0s 3ms/step - loss:
35984220160.0000 - val_loss: 36553678848.0000
Epoch 111/400
80/80 [=====] - 0s 3ms/step - loss:
35844677632.0000 - val_loss: 36394885120.0000
Epoch 112/400
80/80 [=====] - 0s 4ms/step - loss:
35726340096.0000 - val_loss: 36246474752.0000
Epoch 113/400
80/80 [=====] - 0s 3ms/step - loss:
35620040704.0000 - val_loss: 36124581888.0000
Epoch 114/400
80/80 [=====] - 0s 3ms/step - loss:
35500253184.0000 - val_loss: 35974909952.0000
Epoch 115/400
80/80 [=====] - 0s 3ms/step - loss:
35360673792.0000 - val_loss: 35852488704.0000
Epoch 116/400
80/80 [=====] - 0s 3ms/step - loss:
35265781760.0000 - val_loss: 35768840192.0000
Epoch 117/400
80/80 [=====] - 0s 3ms/step - loss:
35137040384.0000 - val_loss: 35642982400.0000
Epoch 118/400
80/80 [=====] - 0s 3ms/step - loss:
35080261632.0000 - val_loss: 35496214528.0000
Epoch 119/400
80/80 [=====] - 0s 3ms/step - loss:
34945761280.0000 - val_loss: 35363680256.0000
Epoch 120/400
80/80 [=====] - 0s 3ms/step - loss:
34836537344.0000 - val_loss: 35252486144.0000
Epoch 121/400
80/80 [=====] - 0s 3ms/step - loss:
34732261376.0000 - val_loss: 35147485184.0000
Epoch 122/400
80/80 [=====] - 0s 4ms/step - loss:
34611150848.0000 - val_loss: 35083513856.0000
Epoch 123/400
80/80 [=====] - 0s 3ms/step - loss:
34528296960.0000 - val_loss: 34924875776.0000
Epoch 124/400
80/80 [=====] - 0s 3ms/step - loss:
34444382208.0000 - val_loss: 34814894080.0000
Epoch 125/400
80/80 [=====] - 0s 3ms/step - loss:
34364198912.0000 - val_loss: 34709966848.0000
Epoch 126/400
80/80 [=====] - 0s 6ms/step - loss:

34297436160.0000 - val_loss: 34592833536.0000
Epoch 127/400
80/80 [=====] - 0s 5ms/step - loss:
34162384896.0000 - val_loss: 34543763456.0000
Epoch 128/400
80/80 [=====] - 0s 6ms/step - loss:
34090680320.0000 - val_loss: 34405629952.0000
Epoch 129/400
80/80 [=====] - 0s 5ms/step - loss:
34022672384.0000 - val_loss: 34335211520.0000
Epoch 130/400
80/80 [=====] - 0s 6ms/step - loss:
33897920512.0000 - val_loss: 34206142464.0000
Epoch 131/400
80/80 [=====] - 0s 4ms/step - loss:
33862940672.0000 - val_loss: 34131382272.0000
Epoch 132/400
80/80 [=====] - 0s 5ms/step - loss:
33744513024.0000 - val_loss: 34029189120.0000
Epoch 133/400
80/80 [=====] - 0s 3ms/step - loss:
33672615936.0000 - val_loss: 33959434240.0000
Epoch 134/400
80/80 [=====] - 0s 3ms/step - loss:
33595303936.0000 - val_loss: 33852252160.0000
Epoch 135/400
80/80 [=====] - 0s 3ms/step - loss:
33491212288.0000 - val_loss: 33786241024.0000
Epoch 136/400
80/80 [=====] - 0s 3ms/step - loss:
33436702720.0000 - val_loss: 33692078080.0000
Epoch 137/400
80/80 [=====] - 0s 3ms/step - loss:
33346340864.0000 - val_loss: 33650497536.0000
Epoch 138/400
80/80 [=====] - 0s 4ms/step - loss:
33301069824.0000 - val_loss: 33554788352.0000
Epoch 139/400
80/80 [=====] - 0s 3ms/step - loss:
33216163840.0000 - val_loss: 33444530176.0000
Epoch 140/400
80/80 [=====] - 0s 3ms/step - loss:
33139372032.0000 - val_loss: 33363208192.0000
Epoch 141/400
80/80 [=====] - 0s 4ms/step - loss:
33102755840.0000 - val_loss: 33287561216.0000
Epoch 142/400
80/80 [=====] - 0s 4ms/step - loss:
32997941248.0000 - val_loss: 33305030656.0000
Epoch 143/400

80/80 [=====] - 0s 3ms/step - loss:
32934443008.0000 - val_loss: 33220831232.0000
Epoch 144/400
80/80 [=====] - 0s 3ms/step - loss:
32857808896.0000 - val_loss: 33062621184.0000
Epoch 145/400
80/80 [=====] - 0s 3ms/step - loss:
32797933568.0000 - val_loss: 33013262336.0000
Epoch 146/400
80/80 [=====] - 0s 3ms/step - loss:
32747421696.0000 - val_loss: 32924215296.0000
Epoch 147/400
80/80 [=====] - 0s 4ms/step - loss:
32684695552.0000 - val_loss: 32852813824.0000
Epoch 148/400
80/80 [=====] - 0s 3ms/step - loss:
32637347840.0000 - val_loss: 32773908480.0000
Epoch 149/400
80/80 [=====] - 0s 3ms/step - loss:
32609521664.0000 - val_loss: 32748949504.0000
Epoch 150/400
80/80 [=====] - 0s 3ms/step - loss:
32489240576.0000 - val_loss: 32662550528.0000
Epoch 151/400
80/80 [=====] - 0s 3ms/step - loss:
32436310016.0000 - val_loss: 32603613184.0000
Epoch 152/400
80/80 [=====] - 0s 3ms/step - loss:
32352391168.0000 - val_loss: 32502607872.0000
Epoch 153/400
80/80 [=====] - 0s 3ms/step - loss:
32313184256.0000 - val_loss: 32458653696.0000
Epoch 154/400
80/80 [=====] - 0s 3ms/step - loss:
32239781888.0000 - val_loss: 32395177984.0000
Epoch 155/400
80/80 [=====] - 0s 3ms/step - loss:
32180877312.0000 - val_loss: 32313036800.0000
Epoch 156/400
80/80 [=====] - 0s 3ms/step - loss:
32105021440.0000 - val_loss: 32261611520.0000
Epoch 157/400
80/80 [=====] - 0s 3ms/step - loss:
32065470464.0000 - val_loss: 32185106432.0000
Epoch 158/400
80/80 [=====] - 0s 3ms/step - loss:
32023957504.0000 - val_loss: 32173096960.0000
Epoch 159/400
80/80 [=====] - 0s 3ms/step - loss:
31976130560.0000 - val_loss: 32075413504.0000

Epoch 160/400
80/80 [=====] - 0s 3ms/step - loss:
31941615616.0000 - val_loss: 32007847936.0000
Epoch 161/400
80/80 [=====] - 0s 3ms/step - loss:
31846774784.0000 - val_loss: 31935721472.0000
Epoch 162/400
80/80 [=====] - 0s 3ms/step - loss:
31803846656.0000 - val_loss: 31906048000.0000
Epoch 163/400
80/80 [=====] - 0s 3ms/step - loss:
31704440832.0000 - val_loss: 31825053696.0000
Epoch 164/400
80/80 [=====] - 0s 3ms/step - loss:
31683448832.0000 - val_loss: 31771252736.0000
Epoch 165/400
80/80 [=====] - 0s 3ms/step - loss:
31682510848.0000 - val_loss: 31754858496.0000
Epoch 166/400
80/80 [=====] - 0s 3ms/step - loss:
31602628608.0000 - val_loss: 31720787968.0000
Epoch 167/400
80/80 [=====] - 0s 4ms/step - loss:
31545176064.0000 - val_loss: 31609876480.0000
Epoch 168/400
80/80 [=====] - 0s 3ms/step - loss:
31502995456.0000 - val_loss: 31564003328.0000
Epoch 169/400
80/80 [=====] - 0s 5ms/step - loss:
31496087552.0000 - val_loss: 31509731328.0000
Epoch 170/400
80/80 [=====] - 0s 5ms/step - loss:
31389892608.0000 - val_loss: 31458338816.0000
Epoch 171/400
80/80 [=====] - 0s 5ms/step - loss:
31407165440.0000 - val_loss: 31447732224.0000
Epoch 172/400
80/80 [=====] - 0s 5ms/step - loss:
31307720704.0000 - val_loss: 31360468992.0000
Epoch 173/400
80/80 [=====] - 0s 5ms/step - loss:
31260878848.0000 - val_loss: 31309615104.0000
Epoch 174/400
80/80 [=====] - 0s 5ms/step - loss:
31214022656.0000 - val_loss: 31258322944.0000
Epoch 175/400
80/80 [=====] - 0s 5ms/step - loss:
31132905472.0000 - val_loss: 31252748288.0000
Epoch 176/400
80/80 [=====] - 0s 3ms/step - loss:

31115192320.0000 - val_loss: 31183874048.0000
Epoch 177/400
80/80 [=====] - 0s 3ms/step - loss:
31085916160.0000 - val_loss: 31119294464.0000
Epoch 178/400
80/80 [=====] - 0s 3ms/step - loss:
31029391360.0000 - val_loss: 31081719808.0000
Epoch 179/400
80/80 [=====] - 0s 3ms/step - loss:
31001518080.0000 - val_loss: 31033708544.0000
Epoch 180/400
80/80 [=====] - 0s 3ms/step - loss:
30963916800.0000 - val_loss: 30994903040.0000
Epoch 181/400
80/80 [=====] - 0s 3ms/step - loss:
30906042368.0000 - val_loss: 30938126336.0000
Epoch 182/400
80/80 [=====] - 0s 3ms/step - loss:
30902329344.0000 - val_loss: 30938806272.0000
Epoch 183/400
80/80 [=====] - 0s 3ms/step - loss:
30851674112.0000 - val_loss: 30873051136.0000
Epoch 184/400
80/80 [=====] - 0s 3ms/step - loss:
30779305984.0000 - val_loss: 30802649088.0000
Epoch 185/400
80/80 [=====] - 0s 3ms/step - loss:
30781587456.0000 - val_loss: 30761824256.0000
Epoch 186/400
80/80 [=====] - 0s 3ms/step - loss:
30721951744.0000 - val_loss: 30723921920.0000
Epoch 187/400
80/80 [=====] - 0s 3ms/step - loss:
30701066240.0000 - val_loss: 30686433280.0000
Epoch 188/400
80/80 [=====] - 0s 3ms/step - loss:
30648295424.0000 - val_loss: 30646052864.0000
Epoch 189/400
80/80 [=====] - 0s 3ms/step - loss:
30604021760.0000 - val_loss: 30589233152.0000
Epoch 190/400
80/80 [=====] - 0s 4ms/step - loss:
30569719808.0000 - val_loss: 30555863040.0000
Epoch 191/400
80/80 [=====] - 0s 3ms/step - loss:
30525218816.0000 - val_loss: 30516383744.0000
Epoch 192/400
80/80 [=====] - 0s 3ms/step - loss:
30487988224.0000 - val_loss: 30481317888.0000
Epoch 193/400

80/80 [=====] - 0s 3ms/step - loss:
30447673344.0000 - val_loss: 30484727808.0000
Epoch 194/400
80/80 [=====] - 0s 3ms/step - loss:
30461149184.0000 - val_loss: 30387218432.0000
Epoch 195/400
80/80 [=====] - 0s 3ms/step - loss:
30404730880.0000 - val_loss: 30346856448.0000
Epoch 196/400
80/80 [=====] - 0s 3ms/step - loss:
30376075264.0000 - val_loss: 30381363200.0000
Epoch 197/400
80/80 [=====] - 0s 3ms/step - loss:
30352701440.0000 - val_loss: 30285580288.0000
Epoch 198/400
80/80 [=====] - 0s 3ms/step - loss:
30296651776.0000 - val_loss: 30250856448.0000
Epoch 199/400
80/80 [=====] - 0s 3ms/step - loss:
30261815296.0000 - val_loss: 30227263488.0000
Epoch 200/400
80/80 [=====] - 0s 3ms/step - loss:
30207352832.0000 - val_loss: 30172323840.0000
Epoch 201/400
80/80 [=====] - 0s 3ms/step - loss:
30195304448.0000 - val_loss: 30118154240.0000
Epoch 202/400
80/80 [=====] - 0s 3ms/step - loss:
30144614400.0000 - val_loss: 30078484480.0000
Epoch 203/400
80/80 [=====] - 0s 4ms/step - loss:
30121234432.0000 - val_loss: 30040905728.0000
Epoch 204/400
80/80 [=====] - 0s 3ms/step - loss:
30078208000.0000 - val_loss: 30007914496.0000
Epoch 205/400
80/80 [=====] - 0s 3ms/step - loss:
30043973632.0000 - val_loss: 30012166144.0000
Epoch 206/400
80/80 [=====] - 0s 3ms/step - loss:
30020374528.0000 - val_loss: 29905817600.0000
Epoch 207/400
80/80 [=====] - 0s 3ms/step - loss:
29998895104.0000 - val_loss: 29888264192.0000
Epoch 208/400
80/80 [=====] - 0s 3ms/step - loss:
29958901760.0000 - val_loss: 29834448896.0000
Epoch 209/400
80/80 [=====] - 0s 3ms/step - loss:
29896910848.0000 - val_loss: 29810812928.0000

Epoch 210/400
80/80 [=====] - 0s 3ms/step - loss:
29894117376.0000 - val_loss: 29760258048.0000
Epoch 211/400
80/80 [=====] - 0s 4ms/step - loss:
29885769728.0000 - val_loss: 29738934272.0000
Epoch 212/400
80/80 [=====] - 0s 5ms/step - loss:
29834254336.0000 - val_loss: 29713985536.0000
Epoch 213/400
80/80 [=====] - 0s 5ms/step - loss:
29811161088.0000 - val_loss: 29670549504.0000
Epoch 214/400
80/80 [=====] - 0s 5ms/step - loss:
29769027584.0000 - val_loss: 29716033536.0000
Epoch 215/400
80/80 [=====] - 0s 5ms/step - loss:
29766942720.0000 - val_loss: 29627901952.0000
Epoch 216/400
80/80 [=====] - 0s 5ms/step - loss:
29743423488.0000 - val_loss: 29601050624.0000
Epoch 217/400
80/80 [=====] - 0s 6ms/step - loss:
29713350656.0000 - val_loss: 29550972928.0000
Epoch 218/400
80/80 [=====] - 0s 5ms/step - loss:
29685039104.0000 - val_loss: 29576142848.0000
Epoch 219/400
80/80 [=====] - 0s 6ms/step - loss:
29660536832.0000 - val_loss: 29484468224.0000
Epoch 220/400
80/80 [=====] - 0s 4ms/step - loss:
29611757568.0000 - val_loss: 29455040512.0000
Epoch 221/400
80/80 [=====] - 0s 3ms/step - loss:
29615560704.0000 - val_loss: 29427015680.0000
Epoch 222/400
80/80 [=====] - 0s 4ms/step - loss:
29593389056.0000 - val_loss: 29411063808.0000
Epoch 223/400
80/80 [=====] - 1s 7ms/step - loss:
29583632384.0000 - val_loss: 29378844672.0000
Epoch 224/400
80/80 [=====] - 0s 3ms/step - loss:
29569495040.0000 - val_loss: 29372377088.0000
Epoch 225/400
80/80 [=====] - 1s 6ms/step - loss:
29578002432.0000 - val_loss: 29333448704.0000
Epoch 226/400
80/80 [=====] - 0s 3ms/step - loss:

29496010752.0000 - val_loss: 29313282048.0000
Epoch 227/400
80/80 [=====] - 0s 3ms/step - loss:
29464961024.0000 - val_loss: 29287327744.0000
Epoch 228/400
80/80 [=====] - 1s 7ms/step - loss:
29455454208.0000 - val_loss: 29242779648.0000
Epoch 229/400
80/80 [=====] - 0s 4ms/step - loss:
29421060096.0000 - val_loss: 29219307520.0000
Epoch 230/400
80/80 [=====] - 0s 3ms/step - loss:
29409099776.0000 - val_loss: 29206398976.0000
Epoch 231/400
80/80 [=====] - 0s 3ms/step - loss:
29361420288.0000 - val_loss: 29177702400.0000
Epoch 232/400
80/80 [=====] - 0s 3ms/step - loss:
29393317888.0000 - val_loss: 29143801856.0000
Epoch 233/400
80/80 [=====] - 0s 3ms/step - loss:
29322547200.0000 - val_loss: 29119076352.0000
Epoch 234/400
80/80 [=====] - 0s 3ms/step - loss:
29343803392.0000 - val_loss: 29172099072.0000
Epoch 235/400
80/80 [=====] - 0s 3ms/step - loss:
29297612800.0000 - val_loss: 29117855744.0000
Epoch 236/400
80/80 [=====] - 0s 4ms/step - loss:
29243668480.0000 - val_loss: 29098747904.0000
Epoch 237/400
80/80 [=====] - 0s 3ms/step - loss:
29232691200.0000 - val_loss: 29040527360.0000
Epoch 238/400
80/80 [=====] - 0s 3ms/step - loss:
29209186304.0000 - val_loss: 29003206656.0000
Epoch 239/400
80/80 [=====] - 0s 3ms/step - loss:
29195597824.0000 - val_loss: 28974780416.0000
Epoch 240/400
80/80 [=====] - 0s 3ms/step - loss:
29163520000.0000 - val_loss: 28969367552.0000
Epoch 241/400
80/80 [=====] - 0s 3ms/step - loss:
29157115904.0000 - val_loss: 28931543040.0000
Epoch 242/400
80/80 [=====] - 0s 3ms/step - loss:
29135538176.0000 - val_loss: 28954609664.0000
Epoch 243/400

80/80 [=====] - 0s 4ms/step - loss:
29107257344.0000 - val_loss: 28890847232.0000
Epoch 244/400
80/80 [=====] - 0s 3ms/step - loss:
29089521664.0000 - val_loss: 28925814784.0000
Epoch 245/400
80/80 [=====] - 0s 3ms/step - loss:
29073727488.0000 - val_loss: 29028302848.0000
Epoch 246/400
80/80 [=====] - 0s 3ms/step - loss:
29031620608.0000 - val_loss: 28825939968.0000
Epoch 247/400
80/80 [=====] - 0s 4ms/step - loss:
29014761472.0000 - val_loss: 28821202944.0000
Epoch 248/400
80/80 [=====] - 0s 3ms/step - loss:
29047033856.0000 - val_loss: 28810549248.0000
Epoch 249/400
80/80 [=====] - 0s 4ms/step - loss:
29007515648.0000 - val_loss: 28768694272.0000
Epoch 250/400
80/80 [=====] - 0s 4ms/step - loss:
28966854656.0000 - val_loss: 28772182016.0000
Epoch 251/400
80/80 [=====] - 0s 4ms/step - loss:
29042251776.0000 - val_loss: 28738457600.0000
Epoch 252/400
80/80 [=====] - 0s 4ms/step - loss:
28960296960.0000 - val_loss: 28702435328.0000
Epoch 253/400
80/80 [=====] - 0s 6ms/step - loss:
28935667712.0000 - val_loss: 28680202240.0000
Epoch 254/400
80/80 [=====] - 0s 6ms/step - loss:
28867710976.0000 - val_loss: 28653762560.0000
Epoch 255/400
80/80 [=====] - 0s 5ms/step - loss:
28863414272.0000 - val_loss: 28655353856.0000
Epoch 256/400
80/80 [=====] - 0s 5ms/step - loss:
28859316224.0000 - val_loss: 28644302848.0000
Epoch 257/400
80/80 [=====] - 0s 4ms/step - loss:
28842248192.0000 - val_loss: 28608188416.0000
Epoch 258/400
80/80 [=====] - 0s 5ms/step - loss:
28815585280.0000 - val_loss: 28618407936.0000
Epoch 259/400
80/80 [=====] - 0s 5ms/step - loss:
28849954816.0000 - val_loss: 28578732032.0000

Epoch 260/400
80/80 [=====] - 0s 3ms/step - loss:
28780744704.0000 - val_loss: 28596453376.0000
Epoch 261/400
80/80 [=====] - 0s 3ms/step - loss:
28790188032.0000 - val_loss: 28550938624.0000
Epoch 262/400
80/80 [=====] - 0s 3ms/step - loss:
28739747840.0000 - val_loss: 28572991488.0000
Epoch 263/400
80/80 [=====] - 0s 4ms/step - loss:
28744679424.0000 - val_loss: 28496519168.0000
Epoch 264/400
80/80 [=====] - 0s 4ms/step - loss:
28707291136.0000 - val_loss: 28465620992.0000
Epoch 265/400
80/80 [=====] - 0s 4ms/step - loss:
28772931584.0000 - val_loss: 28477456384.0000
Epoch 266/400
80/80 [=====] - 0s 4ms/step - loss:
28699117568.0000 - val_loss: 28461197312.0000
Epoch 267/400
80/80 [=====] - 0s 4ms/step - loss:
28634087424.0000 - val_loss: 28390293504.0000
Epoch 268/400
80/80 [=====] - 0s 3ms/step - loss:
28685649920.0000 - val_loss: 28394371072.0000
Epoch 269/400
80/80 [=====] - 0s 4ms/step - loss:
28670898176.0000 - val_loss: 28382164992.0000
Epoch 270/400
80/80 [=====] - 0s 3ms/step - loss:
28620779520.0000 - val_loss: 28365015040.0000
Epoch 271/400
80/80 [=====] - 0s 3ms/step - loss:
28581939200.0000 - val_loss: 28330565632.0000
Epoch 272/400
80/80 [=====] - 0s 3ms/step - loss:
28558362624.0000 - val_loss: 28304216064.0000
Epoch 273/400
80/80 [=====] - 0s 3ms/step - loss:
28581224448.0000 - val_loss: 28290592768.0000
Epoch 274/400
80/80 [=====] - 0s 4ms/step - loss:
28532086784.0000 - val_loss: 28268365824.0000
Epoch 275/400
80/80 [=====] - 0s 3ms/step - loss:
28497215488.0000 - val_loss: 28304259072.0000
Epoch 276/400
80/80 [=====] - 0s 3ms/step - loss:

28507594752.0000 - val_loss: 28303716352.0000
Epoch 277/400
80/80 [=====] - 0s 3ms/step - loss:
28494712832.0000 - val_loss: 28233228288.0000
Epoch 278/400
80/80 [=====] - 0s 3ms/step - loss:
28446853120.0000 - val_loss: 28383383552.0000
Epoch 279/400
80/80 [=====] - 0s 4ms/step - loss:
28444223488.0000 - val_loss: 28174422016.0000
Epoch 280/400
80/80 [=====] - 0s 3ms/step - loss:
28417552384.0000 - val_loss: 28285210624.0000
Epoch 281/400
80/80 [=====] - 0s 3ms/step - loss:
28450463744.0000 - val_loss: 28150622208.0000
Epoch 282/400
80/80 [=====] - 0s 3ms/step - loss:
28477368320.0000 - val_loss: 28263419904.0000
Epoch 283/400
80/80 [=====] - 0s 4ms/step - loss:
28435456000.0000 - val_loss: 28141283328.0000
Epoch 284/400
80/80 [=====] - 0s 4ms/step - loss:
28374065152.0000 - val_loss: 28092870656.0000
Epoch 285/400
80/80 [=====] - 0s 4ms/step - loss:
28358404096.0000 - val_loss: 28077193216.0000
Epoch 286/400
80/80 [=====] - 0s 4ms/step - loss:
28343805952.0000 - val_loss: 28128882688.0000
Epoch 287/400
80/80 [=====] - 0s 3ms/step - loss:
28355026944.0000 - val_loss: 28077201408.0000
Epoch 288/400
80/80 [=====] - 0s 3ms/step - loss:
28301760512.0000 - val_loss: 28039155712.0000
Epoch 289/400
80/80 [=====] - 0s 3ms/step - loss:
28280449024.0000 - val_loss: 28161595392.0000
Epoch 290/400
80/80 [=====] - 0s 3ms/step - loss:
28309901312.0000 - val_loss: 28008759296.0000
Epoch 291/400
80/80 [=====] - 0s 3ms/step - loss:
28297719808.0000 - val_loss: 27993456640.0000
Epoch 292/400
80/80 [=====] - 0s 3ms/step - loss:
28259358720.0000 - val_loss: 27994976256.0000
Epoch 293/400

80/80 [=====] - 0s 3ms/step - loss:
28311111680.0000 - val_loss: 27960993792.0000
Epoch 294/400
80/80 [=====] - 0s 3ms/step - loss:
28239818752.0000 - val_loss: 27939465216.0000
Epoch 295/400
80/80 [=====] - 0s 4ms/step - loss:
28199882752.0000 - val_loss: 27983052800.0000
Epoch 296/400
80/80 [=====] - 0s 5ms/step - loss:
28183312384.0000 - val_loss: 27912552448.0000
Epoch 297/400
80/80 [=====] - 0s 5ms/step - loss:
28189214720.0000 - val_loss: 27904671744.0000
Epoch 298/400
80/80 [=====] - 0s 5ms/step - loss:
28160225280.0000 - val_loss: 27924994048.0000
Epoch 299/400
80/80 [=====] - 0s 5ms/step - loss:
28166344704.0000 - val_loss: 27868057600.0000
Epoch 300/400
80/80 [=====] - 0s 6ms/step - loss:
28117577728.0000 - val_loss: 27850113024.0000
Epoch 301/400
80/80 [=====] - 0s 4ms/step - loss:
28169158656.0000 - val_loss: 27901388800.0000
Epoch 302/400
80/80 [=====] - 0s 4ms/step - loss:
28114575360.0000 - val_loss: 27829659648.0000
Epoch 303/400
80/80 [=====] - 0s 3ms/step - loss:
28133046272.0000 - val_loss: 27797633024.0000
Epoch 304/400
80/80 [=====] - 0s 3ms/step - loss:
28086140928.0000 - val_loss: 27806732288.0000
Epoch 305/400
80/80 [=====] - 0s 3ms/step - loss:
28068294656.0000 - val_loss: 27769069568.0000
Epoch 306/400
80/80 [=====] - 0s 3ms/step - loss:
28041406464.0000 - val_loss: 27786821632.0000
Epoch 307/400
80/80 [=====] - 0s 3ms/step - loss:
28068081664.0000 - val_loss: 27752587264.0000
Epoch 308/400
80/80 [=====] - 0s 3ms/step - loss:
28042033152.0000 - val_loss: 27732727808.0000
Epoch 309/400
80/80 [=====] - 0s 3ms/step - loss:
28033544192.0000 - val_loss: 27769724928.0000

Epoch 310/400
80/80 [=====] - 0s 3ms/step - loss:
28001118208.0000 - val_loss: 27711389696.0000
Epoch 311/400
80/80 [=====] - 0s 3ms/step - loss:
27954470912.0000 - val_loss: 27763128320.0000
Epoch 312/400
80/80 [=====] - 0s 3ms/step - loss:
28002789376.0000 - val_loss: 27688052736.0000
Epoch 313/400
80/80 [=====] - 0s 3ms/step - loss:
27943213056.0000 - val_loss: 27751337984.0000
Epoch 314/400
80/80 [=====] - 0s 3ms/step - loss:
27954432000.0000 - val_loss: 27702167552.0000
Epoch 315/400
80/80 [=====] - 0s 3ms/step - loss:
27930982400.0000 - val_loss: 27665524736.0000
Epoch 316/400
80/80 [=====] - 0s 3ms/step - loss:
27920652288.0000 - val_loss: 27628507136.0000
Epoch 317/400
80/80 [=====] - 0s 3ms/step - loss:
27898966016.0000 - val_loss: 27618117632.0000
Epoch 318/400
80/80 [=====] - 0s 3ms/step - loss:
27869661184.0000 - val_loss: 27611834368.0000
Epoch 319/400
80/80 [=====] - 0s 3ms/step - loss:
27878107136.0000 - val_loss: 27627601920.0000
Epoch 320/400
80/80 [=====] - 0s 3ms/step - loss:
27866214400.0000 - val_loss: 27582865408.0000
Epoch 321/400
80/80 [=====] - 0s 3ms/step - loss:
27852443648.0000 - val_loss: 27561324544.0000
Epoch 322/400
80/80 [=====] - 0s 3ms/step - loss:
27862611968.0000 - val_loss: 27566776320.0000
Epoch 323/400
80/80 [=====] - 0s 3ms/step - loss:
27851864064.0000 - val_loss: 27528648704.0000
Epoch 324/400
80/80 [=====] - 0s 3ms/step - loss:
27781568512.0000 - val_loss: 27514279936.0000
Epoch 325/400
80/80 [=====] - 0s 3ms/step - loss:
27796119552.0000 - val_loss: 27523479552.0000
Epoch 326/400
80/80 [=====] - 0s 3ms/step - loss:

27769755648.0000 - val_loss: 27542929408.0000
Epoch 327/400
80/80 [=====] - 0s 3ms/step - loss:
27752599552.0000 - val_loss: 27496568832.0000
Epoch 328/400
80/80 [=====] - 0s 3ms/step - loss:
27757072384.0000 - val_loss: 27463796736.0000
Epoch 329/400
80/80 [=====] - 0s 3ms/step - loss:
27745525760.0000 - val_loss: 27455492096.0000
Epoch 330/400
80/80 [=====] - 0s 3ms/step - loss:
27712802816.0000 - val_loss: 27432126464.0000
Epoch 331/400
80/80 [=====] - 0s 3ms/step - loss:
27706970112.0000 - val_loss: 27427321856.0000
Epoch 332/400
80/80 [=====] - 0s 3ms/step - loss:
27708659712.0000 - val_loss: 27422550016.0000
Epoch 333/400
80/80 [=====] - 0s 3ms/step - loss:
27703918592.0000 - val_loss: 27395829760.0000
Epoch 334/400
80/80 [=====] - 0s 4ms/step - loss:
27718737920.0000 - val_loss: 27434008576.0000
Epoch 335/400
80/80 [=====] - 0s 3ms/step - loss:
27713069056.0000 - val_loss: 27528681472.0000
Epoch 336/400
80/80 [=====] - 0s 3ms/step - loss:
27631167488.0000 - val_loss: 27432841216.0000
Epoch 337/400
80/80 [=====] - 0s 4ms/step - loss:
27621255168.0000 - val_loss: 27353876480.0000
Epoch 338/400
80/80 [=====] - 0s 3ms/step - loss:
27629522944.0000 - val_loss: 27336574976.0000
Epoch 339/400
80/80 [=====] - 0s 4ms/step - loss:
27603120128.0000 - val_loss: 27345620992.0000
Epoch 340/400
80/80 [=====] - 0s 5ms/step - loss:
27606388736.0000 - val_loss: 27331604480.0000
Epoch 341/400
80/80 [=====] - 0s 5ms/step - loss:
27635671040.0000 - val_loss: 27290195968.0000
Epoch 342/400
80/80 [=====] - 0s 6ms/step - loss:
27580186624.0000 - val_loss: 27281461248.0000
Epoch 343/400

80/80 [=====] - 0s 5ms/step - loss:
27587041280.0000 - val_loss: 27302690816.0000
Epoch 344/400
80/80 [=====] - 0s 5ms/step - loss:
27574198272.0000 - val_loss: 27449458688.0000
Epoch 345/400
80/80 [=====] - 0s 6ms/step - loss:
27547686912.0000 - val_loss: 27255844864.0000
Epoch 346/400
80/80 [=====] - 0s 5ms/step - loss:
27557578752.0000 - val_loss: 27254163456.0000
Epoch 347/400
80/80 [=====] - 0s 4ms/step - loss:
27524325376.0000 - val_loss: 27285465088.0000
Epoch 348/400
80/80 [=====] - 0s 3ms/step - loss:
27539922944.0000 - val_loss: 27222046720.0000
Epoch 349/400
80/80 [=====] - 0s 3ms/step - loss:
27494944768.0000 - val_loss: 27246055424.0000
Epoch 350/400
80/80 [=====] - 0s 3ms/step - loss:
27490195456.0000 - val_loss: 27268374528.0000
Epoch 351/400
80/80 [=====] - 0s 4ms/step - loss:
27532660736.0000 - val_loss: 27193012224.0000
Epoch 352/400
80/80 [=====] - 0s 4ms/step - loss:
27476799488.0000 - val_loss: 27227035648.0000
Epoch 353/400
80/80 [=====] - 0s 3ms/step - loss:
27457914880.0000 - val_loss: 27171182592.0000
Epoch 354/400
80/80 [=====] - 0s 4ms/step - loss:
27428894720.0000 - val_loss: 27154401280.0000
Epoch 355/400
80/80 [=====] - 0s 3ms/step - loss:
27449268224.0000 - val_loss: 27133296640.0000
Epoch 356/400
80/80 [=====] - 0s 3ms/step - loss:
27463600128.0000 - val_loss: 27151489024.0000
Epoch 357/400
80/80 [=====] - 0s 3ms/step - loss:
27381968896.0000 - val_loss: 27098562560.0000
Epoch 358/400
80/80 [=====] - 0s 4ms/step - loss:
27392958464.0000 - val_loss: 27141169152.0000
Epoch 359/400
80/80 [=====] - 0s 3ms/step - loss:
27376658432.0000 - val_loss: 27078162432.0000

Epoch 360/400
80/80 [=====] - 0s 3ms/step - loss:
27372695552.0000 - val_loss: 27104204800.0000
Epoch 361/400
80/80 [=====] - 0s 3ms/step - loss:
27416438784.0000 - val_loss: 27056326656.0000
Epoch 362/400
80/80 [=====] - 0s 4ms/step - loss:
27357796352.0000 - val_loss: 27028674560.0000
Epoch 363/400
80/80 [=====] - 0s 3ms/step - loss:
27361372160.0000 - val_loss: 27062620160.0000
Epoch 364/400
80/80 [=====] - 0s 3ms/step - loss:
27344226304.0000 - val_loss: 27024889856.0000
Epoch 365/400
80/80 [=====] - 0s 4ms/step - loss:
27337670656.0000 - val_loss: 27005032448.0000
Epoch 366/400
80/80 [=====] - 0s 3ms/step - loss:
27313483776.0000 - val_loss: 26977978368.0000
Epoch 367/400
80/80 [=====] - 0s 3ms/step - loss:
27334246400.0000 - val_loss: 26965360640.0000
Epoch 368/400
80/80 [=====] - 0s 3ms/step - loss:
27309301760.0000 - val_loss: 26958440448.0000
Epoch 369/400
80/80 [=====] - 0s 3ms/step - loss:
27302531072.0000 - val_loss: 26952392704.0000
Epoch 370/400
80/80 [=====] - 0s 3ms/step - loss:
27235936256.0000 - val_loss: 26944075776.0000
Epoch 371/400
80/80 [=====] - 0s 4ms/step - loss:
27267293184.0000 - val_loss: 26964729856.0000
Epoch 372/400
80/80 [=====] - 0s 3ms/step - loss:
27224002560.0000 - val_loss: 26940293120.0000
Epoch 373/400
80/80 [=====] - 0s 3ms/step - loss:
27232598016.0000 - val_loss: 26899939328.0000
Epoch 374/400
80/80 [=====] - 0s 3ms/step - loss:
27204947968.0000 - val_loss: 26894043136.0000
Epoch 375/400
80/80 [=====] - 0s 3ms/step - loss:
27186802688.0000 - val_loss: 26879436800.0000
Epoch 376/400
80/80 [=====] - 0s 3ms/step - loss:

27214192640.0000 - val_loss: 26963142656.0000
Epoch 377/400
80/80 [=====] - 0s 4ms/step - loss:
27177052160.0000 - val_loss: 26933413888.0000
Epoch 378/400
80/80 [=====] - 0s 3ms/step - loss:
27220035584.0000 - val_loss: 26868475904.0000
Epoch 379/400
80/80 [=====] - 0s 4ms/step - loss:
27174723584.0000 - val_loss: 26917996544.0000
Epoch 380/400
80/80 [=====] - 0s 3ms/step - loss:
27151546368.0000 - val_loss: 26815150080.0000
Epoch 381/400
80/80 [=====] - 0s 3ms/step - loss:
27132725248.0000 - val_loss: 26846494720.0000
Epoch 382/400
80/80 [=====] - 0s 3ms/step - loss:
27115974656.0000 - val_loss: 26764005376.0000
Epoch 383/400
80/80 [=====] - 0s 5ms/step - loss:
27104976896.0000 - val_loss: 26743373824.0000
Epoch 384/400
80/80 [=====] - 0s 4ms/step - loss:
27086532608.0000 - val_loss: 26719928320.0000
Epoch 385/400
80/80 [=====] - 0s 4ms/step - loss:
27075225600.0000 - val_loss: 26707517440.0000
Epoch 386/400
80/80 [=====] - 0s 5ms/step - loss:
27065556992.0000 - val_loss: 26693154816.0000
Epoch 387/400
80/80 [=====] - 0s 5ms/step - loss:
27055626240.0000 - val_loss: 26700824576.0000
Epoch 388/400
80/80 [=====] - 0s 6ms/step - loss:
27048753152.0000 - val_loss: 26733662208.0000
Epoch 389/400
80/80 [=====] - 0s 5ms/step - loss:
27010177024.0000 - val_loss: 26678208512.0000
Epoch 390/400
80/80 [=====] - 0s 6ms/step - loss:
27014107136.0000 - val_loss: 26650503168.0000
Epoch 391/400
80/80 [=====] - 0s 4ms/step - loss:
27031418880.0000 - val_loss: 26641815552.0000
Epoch 392/400
80/80 [=====] - 0s 3ms/step - loss:
26991888384.0000 - val_loss: 26701058048.0000
Epoch 393/400

```

80/80 [=====] - 0s 3ms/step - loss:
26996484096.0000 - val_loss: 26610440192.0000
Epoch 394/400
80/80 [=====] - 0s 3ms/step - loss:
26989029376.0000 - val_loss: 26600521728.0000
Epoch 395/400
80/80 [=====] - 0s 3ms/step - loss:
26964744192.0000 - val_loss: 26584885248.0000
Epoch 396/400
80/80 [=====] - 0s 3ms/step - loss:
26977986560.0000 - val_loss: 26590046208.0000
Epoch 397/400
80/80 [=====] - 0s 3ms/step - loss:
26927601664.0000 - val_loss: 26558267392.0000
Epoch 398/400
80/80 [=====] - 0s 3ms/step - loss:
26916550656.0000 - val_loss: 26539294720.0000
Epoch 399/400
80/80 [=====] - 0s 3ms/step - loss:
26939013120.0000 - val_loss: 26531196928.0000
Epoch 400/400
80/80 [=====] - 0s 4ms/step - loss:
26888589312.0000 - val_loss: 26544144384.0000

```

<keras.callbacks.History at 0x7faa802329b0>

```

single_house = ds.drop('Price',axis=1).iloc[0]
print(f'Features of new house:\n{single_house}')
single_house = scaler.transform(single_house.values.reshape(-1, 20))
print('\nPrediction Price:',model.predict(single_house)[0,0])
print('\nOriginal Price:',ds.iloc[0]['Price'])

```

Features of new house:

number of bedrooms	5.0000
number of bathrooms	2.5000
living area	3650.0000
lot area	9050.0000
number of floors	2.0000
waterfront present	0.0000
number of views	4.0000
condition of the house	5.0000
grade of the house	10.0000
Area of the house(excluding basement)	3370.0000
Area of the basement	280.0000
Built Year	1921.0000
Renovation Year	0.0000
Postal Code	122003.0000
Lattitude	52.8645
Longitude	-114.5570
living_area_renov	2880.0000
lot_area_renov	5400.0000

```
Number of schools nearby          2.0000
Distance from the airport        58.0000
Name: 0, dtype: float64
1/1 [=====] - 0s 119ms/step
```

Prediction Price: 1566205.6

Original Price: 2380000.0

```
/usr/local/lib/python3.10/dist-packages/sklearn/base.py:439:
UserWarning: X does not have valid feature names, but MinMaxScaler was
fitted with feature names
  warnings.warn(
```