

Data Split

```
In [1]:  
import tensorflow as tf
```

```
In [2]:  
from tensorflow import keras
```

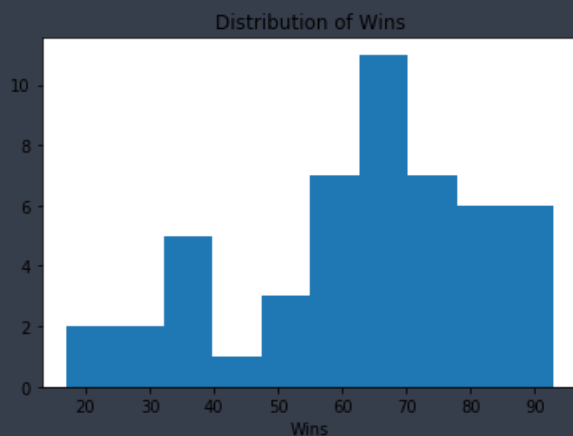
```
In [3]:  
import pandas as pd
```

```
In [4]:  
df = pd.read_csv('practice.csv')  
df.head()
```

	SB_D	SB_R	ERA	ER	CG	SHO	RA	R	AB	H	...	FP	SV	IPOuts	HA	HRA	BBA	SOA	E	DF
0	124	64	5.76	827	1	2	6.32	826	5109	1478	...	0.977	24	3878	1520	155	634	976	124	229
1	136	101	4.97	705	7	5	5.54	803	4999	1429	...	0.979	38	3828	1456	131	561	965	111	219
2	115	96	5.92	838	1	2	6.55	672	4963	1369	...	0.976	27	3819	1593	145	560	980	130	264
3	80	121	5.04	721	2	5	5.64	786	5051	1464	...	0.981	34	3863	1426	122	539	909	103	217
4	90	145	5.63	792	2	5	6.15	777	5001	1439	...	0.983	27	3799	1486	161	585	1009	91	229

5 rows × 27 columns

```
In [5]:  
import matplotlib.pyplot as plt  
%matplotlib inline  
  
plt.hist(df['W'])  
plt.xlabel('Wins')  
plt.title('Distribution of Wins')  
  
plt.show()
```



```
In [6]:  
df.corr()['W']
```

```
SB_D      0.406149  
SB_R      0.623423  
ERA      -0.313221  
ER        0.503294  
CG        0.209995
```

```
SHO      0.473576
RA       -0.339742
R        0.876900
AB       0.838537
H        0.867653
2B       0.818614
3B       0.607394
HR       0.678608
BB       0.627698
SO       0.806856
Rank     -0.522707
G        0.828139
FP       0.109302
SV       0.922951
IPOuts   0.837875
HA       0.732641
HRA      0.491891
BBA      0.627698
SOA      0.806856
E        0.664863
DP       0.259039
W        1.000000
Name: W, dtype: float64
```

```
In [7]:
```

```
x_data = df.values[:, 0:26]
x_data
```

```
array([[124. ,  64. ,  5.76, ..., 976. , 124. , 229. ],
       [136. , 101. ,  4.97, ..., 965. , 111. , 219. ],
       [115. ,  96. ,  5.92, ..., 980. , 130. , 264. ],
       ...,
       [ 82. ,  44. ,  5.46, ..., 447. ,  46. ,  53. ],
       [ 34. ,  81. ,  4.61, ..., 401. ,  43. ,  57. ],
       [ 54. ,  65. ,  4.37, ..., 425. ,  47. ,  62. ]])
```

```
In [8]:
```

```
y_data = df.values[:, [26]]
y_data
```

```
array([[66.],
       [70.],
       [53.],
       [71.],
       [66.],
       [83.],
       [93.],
       [69.],
       [65.],
       [77.],
       [61.],
       [87.],
       [50.],
       [69.],
       [80.],
       [79.],
       [84.],
       [75.],
       [55.],
       [69.],
       [77.],
       [70.],
       [59.],
       [68.]])
```

```
[68.],  
[58.],  
[93.],  
[78.],  
[68.],  
[75.],  
[58.],  
[62.],  
[71.],  
[79.],  
[48.],  
[73.],  
[88.],  
[88.],  
[60.],  
[86.],  
[17.],  
[33.],  
[31.],  
[34.],  
[30.],  
[42.],  
[38.],  
[21.],  
[34.],  
[38.]])
```

Scaling

```
In [9]:  
from sklearn.preprocessing import StandardScaler  
  
scaler = StandardScaler()
```

```
In [10]:  
x_data = scaler.fit_transform(x_data)
```

```
In [11]:  
from sklearn.model_selection import train_test_split  
  
X_train, X_test, y_train, y_test = train_test_split(x_data, y_data, test_size=0.1, random_state  
=7)  
X_train.shape, y_train.shape, X_test.shape, y_test.shape  
  
(45, 26), (45, 1), (5, 26), (5, 1))
```

Linear Regression

```
In [12]:  
from sklearn.linear_model import LinearRegression  
  
lr = LinearRegression().fit(X_train, y_train)  
print("기울기:", lr.coef_) # [0.39390555]  
print("절편:", lr.intercept_) # -0.03180434302675973  
print("훈련 정확도: {:.5f}".format(lr.score(X_train, y_train)))  
print("테스트 정확도: {:.5f}".format(lr.score(X_test, y_test)))
```

```
기울기: [[ -0.18236276   0.14671256   8.20986015 -18.69091666 -1.17798803  
  0.67714682 -2.27818537  18.94768164   6.7835888  -13.71753123  
  1.41563051 -2.14874987 -1.44882931   1.61061913 -2.10618722  
 -3.74254544  15.82163502   0.96382358   5.75196783 -6.85763062  
  8.25212526 -0.76920751   1.61061913 -2.10618722   2.74777861
```

```
-1.52243656]]
질편: [63.21471165]
훈련 정확도:0.99039
테스트 정확도:0.92562
```

DNN 구성

```
In [13]:
```

```
%%time
```

```
model = keras.models.Sequential()
model.add(keras.layers.Dense(256, activation='relu', input_shape=(26,)))
model.add(keras.layers.Dense(100, activation='relu'))
model.add(keras.layers.Dense(32, activation='relu'))
model.add(keras.layers.Dense(1))
model.compile(loss='mse', optimizer='rmsprop', metrics=['mae'])
```

```
hist = model.fit(X_train, y_train, epochs=100, batch_size=1, validation_data=(X_test, y_test), shuffle=True)
```

```
Train on 45 samples, validate on 5 samples
```

```
Epoch 1/100
```

```
45/45 [=====] - 1s 20ms/sample - loss: 3517.5854 - mae: 55.0127 - val_loss: 1656.5198 - val_mae: 36.4793
```

```
Epoch 2/100
```

```
45/45 [=====] - 0s 2ms/sample - loss: 562.6649 - mae: 18.3012 - val_loss: 145.2783 - val_mae: 8.9826
```

```
Epoch 3/100
```

```
45/45 [=====] - 0s 2ms/sample - loss: 132.1918 - mae: 9.1408 - val_loss: 118.0223 - val_mae: 9.7472
```

```
Epoch 4/100
```

```
45/45 [=====] - 0s 2ms/sample - loss: 86.4662 - mae: 7.6993 - val_loss: 72.9060 - val_mae: 7.0049
```

```
Epoch 5/100
```

```
45/45 [=====] - 0s 2ms/sample - loss: 88.5094 - mae: 6.8397 - val_loss: 58.6837 - val_mae: 6.7191
```

```
Epoch 6/100
```

```
45/45 [=====] - 0s 2ms/sample - loss: 63.0508 - mae: 5.4624 - val_loss: 51.7963 - val_mae: 5.5864
```

```
Epoch 7/100
```

```
45/45 [=====] - 0s 2ms/sample - loss: 48.3729 - mae: 5.2081 - val_loss: 64.5569 - val_mae: 7.3873
```

```
Epoch 8/100
```

```
45/45 [=====] - 0s 2ms/sample - loss: 40.5677 - mae: 5.0709 - val_loss: 65.3769 - val_mae: 7.4906
```

```
Epoch 9/100
```

```
45/45 [=====] - 0s 2ms/sample - loss: 31.5387 - mae: 4.4796 - val_loss: 63.6240 - val_mae: 6.1061
```

```
Epoch 10/100
```

```
45/45 [=====] - 0s 2ms/sample - loss: 32.8884 - mae: 4.4165 - val_loss: 51.0800 - val_mae: 5.3586
```

```
Epoch 11/100
```

```
45/45 [=====] - 0s 3ms/sample - loss: 23.6932 - mae: 3.8173 - val_loss: 53.0755 - val_mae: 6.0652
```

```
Epoch 12/100
```

```
45/45 [=====] - 0s 2ms/sample - loss: 25.8039 - mae: 3.8873 - val_loss: 62.8108 - val_mae: 7.0054
```

```
Epoch 13/100
```

```
45/45 [=====] - 0s 2ms/sample - loss: 19.7479 - mae: 3.3578 - val_loss: 27.4419 - val_mae: 4.1359
```

```
Epoch 14/100
```

```
45/45 [=====] - 0s 2ms/sample - loss: 20.1850 - mae: 3.3099 - val_loss: 54.5662 - val_mae: 5.7957
```

```
Epoch 15/100
```

```
45/45 [=====] - 0s 2ms/sample - loss: 16.4030 - mae: 3.0427 - val_loss: 46.1178 - val_mae: 5.9465
```

```
Epoch 16/100
```

```
45/45 [=====] - 0s 2ms/sample - loss: 15.7945 - mae: 2.9684 - val_loss: 41.1111 - val_mae: 5.4444
```

```
45/45 [=====] - 0s 2ms/sample - loss: 17.7843 - mae: 3.0694 - val_loss
: 45.9442 - val_mae: 4.9708
Epoch 17/100
45/45 [=====] - 0s 2ms/sample - loss: 14.6559 - mae: 2.9577 - val_loss
: 58.2304 - val_mae: 6.4838
Epoch 18/100
45/45 [=====] - 0s 2ms/sample - loss: 17.6506 - mae: 3.2810 - val_loss
: 69.1421 - val_mae: 6.8728
Epoch 19/100
45/45 [=====] - 0s 2ms/sample - loss: 13.8988 - mae: 2.9150 - val_loss
: 98.7472 - val_mae: 7.1798
Epoch 20/100
45/45 [=====] - 0s 2ms/sample - loss: 13.4681 - mae: 2.8438 - val_loss
: 101.6175 - val_mae: 8.7048
Epoch 21/100
45/45 [=====] - 0s 2ms/sample - loss: 15.8996 - mae: 3.2685 - val_loss
: 70.5862 - val_mae: 7.4734
Epoch 22/100
45/45 [=====] - 0s 3ms/sample - loss: 9.2445 - mae: 2.5050 - val_loss:
64.9842 - val_mae: 6.4036
Epoch 23/100
45/45 [=====] - 0s 2ms/sample - loss: 19.3703 - mae: 3.3352 - val_loss
: 74.8124 - val_mae: 6.9538
Epoch 24/100
45/45 [=====] - 0s 2ms/sample - loss: 11.9883 - mae: 2.8687 - val_loss
: 64.2303 - val_mae: 6.9504
Epoch 25/100
45/45 [=====] - 0s 3ms/sample - loss: 10.5991 - mae: 2.5341 - val_loss
: 57.3480 - val_mae: 6.9269
Epoch 26/100
45/45 [=====] - 0s 2ms/sample - loss: 12.1181 - mae: 2.9267 - val_loss
: 74.3318 - val_mae: 7.2188
Epoch 27/100
45/45 [=====] - 0s 2ms/sample - loss: 12.1245 - mae: 2.7588 - val_loss
: 67.9356 - val_mae: 7.4736
Epoch 28/100
45/45 [=====] - 0s 2ms/sample - loss: 11.4736 - mae: 2.7864 - val_loss
: 121.2234 - val_mae: 9.0311
Epoch 29/100
45/45 [=====] - 0s 2ms/sample - loss: 10.3366 - mae: 2.6317 - val_loss
: 82.1376 - val_mae: 7.5695
Epoch 30/100
45/45 [=====] - 0s 2ms/sample - loss: 12.4881 - mae: 2.8943 - val_loss
: 94.9821 - val_mae: 7.9759
Epoch 31/100
45/45 [=====] - 0s 2ms/sample - loss: 10.4885 - mae: 2.5837 - val_loss
: 118.9444 - val_mae: 9.3841
Epoch 32/100
45/45 [=====] - 0s 2ms/sample - loss: 8.4396 - mae: 2.2950 - val_loss:
105.5786 - val_mae: 8.5914
Epoch 33/100
45/45 [=====] - 0s 2ms/sample - loss: 9.9624 - mae: 2.2366 - val_loss:
124.8209 - val_mae: 9.2424
Epoch 34/100
45/45 [=====] - 0s 3ms/sample - loss: 9.6002 - mae: 2.4644 - val_loss:
90.3448 - val_mae: 8.2153
Epoch 35/100
45/45 [=====] - 0s 2ms/sample - loss: 9.7513 - mae: 2.2312 - val_loss:
84.1291 - val_mae: 8.3426
Epoch 36/100
45/45 [=====] - 0s 2ms/sample - loss: 14.0291 - mae: 3.0127 - val_loss
: 103.0371 - val_mae: 8.0533
Epoch 37/100
45/45 [=====] - 0s 2ms/sample - loss: 9.1361 - mae: 2.4616 - val_loss:
84.6912 - val_mae: 7.0543
Epoch 38/100
45/45 [=====] - 0s 3ms/sample - loss: 9.9730 - mae: 2.5551 - val_loss:
55.3478 - val_mae: 6.7774
Epoch 39/100
```

```
45/45 [=====] - 0s 3ms/sample - loss: 8.3069 - mae: 2.3526 - val_loss:
83.8205 - val_mae: 7.8619
Epoch 40/100
45/45 [=====] - 0s 2ms/sample - loss: 11.1486 - mae: 2.6082 - val_loss
: 74.1506 - val_mae: 7.4730
Epoch 41/100
45/45 [=====] - 0s 2ms/sample - loss: 7.2677 - mae: 2.1695 - val_loss:
58.0671 - val_mae: 6.4169
Epoch 42/100
45/45 [=====] - 0s 3ms/sample - loss: 9.0514 - mae: 2.3556 - val_loss:
72.1551 - val_mae: 7.2206
Epoch 43/100
45/45 [=====] - 0s 2ms/sample - loss: 11.5541 - mae: 2.6325 - val_loss
: 72.6485 - val_mae: 7.6661
Epoch 44/100
45/45 [=====] - 0s 2ms/sample - loss: 6.4206 - mae: 2.0751 - val_loss:
67.1647 - val_mae: 7.1566
Epoch 45/100
45/45 [=====] - 0s 2ms/sample - loss: 10.4339 - mae: 2.7804 - val_loss
: 90.0616 - val_mae: 7.7300
Epoch 46/100
45/45 [=====] - 0s 3ms/sample - loss: 8.1845 - mae: 2.3849 - val_loss:
75.3751 - val_mae: 7.2335
Epoch 47/100
45/45 [=====] - 0s 2ms/sample - loss: 8.9264 - mae: 2.4561 - val_loss:
102.4369 - val_mae: 8.6540
Epoch 48/100
45/45 [=====] - 0s 2ms/sample - loss: 9.3422 - mae: 2.3863 - val_loss:
108.7020 - val_mae: 8.9155
Epoch 49/100
45/45 [=====] - 0s 3ms/sample - loss: 9.6628 - mae: 2.4268 - val_loss:
98.6434 - val_mae: 8.4058
Epoch 50/100
45/45 [=====] - 0s 3ms/sample - loss: 8.2651 - mae: 2.3443 - val_loss:
90.1990 - val_mae: 7.9900
Epoch 51/100
45/45 [=====] - 0s 2ms/sample - loss: 7.7844 - mae: 2.2831 - val_loss:
62.9195 - val_mae: 6.8177
Epoch 52/100
45/45 [=====] - 0s 3ms/sample - loss: 9.2909 - mae: 2.4533 - val_loss:
85.3639 - val_mae: 8.0756
Epoch 53/100
45/45 [=====] - 0s 3ms/sample - loss: 7.5824 - mae: 2.0955 - val_loss:
98.0603 - val_mae: 8.6457
Epoch 54/100
45/45 [=====] - 0s 2ms/sample - loss: 10.4167 - mae: 2.5513 - val_loss
: 95.0567 - val_mae: 7.9807
Epoch 55/100
45/45 [=====] - 0s 2ms/sample - loss: 6.0491 - mae: 1.7821 - val_loss:
74.5156 - val_mae: 6.7176
Epoch 56/100
45/45 [=====] - 0s 2ms/sample - loss: 9.3387 - mae: 2.2449 - val_loss:
106.0014 - val_mae: 8.1299
Epoch 57/100
45/45 [=====] - 0s 2ms/sample - loss: 7.4921 - mae: 2.2013 - val_loss:
113.6316 - val_mae: 8.2139
Epoch 58/100
45/45 [=====] - 0s 3ms/sample - loss: 9.6119 - mae: 2.4738 - val_loss:
109.0373 - val_mae: 8.4841
Epoch 59/100
45/45 [=====] - 0s 3ms/sample - loss: 7.1905 - mae: 2.1254 - val_loss:
93.1726 - val_mae: 8.2531
Epoch 60/100
45/45 [=====] - 0s 2ms/sample - loss: 10.2976 - mae: 2.5017 - val_loss
: 64.3757 - val_mae: 6.3753
Epoch 61/100
45/45 [=====] - 0s 2ms/sample - loss: 7.9617 - mae: 2.2888 - val_loss:
91.4446 - val_mae: 8.4771
Epoch 62/100
```

```
45/45 [=====] - 0s 2ms/sample - loss: 7.2727 - mae: 2.0580 - val_loss:
94.4375 - val_mae: 8.5696
Epoch 63/100
45/45 [=====] - 0s 3ms/sample - loss: 10.5759 - mae: 2.4799 - val_loss
: 83.8462 - val_mae: 7.4246
Epoch 64/100
45/45 [=====] - 0s 3ms/sample - loss: 8.2742 - mae: 2.1992 - val_loss:
100.4145 - val_mae: 8.0812
Epoch 65/100
45/45 [=====] - 0s 3ms/sample - loss: 8.4892 - mae: 2.4006 - val_loss:
101.5233 - val_mae: 8.6488
Epoch 66/100
45/45 [=====] - 0s 2ms/sample - loss: 6.5972 - mae: 2.0751 - val_loss:
83.4171 - val_mae: 7.3656
Epoch 67/100
45/45 [=====] - 0s 2ms/sample - loss: 8.7747 - mae: 2.1498 - val_loss:
88.0625 - val_mae: 7.7954
Epoch 68/100
45/45 [=====] - 0s 2ms/sample - loss: 8.5215 - mae: 2.2132 - val_loss:
111.1864 - val_mae: 9.0229
Epoch 69/100
45/45 [=====] - 0s 2ms/sample - loss: 5.6450 - mae: 1.7619 - val_loss:
67.2386 - val_mae: 7.3458
Epoch 70/100
45/45 [=====] - 0s 2ms/sample - loss: 7.8071 - mae: 2.2207 - val_loss:
110.0151 - val_mae: 8.6722
Epoch 71/100
45/45 [=====] - 0s 2ms/sample - loss: 7.8590 - mae: 2.3233 - val_loss:
136.2501 - val_mae: 9.8402
Epoch 72/100
45/45 [=====] - 0s 2ms/sample - loss: 7.3154 - mae: 2.1206 - val_loss:
103.8968 - val_mae: 8.6919
Epoch 73/100
45/45 [=====] - 0s 2ms/sample - loss: 7.1675 - mae: 2.1303 - val_loss:
93.9914 - val_mae: 7.9788
Epoch 74/100
45/45 [=====] - 0s 3ms/sample - loss: 9.6572 - mae: 2.4556 - val_loss:
76.4797 - val_mae: 7.6448
Epoch 75/100
45/45 [=====] - 0s 2ms/sample - loss: 6.7279 - mae: 2.0162 - val_loss:
84.9778 - val_mae: 7.3806
Epoch 76/100
45/45 [=====] - 0s 2ms/sample - loss: 10.0394 - mae: 2.4373 - val_loss
: 98.7059 - val_mae: 7.9206
Epoch 77/100
45/45 [=====] - 0s 2ms/sample - loss: 6.5718 - mae: 2.0784 - val_loss:
81.8330 - val_mae: 7.8178
Epoch 78/100
45/45 [=====] - 0s 3ms/sample - loss: 7.8968 - mae: 2.1648 - val_loss:
71.1556 - val_mae: 7.1290
Epoch 79/100
45/45 [=====] - 0s 3ms/sample - loss: 8.2102 - mae: 2.2185 - val_loss:
91.2232 - val_mae: 8.1849
Epoch 80/100
45/45 [=====] - 0s 2ms/sample - loss: 6.0007 - mae: 1.8001 - val_loss:
85.4085 - val_mae: 7.3268
Epoch 81/100
45/45 [=====] - 0s 2ms/sample - loss: 6.5341 - mae: 1.9725 - val_loss:
102.2528 - val_mae: 8.4073
Epoch 82/100
45/45 [=====] - 0s 2ms/sample - loss: 7.0105 - mae: 2.0425 - val_loss:
59.9072 - val_mae: 6.5108
Epoch 83/100
45/45 [=====] - 0s 3ms/sample - loss: 8.7610 - mae: 2.4327 - val_loss:
99.8021 - val_mae: 7.4426
Epoch 84/100
45/45 [=====] - 0s 3ms/sample - loss: 5.8785 - mae: 1.9401 - val_loss:
96.6653 - val_mae: 8.2960
Epoch 85/100
```

```
45/45 [=====] - 0s 2ms/sample - loss: 10.7434 - mae: 2.3399 - val_loss:
: 71.8581 - val_mae: 6.7023
Epoch 86/100
45/45 [=====] - 0s 2ms/sample - loss: 7.7456 - mae: 2.1894 - val_loss:
95.4627 - val_mae: 8.5865
Epoch 87/100
45/45 [=====] - 0s 2ms/sample - loss: 6.8644 - mae: 2.0580 - val_loss:
106.8260 - val_mae: 8.8918
Epoch 88/100
45/45 [=====] - 0s 2ms/sample - loss: 8.1492 - mae: 2.1928 - val_loss:
101.6943 - val_mae: 7.9058
Epoch 89/100
45/45 [=====] - 0s 2ms/sample - loss: 8.6442 - mae: 2.0275 - val_loss:
104.1445 - val_mae: 8.3146
Epoch 90/100
45/45 [=====] - ETA: 0s - loss: 5.2800 - mae: 1.9267 - 0s 2ms/sample -
loss: 5.0653 - mae: 1.8613 - val_loss: 78.5137 - val_mae: 7.2891
Epoch 91/100
45/45 [=====] - 0s 2ms/sample - loss: 6.8887 - mae: 2.1255 - val_loss:
71.2500 - val_mae: 7.8218
Epoch 92/100
45/45 [=====] - 0s 2ms/sample - loss: 9.2542 - mae: 2.3258 - val_loss:
66.6569 - val_mae: 6.5938
Epoch 93/100
45/45 [=====] - 0s 3ms/sample - loss: 7.3498 - mae: 2.0873 - val_loss:
95.9330 - val_mae: 7.8447
Epoch 94/100
45/45 [=====] - 0s 2ms/sample - loss: 5.9463 - mae: 1.8832 - val_loss:
92.1845 - val_mae: 8.1732
Epoch 95/100
45/45 [=====] - 0s 2ms/sample - loss: 6.7548 - mae: 2.0374 - val_loss:
79.3021 - val_mae: 7.4756
Epoch 96/100
45/45 [=====] - 0s 2ms/sample - loss: 5.2149 - mae: 1.9376 - val_loss:
72.0046 - val_mae: 7.0358
Epoch 97/100
45/45 [=====] - 0s 2ms/sample - loss: 9.3290 - mae: 2.4123 - val_loss:
75.7352 - val_mae: 7.2308
Epoch 98/100
45/45 [=====] - 0s 2ms/sample - loss: 7.2185 - mae: 2.1001 - val_loss:
101.1285 - val_mae: 8.6336
Epoch 99/100
45/45 [=====] - 0s 2ms/sample - loss: 9.1894 - mae: 2.2417 - val_loss:
105.2556 - val_mae: 8.4234
Epoch 100/100
45/45 [=====] - 0s 2ms/sample - loss: 5.3161 - mae: 1.7475 - val_loss:
92.3166 - val_mae: 8.0149
Wall time: 11.3 s
```

```
In [14]:
#과적합되었다.
```

하이퍼파라미터 튜닝

```
In [15]:
import numpy as np
```

```
In [16]:
keras.backend.clear_session()
np.random.seed(42)
tf.random.set_seed(42)
```

```
In [17]:
def build_model(n_hidden=1, n_neurons=30, learning_rate=3e-3, input_shape=[26]):
    model = keras.models.Sequential()
    model.add(keras.layers.InputLayer(input_shape=input_shape))
    for layer in range(n_hidden):
        model.add(keras.layers.Dense(n_neurons, activation="relu"))
```



```

        model.add(keras.layers.Dense(n_neurons, activation='tanh'))
    model.add(keras.layers.Dense(1))
    optimizer = keras.optimizers.SGD(lr=learning_rate)
    model.compile(loss="mse", optimizer=optimizer, metrics=['mae'])
    return model

```

In [18]:

```
keras_reg = keras.wrappers.scikit_learn.KerasRegressor(build_model)
```

In [19]:

```

keras_reg.fit(X_train, y_train, epochs=100,
              validation_data=(X_test, y_test),
              callbacks=[keras.callbacks.EarlyStopping(patience=10)])

```

Train on 45 samples, validate on 5 samples

Epoch 1/100

45/45 [=====] - 0s 8ms/sample - loss: 4259.5755 - mae: 62.3482 - val_loss: 2983.4260 - val_mae: 52.2749

Epoch 2/100

45/45 [=====] - 0s 244us/sample - loss: 3125.2669 - mae: 52.8534 - val_loss: 1011.6123 - val_mae: 30.0256

Epoch 3/100

45/45 [=====] - 0s 288us/sample - loss: 633.1677 - mae: 21.6338 - val_loss: 347.0072 - val_mae: 15.2916

Epoch 4/100

45/45 [=====] - 0s 310us/sample - loss: 161.5224 - mae: 10.6456 - val_loss: 109.2932 - val_mae: 7.7679

Epoch 5/100

45/45 [=====] - 0s 289us/sample - loss: 128.3043 - mae: 8.7666 - val_loss: 152.3544 - val_mae: 9.7746

Epoch 6/100

45/45 [=====] - 0s 266us/sample - loss: 107.1447 - mae: 8.1882 - val_loss: 104.1546 - val_mae: 6.8246

Epoch 7/100

45/45 [=====] - 0s 244us/sample - loss: 77.3953 - mae: 7.0106 - val_loss: 93.1701 - val_mae: 7.1585

Epoch 8/100

45/45 [=====] - 0s 310us/sample - loss: 65.6560 - mae: 6.2057 - val_loss: 76.6010 - val_mae: 7.5289

Epoch 9/100

45/45 [=====] - 0s 222us/sample - loss: 59.2730 - mae: 5.8534 - val_loss: 84.0380 - val_mae: 7.2071

Epoch 10/100

45/45 [=====] - 0s 222us/sample - loss: 66.3246 - mae: 6.5082 - val_loss: 74.9095 - val_mae: 6.6180

Epoch 11/100

45/45 [=====] - 0s 244us/sample - loss: 71.3806 - mae: 6.7182 - val_loss: 63.8591 - val_mae: 5.9385

Epoch 12/100

45/45 [=====] - 0s 222us/sample - loss: 45.3574 - mae: 5.1757 - val_loss: 41.1828 - val_mae: 4.9029

Epoch 13/100

45/45 [=====] - 0s 199us/sample - loss: 36.3834 - mae: 4.6996 - val_loss: 34.7032 - val_mae: 5.5206

Epoch 14/100

45/45 [=====] - 0s 222us/sample - loss: 41.5430 - mae: 4.8295 - val_loss: 27.3088 - val_mae: 4.6811

Epoch 15/100

45/45 [=====] - 0s 199us/sample - loss: 36.4664 - mae: 4.5410 - val_loss: 31.6893 - val_mae: 4.7251

Epoch 16/100

45/45 [=====] - 0s 243us/sample - loss: 28.9728 - mae: 4.0457 - val_loss: 30.9954 - val_mae: 4.3680

Epoch 17/100

45/45 [=====] - 0s 332us/sample - loss: 29.1996 - mae: 4.4253 - val_loss: 30.7377 - val_mae: 4.6513

Epoch 18/100

45/45 [=====] - 0s 267us/sample - loss: 25.3630 - mae: 3.7125 - val_loss: 28.7481 - val_mae: 4.4236

Epoch 19/100

```
Epoch 19/100
45/45 [=====] - 0s 244us/sample - loss: 25.5400 - mae: 3.8268 - val_loss: 33.2615 - val_mae: 4.9045
Epoch 20/100
45/45 [=====] - 0s 244us/sample - loss: 25.0189 - mae: 3.9206 - val_loss: 23.6766 - val_mae: 4.0787
Epoch 21/100
45/45 [=====] - 0s 244us/sample - loss: 30.9077 - mae: 4.1534 - val_loss: 47.9999 - val_mae: 5.3724
Epoch 22/100
45/45 [=====] - 0s 243us/sample - loss: 27.7125 - mae: 3.8442 - val_loss: 20.2570 - val_mae: 3.4118
Epoch 23/100
45/45 [=====] - 0s 220us/sample - loss: 21.9843 - mae: 3.6703 - val_loss: 15.9086 - val_mae: 3.3046
Epoch 24/100
45/45 [=====] - 0s 266us/sample - loss: 21.2485 - mae: 3.7225 - val_loss: 39.5284 - val_mae: 4.8010
Epoch 25/100
45/45 [=====] - 0s 221us/sample - loss: 22.8653 - mae: 3.5989 - val_loss: 23.9585 - val_mae: 3.7091
Epoch 26/100
45/45 [=====] - 0s 243us/sample - loss: 17.4996 - mae: 3.3012 - val_loss: 19.7491 - val_mae: 3.4267
Epoch 27/100
45/45 [=====] - 0s 221us/sample - loss: 17.4720 - mae: 3.2388 - val_loss: 25.3832 - val_mae: 3.5140
Epoch 28/100
45/45 [=====] - 0s 221us/sample - loss: 16.1274 - mae: 3.1204 - val_loss: 20.1527 - val_mae: 3.7164
Epoch 29/100
45/45 [=====] - 0s 244us/sample - loss: 17.0759 - mae: 3.2938 - val_loss: 34.1141 - val_mae: 4.2218
Epoch 30/100
45/45 [=====] - 0s 267us/sample - loss: 17.2950 - mae: 3.1073 - val_loss: 29.5554 - val_mae: 3.8151
Epoch 31/100
45/45 [=====] - 0s 243us/sample - loss: 16.0753 - mae: 3.1966 - val_loss: 30.5338 - val_mae: 3.8997
Epoch 32/100
45/45 [=====] - 0s 244us/sample - loss: 14.1516 - mae: 2.6957 - val_loss: 22.1077 - val_mae: 4.2602
Epoch 33/100
45/45 [=====] - 0s 265us/sample - loss: 21.6445 - mae: 3.7722 - val_loss: 22.3312 - val_mae: 3.5881

```

<tensorflow.python.keras.callbacks.History at 0x1e2402be518>

```
In [20]:
mse_test = keras_reg.score(X_test, y_test)
```

```
5/5 [=====] - 0s 598us/sample - loss: 22.3312 - mae: 3.5881
```

```
In [21]:
from scipy.stats import reciprocal
from sklearn.model_selection import RandomizedSearchCV

param_distributions = {
    "n_hidden": [0, 1, 2, 3],
    "n_neurons": np.arange(1, 100),
    "learning_rate": reciprocal(3e-4, 3e-2),
}

rnd_search_cv = RandomizedSearchCV(keras_reg, param_distributions, n_iter=10, cv=3, verbose=2)
rnd_search_cv.fit(X_train, y_train, epochs=100,
```

```
validation_data=(X_test, y_test),  
callbacks=[keras.callbacks.EarlyStopping(patience=10)])
```

```
Fitting 3 folds for each of 10 candidates, totalling 30 fits  
[CV] learning_rate=0.001683454924600351, n_hidden=0, n_neurons=15 ....  
Train on 30 samples, validate on 5 samples  
Epoch 1/100
```

```
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1 concurrent workers.
```

```
30/30 [=====] - 0s 11ms/sample - loss: 4442.4536 - mae: 63.3065 - val_  
_loss: 3744.7200 - val_mae: 59.1898  
Epoch 2/100  
30/30 [=====] - 0s 299us/sample - loss: 4382.2798 - mae: 63.1047 - val_  
_loss: 3714.7051 - val_mae: 59.1090  
Epoch 3/100  
30/30 [=====] - 0s 299us/sample - loss: 4325.3047 - mae: 62.9016 - val_  
_loss: 3686.3276 - val_mae: 59.0242  
Epoch 4/100  
30/30 [=====] - 0s 334us/sample - loss: 4271.2119 - mae: 62.6973 - val_  
_loss: 3659.3926 - val_mae: 58.9356  
Epoch 5/100  
30/30 [=====] - 0s 331us/sample - loss: 4219.7153 - mae: 62.4920 - val_  
_loss: 3633.7273 - val_mae: 58.8434  
Epoch 6/100  
30/30 [=====] - 0s 332us/sample - loss: 4170.5645 - mae: 62.2858 - val_  
_loss: 3609.1797 - val_mae: 58.7479  
Epoch 7/100  
30/30 [=====] - 0s 332us/sample - loss: 4123.5332 - mae: 62.0788 - val_  
_loss: 3585.6165 - val_mae: 58.6492  
Epoch 8/100  
30/30 [=====] - 0s 365us/sample - loss: 4078.4211 - mae: 61.8710 - val_  
_loss: 3562.9194 - val_mae: 58.5476  
Epoch 9/100  
30/30 [=====] - 0s 333us/sample - loss: 4035.0498 - mae: 61.6627 - val_  
_loss: 3540.9858 - val_mae: 58.4432  
Epoch 10/100  
30/30 [=====] - 0s 331us/sample - loss: 3993.2600 - mae: 61.4538 - val_  
_loss: 3519.7246 - val_mae: 58.3362  
Epoch 11/100  
30/30 [=====] - 0s 298us/sample - loss: 3952.9089 - mae: 61.2445 - val_  
_loss: 3499.0547 - val_mae: 58.2268  
Epoch 12/100  
30/30 [=====] - 0s 334us/sample - loss: 3913.8699 - mae: 61.0348 - val_  
_loss: 3478.9077 - val_mae: 58.1151  
Epoch 13/100  
30/30 [=====] - 0s 332us/sample - loss: 3876.0291 - mae: 60.8248 - val_  
_loss: 3459.2212 - val_mae: 58.0013  
Epoch 14/100  
30/30 [=====] - 0s 299us/sample - loss: 3839.2864 - mae: 60.6146 - val_  
_loss: 3439.9407 - val_mae: 57.8854  
Epoch 15/100  
30/30 [=====] - 0s 398us/sample - loss: 3803.5508 - mae: 60.4043 - val_  
_loss: 3421.0200 - val_mae: 57.7678  
Epoch 16/100  
30/30 [=====] - 0s 366us/sample - loss: 3768.7412 - mae: 60.1938 - val_  
_loss: 3402.4175 - val_mae: 57.6484  
Epoch 17/100  
30/30 [=====] - 0s 331us/sample - loss: 3734.7852 - mae: 59.9834 - val_  
_loss: 3384.0977 - val_mae: 57.5273  
Epoch 18/100  
30/30 [=====] - 0s 367us/sample - loss: 3701.6182 - mae: 59.7729 - val_  
_loss: 3366.0281 - val_mae: 57.4048  
Epoch 19/100  
30/30 [=====] - 0s 366us/sample - loss: 3669.1821 - mae: 59.5626 - val_  
_loss: 3348.1824 - val_mae: 57.2808
```

```
Epoch 20/100
30/30 [=====] - 0s 298us/sample - loss: 3637.4248 - mae: 59.3523 - val
_loss: 3330.5364 - val_mae: 57.1555
Epoch 21/100
30/30 [=====] - 0s 399us/sample - loss: 3606.2996 - mae: 59.1422 - val
_loss: 3313.0696 - val_mae: 57.0290
Epoch 22/100
30/30 [=====] - 0s 333us/sample - loss: 3575.7646 - mae: 58.9324 - val
_loss: 3295.7637 - val_mae: 56.9014
Epoch 23/100
30/30 [=====] - 0s 331us/sample - loss: 3545.7820 - mae: 58.7227 - val
_loss: 3278.6030 - val_mae: 56.7727
Epoch 24/100
30/30 [=====] - 0s 399us/sample - loss: 3516.3179 - mae: 58.5134 - val
_loss: 3261.5754 - val_mae: 56.6430
Epoch 25/100
30/30 [=====] - 0s 331us/sample - loss: 3487.3423 - mae: 58.3043 - val
_loss: 3244.6685 - val_mae: 56.5124
Epoch 26/100
30/30 [=====] - 0s 332us/sample - loss: 3458.8269 - mae: 58.0956 - val
_loss: 3227.8726 - val_mae: 56.3810
Epoch 27/100
30/30 [=====] - 0s 399us/sample - loss: 3430.7466 - mae: 57.8873 - val
_loss: 3211.1787 - val_mae: 56.2488
Epoch 28/100
30/30 [=====] - 0s 333us/sample - loss: 3403.0793 - mae: 57.6794 - val
_loss: 3194.5806 - val_mae: 56.1159
Epoch 29/100
30/30 [=====] - 0s 298us/sample - loss: 3375.8049 - mae: 57.4719 - val
_loss: 3178.0715 - val_mae: 55.9824
Epoch 30/100
30/30 [=====] - 0s 399us/sample - loss: 3348.9045 - mae: 57.2648 - val
_loss: 3161.6462 - val_mae: 55.8482
Epoch 31/100
30/30 [=====] - 0s 232us/sample - loss: 3322.3611 - mae: 57.0583 - val
_loss: 3145.3005 - val_mae: 55.7135
Epoch 32/100
30/30 [=====] - 0s 366us/sample - loss: 3296.1599 - mae: 56.8522 - val
_loss: 3129.0312 - val_mae: 55.5783
Epoch 33/100
30/30 [=====] - 0s 300us/sample - loss: 3270.2876 - mae: 56.6466 - val
_loss: 3112.8347 - val_mae: 55.4427
Epoch 34/100
30/30 [=====] - 0s 298us/sample - loss: 3244.7297 - mae: 56.4416 - val
_loss: 3096.7090 - val_mae: 55.3066
Epoch 35/100
30/30 [=====] - 0s 266us/sample - loss: 3219.4761 - mae: 56.2371 - val
_loss: 3080.6514 - val_mae: 55.1702
Epoch 36/100
30/30 [=====] - 0s 299us/sample - loss: 3194.5154 - mae: 56.0332 - val
_loss: 3064.6606 - val_mae: 55.0334
Epoch 37/100
30/30 [=====] - 0s 332us/sample - loss: 3169.8381 - mae: 55.8298 - val
_loss: 3048.7356 - val_mae: 54.8964
Epoch 38/100
30/30 [=====] - 0s 332us/sample - loss: 3145.4353 - mae: 55.6271 - val
_loss: 3032.8750 - val_mae: 54.7591
Epoch 39/100
30/30 [=====] - 0s 299us/sample - loss: 3121.2981 - mae: 55.4249 - val
_loss: 3017.0781 - val_mae: 54.6216
Epoch 40/100
30/30 [=====] - 0s 298us/sample - loss: 3097.4197 - mae: 55.2234 - val
_loss: 3001.3450 - val_mae: 54.4838
Epoch 41/100
30/30 [=====] - 0s 299us/sample - loss: 3073.7927 - mae: 55.0225 - val
_loss: 2985.6743 - val_mae: 54.3459
Epoch 42/100
30/30 [=====] - 0s 299us/sample - loss: 3050.4102 - mae: 54.8222 - val
_loss: 2970.0664 - val_mae: 54.2079
```

```
Epoch 43/100
30/30 [=====] - 0s 266us/sample - loss: 3027.2656 - mae: 54.6225 - val
_loss: 2954.5210 - val_mae: 54.0698
Epoch 44/100
30/30 [=====] - 0s 299us/sample - loss: 3004.3542 - mae: 54.4235 - val
_loss: 2939.0386 - val_mae: 53.9316
Epoch 45/100
30/30 [=====] - 0s 232us/sample - loss: 2981.6704 - mae: 54.2252 - val
_loss: 2923.6187 - val_mae: 53.7933
Epoch 46/100
30/30 [=====] - 0s 299us/sample - loss: 2959.2080 - mae: 54.0275 - val
_loss: 2908.2612 - val_mae: 53.6550
Epoch 47/100
30/30 [=====] - 0s 265us/sample - loss: 2936.9641 - mae: 53.8305 - val
_loss: 2892.9675 - val_mae: 53.5166
Epoch 48/100
30/30 [=====] - 0s 298us/sample - loss: 2914.9331 - mae: 53.6342 - val
_loss: 2877.7371 - val_mae: 53.3783
Epoch 49/100
30/30 [=====] - 0s 266us/sample - loss: 2893.1106 - mae: 53.4386 - val
_loss: 2862.5698 - val_mae: 53.2400
Epoch 50/100
30/30 [=====] - 0s 333us/sample - loss: 2871.4934 - mae: 53.2436 - val
_loss: 2847.4673 - val_mae: 53.1017
Epoch 51/100
30/30 [=====] - 0s 332us/sample - loss: 2850.0776 - mae: 53.0493 - val
_loss: 2832.4282 - val_mae: 52.9634
Epoch 52/100
30/30 [=====] - 0s 265us/sample - loss: 2828.8594 - mae: 52.8557 - val
_loss: 2817.4546 - val_mae: 52.8253
Epoch 53/100
30/30 [=====] - 0s 333us/sample - loss: 2807.8350 - mae: 52.6628 - val
_loss: 2802.5452 - val_mae: 52.6872
Epoch 54/100
30/30 [=====] - 0s 299us/sample - loss: 2787.0017 - mae: 52.4706 - val
_loss: 2787.7017 - val_mae: 52.5492
Epoch 55/100
30/30 [=====] - 0s 298us/sample - loss: 2766.3562 - mae: 52.2791 - val
_loss: 2772.9229 - val_mae: 52.4113
Epoch 56/100
30/30 [=====] - 0s 299us/sample - loss: 2745.8955 - mae: 52.0883 - val
_loss: 2758.2104 - val_mae: 52.2736
Epoch 57/100
30/30 [=====] - 0s 399us/sample - loss: 2725.6169 - mae: 51.8982 - val
_loss: 2743.5640 - val_mae: 52.1360
Epoch 58/100
30/30 [=====] - 0s 334us/sample - loss: 2705.5178 - mae: 51.7088 - val
_loss: 2728.9841 - val_mae: 51.9985
Epoch 59/100
30/30 [=====] - 0s 299us/sample - loss: 2685.5950 - mae: 51.5201 - val
_loss: 2714.4712 - val_mae: 51.8612
Epoch 60/100
30/30 [=====] - 0s 332us/sample - loss: 2665.8462 - mae: 51.3321 - val
_loss: 2700.0249 - val_mae: 51.7241
Epoch 61/100
30/30 [=====] - 0s 366us/sample - loss: 2646.2688 - mae: 51.1448 - val
_loss: 2685.6465 - val_mae: 51.5871
Epoch 62/100
30/30 [=====] - 0s 332us/sample - loss: 2626.8608 - mae: 50.9583 - val
_loss: 2671.3347 - val_mae: 51.4503
Epoch 63/100
30/30 [=====] - 0s 299us/sample - loss: 2607.6201 - mae: 50.7724 - val
_loss: 2657.0913 - val_mae: 51.3137
Epoch 64/100
30/30 [=====] - 0s 299us/sample - loss: 2588.5439 - mae: 50.5872 - val
_loss: 2642.9153 - val_mae: 51.1774
Epoch 65/100
30/30 [=====] - 0s 331us/sample - loss: 2569.6306 - mae: 50.4028 - val
_loss: 2628.8071 - val_mae: 51.0412
```

```
Epoch 66/100
30/30 [=====] - 0s 299us/sample - loss: 2550.8774 - mae: 50.2190 - val
_loss: 2614.7671 - val_mae: 50.9053
Epoch 67/100
30/30 [=====] - 0s 332us/sample - loss: 2532.2827 - mae: 50.0359 - val
_loss: 2600.7957 - val_mae: 50.7695
Epoch 68/100
30/30 [=====] - 0s 266us/sample - loss: 2513.8442 - mae: 49.8536 - val
_loss: 2586.8923 - val_mae: 50.6340
Epoch 69/100
30/30 [=====] - 0s 299us/sample - loss: 2495.5608 - mae: 49.6719 - val
_loss: 2573.0576 - val_mae: 50.4988
Epoch 70/100
30/30 [=====] - 0s 333us/sample - loss: 2477.4297 - mae: 49.4909 - val
_loss: 2559.2910 - val_mae: 50.3638
Epoch 71/100
30/30 [=====] - 0s 266us/sample - loss: 2459.4495 - mae: 49.3107 - val
_loss: 2545.5933 - val_mae: 50.2290
Epoch 72/100
30/30 [=====] - 0s 299us/sample - loss: 2441.6182 - mae: 49.1311 - val
_loss: 2531.9641 - val_mae: 50.0945
Epoch 73/100
30/30 [=====] - 0s 266us/sample - loss: 2423.9343 - mae: 48.9522 - val
_loss: 2518.4033 - val_mae: 49.9603
Epoch 74/100
30/30 [=====] - 0s 299us/sample - loss: 2406.3962 - mae: 48.7740 - val
_loss: 2504.9109 - val_mae: 49.8263
Epoch 75/100
30/30 [=====] - 0s 298us/sample - loss: 2389.0015 - mae: 48.5966 - val
_loss: 2491.4873 - val_mae: 49.6926
Epoch 76/100
30/30 [=====] - 0s 266us/sample - loss: 2371.7495 - mae: 48.4198 - val
_loss: 2478.1326 - val_mae: 49.5591
Epoch 77/100
30/30 [=====] - 0s 332us/sample - loss: 2354.6379 - mae: 48.2436 - val
_loss: 2464.8459 - val_mae: 49.4260
Epoch 78/100
30/30 [=====] - 0s 266us/sample - loss: 2337.6658 - mae: 48.0682 - val
_loss: 2451.6277 - val_mae: 49.2931
Epoch 79/100
30/30 [=====] - 0s 264us/sample - loss: 2320.8313 - mae: 47.8935 - val
_loss: 2438.4780 - val_mae: 49.1605
Epoch 80/100
30/30 [=====] - 0s 266us/sample - loss: 2304.1326 - mae: 47.7194 - val
_loss: 2425.3962 - val_mae: 49.0282
Epoch 81/100
30/30 [=====] - 0s 265us/sample - loss: 2287.5688 - mae: 47.5460 - val
_loss: 2412.3833 - val_mae: 48.8961
Epoch 82/100
30/30 [=====] - 0s 266us/sample - loss: 2271.1379 - mae: 47.3733 - val
_loss: 2399.4380 - val_mae: 48.7644
Epoch 83/100
30/30 [=====] - 0s 266us/sample - loss: 2254.8391 - mae: 47.2013 - val
_loss: 2386.5605 - val_mae: 48.6330
Epoch 84/100
30/30 [=====] - 0s 266us/sample - loss: 2238.6704 - mae: 47.0299 - val
_loss: 2373.7515 - val_mae: 48.5018
Epoch 85/100
30/30 [=====] - 0s 266us/sample - loss: 2222.6306 - mae: 46.8592 - val
_loss: 2361.0093 - val_mae: 48.3710
Epoch 86/100
30/30 [=====] - 0s 266us/sample - loss: 2206.7188 - mae: 46.6892 - val
_loss: 2348.3350 - val_mae: 48.2404
Epoch 87/100
30/30 [=====] - 0s 300us/sample - loss: 2190.9333 - mae: 46.5198 - val
_loss: 2335.7280 - val_mae: 48.1102
Epoch 88/100
30/30 [=====] - 0s 298us/sample - loss: 2175.2732 - mae: 46.3511 - val
_loss: 2323.1882 - val_mae: 47.9803
```

```
Epoch 89/100
30/30 [=====] - 0s 266us/sample - loss: 2159.7366 - mae: 46.1831 - val_
_loss: 2310.7158 - val_mae: 47.8507
Epoch 90/100
30/30 [=====] - 0s 300us/sample - loss: 2144.3228 - mae: 46.0157 - val_
_loss: 2298.3098 - val_mae: 47.7214
Epoch 91/100
30/30 [=====] - 0s 265us/sample - loss: 2129.0298 - mae: 45.8489 - val_
_loss: 2285.9712 - val_mae: 47.5924
Epoch 92/100
30/30 [=====] - 0s 266us/sample - loss: 2113.8572 - mae: 45.6829 - val_
_loss: 2273.6980 - val_mae: 47.4637
Epoch 93/100
30/30 [=====] - 0s 298us/sample - loss: 2098.8035 - mae: 45.5174 - val_
_loss: 2261.4917 - val_mae: 47.3353
Epoch 94/100
30/30 [=====] - 0s 266us/sample - loss: 2083.8677 - mae: 45.3526 - val_
_loss: 2249.3516 - val_mae: 47.2073
Epoch 95/100
30/30 [=====] - 0s 266us/sample - loss: 2069.0483 - mae: 45.1885 - val_
_loss: 2237.2769 - val_mae: 47.0796
Epoch 96/100
30/30 [=====] - 0s 265us/sample - loss: 2054.3447 - mae: 45.0250 - val_
_loss: 2225.2681 - val_mae: 46.9522
Epoch 97/100
30/30 [=====] - 0s 265us/sample - loss: 2039.7555 - mae: 44.8621 - val_
_loss: 2213.3247 - val_mae: 46.8251
Epoch 98/100
30/30 [=====] - 0s 265us/sample - loss: 2025.2794 - mae: 44.6999 - val_
_loss: 2201.4468 - val_mae: 46.6983
Epoch 99/100
30/30 [=====] - 0s 266us/sample - loss: 2010.9154 - mae: 44.5383 - val_
_loss: 2189.6335 - val_mae: 46.5719
Epoch 100/100
30/30 [=====] - 0s 266us/sample - loss: 1996.6626 - mae: 44.3774 - val_
_loss: 2177.8853 - val_mae: 46.4458
15/15 [=====] - 0s 199us/sample - loss: 2287.9390 - mae: 47.2808
[CV] learning_rate=0.001683454924600351, n_hidden=0, n_neurons=15, total= 1.5s
[CV] learning_rate=0.001683454924600351, n_hidden=0, n_neurons=15 ....
Train on 30 samples, validate on 5 samples
Epoch 1/100
[Parallel(n_jobs=1)]: Done 1 out of 1 | elapsed: 1.4s remaining: 0.0s

30/30 [=====] - 0s 12ms/sample - loss: 4160.9619 - mae: 61.8290 - val_
_loss: 3728.7441 - val_mae: 59.1222
Epoch 2/100
30/30 [=====] - 0s 298us/sample - loss: 4119.0679 - mae: 61.6467 - val_
_loss: 3699.6548 - val_mae: 58.9854
Epoch 3/100
30/30 [=====] - 0s 266us/sample - loss: 4078.7446 - mae: 61.4628 - val_
_loss: 3671.5090 - val_mae: 58.8463
Epoch 4/100
30/30 [=====] - 0s 265us/sample - loss: 4039.8398 - mae: 61.2772 - val_
_loss: 3644.2102 - val_mae: 58.7051
Epoch 5/100
30/30 [=====] - 0s 265us/sample - loss: 4002.2202 - mae: 61.0902 - val_
_loss: 3617.6738 - val_mae: 58.5619
Epoch 6/100
30/30 [=====] - 0s 266us/sample - loss: 3965.7654 - mae: 60.9019 - val_
_loss: 3591.8247 - val_mae: 58.4170
Epoch 7/100
30/30 [=====] - 0s 267us/sample - loss: 3930.3682 - mae: 60.7125 - val_
_loss: 3566.5945 - val_mae: 58.2705
Epoch 8/100
30/30 [=====] - 0s 265us/sample - loss: 3895.9351 - mae: 60.5219 - val
```

```
_loss: 3541.9265 - val_mae: 58.1224
Epoch 9/100
30/30 [=====] - 0s 265us/sample - loss: 3862.3816 - mae: 60.3304 - val
_loss: 3517.7671 - val_mae: 57.9729
Epoch 10/100
30/30 [=====] - 0s 266us/sample - loss: 3829.6323 - mae: 60.1381 - val
_loss: 3494.0708 - val_mae: 57.8221
Epoch 11/100
30/30 [=====] - 0s 265us/sample - loss: 3797.6218 - mae: 59.9449 - val
_loss: 3470.7969 - val_mae: 57.6701
Epoch 12/100
30/30 [=====] - 0s 265us/sample - loss: 3766.2900 - mae: 59.7511 - val
_loss: 3447.9087 - val_mae: 57.5170
Epoch 13/100
30/30 [=====] - 0s 300us/sample - loss: 3735.5847 - mae: 59.5568 - val
_loss: 3425.3755 - val_mae: 57.3629
Epoch 14/100
30/30 [=====] - 0s 331us/sample - loss: 3705.4578 - mae: 59.3619 - val
_loss: 3403.1675 - val_mae: 57.2078
Epoch 15/100
30/30 [=====] - 0s 266us/sample - loss: 3675.8687 - mae: 59.1665 - val
_loss: 3381.2612 - val_mae: 57.0520
Epoch 16/100
30/30 [=====] - 0s 300us/sample - loss: 3646.7803 - mae: 58.9709 - val
_loss: 3359.6340 - val_mae: 56.8954
Epoch 17/100
30/30 [=====] - 0s 265us/sample - loss: 3618.1572 - mae: 58.7749 - val
_loss: 3338.2668 - val_mae: 56.7381
Epoch 18/100
30/30 [=====] - 0s 298us/sample - loss: 3589.9714 - mae: 58.5787 - val
_loss: 3317.1418 - val_mae: 56.5802
Epoch 19/100
30/30 [=====] - 0s 265us/sample - loss: 3562.1953 - mae: 58.3823 - val
_loss: 3296.2434 - val_mae: 56.4217
Epoch 20/100
30/30 [=====] - 0s 299us/sample - loss: 3534.8057 - mae: 58.1858 - val
_loss: 3275.5586 - val_mae: 56.2627
Epoch 21/100
30/30 [=====] - 0s 265us/sample - loss: 3507.7808 - mae: 57.9892 - val
_loss: 3255.0752 - val_mae: 56.1033
Epoch 22/100
30/30 [=====] - 0s 332us/sample - loss: 3481.1018 - mae: 57.7926 - val
_loss: 3234.7827 - val_mae: 55.9435
Epoch 23/100
30/30 [=====] - 0s 299us/sample - loss: 3454.7515 - mae: 57.5961 - val
_loss: 3214.6719 - val_mae: 55.7834
Epoch 24/100
30/30 [=====] - 0s 266us/sample - loss: 3428.7141 - mae: 57.3996 - val
_loss: 3194.7339 - val_mae: 55.6230
Epoch 25/100
30/30 [=====] - 0s 299us/sample - loss: 3402.9766 - mae: 57.2032 - val
_loss: 3174.9617 - val_mae: 55.4623
Epoch 26/100
30/30 [=====] - 0s 266us/sample - loss: 3377.5251 - mae: 57.0070 - val
_loss: 3155.3479 - val_mae: 55.3014
Epoch 27/100
30/30 [=====] - 0s 332us/sample - loss: 3352.3499 - mae: 56.8109 - val
_loss: 3135.8877 - val_mae: 55.1404
Epoch 28/100
30/30 [=====] - 0s 266us/sample - loss: 3327.4392 - mae: 56.6150 - val
_loss: 3116.5750 - val_mae: 54.9793
Epoch 29/100
30/30 [=====] - 0s 300us/sample - loss: 3302.7854 - mae: 56.4194 - val
_loss: 3097.4058 - val_mae: 54.8181
Epoch 30/100
30/30 [=====] - 0s 332us/sample - loss: 3278.3787 - mae: 56.2241 - val
_loss: 3078.3755 - val_mae: 54.6568
Epoch 31/100
30/30 [=====] - 0s 266us/sample - loss: 3254.2122 - mae: 56.0290 - val
```



```
_loss: 3059.4800 - val_mae: 54.4955
Epoch 32/100
30/30 [=====] - 0s 299us/sample - loss: 3230.2783 - mae: 55.8343 - val
_loss: 3040.7163 - val_mae: 54.3342
Epoch 33/100
30/30 [=====] - 0s 332us/sample - loss: 3206.5720 - mae: 55.6399 - val
_loss: 3022.0818 - val_mae: 54.1729
Epoch 34/100
30/30 [=====] - 0s 299us/sample - loss: 3183.0864 - mae: 55.4459 - val
_loss: 3003.5737 - val_mae: 54.0117
Epoch 35/100
30/30 [=====] - 0s 299us/sample - loss: 3159.8167 - mae: 55.2523 - val
_loss: 2985.1890 - val_mae: 53.8505
Epoch 36/100
30/30 [=====] - 0s 300us/sample - loss: 3136.7573 - mae: 55.0591 - val
_loss: 2966.9258 - val_mae: 53.6895
Epoch 37/100
30/30 [=====] - 0s 300us/sample - loss: 3113.9041 - mae: 54.8663 - val
_loss: 2948.7820 - val_mae: 53.5285
Epoch 38/100
30/30 [=====] - 0s 332us/sample - loss: 3091.2532 - mae: 54.6740 - val
_loss: 2930.7559 - val_mae: 53.3678
Epoch 39/100
30/30 [=====] - 0s 332us/sample - loss: 3068.8005 - mae: 54.4821 - val
_loss: 2912.8459 - val_mae: 53.2072
Epoch 40/100
30/30 [=====] - 0s 265us/sample - loss: 3046.5420 - mae: 54.2907 - val
_loss: 2895.0500 - val_mae: 53.0467
Epoch 41/100
30/30 [=====] - 0s 265us/sample - loss: 3024.4751 - mae: 54.0998 - val
_loss: 2877.3672 - val_mae: 52.8865
Epoch 42/100
30/30 [=====] - 0s 298us/sample - loss: 3002.5959 - mae: 53.9094 - val
_loss: 2859.7957 - val_mae: 52.7265
Epoch 43/100
30/30 [=====] - 0s 266us/sample - loss: 2980.9016 - mae: 53.7194 - val
_loss: 2842.3347 - val_mae: 52.5667
Epoch 44/100
30/30 [=====] - 0s 298us/sample - loss: 2959.3899 - mae: 53.5301 - val
_loss: 2824.9832 - val_mae: 52.4071
Epoch 45/100
30/30 [=====] - 0s 265us/sample - loss: 2938.0574 - mae: 53.3412 - val
_loss: 2807.7397 - val_mae: 52.2478
Epoch 46/100
30/30 [=====] - 0s 300us/sample - loss: 2916.9021 - mae: 53.1529 - val
_loss: 2790.6038 - val_mae: 52.0887
Epoch 47/100
30/30 [=====] - 0s 265us/sample - loss: 2895.9219 - mae: 52.9651 - val
_loss: 2773.5737 - val_mae: 51.9299
Epoch 48/100
30/30 [=====] - 0s 299us/sample - loss: 2875.1135 - mae: 52.7779 - val
_loss: 2756.6492 - val_mae: 51.7714
Epoch 49/100
30/30 [=====] - 0s 266us/sample - loss: 2854.4761 - mae: 52.5912 - val
_loss: 2739.8293 - val_mae: 51.6132
Epoch 50/100
30/30 [=====] - 0s 266us/sample - loss: 2834.0063 - mae: 52.4051 - val
_loss: 2723.1133 - val_mae: 51.4554
Epoch 51/100
30/30 [=====] - 0s 265us/sample - loss: 2813.7031 - mae: 52.2196 - val
_loss: 2706.5000 - val_mae: 51.2978
Epoch 52/100
30/30 [=====] - 0s 299us/sample - loss: 2793.5640 - mae: 52.0347 - val
_loss: 2689.9888 - val_mae: 51.1405
Epoch 53/100
30/30 [=====] - 0s 265us/sample - loss: 2773.5872 - mae: 51.8504 - val
_loss: 2673.5786 - val_mae: 50.9836
Epoch 54/100
30/30 [=====] - 0s 266us/sample - loss: 2753.7712 - mae: 51.6666 - val
```

```
_loss: 2657.2698 - val_mae: 50.8270
Epoch 55/100
30/30 [=====] - 0s 265us/sample - loss: 2734.1140 - mae: 51.4835 - val
_loss: 2641.0608 - val_mae: 50.6707
Epoch 56/100
30/30 [=====] - 0s 299us/sample - loss: 2714.6145 - mae: 51.3009 - val
_loss: 2624.9512 - val_mae: 50.5148
Epoch 57/100
30/30 [=====] - 0s 267us/sample - loss: 2695.2705 - mae: 51.1190 - val
_loss: 2608.9402 - val_mae: 50.3592
Epoch 58/100
30/30 [=====] - 0s 265us/sample - loss: 2676.0803 - mae: 50.9376 - val
_loss: 2593.0269 - val_mae: 50.2040
Epoch 59/100
30/30 [=====] - 0s 266us/sample - loss: 2657.0427 - mae: 50.7569 - val
_loss: 2577.2119 - val_mae: 50.0492
Epoch 60/100
30/30 [=====] - 0s 265us/sample - loss: 2638.1558 - mae: 50.5768 - val
_loss: 2561.4932 - val_mae: 49.8947
Epoch 61/100
30/30 [=====] - 0s 299us/sample - loss: 2619.4187 - mae: 50.3973 - val
_loss: 2545.8706 - val_mae: 49.7406
Epoch 62/100
30/30 [=====] - 0s 265us/sample - loss: 2600.8296 - mae: 50.2184 - val
_loss: 2530.3442 - val_mae: 49.5868
Epoch 63/100
30/30 [=====] - 0s 266us/sample - loss: 2582.3870 - mae: 50.0401 - val
_loss: 2514.9126 - val_mae: 49.4335
Epoch 64/100
30/30 [=====] - 0s 299us/sample - loss: 2564.0894 - mae: 49.8625 - val
_loss: 2499.5752 - val_mae: 49.2805
Epoch 65/100
30/30 [=====] - 0s 232us/sample - loss: 2545.9360 - mae: 49.6855 - val
_loss: 2484.3315 - val_mae: 49.1279
Epoch 66/100
30/30 [=====] - 0s 332us/sample - loss: 2527.9250 - mae: 49.5090 - val
_loss: 2469.1816 - val_mae: 48.9757
Epoch 67/100
30/30 [=====] - 0s 298us/sample - loss: 2510.0549 - mae: 49.3333 - val
_loss: 2454.1245 - val_mae: 48.8239
Epoch 68/100
30/30 [=====] - 0s 299us/sample - loss: 2492.3247 - mae: 49.1581 - val
_loss: 2439.1592 - val_mae: 48.6725
Epoch 69/100
30/30 [=====] - 0s 267us/sample - loss: 2474.7336 - mae: 48.9835 - val
_loss: 2424.2856 - val_mae: 48.5214
Epoch 70/100
30/30 [=====] - 0s 299us/sample - loss: 2457.2798 - mae: 48.8096 - val
_loss: 2409.5034 - val_mae: 48.3708
Epoch 71/100
30/30 [=====] - 0s 265us/sample - loss: 2439.9619 - mae: 48.6363 - val
_loss: 2394.8115 - val_mae: 48.2206
Epoch 72/100
30/30 [=====] - 0s 266us/sample - loss: 2422.7791 - mae: 48.4636 - val
_loss: 2380.2097 - val_mae: 48.0708
Epoch 73/100
30/30 [=====] - 0s 266us/sample - loss: 2405.7297 - mae: 48.2916 - val
_loss: 2365.6978 - val_mae: 47.9213
Epoch 74/100
30/30 [=====] - 0s 299us/sample - loss: 2388.8125 - mae: 48.1202 - val
_loss: 2351.2737 - val_mae: 47.7723
Epoch 75/100
30/30 [=====] - 0s 300us/sample - loss: 2372.0271 - mae: 47.9494 - val
_loss: 2336.9390 - val_mae: 47.6237
Epoch 76/100
30/30 [=====] - 0s 232us/sample - loss: 2355.3716 - mae: 47.7792 - val
_loss: 2322.6914 - val_mae: 47.4755
Epoch 77/100
30/30 [=====] - 0s 298us/sample - loss: 2338.8452 - mae: 47.6096 - val
```

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30/30 [=====] - 0s 290us/sample - loss: 2338.8492 - mae: 47.6090 - val
_loss: 2308.5315 - val_mae: 47.3276
Epoch 78/100
30/30 [=====] - 0s 232us/sample - loss: 2322.4468 - mae: 47.4406 - val
_loss: 2294.4585 - val_mae: 47.1802
Epoch 79/100
30/30 [=====] - 0s 298us/sample - loss: 2306.1753 - mae: 47.2723 - val
_loss: 2280.4714 - val_mae: 47.0332
Epoch 80/100
30/30 [=====] - 0s 265us/sample - loss: 2290.0288 - mae: 47.1046 - val
_loss: 2266.5706 - val_mae: 46.8867
Epoch 81/100
30/30 [=====] - 0s 266us/sample - loss: 2274.0073 - mae: 46.9375 - val
_loss: 2252.7546 - val_mae: 46.7405
Epoch 82/100
30/30 [=====] - 0s 265us/sample - loss: 2258.1091 - mae: 46.7710 - val
_loss: 2239.0239 - val_mae: 46.5947
Epoch 83/100
30/30 [=====] - 0s 265us/sample - loss: 2242.3333 - mae: 46.6052 - val
_loss: 2225.3772 - val_mae: 46.4493
Epoch 84/100
30/30 [=====] - 0s 265us/sample - loss: 2226.6792 - mae: 46.4399 - val
_loss: 2211.8140 - val_mae: 46.3044
Epoch 85/100
30/30 [=====] - 0s 266us/sample - loss: 2211.1448 - mae: 46.2753 - val
_loss: 2198.3342 - val_mae: 46.1598
Epoch 86/100
30/30 [=====] - 0s 298us/sample - loss: 2195.7300 - mae: 46.1112 - val
_loss: 2184.9370 - val_mae: 46.0157
Epoch 87/100
30/30 [=====] - 0s 266us/sample - loss: 2180.4333 - mae: 45.9478 - val
_loss: 2171.6226 - val_mae: 45.8720
Epoch 88/100
30/30 [=====] - 0s 299us/sample - loss: 2165.2537 - mae: 45.7850 - val
_loss: 2158.3892 - val_mae: 45.7287
Epoch 89/100
30/30 [=====] - 0s 266us/sample - loss: 2150.1904 - mae: 45.6228 - val
_loss: 2145.2378 - val_mae: 45.5858
Epoch 90/100
30/30 [=====] - 0s 298us/sample - loss: 2135.2424 - mae: 45.4612 - val
_loss: 2132.1665 - val_mae: 45.4433
Epoch 91/100
30/30 [=====] - 0s 266us/sample - loss: 2120.4087 - mae: 45.3002 - val
_loss: 2119.1758 - val_mae: 45.3012
Epoch 92/100
30/30 [=====] - 0s 266us/sample - loss: 2105.6880 - mae: 45.1398 - val
_loss: 2106.2651 - val_mae: 45.1595
Epoch 93/100
30/30 [=====] - 0s 265us/sample - loss: 2091.0796 - mae: 44.9800 - val
_loss: 2093.4331 - val_mae: 45.0182
Epoch 94/100
30/30 [=====] - 0s 399us/sample - loss: 2076.5828 - mae: 44.8207 - val
_loss: 2080.6807 - val_mae: 44.8774
Epoch 95/100
30/30 [=====] - 0s 798us/sample - loss: 2062.1960 - mae: 44.6621 - val
_loss: 2068.0061 - val_mae: 44.7369
Epoch 96/100
30/30 [=====] - 0s 366us/sample - loss: 2047.9188 - mae: 44.5041 - val
_loss: 2055.4094 - val_mae: 44.5969
Epoch 97/100
30/30 [=====] - 0s 399us/sample - loss: 2033.7501 - mae: 44.3467 - val
_loss: 2042.8904 - val_mae: 44.4573
Epoch 98/100
30/30 [=====] - 0s 499us/sample - loss: 2019.6892 - mae: 44.1899 - val
_loss: 2030.4485 - val_mae: 44.3180
Epoch 99/100
30/30 [=====] - 0s 699us/sample - loss: 2005.7347 - mae: 44.0336 - val
_loss: 2018.0828 - val_mae: 44.1792
Epoch 100/100
30/30 [=====] - 0s 666us/sample - loss: 1991.6881 - mae: 43.8786 - val
_loss: 2004.0309 - val_mae: 44.0392
```

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30/30 [=====] - 0s 608us/sample - loss: 1991.8864 - mae: 43.8779 - val_
_loss: 2005.7933 - val_mae: 44.0408
15/15 [=====] - 0s 132us/sample - loss: 2581.0393 - mae: 50.0625
[CV] learning_rate=0.001683454924600351, n_hidden=0, n_neurons=15, total= 1.5s
[CV] learning_rate=0.001683454924600351, n_hidden=0, n_neurons=15 ....
Train on 30 samples, validate on 5 samples
Epoch 1/100
30/30 [=====] - 0s 11ms/sample - loss: 4709.0269 - mae: 66.2219 - val_
_loss: 3733.7305 - val_mae: 59.1624
Epoch 2/100
30/30 [=====] - 0s 299us/sample - loss: 4625.2500 - mae: 65.7925 - val_
_loss: 3695.8848 - val_mae: 59.0692
Epoch 3/100
30/30 [=====] - 0s 298us/sample - loss: 4545.7344 - mae: 65.3721 - val_
_loss: 3660.6746 - val_mae: 58.9731
Epoch 4/100
30/30 [=====] - 0s 266us/sample - loss: 4470.1709 - mae: 64.9604 - val_
_loss: 3627.8452 - val_mae: 58.8742
Epoch 5/100
30/30 [=====] - 0s 266us/sample - loss: 4398.2739 - mae: 64.5570 - val_
_loss: 3597.1646 - val_mae: 58.7727
Epoch 6/100
30/30 [=====] - 0s 265us/sample - loss: 4329.7817 - mae: 64.1617 - val_
_loss: 3568.4204 - val_mae: 58.6687
Epoch 7/100
30/30 [=====] - 0s 266us/sample - loss: 4264.4502 - mae: 63.7741 - val_
_loss: 3541.4194 - val_mae: 58.5622
Epoch 8/100
30/30 [=====] - 0s 333us/sample - loss: 4202.0562 - mae: 63.3939 - val_
_loss: 3515.9875 - val_mae: 58.4535
Epoch 9/100
30/30 [=====] - 0s 266us/sample - loss: 4142.3921 - mae: 63.0210 - val_
_loss: 3491.9624 - val_mae: 58.3425
Epoch 10/100
30/30 [=====] - 0s 333us/sample - loss: 4085.2654 - mae: 62.6550 - val_
_loss: 3469.2000 - val_mae: 58.2295
Epoch 11/100
30/30 [=====] - 0s 265us/sample - loss: 4030.5010 - mae: 62.2957 - val_
_loss: 3447.5676 - val_mae: 58.1145
Epoch 12/100
30/30 [=====] - 0s 300us/sample - loss: 3977.9348 - mae: 61.9429 - val_
_loss: 3426.9446 - val_mae: 57.9976
Epoch 13/100
30/30 [=====] - 0s 298us/sample - loss: 3927.4170 - mae: 61.5963 - val_
_loss: 3407.2219 - val_mae: 57.8790
Epoch 14/100
30/30 [=====] - 0s 266us/sample - loss: 3878.8074 - mae: 61.2557 - val_
_loss: 3388.3013 - val_mae: 57.7586
Epoch 15/100
30/30 [=====] - 0s 333us/sample - loss: 3831.9775 - mae: 60.9210 - val_
_loss: 3370.0923 - val_mae: 57.6365
Epoch 16/100
30/30 [=====] - 0s 266us/sample - loss: 3786.8088 - mae: 60.5918 - val_
_loss: 3352.5137 - val_mae: 57.5130
Epoch 17/100
30/30 [=====] - 0s 265us/sample - loss: 3743.1909 - mae: 60.2681 - val_
_loss: 3335.4927 - val_mae: 57.3879
Epoch 18/100
30/30 [=====] - 0s 298us/sample - loss: 3701.0227 - mae: 59.9497 - val_
_loss: 3318.9624 - val_mae: 57.2615
Epoch 19/100
30/30 [=====] - 0s 266us/sample - loss: 3660.2092 - mae: 59.6362 - val_
_loss: 3302.8640 - val_mae: 57.1338
Epoch 20/100
30/30 [=====] - 0s 332us/sample - loss: 3620.6646 - mae: 59.3277 - val_
_loss: 3287.1421 - val_mae: 57.0047
Epoch 21/100
30/30 [=====] - 0s 267us/sample - loss: 3582.3079 - mae: 59.0239 - val_
_loss: 3271.7495 - val_mae: 56.8746
```

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Epoch 22/100
30/30 [=====] - 0s 332us/sample - loss: 3545.0647 - mae: 58.7247 - val
_loss: 3256.6416 - val_mae: 56.7432
Epoch 23/100
30/30 [=====] - 0s 232us/sample - loss: 3508.8662 - mae: 58.4298 - val
_loss: 3241.7803 - val_mae: 56.6109
Epoch 24/100
30/30 [=====] - 0s 300us/sample - loss: 3473.6487 - mae: 58.1393 - val
_loss: 3227.1296 - val_mae: 56.4775
Epoch 25/100
30/30 [=====] - 0s 298us/sample - loss: 3439.3538 - mae: 57.8528 - val
_loss: 3212.6592 - val_mae: 56.3432
Epoch 26/100
30/30 [=====] - 0s 266us/sample - loss: 3405.9255 - mae: 57.5704 - val
_loss: 3198.3408 - val_mae: 56.2079
Epoch 27/100
30/30 [=====] - 0s 333us/sample - loss: 3373.3142 - mae: 57.2918 - val
_loss: 3184.1497 - val_mae: 56.0719
Epoch 28/100
30/30 [=====] - 0s 267us/sample - loss: 3341.4731 - mae: 57.0170 - val
_loss: 3170.0637 - val_mae: 55.9350
Epoch 29/100
30/30 [=====] - 0s 365us/sample - loss: 3310.3586 - mae: 56.7457 - val
_loss: 3156.0640 - val_mae: 55.7974
Epoch 30/100
30/30 [=====] - 0s 266us/sample - loss: 3279.9302 - mae: 56.4780 - val
_loss: 3142.1326 - val_mae: 55.6591
Epoch 31/100
30/30 [=====] - 0s 266us/sample - loss: 3250.1501 - mae: 56.2137 - val
_loss: 3128.2554 - val_mae: 55.5202
Epoch 32/100
30/30 [=====] - 0s 298us/sample - loss: 3220.9846 - mae: 55.9526 - val
_loss: 3114.4192 - val_mae: 55.3806
Epoch 33/100
30/30 [=====] - 0s 266us/sample - loss: 3192.4014 - mae: 55.6948 - val
_loss: 3100.6118 - val_mae: 55.2405
Epoch 34/100
30/30 [=====] - 0s 366us/sample - loss: 3164.3696 - mae: 55.4400 - val
_loss: 3086.8237 - val_mae: 55.0998
Epoch 35/100
30/30 [=====] - 0s 266us/sample - loss: 3136.8623 - mae: 55.1882 - val
_loss: 3073.0474 - val_mae: 54.9587
Epoch 36/100
30/30 [=====] - 0s 332us/sample - loss: 3109.8540 - mae: 54.9394 - val
_loss: 3059.2744 - val_mae: 54.8171
Epoch 37/100
30/30 [=====] - 0s 333us/sample - loss: 3083.3198 - mae: 54.6933 - val
_loss: 3045.4993 - val_mae: 54.6751
Epoch 38/100
30/30 [=====] - 0s 266us/sample - loss: 3057.2380 - mae: 54.4500 - val
_loss: 3031.7173 - val_mae: 54.5327
Epoch 39/100
30/30 [=====] - 0s 299us/sample - loss: 3031.5881 - mae: 54.2093 - val
_loss: 3017.9243 - val_mae: 54.3899
Epoch 40/100
30/30 [=====] - 0s 265us/sample - loss: 3006.3503 - mae: 53.9712 - val
_loss: 3004.1162 - val_mae: 54.2468
Epoch 41/100
30/30 [=====] - 0s 332us/sample - loss: 2981.5066 - mae: 53.7356 - val
_loss: 2990.2913 - val_mae: 54.1034
Epoch 42/100
30/30 [=====] - 0s 265us/sample - loss: 2957.0405 - mae: 53.5024 - val
_loss: 2976.4475 - val_mae: 53.9598
Epoch 43/100
30/30 [=====] - 0s 299us/sample - loss: 2932.9368 - mae: 53.2716 - val
_loss: 2962.5835 - val_mae: 53.8159
Epoch 44/100
30/30 [=====] - 0s 299us/sample - loss: 2909.1802 - mae: 53.0430 - val
_loss: 2948.6985 - val_mae: 53.6718
```

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Epoch 45/100
30/30 [=====] - 0s 300us/sample - loss: 2885.7576 - mae: 52.8167 - val
_loss: 2934.7922 - val_mae: 53.5275
Epoch 46/100
30/30 [=====] - 0s 332us/sample - loss: 2862.6558 - mae: 52.5926 - val
_loss: 2920.8645 - val_mae: 53.3830
Epoch 47/100
30/30 [=====] - 0s 233us/sample - loss: 2839.8630 - mae: 52.3705 - val
_loss: 2906.9163 - val_mae: 53.2384
Epoch 48/100
30/30 [=====] - 0s 332us/sample - loss: 2817.3689 - mae: 52.1506 - val
_loss: 2892.9475 - val_mae: 53.0937
Epoch 49/100
30/30 [=====] - 0s 265us/sample - loss: 2795.1619 - mae: 51.9326 - val
_loss: 2878.9600 - val_mae: 52.9489
Epoch 50/100
30/30 [=====] - 0s 299us/sample - loss: 2773.2329 - mae: 51.7165 - val
_loss: 2864.9543 - val_mae: 52.8040
Epoch 51/100
30/30 [=====] - 0s 331us/sample - loss: 2751.5728 - mae: 51.5024 - val
_loss: 2850.9329 - val_mae: 52.6590
Epoch 52/100
30/30 [=====] - 0s 366us/sample - loss: 2730.1731 - mae: 51.2900 - val
_loss: 2836.8962 - val_mae: 52.5141
Epoch 53/100
30/30 [=====] - 0s 565us/sample - loss: 2709.0256 - mae: 51.0795 - val
_loss: 2822.8472 - val_mae: 52.3691
Epoch 54/100
30/30 [=====] - 0s 598us/sample - loss: 2688.1223 - mae: 50.8707 - val
_loss: 2808.7866 - val_mae: 52.2241
Epoch 55/100
30/30 [=====] - 0s 366us/sample - loss: 2667.4573 - mae: 50.6637 - val
_loss: 2794.7170 - val_mae: 52.0791
Epoch 56/100
30/30 [=====] - 0s 299us/sample - loss: 2647.0229 - mae: 50.4583 - val
_loss: 2780.6406 - val_mae: 51.9341
Epoch 57/100
30/30 [=====] - 0s 366us/sample - loss: 2626.8130 - mae: 50.2545 - val
_loss: 2766.5588 - val_mae: 51.7892
Epoch 58/100
30/30 [=====] - 0s 299us/sample - loss: 2606.8213 - mae: 50.0523 - val
_loss: 2752.4744 - val_mae: 51.6444
Epoch 59/100
30/30 [=====] - 0s 299us/sample - loss: 2587.0432 - mae: 49.8517 - val
_loss: 2738.3899 - val_mae: 51.4996
Epoch 60/100
30/30 [=====] - 0s 299us/sample - loss: 2567.4727 - mae: 49.6526 - val
_loss: 2724.3066 - val_mae: 51.3549
Epoch 61/100
30/30 [=====] - 0s 266us/sample - loss: 2548.1052 - mae: 49.4549 - val
_loss: 2710.2271 - val_mae: 51.2103
Epoch 62/100
30/30 [=====] - 0s 332us/sample - loss: 2528.9351 - mae: 49.2587 - val
_loss: 2696.1538 - val_mae: 51.0659
Epoch 63/100
30/30 [=====] - 0s 332us/sample - loss: 2509.9585 - mae: 49.0639 - val
_loss: 2682.0891 - val_mae: 50.9215
Epoch 64/100
30/30 [=====] - 0s 266us/sample - loss: 2491.1716 - mae: 48.8705 - val
_loss: 2668.0347 - val_mae: 50.7774
Epoch 65/100
30/30 [=====] - 0s 265us/sample - loss: 2472.5696 - mae: 48.6785 - val
_loss: 2653.9929 - val_mae: 50.6333
Epoch 66/100
30/30 [=====] - 0s 265us/sample - loss: 2454.1489 - mae: 48.4877 - val
_loss: 2639.9656 - val_mae: 50.4894
Epoch 67/100
30/30 [=====] - 0s 266us/sample - loss: 2435.9062 - mae: 48.2983 - val
_loss: 2625.9556 - val_mae: 50.3457
```

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Epoch 68/100
30/30 [=====] - 0s 266us/sample - loss: 2417.8374 - mae: 48.1101 - val
_loss: 2611.9644 - val_mae: 50.2022
Epoch 69/100
30/30 [=====] - 0s 233us/sample - loss: 2399.9392 - mae: 47.9232 - val
_loss: 2597.9944 - val_mae: 50.0588
Epoch 70/100
30/30 [=====] - 0s 266us/sample - loss: 2382.2092 - mae: 47.7375 - val
_loss: 2584.0464 - val_mae: 49.9157
Epoch 71/100
30/30 [=====] - 0s 266us/sample - loss: 2364.6436 - mae: 47.5529 - val
_loss: 2570.1238 - val_mae: 49.7728
Epoch 72/100
30/30 [=====] - 0s 299us/sample - loss: 2347.2395 - mae: 47.3696 - val
_loss: 2556.2283 - val_mae: 49.6300
Epoch 73/100
30/30 [=====] - 0s 299us/sample - loss: 2329.9949 - mae: 47.1874 - val
_loss: 2542.3608 - val_mae: 49.4876
Epoch 74/100
30/30 [=====] - 0s 265us/sample - loss: 2312.9065 - mae: 47.0063 - val
_loss: 2528.5239 - val_mae: 49.3453
Epoch 75/100
30/30 [=====] - 0s 198us/sample - loss: 2295.9722 - mae: 46.8263 - val
_loss: 2514.7185 - val_mae: 49.2033
Epoch 76/100
30/30 [=====] - 0s 232us/sample - loss: 2279.1885 - mae: 46.6475 - val
_loss: 2500.9473 - val_mae: 49.0615
Epoch 77/100
30/30 [=====] - 0s 265us/sample - loss: 2262.5542 - mae: 46.4696 - val
_loss: 2487.2109 - val_mae: 48.9200
Epoch 78/100
30/30 [=====] - 0s 267us/sample - loss: 2246.0669 - mae: 46.2929 - val
_loss: 2473.5117 - val_mae: 48.7787
Epoch 79/100
30/30 [=====] - 0s 298us/sample - loss: 2229.7236 - mae: 46.1171 - val
_loss: 2459.8503 - val_mae: 48.6377
Epoch 80/100
30/30 [=====] - 0s 266us/sample - loss: 2213.5232 - mae: 45.9424 - val
_loss: 2446.2288 - val_mae: 48.4970
Epoch 81/100
30/30 [=====] - 0s 300us/sample - loss: 2197.4631 - mae: 45.7687 - val
_loss: 2432.6479 - val_mae: 48.3565
Epoch 82/100
30/30 [=====] - 0s 265us/sample - loss: 2181.5415 - mae: 45.5959 - val
_loss: 2419.1099 - val_mae: 48.2164
Epoch 83/100
30/30 [=====] - 0s 266us/sample - loss: 2165.7561 - mae: 45.4241 - val
_loss: 2405.6152 - val_mae: 48.0765
Epoch 84/100
30/30 [=====] - 0s 232us/sample - loss: 2150.1055 - mae: 45.2533 - val
_loss: 2392.1653 - val_mae: 47.9369
Epoch 85/100
30/30 [=====] - 0s 266us/sample - loss: 2134.5884 - mae: 45.0834 - val
_loss: 2378.7615 - val_mae: 47.7976
Epoch 86/100
30/30 [=====] - 0s 266us/sample - loss: 2119.2019 - mae: 44.9144 - val
_loss: 2365.4048 - val_mae: 47.6586
Epoch 87/100
30/30 [=====] - 0s 265us/sample - loss: 2103.9451 - mae: 44.7463 - val
_loss: 2352.0962 - val_mae: 47.5199
Epoch 88/100
30/30 [=====] - 0s 267us/sample - loss: 2088.8164 - mae: 44.5791 - val
_loss: 2338.8367 - val_mae: 47.3815
Epoch 89/100
30/30 [=====] - 0s 298us/sample - loss: 2073.8140 - mae: 44.4127 - val
_loss: 2325.6270 - val_mae: 47.2435
Epoch 90/100
30/30 [=====] - 0s 301us/sample - loss: 2058.9363 - mae: 44.2473 - val
_loss: 2312.4688 - val_mae: 47.1057
```

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Epoch 91/100
30/30 [=====] - 0s 299us/sample - loss: 2044.1818 - mae: 44.0827 - val
_loss: 2299.3618 - val_mae: 46.9683
Epoch 92/100
30/30 [=====] - 0s 298us/sample - loss: 2029.5494 - mae: 43.9189 - val
_loss: 2286.3081 - val_mae: 46.8312
Epoch 93/100
30/30 [=====] - 0s 332us/sample - loss: 2015.0375 - mae: 43.7560 - val
_loss: 2273.3079 - val_mae: 46.6944
Epoch 94/100
30/30 [=====] - 0s 299us/sample - loss: 2000.6448 - mae: 43.5939 - val
_loss: 2260.3613 - val_mae: 46.5580
Epoch 95/100
30/30 [=====] - 0s 332us/sample - loss: 1986.3695 - mae: 43.4326 - val
_loss: 2247.4700 - val_mae: 46.4219
Epoch 96/100
30/30 [=====] - 0s 299us/sample - loss: 1972.2108 - mae: 43.2721 - val
_loss: 2234.6340 - val_mae: 46.2861
Epoch 97/100
30/30 [=====] - 0s 266us/sample - loss: 1958.1672 - mae: 43.1124 - val
_loss: 2221.8540 - val_mae: 46.1506
Epoch 98/100
30/30 [=====] - 0s 299us/sample - loss: 1944.2375 - mae: 42.9535 - val
_loss: 2209.1309 - val_mae: 46.0155
Epoch 99/100
30/30 [=====] - 0s 299us/sample - loss: 1930.4203 - mae: 42.7953 - val
_loss: 2196.4648 - val_mae: 45.8808
Epoch 100/100
30/30 [=====] - 0s 299us/sample - loss: 1916.7146 - mae: 42.6379 - val
_loss: 2183.8564 - val_mae: 45.7464
15/15 [=====] - 0s 197us/sample - loss: 2786.0100 - mae: 52.0077
[CV] learning_rate=0.001683454924600351, n_hidden=0, n_neurons=15, total= 1.5s
[CV] learning_rate=0.008731907739399206, n_hidden=0, n_neurons=21 ....
Train on 30 samples, validate on 5 samples
Epoch 1/100
30/30 [=====] - 0s 11ms/sample - loss: 4415.9976 - mae: 63.2660 - val_
loss: 3620.4565 - val_mae: 58.9649
Epoch 2/100
30/30 [=====] - 0s 298us/sample - loss: 4131.7017 - mae: 62.2105 - val
_loss: 3509.2676 - val_mae: 58.4461
Epoch 3/100
30/30 [=====] - 0s 198us/sample - loss: 3910.8323 - mae: 61.1231 - val
_loss: 3412.6265 - val_mae: 57.8512
Epoch 4/100
30/30 [=====] - 0s 266us/sample - loss: 3725.6897 - mae: 60.0212 - val
_loss: 3322.6108 - val_mae: 57.2049
Epoch 5/100
30/30 [=====] - 0s 199us/sample - loss: 3562.2302 - mae: 58.9168 - val
_loss: 3235.8313 - val_mae: 56.5244
Epoch 6/100
30/30 [=====] - 0s 264us/sample - loss: 3413.1902 - mae: 57.8181 - val
_loss: 3150.9700 - val_mae: 55.8223
Epoch 7/100
30/30 [=====] - 0s 299us/sample - loss: 3274.6858 - mae: 56.7305 - val
_loss: 3067.6143 - val_mae: 55.1071
Epoch 8/100
30/30 [=====] - 0s 266us/sample - loss: 3144.5369 - mae: 55.6577 - val
_loss: 2985.7205 - val_mae: 54.3852
Epoch 9/100
30/30 [=====] - 0s 266us/sample - loss: 3021.4346 - mae: 54.6021 - val
_loss: 2905.3716 - val_mae: 53.6610
Epoch 10/100
30/30 [=====] - 0s 299us/sample - loss: 2904.5259 - mae: 53.5649 - val
_loss: 2826.6738 - val_mae: 52.9376
Epoch 11/100
30/30 [=====] - 0s 266us/sample - loss: 2793.2056 - mae: 52.5472 - val
_loss: 2749.7207 - val_mae: 52.2175
Epoch 12/100
30/30 [=====] - 0s 298us/sample - loss: 2687.0117 - mae: 51.5492 - val
```



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30/30 [=====] - 0s 290us/sample - loss: 2687.6117 - mae: 51.5432 - val
_loss: 2674.5786 - val_mae: 51.5022
Epoch 13/100
30/30 [=====] - 0s 266us/sample - loss: 2585.5688 - mae: 50.5710 - val
_loss: 2601.2893 - val_mae: 50.7929
Epoch 14/100
30/30 [=====] - 0s 300us/sample - loss: 2488.5591 - mae: 49.6127 - val
_loss: 2529.8726 - val_mae: 50.0906
Epoch 15/100
30/30 [=====] - 0s 267us/sample - loss: 2395.7063 - mae: 48.6738 - val
_loss: 2460.3325 - val_mae: 49.3958
Epoch 16/100
30/30 [=====] - 0s 300us/sample - loss: 2306.7659 - mae: 47.7542 - val
_loss: 2392.6582 - val_mae: 48.7091
Epoch 17/100
30/30 [=====] - 0s 265us/sample - loss: 2221.5171 - mae: 46.8535 - val
_loss: 2326.8315 - val_mae: 48.0307
Epoch 18/100
30/30 [=====] - 0s 300us/sample - loss: 2139.7612 - mae: 45.9712 - val
_loss: 2262.8267 - val_mae: 47.3609
Epoch 19/100
30/30 [=====] - 0s 298us/sample - loss: 2061.3159 - mae: 45.1070 - val
_loss: 2200.6130 - val_mae: 46.6999
Epoch 20/100
30/30 [=====] - 0s 267us/sample - loss: 1986.0149 - mae: 44.2605 - val
_loss: 2140.1570 - val_mae: 46.0479
Epoch 21/100
30/30 [=====] - 0s 298us/sample - loss: 1913.7035 - mae: 43.4312 - val
_loss: 2081.4224 - val_mae: 45.4048
Epoch 22/100
30/30 [=====] - 0s 266us/sample - loss: 1844.2401 - mae: 42.6187 - val
_loss: 2024.3705 - val_mae: 44.7707
Epoch 23/100
30/30 [=====] - 0s 300us/sample - loss: 1777.4919 - mae: 41.8226 - val
_loss: 1968.9629 - val_mae: 44.1456
Epoch 24/100
30/30 [=====] - 0s 265us/sample - loss: 1713.3358 - mae: 41.0426 - val
_loss: 1915.1599 - val_mae: 43.5296
Epoch 25/100
30/30 [=====] - 0s 299us/sample - loss: 1651.6560 - mae: 40.2782 - val
_loss: 1862.9222 - val_mae: 42.9226
Epoch 26/100
30/30 [=====] - 0s 266us/sample - loss: 1592.3448 - mae: 39.5292 - val
_loss: 1812.2094 - val_mae: 42.3246
Epoch 27/100
30/30 [=====] - 0s 265us/sample - loss: 1535.2997 - mae: 38.7950 - val
_loss: 1762.9817 - val_mae: 41.7356
Epoch 28/100
30/30 [=====] - 0s 266us/sample - loss: 1480.4250 - mae: 38.0754 - val
_loss: 1715.1998 - val_mae: 41.1554
Epoch 29/100
30/30 [=====] - 0s 231us/sample - loss: 1427.6300 - mae: 37.3701 - val
_loss: 1668.8246 - val_mae: 40.5840
Epoch 30/100
30/30 [=====] - 0s 299us/sample - loss: 1376.8285 - mae: 36.6787 - val
_loss: 1623.8171 - val_mae: 40.0213
Epoch 31/100
30/30 [=====] - 0s 233us/sample - loss: 1327.9390 - mae: 36.0009 - val
_loss: 1580.1396 - val_mae: 39.4673
Epoch 32/100
30/30 [=====] - 0s 298us/sample - loss: 1280.8844 - mae: 35.3364 - val
_loss: 1537.7544 - val_mae: 38.9219
Epoch 33/100
30/30 [=====] - 0s 266us/sample - loss: 1235.5907 - mae: 34.6849 - val
_loss: 1496.6248 - val_mae: 38.3850
Epoch 34/100
30/30 [=====] - 0s 366us/sample - loss: 1191.9882 - mae: 34.0462 - val
_loss: 1456.7146 - val_mae: 37.8564
Epoch 35/100
30/30 [=====] - 0s 533us/sample - loss: 1159.8895 - mae: 33.4186 - val
_loss: 1416.6044 - val_mae: 37.3276
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30/30 [=====] - 0s 533us/sample - loss: 1150.0095 - mae: 33.4198 - val_
_loss: 1417.9882 - val_mae: 37.3362
Epoch 36/100
30/30 [=====] - 0s 464us/sample - loss: 1109.5911 - mae: 32.8057 - val_
_loss: 1380.4109 - val_mae: 36.8242
Epoch 37/100
30/30 [=====] - 0s 432us/sample - loss: 1070.6718 - mae: 32.2034 - val_
_loss: 1343.9491 - val_mae: 36.3202
Epoch 38/100
30/30 [=====] - 0s 299us/sample - loss: 1033.1932 - mae: 31.6128 - val_
_loss: 1308.5696 - val_mae: 35.8243
Epoch 39/100
30/30 [=====] - 0s 365us/sample - loss: 997.0997 - mae: 31.0336 - val_
_loss: 1274.2397 - val_mae: 35.3362
Epoch 40/100
30/30 [=====] - 0s 300us/sample - loss: 962.3377 - mae: 30.4656 - val_
_loss: 1240.9283 - val_mae: 34.8559
Epoch 41/100
30/30 [=====] - 0s 233us/sample - loss: 928.8562 - mae: 29.9084 - val_
_loss: 1208.6044 - val_mae: 34.3833
Epoch 42/100
30/30 [=====] - 0s 333us/sample - loss: 896.6059 - mae: 29.3620 - val_
_loss: 1177.2383 - val_mae: 33.9183
Epoch 43/100
30/30 [=====] - 0s 299us/sample - loss: 865.5400 - mae: 28.8261 - val_
_loss: 1146.8005 - val_mae: 33.4607
Epoch 44/100
30/30 [=====] - 0s 366us/sample - loss: 835.6130 - mae: 28.3004 - val_
_loss: 1117.2629 - val_mae: 33.0105
Epoch 45/100
30/30 [=====] - 0s 498us/sample - loss: 806.7820 - mae: 27.7848 - val_
_loss: 1088.5977 - val_mae: 32.5676
Epoch 46/100
30/30 [=====] - 0s 331us/sample - loss: 779.0052 - mae: 27.2790 - val_
_loss: 1060.7783 - val_mae: 32.1317
Epoch 47/100
30/30 [=====] - 0s 266us/sample - loss: 752.2428 - mae: 26.7829 - val_
_loss: 1033.7784 - val_mae: 31.7029
Epoch 48/100
30/30 [=====] - 0s 365us/sample - loss: 726.4562 - mae: 26.2962 - val_
_loss: 1007.5729 - val_mae: 31.2810
Epoch 49/100
30/30 [=====] - 0s 267us/sample - loss: 701.6088 - mae: 25.8188 - val_
_loss: 982.1372 - val_mae: 30.8660
Epoch 50/100
30/30 [=====] - 0s 265us/sample - loss: 677.6654 - mae: 25.3504 - val_
_loss: 957.4474 - val_mae: 30.4576
Epoch 51/100
30/30 [=====] - 0s 265us/sample - loss: 654.5917 - mae: 24.8909 - val_
_loss: 933.4805 - val_mae: 30.0559
Epoch 52/100
30/30 [=====] - 0s 300us/sample - loss: 632.3555 - mae: 24.4401 - val_
_loss: 910.2137 - val_mae: 29.6606
Epoch 53/100
30/30 [=====] - 0s 299us/sample - loss: 610.9247 - mae: 23.9979 - val_
_loss: 887.6257 - val_mae: 29.2718
Epoch 54/100
30/30 [=====] - 0s 266us/sample - loss: 590.2699 - mae: 23.5640 - val_
_loss: 865.6951 - val_mae: 28.8892
Epoch 55/100
30/30 [=====] - 0s 300us/sample - loss: 570.3615 - mae: 23.1384 - val_
_loss: 844.4017 - val_mae: 28.5128
Epoch 56/100
30/30 [=====] - 0s 265us/sample - loss: 551.1720 - mae: 22.7207 - val_
_loss: 823.7253 - val_mae: 28.1426
Epoch 57/100
30/30 [=====] - 0s 299us/sample - loss: 532.6744 - mae: 22.3110 - val_
_loss: 803.6471 - val_mae: 27.7783
Epoch 58/100
```

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30/30 [=====] - 0s 298us/sample - loss: 514.8430 - mae: 21.9089 - val_
loss: 784.1481 - val_mae: 27.4199
Epoch 59/100
30/30 [=====] - 0s 299us/sample - loss: 497.6529 - mae: 21.5145 - val_
loss: 765.2106 - val_mae: 27.0673
Epoch 60/100
30/30 [=====] - 0s 266us/sample - loss: 481.0804 - mae: 21.1274 - val_
loss: 746.8169 - val_mae: 26.7204
Epoch 61/100
30/30 [=====] - 0s 299us/sample - loss: 465.1024 - mae: 20.7477 - val_
loss: 728.9504 - val_mae: 26.3791
Epoch 62/100
30/30 [=====] - 0s 332us/sample - loss: 449.6970 - mae: 20.3750 - val_
loss: 711.5944 - val_mae: 26.0433
Epoch 63/100
30/30 [=====] - 0s 298us/sample - loss: 434.8427 - mae: 20.0094 - val_
loss: 694.7333 - val_mae: 25.7129
Epoch 64/100
30/30 [=====] - 0s 334us/sample - loss: 420.5194 - mae: 19.6506 - val_
loss: 678.3517 - val_mae: 25.3879
Epoch 65/100
30/30 [=====] - 0s 298us/sample - loss: 406.7074 - mae: 19.2985 - val_
loss: 662.4348 - val_mae: 25.0681
Epoch 66/100
30/30 [=====] - 0s 266us/sample - loss: 393.3878 - mae: 18.9531 - val_
loss: 646.9680 - val_mae: 24.7535
Epoch 67/100
30/30 [=====] - 0s 300us/sample - loss: 380.5423 - mae: 18.6141 - val_
loss: 631.9376 - val_mae: 24.4439
Epoch 68/100
30/30 [=====] - 0s 266us/sample - loss: 368.1534 - mae: 18.2814 - val_
loss: 617.3300 - val_mae: 24.1393
Epoch 69/100
30/30 [=====] - 0s 300us/sample - loss: 356.2045 - mae: 17.9550 - val_
loss: 603.1321 - val_mae: 23.8396
Epoch 70/100
30/30 [=====] - 0s 300us/sample - loss: 344.6792 - mae: 17.6347 - val_
loss: 589.3315 - val_mae: 23.5447
Epoch 71/100
30/30 [=====] - 0s 331us/sample - loss: 333.5620 - mae: 17.3203 - val_
loss: 575.9159 - val_mae: 23.2545
Epoch 72/100
30/30 [=====] - 0s 331us/sample - loss: 322.8378 - mae: 17.0118 - val_
loss: 562.8734 - val_mae: 22.9690
Epoch 73/100
30/30 [=====] - 0s 266us/sample - loss: 312.4923 - mae: 16.7091 - val_
loss: 550.1925 - val_mae: 22.6881
Epoch 74/100
30/30 [=====] - 0s 299us/sample - loss: 302.5116 - mae: 16.4120 - val_
loss: 537.8623 - val_mae: 22.4117
Epoch 75/100
30/30 [=====] - 0s 366us/sample - loss: 292.8822 - mae: 16.1204 - val_
loss: 525.8721 - val_mae: 22.1396
Epoch 76/100
30/30 [=====] - 0s 299us/sample - loss: 283.5915 - mae: 15.8343 - val_
loss: 514.2115 - val_mae: 21.8720
Epoch 77/100
30/30 [=====] - 0s 298us/sample - loss: 274.6268 - mae: 15.5535 - val_
loss: 502.8704 - val_mae: 21.6085
Epoch 78/100
30/30 [=====] - 0s 265us/sample - loss: 265.9765 - mae: 15.2779 - val_
loss: 491.8390 - val_mae: 21.3493
Epoch 79/100
30/30 [=====] - 0s 267us/sample - loss: 257.6289 - mae: 15.0074 - val_
loss: 481.1082 - val_mae: 21.0942
Epoch 80/100
30/30 [=====] - 0s 265us/sample - loss: 249.5731 - mae: 14.7420 - val_
loss: 470.6685 - val_mae: 20.8432
Epoch 81/100
```

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30/30 [=====] - 0s 299us/sample - loss: 241.7984 - mae: 14.4814 - val_
loss: 460.5113 - val_mae: 20.5961
Epoch 82/100
30/30 [=====] - 0s 300us/sample - loss: 234.2946 - mae: 14.2258 - val_
loss: 450.6281 - val_mae: 20.3530
Epoch 83/100
30/30 [=====] - 0s 265us/sample - loss: 227.0517 - mae: 13.9748 - val_
loss: 441.0107 - val_mae: 20.1137
Epoch 84/100
30/30 [=====] - 0s 299us/sample - loss: 220.0605 - mae: 13.7285 - val_
loss: 431.6509 - val_mae: 19.8782
Epoch 85/100
30/30 [=====] - 0s 266us/sample - loss: 213.3117 - mae: 13.4868 - val_
loss: 422.5412 - val_mae: 19.6464
Epoch 86/100
30/30 [=====] - 0s 265us/sample - loss: 206.7965 - mae: 13.2495 - val_
loss: 413.6738 - val_mae: 19.4183
Epoch 87/100
30/30 [=====] - 0s 231us/sample - loss: 200.5065 - mae: 13.0166 - val_
loss: 405.0419 - val_mae: 19.1937
Epoch 88/100
30/30 [=====] - 0s 299us/sample - loss: 194.4335 - mae: 12.7881 - val_
loss: 396.6383 - val_mae: 18.9727
Epoch 89/100
30/30 [=====] - 0s 266us/sample - loss: 188.5698 - mae: 12.5637 - val_
loss: 388.4561 - val_mae: 18.7552
Epoch 90/100
30/30 [=====] - 0s 265us/sample - loss: 182.9078 - mae: 12.3532 - val_
loss: 380.4889 - val_mae: 18.5410
Epoch 91/100
30/30 [=====] - 0s 232us/sample - loss: 177.4401 - mae: 12.1493 - val_
loss: 372.7302 - val_mae: 18.3303
Epoch 92/100
30/30 [=====] - 0s 264us/sample - loss: 172.1597 - mae: 11.9491 - val_
loss: 365.1740 - val_mae: 18.1228
Epoch 93/100
30/30 [=====] - 0s 265us/sample - loss: 167.0601 - mae: 11.7526 - val_
loss: 357.8140 - val_mae: 17.9185
Epoch 94/100
30/30 [=====] - 0s 300us/sample - loss: 162.1346 - mae: 11.5597 - val_
loss: 350.6448 - val_mae: 17.7175
Epoch 95/100
30/30 [=====] - 0s 232us/sample - loss: 157.3770 - mae: 11.3702 - val_
loss: 343.6607 - val_mae: 17.5196
Epoch 96/100
30/30 [=====] - 0s 265us/sample - loss: 152.7813 - mae: 11.1842 - val_
loss: 336.8563 - val_mae: 17.3247
Epoch 97/100
30/30 [=====] - 0s 232us/sample - loss: 148.3417 - mae: 11.0016 - val_
loss: 330.2262 - val_mae: 17.1329
Epoch 98/100
30/30 [=====] - 0s 265us/sample - loss: 144.0526 - mae: 10.8223 - val_
loss: 323.7655 - val_mae: 16.9440
Epoch 99/100
30/30 [=====] - 0s 266us/sample - loss: 139.9086 - mae: 10.6462 - val_
loss: 317.4691 - val_mae: 16.7581
Epoch 100/100
30/30 [=====] - 0s 265us/sample - loss: 135.9045 - mae: 10.4733 - val_
loss: 311.3324 - val_mae: 16.5750
15/15 [=====] - 0s 132us/sample - loss: 361.4980 - mae: 16.6501
[CV] learning_rate=0.008731907739399206, n_hidden=0, n_neurons=21, total= 1.4s
[CV] learning_rate=0.008731907739399206, n_hidden=0, n_neurons=21 ....
Train on 30 samples, validate on 5 samples
Epoch 1/100
30/30 [=====] - 0s 11ms/sample - loss: 4196.1025 - mae: 61.7618 - val_
loss: 3650.3472 - val_mae: 58.7589
Epoch 2/100
30/30 [=====] - 0s 300us/sample - loss: 3974.8401 - mae: 60.8435 - val_
loss: 3517.1335 - val_mae: 58.0171
```

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Epoch 3/100
30/30 [=====] - 0s 298us/sample - loss: 3793.7222 - mae: 59.8708 - val
_loss: 3398.3413 - val_mae: 57.2280
Epoch 4/100
30/30 [=====] - 0s 299us/sample - loss: 3635.2563 - mae: 58.8669 - val
_loss: 3288.0129 - val_mae: 56.4099
Epoch 5/100
30/30 [=====] - 0s 333us/sample - loss: 3490.7827 - mae: 57.8476 - val
_loss: 3183.2966 - val_mae: 55.5754
Epoch 6/100
30/30 [=====] - 0s 266us/sample - loss: 3355.9482 - mae: 56.8240 - val
_loss: 3082.8171 - val_mae: 54.7335
Epoch 7/100
30/30 [=====] - 0s 332us/sample - loss: 3228.4978 - mae: 55.8035 - val
_loss: 2985.8950 - val_mae: 53.8902
Epoch 8/100
30/30 [=====] - 0s 266us/sample - loss: 3107.2078 - mae: 54.7913 - val
_loss: 2892.1758 - val_mae: 53.0498
Epoch 9/100
30/30 [=====] - 0s 299us/sample - loss: 2991.3601 - mae: 53.7908 - val
_loss: 2801.4561 - val_mae: 52.2151
Epoch 10/100
30/30 [=====] - 0s 266us/sample - loss: 2880.4919 - mae: 52.8043 - val
_loss: 2713.6001 - val_mae: 51.3882
Epoch 11/100
30/30 [=====] - 0s 299us/sample - loss: 2774.2695 - mae: 51.8333 - val
_loss: 2628.5046 - val_mae: 50.5704
Epoch 12/100
30/30 [=====] - 0s 265us/sample - loss: 2672.4282 - mae: 50.8787 - val
_loss: 2546.0796 - val_mae: 49.7626
Epoch 13/100
30/30 [=====] - 0s 266us/sample - loss: 2574.7417 - mae: 49.9410 - val
_loss: 2466.2427 - val_mae: 48.9654
Epoch 14/100
30/30 [=====] - 0s 266us/sample - loss: 2481.0083 - mae: 49.0205 - val
_loss: 2388.9146 - val_mae: 48.1791
Epoch 15/100
30/30 [=====] - 0s 265us/sample - loss: 2391.0435 - mae: 48.1172 - val
_loss: 2314.0190 - val_mae: 47.4039
Epoch 16/100
30/30 [=====] - 0s 265us/sample - loss: 2304.6748 - mae: 47.2311 - val
_loss: 2241.4812 - val_mae: 46.6400
Epoch 17/100
30/30 [=====] - 0s 233us/sample - loss: 2221.7393 - mae: 46.3619 - val
_loss: 2171.2292 - val_mae: 45.8874
Epoch 18/100
30/30 [=====] - 0s 266us/sample - loss: 2142.0845 - mae: 45.5096 - val
_loss: 2103.1926 - val_mae: 45.1460
Epoch 19/100
30/30 [=====] - 0s 232us/sample - loss: 2065.5654 - mae: 44.6739 - val
_loss: 2037.3027 - val_mae: 44.4159
Epoch 20/100
30/30 [=====] - 0s 298us/sample - loss: 1992.0443 - mae: 43.8544 - val
_loss: 1973.4935 - val_mae: 43.6968
Epoch 21/100
30/30 [=====] - 0s 266us/sample - loss: 1921.3906 - mae: 43.0510 - val
_loss: 1911.7002 - val_mae: 42.9887
Epoch 22/100
30/30 [=====] - 0s 298us/sample - loss: 1853.4805 - mae: 42.2632 - val
_loss: 1851.8601 - val_mae: 42.2915
Epoch 23/100
30/30 [=====] - 0s 299us/sample - loss: 1788.1958 - mae: 41.4909 - val
_loss: 1793.9131 - val_mae: 41.6050
Epoch 24/100
30/30 [=====] - 0s 299us/sample - loss: 1725.4244 - mae: 40.7337 - val
_loss: 1737.7998 - val_mae: 40.9292
Epoch 25/100
30/30 [=====] - 0s 265us/sample - loss: 1665.0598 - mae: 39.9913 - val
_loss: 1683.4631 - val_mae: 40.2638
```

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Epoch 26/100
30/30 [=====] - 0s 299us/sample - loss: 1606.9999 - mae: 39.2634 - val_
_loss: 1630.8474 - val_mae: 39.6088
Epoch 27/100
30/30 [=====] - 0s 298us/sample - loss: 1551.1478 - mae: 38.5497 - val_
_loss: 1579.8995 - val_mae: 38.9640
Epoch 28/100
30/30 [=====] - 0s 299us/sample - loss: 1497.4114 - mae: 37.8499 - val_
_loss: 1530.5671 - val_mae: 38.3293
Epoch 29/100
30/30 [=====] - 0s 265us/sample - loss: 1445.7028 - mae: 37.1638 - val_
_loss: 1482.7997 - val_mae: 37.7045
Epoch 30/100
30/30 [=====] - 0s 299us/sample - loss: 1395.9377 - mae: 36.4910 - val_
_loss: 1436.5481 - val_mae: 37.0895
Epoch 31/100
30/30 [=====] - 0s 300us/sample - loss: 1348.0365 - mae: 35.8314 - val_
_loss: 1391.7649 - val_mae: 36.4841
Epoch 32/100
30/30 [=====] - 0s 265us/sample - loss: 1301.9226 - mae: 35.1845 - val_
_loss: 1348.4042 - val_mae: 35.8882
Epoch 33/100
30/30 [=====] - 0s 299us/sample - loss: 1257.5232 - mae: 34.5503 - val_
_loss: 1306.4210 - val_mae: 35.3018
Epoch 34/100
30/30 [=====] - 0s 232us/sample - loss: 1214.7684 - mae: 33.9283 - val_
_loss: 1265.7723 - val_mae: 34.7245
Epoch 35/100
30/30 [=====] - 0s 299us/sample - loss: 1173.5920 - mae: 33.3183 - val_
_loss: 1226.4163 - val_mae: 34.1564
Epoch 36/100
30/30 [=====] - 0s 265us/sample - loss: 1133.9308 - mae: 32.7202 - val_
_loss: 1188.3119 - val_mae: 33.5972
Epoch 37/100
30/30 [=====] - 0s 299us/sample - loss: 1095.7233 - mae: 32.1336 - val_
_loss: 1151.4202 - val_mae: 33.0468
Epoch 38/100
30/30 [=====] - 0s 265us/sample - loss: 1058.9120 - mae: 31.5584 - val_
_loss: 1115.7025 - val_mae: 32.5052
Epoch 39/100
30/30 [=====] - 0s 266us/sample - loss: 1023.4415 - mae: 30.9942 - val_
_loss: 1081.1219 - val_mae: 31.9721
Epoch 40/100
30/30 [=====] - 0s 332us/sample - loss: 989.2586 - mae: 30.4409 - val_
_loss: 1047.6431 - val_mae: 31.4475
Epoch 41/100
30/30 [=====] - 0s 299us/sample - loss: 956.3125 - mae: 29.8982 - val_
_loss: 1015.2306 - val_mae: 30.9311
Epoch 42/100
30/30 [=====] - 0s 266us/sample - loss: 924.5547 - mae: 29.3659 - val_
_loss: 983.8511 - val_mae: 30.4230
Epoch 43/100
30/30 [=====] - 0s 298us/sample - loss: 893.9388 - mae: 28.8438 - val_
_loss: 953.4720 - val_mae: 29.9229
Epoch 44/100
30/30 [=====] - 0s 267us/sample - loss: 864.4205 - mae: 28.3318 - val_
_loss: 924.0615 - val_mae: 29.4308
Epoch 45/100
30/30 [=====] - 0s 298us/sample - loss: 835.9569 - mae: 27.8295 - val_
_loss: 895.5892 - val_mae: 28.9465
Epoch 46/100
30/30 [=====] - 0s 232us/sample - loss: 808.5075 - mae: 27.3368 - val_
_loss: 868.0252 - val_mae: 28.4699
Epoch 47/100
30/30 [=====] - 0s 298us/sample - loss: 782.0330 - mae: 26.8535 - val_
_loss: 841.3409 - val_mae: 28.0008
Epoch 48/100
30/30 [=====] - 0s 232us/sample - loss: 756.4962 - mae: 26.3794 - val_
_loss: 815.5085 - val_mae: 27.5393
```

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Epoch 49/100
30/30 [=====] - 0s 266us/sample - loss: 731.8611 - mae: 25.9143 - val_
loss: 790.5009 - val_mae: 27.0850
Epoch 50/100
30/30 [=====] - 0s 266us/sample - loss: 708.0935 - mae: 25.4581 - val_
loss: 766.2920 - val_mae: 26.6380
Epoch 51/100
30/30 [=====] - 0s 298us/sample - loss: 685.1603 - mae: 25.0105 - val_
loss: 742.8564 - val_mae: 26.1981
Epoch 52/100
30/30 [=====] - 0s 299us/sample - loss: 663.0302 - mae: 24.5713 - val_
loss: 720.1700 - val_mae: 25.7653
Epoch 53/100
30/30 [=====] - 0s 266us/sample - loss: 641.6729 - mae: 24.1405 - val_
loss: 698.2086 - val_mae: 25.3393
Epoch 54/100
30/30 [=====] - 0s 464us/sample - loss: 621.0590 - mae: 23.7178 - val_
loss: 676.9495 - val_mae: 24.9201
Epoch 55/100
30/30 [=====] - 0s 332us/sample - loss: 601.1611 - mae: 23.3031 - val_
loss: 656.3704 - val_mae: 24.5076
Epoch 56/100
30/30 [=====] - 0s 367us/sample - loss: 581.9523 - mae: 22.8962 - val_
loss: 636.4493 - val_mae: 24.1017
Epoch 57/100
30/30 [=====] - 0s 298us/sample - loss: 563.4069 - mae: 22.4969 - val_
loss: 617.1658 - val_mae: 23.7023
Epoch 58/100
30/30 [=====] - 0s 232us/sample - loss: 545.5003 - mae: 22.1051 - val_
loss: 598.4996 - val_mae: 23.3092
Epoch 59/100
30/30 [=====] - 0s 331us/sample - loss: 528.2092 - mae: 21.7207 - val_
loss: 580.4310 - val_mae: 22.9224
Epoch 60/100
30/30 [=====] - 0s 234us/sample - loss: 511.5107 - mae: 21.3435 - val_
loss: 562.9411 - val_mae: 22.5418
Epoch 61/100
30/30 [=====] - 0s 300us/sample - loss: 495.3829 - mae: 20.9733 - val_
loss: 546.0115 - val_mae: 22.1673
Epoch 62/100
30/30 [=====] - 0s 233us/sample - loss: 479.8053 - mae: 20.6100 - val_
loss: 529.6243 - val_mae: 21.7987
Epoch 63/100
30/30 [=====] - 0s 300us/sample - loss: 464.7575 - mae: 20.2535 - val_
loss: 513.7624 - val_mae: 21.4361
Epoch 64/100
30/30 [=====] - 0s 299us/sample - loss: 450.2203 - mae: 19.9036 - val_
loss: 498.4089 - val_mae: 21.0792
Epoch 65/100
30/30 [=====] - 0s 299us/sample - loss: 436.1752 - mae: 19.5603 - val_
loss: 483.5479 - val_mae: 20.7280
Epoch 66/100
30/30 [=====] - 0s 298us/sample - loss: 422.6043 - mae: 19.2233 - val_
loss: 469.1634 - val_mae: 20.3824
Epoch 67/100
30/30 [=====] - 0s 299us/sample - loss: 409.4906 - mae: 18.8925 - val_
loss: 455.2406 - val_mae: 20.0424
Epoch 68/100
30/30 [=====] - 0s 298us/sample - loss: 396.8177 - mae: 18.5679 - val_
loss: 441.7648 - val_mae: 19.7078
Epoch 69/100
30/30 [=====] - 0s 299us/sample - loss: 384.5698 - mae: 18.2492 - val_
loss: 428.7215 - val_mae: 19.3785
Epoch 70/100
30/30 [=====] - 0s 300us/sample - loss: 372.7316 - mae: 17.9365 - val_
loss: 416.0972 - val_mae: 19.0546
Epoch 71/100
30/30 [=====] - 0s 298us/sample - loss: 361.2886 - mae: 17.6295 - val_
loss: 403.8784 - val_mae: 18.7357
```

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loss: 403.8784 - val_mae: 18.7337
Epoch 72/100
30/30 [=====] - 0s 300us/sample - loss: 350.2268 - mae: 17.3281 - val_
loss: 392.0522 - val_mae: 18.4220
Epoch 73/100
30/30 [=====] - 0s 298us/sample - loss: 339.5325 - mae: 17.0323 - val_
loss: 380.6063 - val_mae: 18.1133
Epoch 74/100
30/30 [=====] - 0s 298us/sample - loss: 329.1928 - mae: 16.7517 - val_
loss: 369.5283 - val_mae: 17.8096
Epoch 75/100
30/30 [=====] - 0s 299us/sample - loss: 319.1953 - mae: 16.4821 - val_
loss: 358.8066 - val_mae: 17.5106
Epoch 76/100
30/30 [=====] - 0s 267us/sample - loss: 309.5278 - mae: 16.2173 - val_
loss: 348.4298 - val_mae: 17.2165
Epoch 77/100
30/30 [=====] - 0s 333us/sample - loss: 300.1787 - mae: 15.9571 - val_
loss: 338.3870 - val_mae: 16.9271
Epoch 78/100
30/30 [=====] - 0s 265us/sample - loss: 291.1370 - mae: 15.7015 - val_
loss: 328.6675 - val_mae: 16.6423
Epoch 79/100
30/30 [=====] - 0s 300us/sample - loss: 282.3920 - mae: 15.4504 - val_
loss: 319.2608 - val_mae: 16.3621
Epoch 80/100
30/30 [=====] - 0s 265us/sample - loss: 273.9331 - mae: 15.2037 - val_
loss: 310.1572 - val_mae: 16.0863
Epoch 81/100
30/30 [=====] - 0s 266us/sample - loss: 265.7506 - mae: 14.9612 - val_
loss: 301.3469 - val_mae: 15.8150
Epoch 82/100
30/30 [=====] - 0s 231us/sample - loss: 257.8349 - mae: 14.7231 - val_
loss: 292.8206 - val_mae: 15.5480
Epoch 83/100
30/30 [=====] - 0s 299us/sample - loss: 250.1768 - mae: 14.4890 - val_
loss: 284.5690 - val_mae: 15.2852
Epoch 84/100
30/30 [=====] - 0s 265us/sample - loss: 242.7673 - mae: 14.2590 - val_
loss: 276.5836 - val_mae: 15.0267
Epoch 85/100
30/30 [=====] - 0s 265us/sample - loss: 235.5981 - mae: 14.0330 - val_
loss: 268.8558 - val_mae: 14.7723
Epoch 86/100
30/30 [=====] - 0s 299us/sample - loss: 228.6606 - mae: 13.8110 - val_
loss: 261.3773 - val_mae: 14.5220
Epoch 87/100
30/30 [=====] - 0s 298us/sample - loss: 221.9472 - mae: 13.5928 - val_
loss: 254.1401 - val_mae: 14.2757
Epoch 88/100
30/30 [=====] - 0s 265us/sample - loss: 215.4499 - mae: 13.3783 - val_
loss: 247.1366 - val_mae: 14.0333
Epoch 89/100
30/30 [=====] - 0s 266us/sample - loss: 209.1617 - mae: 13.1676 - val_
loss: 240.3592 - val_mae: 13.7948
Epoch 90/100
30/30 [=====] - 0s 298us/sample - loss: 203.0752 - mae: 12.9605 - val_
loss: 233.8008 - val_mae: 13.5601
Epoch 91/100
30/30 [=====] - 0s 266us/sample - loss: 197.1838 - mae: 12.7570 - val_
loss: 227.4543 - val_mae: 13.3292
Epoch 92/100
30/30 [=====] - 0s 299us/sample - loss: 191.4807 - mae: 12.5570 - val_
loss: 221.3128 - val_mae: 13.1019
Epoch 93/100
30/30 [=====] - 0s 266us/sample - loss: 185.9597 - mae: 12.3604 - val_
loss: 215.3699 - val_mae: 12.8783
Epoch 94/100
30/30 [=====] - 0s 266us/sample - loss: 180.6146 - mae: 12.1672 - val_
```



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loss: 209.6192 - val_mae: 12.6583
Epoch 95/100
30/30 [=====] - 0s 298us/sample - loss: 175.4394 - mae: 11.9774 - val_
loss: 204.0544 - val_mae: 12.4418
Epoch 96/100
30/30 [=====] - 0s 265us/sample - loss: 170.4284 - mae: 11.7907 - val_
loss: 198.6697 - val_mae: 12.2288
Epoch 97/100
30/30 [=====] - 0s 298us/sample - loss: 165.5762 - mae: 11.6073 - val_
loss: 193.4592 - val_mae: 12.0192
Epoch 98/100
30/30 [=====] - 0s 266us/sample - loss: 160.8775 - mae: 11.4270 - val_
loss: 188.4173 - val_mae: 11.8129
Epoch 99/100
30/30 [=====] - 0s 300us/sample - loss: 156.3271 - mae: 11.2498 - val_
loss: 183.5386 - val_mae: 11.6100
Epoch 100/100
30/30 [=====] - 0s 265us/sample - loss: 151.9201 - mae: 11.0756 - val_
loss: 178.8179 - val_mae: 11.4102
15/15 [=====] - 0s 198us/sample - loss: 355.9130 - mae: 17.4460
[CV] learning_rate=0.008731907739399206, n_hidden=0, n_neurons=21, total= 1.3s
[CV] learning_rate=0.008731907739399206, n_hidden=0, n_neurons=21 ....
Train on 30 samples, validate on 5 samples
Epoch 1/100
30/30 [=====] - 0s 11ms/sample - loss: 4672.6431 - mae: 66.2092 - val_
loss: 3595.7969 - val_mae: 58.9712
Epoch 2/100
30/30 [=====] - 0s 298us/sample - loss: 4267.4707 - mae: 63.9836 - val_
loss: 3469.1570 - val_mae: 58.4091
Epoch 3/100
30/30 [=====] - 0s 266us/sample - loss: 3958.6667 - mae: 61.9992 - val_
loss: 3373.8042 - val_mae: 57.7854
Epoch 4/100
30/30 [=====] - 0s 333us/sample - loss: 3713.2537 - mae: 60.2104 - val_
loss: 3293.9187 - val_mae: 57.1152
Epoch 5/100
30/30 [=====] - 0s 265us/sample - loss: 3510.2866 - mae: 58.5814 - val_
loss: 3220.7004 - val_mae: 56.4105
Epoch 6/100
30/30 [=====] - 0s 299us/sample - loss: 3336.4075 - mae: 57.0835 - val_
loss: 3149.5098 - val_mae: 55.6808
Epoch 7/100
30/30 [=====] - 0s 231us/sample - loss: 3183.0452 - mae: 55.6938 - val_
loss: 3078.1226 - val_mae: 54.9336
Epoch 8/100
30/30 [=====] - 0s 300us/sample - loss: 3044.6565 - mae: 54.3941 - val_
loss: 3005.6758 - val_mae: 54.1750
Epoch 9/100
30/30 [=====] - 0s 265us/sample - loss: 2917.6187 - mae: 53.1700 - val_
loss: 2932.0398 - val_mae: 53.4097
Epoch 10/100
30/30 [=====] - 0s 233us/sample - loss: 2799.5286 - mae: 52.0097 - val_
loss: 2857.4517 - val_mae: 52.6415
Epoch 11/100
30/30 [=====] - 0s 265us/sample - loss: 2688.7642 - mae: 50.9039 - val_
loss: 2782.3035 - val_mae: 51.8735
Epoch 12/100
30/30 [=====] - 0s 399us/sample - loss: 2584.2024 - mae: 49.8453 - val_
loss: 2707.0259 - val_mae: 51.1080
Epoch 13/100
30/30 [=====] - 0s 332us/sample - loss: 2485.0471 - mae: 48.8278 - val_
loss: 2632.0288 - val_mae: 50.3470
Epoch 14/100
30/30 [=====] - 0s 299us/sample - loss: 2390.7119 - mae: 47.8465 - val_
loss: 2557.6729 - val_mae: 49.5919
Epoch 15/100
30/30 [=====] - 0s 299us/sample - loss: 2300.7532 - mae: 46.8975 - val_
loss: 2484.2607 - val_mae: 48.8438
Epoch 16/100
```

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30/30 [=====] - 0s 332us/sample - loss: 2214.8203 - mae: 45.9777 - val
_loss: 2412.0359 - val_mae: 48.1037
Epoch 17/100
30/30 [=====] - 0s 233us/sample - loss: 2132.6282 - mae: 45.0843 - val
_loss: 2341.1895 - val_mae: 47.3724
Epoch 18/100
30/30 [=====] - 0s 333us/sample - loss: 2053.9382 - mae: 44.2153 - val
_loss: 2271.8640 - val_mae: 46.6502
Epoch 19/100
30/30 [=====] - 0s 265us/sample - loss: 1978.5442 - mae: 43.3689 - val
_loss: 2204.1646 - val_mae: 45.9378
Epoch 20/100
30/30 [=====] - 0s 300us/sample - loss: 1906.2643 - mae: 42.5435 - val
_loss: 2138.1624 - val_mae: 45.2352
Epoch 21/100
30/30 [=====] - 0s 265us/sample - loss: 1836.9366 - mae: 41.7380 - val
_loss: 2073.9021 - val_mae: 44.5429
Epoch 22/100
30/30 [=====] - 0s 298us/sample - loss: 1770.4124 - mae: 40.9512 - val
_loss: 2011.4082 - val_mae: 43.8608
Epoch 23/100
30/30 [=====] - 0s 266us/sample - loss: 1706.5571 - mae: 40.1823 - val
_loss: 1950.6873 - val_mae: 43.1891
Epoch 24/100
30/30 [=====] - 0s 399us/sample - loss: 1645.2455 - mae: 39.4304 - val
_loss: 1891.7336 - val_mae: 42.5279
Epoch 25/100
30/30 [=====] - 0s 365us/sample - loss: 1586.3606 - mae: 38.6950 - val
_loss: 1834.5305 - val_mae: 41.8771
Epoch 26/100
30/30 [=====] - 0s 300us/sample - loss: 1529.7932 - mae: 37.9753 - val
_loss: 1779.0540 - val_mae: 41.2367
Epoch 27/100
30/30 [=====] - 0s 299us/sample - loss: 1475.4409 - mae: 37.2709 - val
_loss: 1725.2737 - val_mae: 40.6067
Epoch 28/100
30/30 [=====] - 0s 366us/sample - loss: 1423.2072 - mae: 36.5812 - val
_loss: 1673.1553 - val_mae: 39.9870
Epoch 29/100
30/30 [=====] - 0s 299us/sample - loss: 1373.0007 - mae: 35.9059 - val
_loss: 1622.6616 - val_mae: 39.3774
Epoch 30/100
30/30 [=====] - 0s 332us/sample - loss: 1324.7351 - mae: 35.2444 - val
_loss: 1573.7523 - val_mae: 38.7780
Epoch 31/100
30/30 [=====] - 0s 266us/sample - loss: 1278.3285 - mae: 34.5964 - val
_loss: 1526.3868 - val_mae: 38.1886
Epoch 32/100
30/30 [=====] - 0s 266us/sample - loss: 1233.7030 - mae: 33.9616 - val
_loss: 1480.5226 - val_mae: 37.6091
Epoch 33/100
30/30 [=====] - 0s 299us/sample - loss: 1190.7844 - mae: 33.3396 - val
_loss: 1436.1172 - val_mae: 37.0393
Epoch 34/100
30/30 [=====] - 0s 266us/sample - loss: 1149.5024 - mae: 32.7302 - val
_loss: 1393.1283 - val_mae: 36.4792
Epoch 35/100
30/30 [=====] - 0s 265us/sample - loss: 1109.7899 - mae: 32.1329 - val
_loss: 1351.5134 - val_mae: 35.9286
Epoch 36/100
30/30 [=====] - 0s 232us/sample - loss: 1071.5830 - mae: 31.5476 - val
_loss: 1311.2316 - val_mae: 35.3873
Epoch 37/100
30/30 [=====] - 0s 266us/sample - loss: 1034.8199 - mae: 30.9739 - val
_loss: 1272.2406 - val_mae: 34.8553
Epoch 38/100
30/30 [=====] - 0s 299us/sample - loss: 999.4427 - mae: 30.4116 - val
_loss: 1234.5004 - val_mae: 34.3323
Epoch 39/100
```

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30/30 [=====] - 0s 300us/sample - loss: 965.3954 - mae: 29.8605 - val_
loss: 1197.9714 - val_mae: 33.8183
Epoch 40/100
30/30 [=====] - 0s 298us/sample - loss: 932.6246 - mae: 29.3202 - val_
loss: 1162.6155 - val_mae: 33.3131
Epoch 41/100
30/30 [=====] - 0s 299us/sample - loss: 901.0792 - mae: 28.7906 - val_
loss: 1128.3942 - val_mae: 32.8165
Epoch 42/100
30/30 [=====] - 0s 276us/sample - loss: 870.7103 - mae: 28.2714 - val_
loss: 1095.2710 - val_mae: 32.3285
Epoch 43/100
30/30 [=====] - 0s 299us/sample - loss: 841.4713 - mae: 27.7624 - val_
loss: 1063.2104 - val_mae: 31.8488
Epoch 44/100
30/30 [=====] - 0s 200us/sample - loss: 813.3173 - mae: 27.2634 - val_
loss: 1032.1772 - val_mae: 31.3774
Epoch 45/100
30/30 [=====] - 0s 266us/sample - loss: 786.2052 - mae: 26.7742 - val_
loss: 1002.1380 - val_mae: 30.9140
Epoch 46/100
30/30 [=====] - 0s 245us/sample - loss: 760.0940 - mae: 26.2945 - val_
loss: 973.0601 - val_mae: 30.4586
Epoch 47/100
30/30 [=====] - 0s 266us/sample - loss: 734.9444 - mae: 25.8241 - val_
loss: 944.9115 - val_mae: 30.0111
Epoch 48/100
30/30 [=====] - 0s 265us/sample - loss: 710.7187 - mae: 25.3630 - val_
loss: 917.6613 - val_mae: 29.5712
Epoch 49/100
30/30 [=====] - 0s 233us/sample - loss: 687.3803 - mae: 24.9108 - val_
loss: 891.2801 - val_mae: 29.1389
Epoch 50/100
30/30 [=====] - 0s 233us/sample - loss: 664.8948 - mae: 24.4674 - val_
loss: 865.7389 - val_mae: 28.7139
Epoch 51/100
30/30 [=====] - 0s 266us/sample - loss: 643.2288 - mae: 24.0326 - val_
loss: 841.0099 - val_mae: 28.2963
Epoch 52/100
30/30 [=====] - 0s 233us/sample - loss: 622.3506 - mae: 23.6062 - val_
loss: 817.0657 - val_mae: 27.8858
Epoch 53/100
30/30 [=====] - 0s 233us/sample - loss: 602.2294 - mae: 23.1881 - val_
loss: 793.8806 - val_mae: 27.4824
Epoch 54/100
30/30 [=====] - 0s 233us/sample - loss: 582.8358 - mae: 22.7780 - val_
loss: 771.4288 - val_mae: 27.0859
Epoch 55/100
30/30 [=====] - 0s 266us/sample - loss: 564.1417 - mae: 22.3759 - val_
loss: 749.6862 - val_mae: 26.6961
Epoch 56/100
30/30 [=====] - 0s 299us/sample - loss: 546.1201 - mae: 21.9815 - val_
loss: 728.6292 - val_mae: 26.3130
Epoch 57/100
30/30 [=====] - 0s 233us/sample - loss: 528.7450 - mae: 21.5947 - val_
loss: 708.2347 - val_mae: 25.9364
Epoch 58/100
30/30 [=====] - 0s 299us/sample - loss: 511.9916 - mae: 21.2154 - val_
loss: 688.4807 - val_mae: 25.5663
Epoch 59/100
30/30 [=====] - 0s 266us/sample - loss: 495.8358 - mae: 20.8433 - val_
loss: 669.3458 - val_mae: 25.2025
Epoch 60/100
30/30 [=====] - 0s 265us/sample - loss: 480.2549 - mae: 20.4784 - val_
loss: 650.8093 - val_mae: 24.8448
Epoch 61/100
30/30 [=====] - 0s 232us/sample - loss: 465.2267 - mae: 20.1204 - val_
loss: 632.8515 - val_mae: 24.4932
Epoch 62/100
```

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30/30 [=====] - 0s 266us/sample - loss: 450.7304 - mae: 19.7693 - val_
loss: 615.4530 - val_mae: 24.1476
Epoch 63/100
30/30 [=====] - 0s 232us/sample - loss: 436.7453 - mae: 19.4250 - val_
loss: 598.5950 - val_mae: 23.8078
Epoch 64/100
30/30 [=====] - 0s 300us/sample - loss: 423.2523 - mae: 19.0871 - val_
loss: 582.2599 - val_mae: 23.4738
Epoch 65/100
30/30 [=====] - 0s 265us/sample - loss: 410.2325 - mae: 18.7558 - val_
loss: 566.4301 - val_mae: 23.1455
Epoch 66/100
30/30 [=====] - 0s 266us/sample - loss: 397.6680 - mae: 18.4307 - val_
loss: 551.0889 - val_mae: 22.8227
Epoch 67/100
30/30 [=====] - 0s 233us/sample - loss: 385.5417 - mae: 18.1118 - val_
loss: 536.2200 - val_mae: 22.5053
Epoch 68/100
30/30 [=====] - 0s 232us/sample - loss: 373.8368 - mae: 17.7990 - val_
loss: 521.8080 - val_mae: 22.1932
Epoch 69/100
30/30 [=====] - 0s 231us/sample - loss: 362.5378 - mae: 17.4921 - val_
loss: 507.8378 - val_mae: 21.8864
Epoch 70/100
30/30 [=====] - 0s 232us/sample - loss: 351.6291 - mae: 17.1910 - val_
loss: 494.2945 - val_mae: 21.5848
Epoch 71/100
30/30 [=====] - 0s 267us/sample - loss: 341.0962 - mae: 16.8956 - val_
loss: 481.1642 - val_mae: 21.2882
Epoch 72/100
30/30 [=====] - 0s 299us/sample - loss: 330.9249 - mae: 16.6058 - val_
loss: 468.4333 - val_mae: 20.9966
Epoch 73/100
30/30 [=====] - 0s 232us/sample - loss: 321.1018 - mae: 16.3345 - val_
loss: 456.0886 - val_mae: 20.7098
Epoch 74/100
30/30 [=====] - 0s 266us/sample - loss: 311.6140 - mae: 16.0686 - val_
loss: 444.1175 - val_mae: 20.4278
Epoch 75/100
30/30 [=====] - 0s 266us/sample - loss: 302.4488 - mae: 15.8076 - val_
loss: 432.5078 - val_mae: 20.1505
Epoch 76/100
30/30 [=====] - 0s 299us/sample - loss: 293.5944 - mae: 15.5513 - val_
loss: 421.2474 - val_mae: 19.8778
Epoch 77/100
30/30 [=====] - 0s 265us/sample - loss: 285.0391 - mae: 15.2998 - val_
loss: 410.3253 - val_mae: 19.6097
Epoch 78/100
30/30 [=====] - 0s 299us/sample - loss: 276.7721 - mae: 15.0528 - val_
loss: 399.7302 - val_mae: 19.3460
Epoch 79/100
30/30 [=====] - 0s 265us/sample - loss: 268.7826 - mae: 14.8103 - val_
loss: 389.4513 - val_mae: 19.0866
Epoch 80/100
30/30 [=====] - 0s 300us/sample - loss: 261.0604 - mae: 14.5722 - val_
loss: 379.4786 - val_mae: 18.8315
Epoch 81/100
30/30 [=====] - 0s 299us/sample - loss: 253.5957 - mae: 14.3384 - val_
loss: 369.8021 - val_mae: 18.5806
Epoch 82/100
30/30 [=====] - 0s 299us/sample - loss: 246.3790 - mae: 14.1089 - val_
loss: 360.4123 - val_mae: 18.3339
Epoch 83/100
30/30 [=====] - 0s 265us/sample - loss: 239.4015 - mae: 13.8836 - val_
loss: 351.2996 - val_mae: 18.0912
Epoch 84/100
30/30 [=====] - 0s 266us/sample - loss: 232.6542 - mae: 13.6623 - val_
loss: 342.4553 - val_mae: 17.8525
Epoch 85/100
```

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Epoch 85/100
30/30 [=====] - 0s 266us/sample - loss: 226.1288 - mae: 13.4450 - val_
loss: 333.8708 - val_mae: 17.6177
Epoch 86/100
30/30 [=====] - 0s 266us/sample - loss: 219.8173 - mae: 13.2317 - val_
loss: 325.5376 - val_mae: 17.3867
Epoch 87/100
30/30 [=====] - 0s 265us/sample - loss: 213.7119 - mae: 13.0222 - val_
loss: 317.4476 - val_mae: 17.1595
Epoch 88/100
30/30 [=====] - 0s 265us/sample - loss: 207.8051 - mae: 12.8164 - val_
loss: 309.5932 - val_mae: 16.9360
Epoch 89/100
30/30 [=====] - 0s 233us/sample - loss: 202.0899 - mae: 12.6144 - val_
loss: 301.9668 - val_mae: 16.7161
Epoch 90/100
30/30 [=====] - 0s 267us/sample - loss: 196.5593 - mae: 12.4159 - val_
loss: 294.5611 - val_mae: 16.4998
Epoch 91/100
30/30 [=====] - 0s 266us/sample - loss: 191.2068 - mae: 12.2211 - val_
loss: 287.3690 - val_mae: 16.2870
Epoch 92/100
30/30 [=====] - 0s 232us/sample - loss: 186.0259 - mae: 12.0378 - val_
loss: 280.3839 - val_mae: 16.0776
Epoch 93/100
30/30 [=====] - 0s 298us/sample - loss: 181.0107 - mae: 11.8589 - val_
loss: 273.5990 - val_mae: 15.8716
Epoch 94/100
30/30 [=====] - 0s 266us/sample - loss: 176.1550 - mae: 11.6831 - val_
loss: 267.0082 - val_mae: 15.6690
Epoch 95/100
30/30 [=====] - 0s 266us/sample - loss: 171.4534 - mae: 11.5103 - val_
loss: 260.6054 - val_mae: 15.4696
Epoch 96/100
30/30 [=====] - 0s 266us/sample - loss: 166.9003 - mae: 11.3404 - val_
loss: 254.3844 - val_mae: 15.2733
Epoch 97/100
30/30 [=====] - 0s 266us/sample - loss: 162.4906 - mae: 11.1735 - val_
loss: 248.3397 - val_mae: 15.0802
Epoch 98/100
30/30 [=====] - 0s 265us/sample - loss: 158.2191 - mae: 11.0094 - val_
loss: 242.4659 - val_mae: 14.8903
Epoch 99/100
30/30 [=====] - 0s 266us/sample - loss: 154.0811 - mae: 10.8481 - val_
loss: 236.7573 - val_mae: 14.7033
Epoch 100/100
30/30 [=====] - 0s 266us/sample - loss: 150.0720 - mae: 10.6896 - val_
loss: 231.2091 - val_mae: 14.5193
15/15 [=====] - 0s 199us/sample - loss: 516.1515 - mae: 21.4012
[CV] learning_rate=0.008731907739399206, n_hidden=0, n_neurons=21, total= 1.3s
[CV] learning_rate=0.0006154014789262348, n_hidden=2, n_neurons=87 ...
Train on 30 samples, validate on 5 samples
Epoch 1/100
30/30 [=====] - 0s 16ms/sample - loss: 4506.5464 - mae: 63.9122 - val_
loss: 3713.8472 - val_mae: 58.8093
Epoch 2/100
30/30 [=====] - 0s 399us/sample - loss: 4375.3374 - mae: 62.7917 - val_
_loss: 3625.1375 - val_mae: 57.9670
Epoch 3/100
30/30 [=====] - 0s 399us/sample - loss: 4251.3032 - mae: 61.7325 - val_
_loss: 3521.2395 - val_mae: 56.9922
Epoch 4/100
30/30 [=====] - 0s 366us/sample - loss: 4103.8262 - mae: 60.4845 - val_
_loss: 3377.6609 - val_mae: 55.6656
Epoch 5/100
30/30 [=====] - 0s 366us/sample - loss: 3901.4133 - mae: 58.7869 - val_
_loss: 3162.4558 - val_mae: 53.6848
Epoch 6/100
30/30 [=====] - 0s 399us/sample - loss: 3593.1121 - mae: 56.1965 - val_
_loss: 2816.2730 - val_mae: 50.4516
```

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_loss: 2016.3750 - val_mae: 50.4316
Epoch 7/100
30/30 [=====] - 0s 399us/sample - loss: 3089.5334 - mae: 51.8472 - val
_loss: 2246.0908 - val_mae: 44.7872
Epoch 8/100
30/30 [=====] - 0s 432us/sample - loss: 2267.5654 - mae: 44.0919 - val
_loss: 1401.5149 - val_mae: 34.8516
Epoch 9/100
30/30 [=====] - 0s 399us/sample - loss: 1116.7233 - mae: 30.4253 - val
_loss: 593.7417 - val_mae: 20.8519
Epoch 10/100
30/30 [=====] - 0s 399us/sample - loss: 241.3973 - mae: 13.7143 - val_
loss: 336.9922 - val_mae: 13.1958
Epoch 11/100
30/30 [=====] - 0s 432us/sample - loss: 132.7124 - mae: 9.5119 - val_l
oss: 345.5630 - val_mae: 14.2544
Epoch 12/100
30/30 [=====] - 0s 366us/sample - loss: 109.8628 - mae: 9.0969 - val_l
oss: 291.7034 - val_mae: 12.5335
Epoch 13/100
30/30 [=====] - 0s 432us/sample - loss: 97.1299 - mae: 8.5027 - val_lo
ss: 273.9222 - val_mae: 12.2050
Epoch 14/100
30/30 [=====] - 0s 365us/sample - loss: 87.9935 - mae: 8.1384 - val_lo
ss: 246.5046 - val_mae: 11.3653
Epoch 15/100
30/30 [=====] - 0s 432us/sample - loss: 80.5991 - mae: 7.7263 - val_lo
ss: 227.8759 - val_mae: 10.8540
Epoch 16/100
30/30 [=====] - 0s 399us/sample - loss: 74.4132 - mae: 7.3968 - val_lo
ss: 209.7142 - val_mae: 10.2903
Epoch 17/100
30/30 [=====] - 0s 366us/sample - loss: 69.1556 - mae: 7.0774 - val_lo
ss: 194.5530 - val_mae: 9.8223
Epoch 18/100
30/30 [=====] - 0s 399us/sample - loss: 64.6092 - mae: 6.7966 - val_lo
ss: 180.7451 - val_mae: 9.3762
Epoch 19/100
30/30 [=====] - 0s 399us/sample - loss: 60.6378 - mae: 6.5597 - val_lo
ss: 168.6478 - val_mae: 8.9710
Epoch 20/100
30/30 [=====] - 0s 399us/sample - loss: 57.2006 - mae: 6.3665 - val_lo
ss: 158.0877 - val_mae: 8.6212
Epoch 21/100
30/30 [=====] - 0s 399us/sample - loss: 54.1720 - mae: 6.1985 - val_lo
ss: 148.0998 - val_mae: 8.4483
Epoch 22/100
30/30 [=====] - 0s 366us/sample - loss: 51.4994 - mae: 6.0376 - val_lo
ss: 139.8425 - val_mae: 8.3209
Epoch 23/100
30/30 [=====] - 0s 366us/sample - loss: 49.1166 - mae: 5.8947 - val_lo
ss: 132.1862 - val_mae: 8.1892
Epoch 24/100
30/30 [=====] - 0s 399us/sample - loss: 46.9741 - mae: 5.7564 - val_lo
ss: 125.1570 - val_mae: 8.0568
Epoch 25/100
30/30 [=====] - 0s 432us/sample - loss: 45.0325 - mae: 5.6262 - val_lo
ss: 118.8128 - val_mae: 7.9332
Epoch 26/100
30/30 [=====] - 0s 432us/sample - loss: 43.2662 - mae: 5.5049 - val_lo
ss: 113.1508 - val_mae: 7.8161
Epoch 27/100
30/30 [=====] - 0s 399us/sample - loss: 41.6370 - mae: 5.3991 - val_lo
ss: 107.9700 - val_mae: 7.7011
Epoch 28/100
30/30 [=====] - 0s 366us/sample - loss: 40.1515 - mae: 5.3007 - val_lo
ss: 103.2005 - val_mae: 7.5917
Epoch 29/100
30/30 [=====] - 0s 366us/sample - loss: 38.7908 - mae: 5.2084 - val_lo
ss: 98.8665 - val_mae: 7.4837
```

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ss: 98.8205 - val_mae: 7.4797
Epoch 30/100
30/30 [=====] - 0s 432us/sample - loss: 37.5183 - mae: 5.1147 - val_lo
ss: 94.6582 - val_mae: 7.3693
Epoch 31/100
30/30 [=====] - 0s 399us/sample - loss: 36.3200 - mae: 5.0248 - val_lo
ss: 91.2020 - val_mae: 7.2868
Epoch 32/100
30/30 [=====] - 0s 399us/sample - loss: 35.2135 - mae: 4.9417 - val_lo
ss: 87.7815 - val_mae: 7.1944
Epoch 33/100
30/30 [=====] - 0s 432us/sample - loss: 34.1794 - mae: 4.8644 - val_lo
ss: 84.6980 - val_mae: 7.1081
Epoch 34/100
30/30 [=====] - 0s 366us/sample - loss: 33.2140 - mae: 4.7899 - val_lo
ss: 81.7616 - val_mae: 7.0248
Epoch 35/100
30/30 [=====] - 0s 432us/sample - loss: 32.2858 - mae: 4.7177 - val_lo
ss: 78.9909 - val_mae: 6.9367
Epoch 36/100
30/30 [=====] - 0s 399us/sample - loss: 31.4150 - mae: 4.6528 - val_lo
ss: 76.3521 - val_mae: 6.8494
Epoch 37/100
30/30 [=====] - 0s 432us/sample - loss: 30.5837 - mae: 4.5860 - val_lo
ss: 73.8981 - val_mae: 6.7725
Epoch 38/100
30/30 [=====] - 0s 399us/sample - loss: 29.7783 - mae: 4.5239 - val_lo
ss: 71.7298 - val_mae: 6.7026
Epoch 39/100
30/30 [=====] - 0s 399us/sample - loss: 29.0158 - mae: 4.4672 - val_lo
ss: 69.4186 - val_mae: 6.6188
Epoch 40/100
30/30 [=====] - 0s 399us/sample - loss: 28.2752 - mae: 4.4079 - val_lo
ss: 67.5443 - val_mae: 6.5560
Epoch 41/100
30/30 [=====] - 0s 399us/sample - loss: 27.5709 - mae: 4.3547 - val_lo
ss: 65.3624 - val_mae: 6.4714
Epoch 42/100
30/30 [=====] - 0s 399us/sample - loss: 26.8854 - mae: 4.2947 - val_lo
ss: 63.7216 - val_mae: 6.4148
Epoch 43/100
30/30 [=====] - 0s 366us/sample - loss: 26.2320 - mae: 4.2451 - val_lo
ss: 61.7865 - val_mae: 6.3378
Epoch 44/100
30/30 [=====] - 0s 432us/sample - loss: 25.5962 - mae: 4.1928 - val_lo
ss: 60.2743 - val_mae: 6.2763
Epoch 45/100
30/30 [=====] - 0s 366us/sample - loss: 24.9948 - mae: 4.1433 - val_lo
ss: 58.6001 - val_mae: 6.2092
Epoch 46/100
30/30 [=====] - 0s 366us/sample - loss: 24.4077 - mae: 4.0923 - val_lo
ss: 57.0483 - val_mae: 6.1465
Epoch 47/100
30/30 [=====] - 0s 399us/sample - loss: 23.8487 - mae: 4.0441 - val_lo
ss: 55.5833 - val_mae: 6.0862
Epoch 48/100
30/30 [=====] - 0s 366us/sample - loss: 23.2999 - mae: 3.9956 - val_lo
ss: 54.1623 - val_mae: 6.0207
Epoch 49/100
30/30 [=====] - 0s 399us/sample - loss: 22.7735 - mae: 3.9455 - val_lo
ss: 52.8456 - val_mae: 5.9635
Epoch 50/100
30/30 [=====] - 0s 366us/sample - loss: 22.2719 - mae: 3.8988 - val_lo
ss: 51.4779 - val_mae: 5.9005
Epoch 51/100
30/30 [=====] - 0s 432us/sample - loss: 21.7744 - mae: 3.8500 - val_lo
ss: 50.1118 - val_mae: 5.8322
Epoch 52/100
30/30 [=====] - 0s 399us/sample - loss: 21.3015 - mae: 3.8039 - val_lo
```

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ss: 49.0090 - val_mae: 5.7840
Epoch 53/100
30/30 [=====] - 0s 432us/sample - loss: 20.8318 - mae: 3.7606 - val_lo
ss: 47.7235 - val_mae: 5.7172
Epoch 54/100
30/30 [=====] - 0s 432us/sample - loss: 20.3881 - mae: 3.7186 - val_lo
ss: 46.7160 - val_mae: 5.6702
Epoch 55/100
30/30 [=====] - 0s 366us/sample - loss: 19.9495 - mae: 3.6800 - val_lo
ss: 45.6639 - val_mae: 5.6140
Epoch 56/100
30/30 [=====] - 0s 432us/sample - loss: 19.5280 - mae: 3.6420 - val_lo
ss: 44.5857 - val_mae: 5.5612
Epoch 57/100
30/30 [=====] - 0s 432us/sample - loss: 19.1121 - mae: 3.6004 - val_lo
ss: 43.6651 - val_mae: 5.5149
Epoch 58/100
30/30 [=====] - 0s 399us/sample - loss: 18.7104 - mae: 3.5621 - val_lo
ss: 42.5824 - val_mae: 5.4554
Epoch 59/100
30/30 [=====] - 0s 432us/sample - loss: 18.3306 - mae: 3.5229 - val_lo
ss: 41.7601 - val_mae: 5.4085
Epoch 60/100
30/30 [=====] - 0s 399us/sample - loss: 17.9579 - mae: 3.4873 - val_lo
ss: 40.8522 - val_mae: 5.3593
Epoch 61/100
30/30 [=====] - 0s 432us/sample - loss: 17.5864 - mae: 3.4502 - val_lo
ss: 39.9380 - val_mae: 5.3081
Epoch 62/100
30/30 [=====] - 0s 432us/sample - loss: 17.2392 - mae: 3.4130 - val_lo
ss: 39.1010 - val_mae: 5.2614
Epoch 63/100
30/30 [=====] - 0s 465us/sample - loss: 16.8939 - mae: 3.3767 - val_lo
ss: 38.2204 - val_mae: 5.2102
Epoch 64/100
30/30 [=====] - 0s 432us/sample - loss: 16.5593 - mae: 3.3404 - val_lo
ss: 37.4281 - val_mae: 5.1633
Epoch 65/100
30/30 [=====] - 0s 366us/sample - loss: 16.2327 - mae: 3.3056 - val_lo
ss: 36.7257 - val_mae: 5.1250
Epoch 66/100
30/30 [=====] - 0s 399us/sample - loss: 15.9170 - mae: 3.2702 - val_lo
ss: 36.0884 - val_mae: 5.0836
Epoch 67/100
30/30 [=====] - 0s 366us/sample - loss: 15.6078 - mae: 3.2390 - val_lo
ss: 35.2855 - val_mae: 5.0338
Epoch 68/100
30/30 [=====] - 0s 366us/sample - loss: 15.3087 - mae: 3.2017 - val_lo
ss: 34.7098 - val_mae: 4.9995
Epoch 69/100
30/30 [=====] - 0s 366us/sample - loss: 15.0099 - mae: 3.1696 - val_lo
ss: 33.9739 - val_mae: 4.9485
Epoch 70/100
30/30 [=====] - 0s 332us/sample - loss: 14.7296 - mae: 3.1353 - val_lo
ss: 33.3307 - val_mae: 4.9095
Epoch 71/100
30/30 [=====] - 0s 366us/sample - loss: 14.4535 - mae: 3.1038 - val_lo
ss: 32.6506 - val_mae: 4.8649
Epoch 72/100
30/30 [=====] - 0s 432us/sample - loss: 14.1864 - mae: 3.0690 - val_lo
ss: 32.1880 - val_mae: 4.8333
Epoch 73/100
30/30 [=====] - 0s 366us/sample - loss: 13.9221 - mae: 3.0409 - val_lo
ss: 31.5047 - val_mae: 4.7889
Epoch 74/100
30/30 [=====] - 0s 366us/sample - loss: 13.6634 - mae: 3.0060 - val_lo
ss: 31.0331 - val_mae: 4.7575
Epoch 75/100
30/30 [=====] - 0s 399us/sample - loss: 13.4206 - mae: 2.9775 - val_lo
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ss: 30.3308 - val_mae: 4.7066
Epoch 76/100
30/30 [=====] - 0s 366us/sample - loss: 13.1746 - mae: 2.9435 - val_lo
ss: 29.9403 - val_mae: 4.6781
Epoch 77/100
30/30 [=====] - 0s 399us/sample - loss: 12.9391 - mae: 2.9166 - val_lo
ss: 29.4252 - val_mae: 4.6415
Epoch 78/100
30/30 [=====] - 0s 366us/sample - loss: 12.7082 - mae: 2.8863 - val_lo
ss: 28.8959 - val_mae: 4.6032
Epoch 79/100
30/30 [=====] - 0s 399us/sample - loss: 12.4883 - mae: 2.8586 - val_lo
ss: 28.3899 - val_mae: 4.5662
Epoch 80/100
30/30 [=====] - 0s 332us/sample - loss: 12.2696 - mae: 2.8266 - val_lo
ss: 28.0529 - val_mae: 4.5436
Epoch 81/100
30/30 [=====] - 0s 332us/sample - loss: 12.0614 - mae: 2.8021 - val_lo
ss: 27.5540 - val_mae: 4.5017
Epoch 82/100
30/30 [=====] - 0s 366us/sample - loss: 11.8545 - mae: 2.7729 - val_lo
ss: 27.1678 - val_mae: 4.4702
Epoch 83/100
30/30 [=====] - 0s 399us/sample - loss: 11.6638 - mae: 2.7497 - val_lo
ss: 26.6685 - val_mae: 4.4357
Epoch 84/100
30/30 [=====] - 0s 432us/sample - loss: 11.4715 - mae: 2.7202 - val_lo
ss: 26.3531 - val_mae: 4.4065
Epoch 85/100
30/30 [=====] - 0s 366us/sample - loss: 11.2800 - mae: 2.6947 - val_lo
ss: 25.9378 - val_mae: 4.3780
Epoch 86/100
30/30 [=====] - 0s 332us/sample - loss: 11.1023 - mae: 2.6699 - val_lo
ss: 25.5321 - val_mae: 4.3411
Epoch 87/100
30/30 [=====] - 0s 399us/sample - loss: 10.9174 - mae: 2.6430 - val_lo
ss: 25.1539 - val_mae: 4.3134
Epoch 88/100
30/30 [=====] - 0s 399us/sample - loss: 10.7416 - mae: 2.6177 - val_lo
ss: 24.8676 - val_mae: 4.2910
Epoch 89/100
30/30 [=====] - 0s 399us/sample - loss: 10.5738 - mae: 2.5937 - val_lo
ss: 24.5127 - val_mae: 4.2607
Epoch 90/100
30/30 [=====] - 0s 366us/sample - loss: 10.4088 - mae: 2.5700 - val_lo
ss: 24.2115 - val_mae: 4.2368
Epoch 91/100
30/30 [=====] - 0s 399us/sample - loss: 10.2427 - mae: 2.5496 - val_lo
ss: 23.8365 - val_mae: 4.2068
Epoch 92/100
30/30 [=====] - 0s 432us/sample - loss: 10.0848 - mae: 2.5288 - val_lo
ss: 23.5612 - val_mae: 4.1891
Epoch 93/100
30/30 [=====] - 0s 399us/sample - loss: 9.9263 - mae: 2.5101 - val_lo
ss: 23.2210 - val_mae: 4.1610
Epoch 94/100
30/30 [=====] - 0s 332us/sample - loss: 9.7824 - mae: 2.4921 - val_lo
ss: 22.9603 - val_mae: 4.1489
Epoch 95/100
30/30 [=====] - 0s 399us/sample - loss: 9.6276 - mae: 2.4726 - val_lo
ss: 22.6638 - val_mae: 4.1254
Epoch 96/100
30/30 [=====] - 0s 366us/sample - loss: 9.4840 - mae: 2.4545 - val_lo
ss: 22.4508 - val_mae: 4.1152
Epoch 97/100
30/30 [=====] - 0s 366us/sample - loss: 9.3394 - mae: 2.4352 - val_lo
ss: 22.1234 - val_mae: 4.0880
Epoch 98/100
30/30 [=====] - 0s 399us/sample - loss: 9.2038 - mae: 2.4178 - val_lo
```

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s: 21.8787 - val_mae: 4.0690
Epoch 99/100
30/30 [=====] - 0s 432us/sample - loss: 9.0632 - mae: 2.3985 - val_loss: 21.6110 - val_mae: 4.0520
Epoch 100/100
30/30 [=====] - 0s 432us/sample - loss: 8.9323 - mae: 2.3822 - val_loss: 21.3549 - val_mae: 4.0291
15/15 [=====] - 0s 266us/sample - loss: 214.6832 - mae: 12.0413
[CV] learning_rate=0.0006154014789262348, n_hidden=2, n_neurons=87, total= 1.9s
[CV] learning_rate=0.0006154014789262348, n_hidden=2, n_neurons=87 ...
Train on 30 samples, validate on 5 samples
Epoch 1/100
30/30 [=====] - 1s 19ms/sample - loss: 4178.4941 - mae: 61.7010 - val_loss: 3672.8723 - val_mae: 58.2480
Epoch 2/100
30/30 [=====] - 0s 366us/sample - loss: 4058.8948 - mae: 60.6870 - val_loss: 3571.2434 - val_mae: 57.3152
Epoch 3/100
30/30 [=====] - 0s 366us/sample - loss: 3934.5481 - mae: 59.6138 - val_loss: 3447.0425 - val_mae: 56.1575
Epoch 4/100
30/30 [=====] - 0s 399us/sample - loss: 3777.4089 - mae: 58.2460 - val_loss: 3273.0718 - val_mae: 54.5222
Epoch 5/100
30/30 [=====] - 0s 366us/sample - loss: 3553.5256 - mae: 56.2767 - val_loss: 3010.4695 - val_mae: 52.0205
Epoch 6/100
30/30 [=====] - 0s 366us/sample - loss: 3214.2927 - mae: 53.2239 - val_loss: 2598.9211 - val_mae: 47.9568
Epoch 7/100
30/30 [=====] - 0s 366us/sample - loss: 2686.0588 - mae: 48.2031 - val_loss: 1969.3658 - val_mae: 41.1942
Epoch 8/100
30/30 [=====] - 0s 399us/sample - loss: 1893.0034 - mae: 39.7063 - val_loss: 1143.4189 - val_mae: 30.3911
Epoch 9/100
30/30 [=====] - 0s 432us/sample - loss: 936.2092 - mae: 26.4709 - val_loss: 472.9437 - val_mae: 17.6491
Epoch 10/100
30/30 [=====] - 0s 399us/sample - loss: 337.7075 - mae: 14.2761 - val_loss: 261.4134 - val_mae: 12.6661
Epoch 11/100
30/30 [=====] - 0s 365us/sample - loss: 212.8602 - mae: 11.2872 - val_loss: 215.8697 - val_mae: 11.3455
Epoch 12/100
30/30 [=====] - 0s 366us/sample - loss: 156.3369 - mae: 9.7719 - val_loss: 170.2615 - val_mae: 9.8638
Epoch 13/100
30/30 [=====] - 0s 366us/sample - loss: 124.9120 - mae: 8.6658 - val_loss: 144.8329 - val_mae: 8.9579
Epoch 14/100
30/30 [=====] - 0s 366us/sample - loss: 105.4933 - mae: 7.9895 - val_loss: 125.1216 - val_mae: 8.2438
Epoch 15/100
30/30 [=====] - 0s 399us/sample - loss: 92.1663 - mae: 7.5171 - val_loss: 111.0168 - val_mae: 7.7070
Epoch 16/100
30/30 [=====] - 0s 399us/sample - loss: 82.2776 - mae: 7.0990 - val_loss: 100.1862 - val_mae: 7.2781
Epoch 17/100
30/30 [=====] - 0s 399us/sample - loss: 74.4540 - mae: 6.7532 - val_loss: 91.7521 - val_mae: 6.9419
Epoch 18/100
30/30 [=====] - 0s 366us/sample - loss: 67.8971 - mae: 6.4475 - val_loss: 84.9619 - val_mae: 6.6621
Epoch 19/100
30/30 [=====] - 0s 399us/sample - loss: 62.4067 - mae: 6.2119 - val_loss: 79.6340 - val_mae: 6.4245
Epoch 20/100
```

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30/30 [=====] - 0s 432us/sample - loss: 57.7342 - mae: 6.0014 - val_loss: 75.1845 - val_mae: 6.2885
Epoch 21/100
30/30 [=====] - 0s 432us/sample - loss: 53.6789 - mae: 5.7991 - val_loss: 71.4880 - val_mae: 6.2570
Epoch 22/100
30/30 [=====] - 0s 366us/sample - loss: 50.1254 - mae: 5.6321 - val_loss: 68.4058 - val_mae: 6.2014
Epoch 23/100
30/30 [=====] - 0s 399us/sample - loss: 47.0090 - mae: 5.4717 - val_loss: 65.6954 - val_mae: 6.1607
Epoch 24/100
30/30 [=====] - 0s 399us/sample - loss: 44.2247 - mae: 5.3224 - val_loss: 63.4190 - val_mae: 6.1339
Epoch 25/100
30/30 [=====] - 0s 399us/sample - loss: 41.7233 - mae: 5.1777 - val_loss: 61.4850 - val_mae: 6.0928
Epoch 26/100
30/30 [=====] - 0s 465us/sample - loss: 39.4624 - mae: 5.0401 - val_loss: 59.6865 - val_mae: 6.0556
Epoch 27/100
30/30 [=====] - 0s 366us/sample - loss: 37.3623 - mae: 4.9040 - val_loss: 58.0493 - val_mae: 6.0289
Epoch 28/100
30/30 [=====] - 0s 333us/sample - loss: 35.4411 - mae: 4.7764 - val_loss: 56.6350 - val_mae: 5.9882
Epoch 29/100
30/30 [=====] - 0s 399us/sample - loss: 33.6888 - mae: 4.6529 - val_loss: 55.3115 - val_mae: 5.9779
Epoch 30/100
30/30 [=====] - 0s 366us/sample - loss: 32.0663 - mae: 4.5375 - val_loss: 54.1822 - val_mae: 5.9433
Epoch 31/100
30/30 [=====] - 0s 366us/sample - loss: 30.5574 - mae: 4.4312 - val_loss: 52.9874 - val_mae: 5.9079
Epoch 32/100
30/30 [=====] - 0s 399us/sample - loss: 29.1533 - mae: 4.3406 - val_loss: 52.0156 - val_mae: 5.8990
Epoch 33/100
30/30 [=====] - 0s 366us/sample - loss: 27.8640 - mae: 4.2486 - val_loss: 51.1113 - val_mae: 5.8629
Epoch 34/100
30/30 [=====] - 0s 366us/sample - loss: 26.6524 - mae: 4.1598 - val_loss: 50.1838 - val_mae: 5.8424
Epoch 35/100
30/30 [=====] - 0s 432us/sample - loss: 25.5245 - mae: 4.0803 - val_loss: 49.4994 - val_mae: 5.8357
Epoch 36/100
30/30 [=====] - 0s 399us/sample - loss: 24.4762 - mae: 3.9988 - val_loss: 48.7618 - val_mae: 5.8080
Epoch 37/100
30/30 [=====] - 0s 399us/sample - loss: 23.4697 - mae: 3.9190 - val_loss: 48.0433 - val_mae: 5.7969
Epoch 38/100
30/30 [=====] - 0s 366us/sample - loss: 22.5313 - mae: 3.8417 - val_loss: 47.4489 - val_mae: 5.7701
Epoch 39/100
30/30 [=====] - 0s 399us/sample - loss: 21.6447 - mae: 3.7677 - val_loss: 46.7790 - val_mae: 5.7646
Epoch 40/100
30/30 [=====] - 0s 432us/sample - loss: 20.8119 - mae: 3.6969 - val_loss: 46.2685 - val_mae: 5.7464
Epoch 41/100
30/30 [=====] - 0s 366us/sample - loss: 20.0237 - mae: 3.6225 - val_loss: 45.6397 - val_mae: 5.7238
Epoch 42/100
30/30 [=====] - 0s 366us/sample - loss: 19.2849 - mae: 3.5550 - val_loss: 45.1790 - val_mae: 5.7211
Epoch 43/100
```

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Epoch 43/100
30/30 [=====] - 0s 366us/sample - loss: 18.5958 - mae: 3.4863 - val_loss: 44.6718 - val_mae: 5.7001
Epoch 44/100
30/30 [=====] - 0s 432us/sample - loss: 17.9493 - mae: 3.4193 - val_loss: 44.0822 - val_mae: 5.6699
Epoch 45/100
30/30 [=====] - 0s 366us/sample - loss: 17.3369 - mae: 3.3588 - val_loss: 43.5566 - val_mae: 5.6546
Epoch 46/100
30/30 [=====] - 0s 465us/sample - loss: 16.7521 - mae: 3.2983 - val_loss: 43.1342 - val_mae: 5.6434
Epoch 47/100
30/30 [=====] - 0s 432us/sample - loss: 16.1951 - mae: 3.2364 - val_loss: 42.6757 - val_mae: 5.6223
Epoch 48/100
30/30 [=====] - 0s 399us/sample - loss: 15.6678 - mae: 3.1853 - val_loss: 42.2158 - val_mae: 5.6114
Epoch 49/100
30/30 [=====] - 0s 399us/sample - loss: 15.1627 - mae: 3.1344 - val_loss: 41.7990 - val_mae: 5.5977
Epoch 50/100
30/30 [=====] - 0s 432us/sample - loss: 14.6883 - mae: 3.0793 - val_loss: 41.3201 - val_mae: 5.5708
Epoch 51/100
30/30 [=====] - 0s 366us/sample - loss: 14.2331 - mae: 3.0362 - val_loss: 40.8535 - val_mae: 5.5549
Epoch 52/100
30/30 [=====] - 0s 366us/sample - loss: 13.8020 - mae: 2.9888 - val_loss: 40.5405 - val_mae: 5.5514
Epoch 53/100
30/30 [=====] - 0s 399us/sample - loss: 13.3869 - mae: 2.9392 - val_loss: 40.1284 - val_mae: 5.5307
Epoch 54/100
30/30 [=====] - 0s 432us/sample - loss: 12.9881 - mae: 2.8984 - val_loss: 39.7089 - val_mae: 5.5156
Epoch 55/100
30/30 [=====] - 0s 432us/sample - loss: 12.6095 - mae: 2.8512 - val_loss: 39.4093 - val_mae: 5.5097
Epoch 56/100
30/30 [=====] - 0s 366us/sample - loss: 12.2498 - mae: 2.8095 - val_loss: 39.0694 - val_mae: 5.4919
Epoch 57/100
30/30 [=====] - 0s 432us/sample - loss: 11.9067 - mae: 2.7742 - val_loss: 38.7109 - val_mae: 5.4764
Epoch 58/100
30/30 [=====] - 0s 432us/sample - loss: 11.5984 - mae: 2.7396 - val_loss: 38.4522 - val_mae: 5.4643
Epoch 59/100
30/30 [=====] - 0s 399us/sample - loss: 11.3072 - mae: 2.7062 - val_loss: 38.1512 - val_mae: 5.4543
Epoch 60/100
30/30 [=====] - 0s 399us/sample - loss: 11.0173 - mae: 2.6714 - val_loss: 37.9201 - val_mae: 5.4429
Epoch 61/100
30/30 [=====] - 0s 399us/sample - loss: 10.7413 - mae: 2.6422 - val_loss: 37.6961 - val_mae: 5.4397
Epoch 62/100
30/30 [=====] - 0s 399us/sample - loss: 10.4802 - mae: 2.6048 - val_loss: 37.4710 - val_mae: 5.4331
Epoch 63/100
30/30 [=====] - 0s 366us/sample - loss: 10.2232 - mae: 2.5712 - val_loss: 37.2262 - val_mae: 5.4199
Epoch 64/100
30/30 [=====] - 0s 399us/sample - loss: 9.9773 - mae: 2.5400 - val_loss: 36.9618 - val_mae: 5.4078
Epoch 65/100
30/30 [=====] - 0s 366us/sample - loss: 9.7399 - mae: 2.5052 - val_loss: 36.7777 - val_mae: 5.4004
Epoch 66/100
```

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Epoch 66/100
30/30 [=====] - 0s 366us/sample - loss: 9.5083 - mae: 2.4745 - val_loss: 36.5727 - val_mae: 5.3929
Epoch 67/100
30/30 [=====] - 0s 366us/sample - loss: 9.2880 - mae: 2.4447 - val_loss: 36.4092 - val_mae: 5.3879
Epoch 68/100
30/30 [=====] - 0s 399us/sample - loss: 9.0751 - mae: 2.4150 - val_loss: 36.2193 - val_mae: 5.3799
Epoch 69/100
30/30 [=====] - 0s 366us/sample - loss: 8.8635 - mae: 2.3861 - val_loss: 36.0218 - val_mae: 5.3677
Epoch 70/100
30/30 [=====] - 0s 399us/sample - loss: 8.6659 - mae: 2.3618 - val_loss: 35.8260 - val_mae: 5.3646
Epoch 71/100
30/30 [=====] - 0s 399us/sample - loss: 8.4744 - mae: 2.3279 - val_loss: 35.7092 - val_mae: 5.3559
Epoch 72/100
30/30 [=====] - 0s 366us/sample - loss: 8.2832 - mae: 2.3081 - val_loss: 35.5189 - val_mae: 5.3491
Epoch 73/100
30/30 [=====] - 0s 366us/sample - loss: 8.0998 - mae: 2.2805 - val_loss: 35.4060 - val_mae: 5.3499
Epoch 74/100
30/30 [=====] - 0s 366us/sample - loss: 7.9287 - mae: 2.2513 - val_loss: 35.1943 - val_mae: 5.3305
Epoch 75/100
30/30 [=====] - 0s 432us/sample - loss: 7.7566 - mae: 2.2301 - val_loss: 35.0675 - val_mae: 5.3307
Epoch 76/100
30/30 [=====] - 0s 399us/sample - loss: 7.5923 - mae: 2.2006 - val_loss: 34.9416 - val_mae: 5.3215
Epoch 77/100
30/30 [=====] - 0s 332us/sample - loss: 7.4323 - mae: 2.1790 - val_loss: 34.7560 - val_mae: 5.3103
Epoch 78/100
30/30 [=====] - 0s 366us/sample - loss: 7.2797 - mae: 2.1571 - val_loss: 34.6436 - val_mae: 5.3090
Epoch 79/100
30/30 [=====] - 0s 399us/sample - loss: 7.1231 - mae: 2.1282 - val_loss: 34.5747 - val_mae: 5.3064
Epoch 80/100
30/30 [=====] - 0s 366us/sample - loss: 6.9780 - mae: 2.1056 - val_loss: 34.4226 - val_mae: 5.2949
Epoch 81/100
30/30 [=====] - 0s 399us/sample - loss: 6.8321 - mae: 2.0843 - val_loss: 34.2884 - val_mae: 5.2899
Epoch 82/100
30/30 [=====] - 0s 399us/sample - loss: 6.6877 - mae: 2.0580 - val_loss: 34.2241 - val_mae: 5.2853
Epoch 83/100
30/30 [=====] - 0s 399us/sample - loss: 6.5553 - mae: 2.0387 - val_loss: 34.0695 - val_mae: 5.2779
Epoch 84/100
30/30 [=====] - 0s 399us/sample - loss: 6.4215 - mae: 2.0128 - val_loss: 34.0446 - val_mae: 5.2777
Epoch 85/100
30/30 [=====] - 0s 432us/sample - loss: 6.2902 - mae: 1.9930 - val_loss: 33.9328 - val_mae: 5.2739
Epoch 86/100
30/30 [=====] - 0s 399us/sample - loss: 6.1672 - mae: 1.9730 - val_loss: 33.8632 - val_mae: 5.2689
Epoch 87/100
30/30 [=====] - 0s 399us/sample - loss: 6.0458 - mae: 1.9563 - val_loss: 33.7225 - val_mae: 5.2591
Epoch 88/100
30/30 [=====] - 0s 465us/sample - loss: 5.9238 - mae: 1.9364 - val_loss: 33.6424 - val_mae: 5.2553
```

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Epoch 89/100
30/30 [=====] - 0s 432us/sample - loss: 5.8129 - mae: 1.9182 - val_loss: 33.5537 - val_mae: 5.2515
Epoch 90/100
30/30 [=====] - 0s 399us/sample - loss: 5.7016 - mae: 1.8992 - val_loss: 33.4340 - val_mae: 5.2394
Epoch 91/100
30/30 [=====] - 0s 399us/sample - loss: 5.5908 - mae: 1.8838 - val_loss: 33.4115 - val_mae: 5.2435
Epoch 92/100
30/30 [=====] - 0s 399us/sample - loss: 5.4882 - mae: 1.8687 - val_loss: 33.3111 - val_mae: 5.2366
Epoch 93/100
30/30 [=====] - 0s 399us/sample - loss: 5.3837 - mae: 1.8496 - val_loss: 33.2076 - val_mae: 5.2232
Epoch 94/100
30/30 [=====] - 0s 432us/sample - loss: 5.2840 - mae: 1.8351 - val_loss: 33.1333 - val_mae: 5.2228
Epoch 95/100
30/30 [=====] - 0s 432us/sample - loss: 5.1852 - mae: 1.8182 - val_loss: 33.0852 - val_mae: 5.2187
Epoch 96/100
30/30 [=====] - 0s 399us/sample - loss: 5.0917 - mae: 1.8036 - val_loss: 32.9801 - val_mae: 5.2094
Epoch 97/100
30/30 [=====] - 0s 399us/sample - loss: 4.9959 - mae: 1.7865 - val_loss: 32.8633 - val_mae: 5.1981
Epoch 98/100
30/30 [=====] - 0s 399us/sample - loss: 4.9061 - mae: 1.7712 - val_loss: 32.8809 - val_mae: 5.2037
Epoch 99/100
30/30 [=====] - 0s 432us/sample - loss: 4.8195 - mae: 1.7590 - val_loss: 32.7461 - val_mae: 5.1890
Epoch 100/100
30/30 [=====] - 0s 432us/sample - loss: 4.7317 - mae: 1.7447 - val_loss: 32.7481 - val_mae: 5.1915
15/15 [=====] - 0s 266us/sample - loss: 135.1552 - mae: 9.3302
[CV] learning_rate=0.0006154014789262348, n_hidden=2, n_neurons=87, total= 2.1s
[CV] learning_rate=0.0006154014789262348, n_hidden=2, n_neurons=87 ...
Train on 30 samples, validate on 5 samples
Epoch 1/100
30/30 [=====] - 0s 14ms/sample - loss: 4757.5361 - mae: 66.6929 - val_loss: 3713.0259 - val_mae: 58.8003
Epoch 2/100
30/30 [=====] - 0s 399us/sample - loss: 4636.4219 - mae: 65.7800 - val_loss: 3625.7493 - val_mae: 58.0313
Epoch 3/100
30/30 [=====] - 0s 399us/sample - loss: 4512.5996 - mae: 64.8353 - val_loss: 3514.5181 - val_mae: 57.0595
Epoch 4/100
30/30 [=====] - 0s 366us/sample - loss: 4354.2603 - mae: 63.6240 - val_loss: 3350.4272 - val_mae: 55.6374
Epoch 5/100
30/30 [=====] - 0s 399us/sample - loss: 4121.4775 - mae: 61.8284 - val_loss: 3086.7007 - val_mae: 53.3282
Epoch 6/100
30/30 [=====] - 0s 399us/sample - loss: 3738.1260 - mae: 58.7948 - val_loss: 2634.0872 - val_mae: 49.2171
Epoch 7/100
30/30 [=====] - 0s 432us/sample - loss: 3081.1025 - mae: 53.2529 - val_loss: 1876.3352 - val_mae: 41.5539
Epoch 8/100
30/30 [=====] - 0s 366us/sample - loss: 2014.7255 - mae: 42.7609 - val_loss: 871.2658 - val_mae: 28.2112
Epoch 9/100
30/30 [=====] - 0s 399us/sample - loss: 744.3450 - mae: 24.4233 - val_loss: 251.6143 - val_mae: 13.6725
Epoch 10/100
30/30 [=====] - 0s 399us/sample - loss: 225.8735 - mae: 12.6804 - val_loss: 100.0000 - val_mae: 5.0000
```

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loss: 203.6442 - val_mae: 12.4168
Epoch 11/100
30/30 [=====] - 0s 432us/sample - loss: 173.1722 - mae: 11.0087 - val_
loss: 168.9605 - val_mae: 11.1101
Epoch 12/100
30/30 [=====] - 0s 366us/sample - loss: 148.1897 - mae: 10.0001 - val_
loss: 147.1462 - val_mae: 10.1166
Epoch 13/100
30/30 [=====] - 0s 399us/sample - loss: 131.5354 - mae: 9.2750 - val_l
oss: 128.8515 - val_mae: 9.1372
Epoch 14/100
30/30 [=====] - 0s 366us/sample - loss: 118.7338 - mae: 8.6526 - val_l
oss: 115.3684 - val_mae: 8.3339
Epoch 15/100
30/30 [=====] - 0s 432us/sample - loss: 108.4166 - mae: 8.2136 - val_l
oss: 104.1771 - val_mae: 7.8225
Epoch 16/100
30/30 [=====] - 0s 432us/sample - loss: 99.8603 - mae: 7.8329 - val_lo
ss: 94.9734 - val_mae: 7.5297
Epoch 17/100
30/30 [=====] - 0s 399us/sample - loss: 92.5281 - mae: 7.4883 - val_lo
ss: 87.4258 - val_mae: 7.2939
Epoch 18/100
30/30 [=====] - 0s 366us/sample - loss: 86.2491 - mae: 7.2035 - val_lo
ss: 80.4973 - val_mae: 7.0565
Epoch 19/100
30/30 [=====] - 0s 399us/sample - loss: 80.6738 - mae: 6.9538 - val_lo
ss: 74.9246 - val_mae: 6.8854
Epoch 20/100
30/30 [=====] - 0s 399us/sample - loss: 75.6845 - mae: 6.7467 - val_lo
ss: 69.7803 - val_mae: 6.7106
Epoch 21/100
30/30 [=====] - 0s 432us/sample - loss: 71.1885 - mae: 6.5493 - val_lo
ss: 65.4870 - val_mae: 6.5640
Epoch 22/100
30/30 [=====] - 0s 399us/sample - loss: 67.1201 - mae: 6.3699 - val_lo
ss: 60.9916 - val_mae: 6.3820
Epoch 23/100
30/30 [=====] - 0s 399us/sample - loss: 63.3794 - mae: 6.1814 - val_lo
ss: 57.6414 - val_mae: 6.2645
Epoch 24/100
30/30 [=====] - 0s 432us/sample - loss: 59.9095 - mae: 6.0131 - val_lo
ss: 54.4028 - val_mae: 6.1242
Epoch 25/100
30/30 [=====] - 0s 366us/sample - loss: 56.7770 - mae: 5.8561 - val_lo
ss: 51.3258 - val_mae: 5.9939
Epoch 26/100
30/30 [=====] - 0s 399us/sample - loss: 53.8468 - mae: 5.7105 - val_lo
ss: 48.6088 - val_mae: 5.8596
Epoch 27/100
30/30 [=====] - 0s 399us/sample - loss: 51.1969 - mae: 5.5876 - val_lo
ss: 46.3013 - val_mae: 5.7641
Epoch 28/100
30/30 [=====] - 0s 432us/sample - loss: 48.6882 - mae: 5.4867 - val_lo
ss: 43.8376 - val_mae: 5.6252
Epoch 29/100
30/30 [=====] - 0s 432us/sample - loss: 46.4054 - mae: 5.3942 - val_lo
ss: 42.1402 - val_mae: 5.5469
Epoch 30/100
30/30 [=====] - 0s 399us/sample - loss: 44.2433 - mae: 5.2992 - val_lo
ss: 40.0916 - val_mae: 5.4372
Epoch 31/100
30/30 [=====] - 0s 432us/sample - loss: 42.2273 - mae: 5.2076 - val_lo
ss: 38.3545 - val_mae: 5.3316
Epoch 32/100
30/30 [=====] - 0s 366us/sample - loss: 40.3578 - mae: 5.1173 - val_lo
ss: 37.0731 - val_mae: 5.2619
Epoch 33/100
30/30 [=====] - 0s 465us/sample - loss: 38.5960 - mae: 5.0265 - val_lo
```

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ss: 35.4810 - val_mae: 5.1545
Epoch 34/100
30/30 [=====] - 0s 399us/sample - loss: 36.9724 - mae: 4.9415 - val_lo
ss: 34.5762 - val_mae: 5.1140
Epoch 35/100
30/30 [=====] - 0s 399us/sample - loss: 35.4679 - mae: 4.8555 - val_lo
ss: 33.0167 - val_mae: 4.9981
Epoch 36/100
30/30 [=====] - 0s 432us/sample - loss: 34.0819 - mae: 4.7768 - val_lo
ss: 32.4067 - val_mae: 4.9737
Epoch 37/100
30/30 [=====] - 0s 366us/sample - loss: 32.7474 - mae: 4.6938 - val_lo
ss: 31.4550 - val_mae: 4.8917
Epoch 38/100
30/30 [=====] - 0s 399us/sample - loss: 31.4926 - mae: 4.6139 - val_lo
ss: 30.5427 - val_mae: 4.8349
Epoch 39/100
30/30 [=====] - 0s 399us/sample - loss: 30.3297 - mae: 4.5387 - val_lo
ss: 29.7856 - val_mae: 4.7734
Epoch 40/100
30/30 [=====] - 0s 432us/sample - loss: 29.2062 - mae: 4.4614 - val_lo
ss: 29.1922 - val_mae: 4.7385
Epoch 41/100
30/30 [=====] - 0s 432us/sample - loss: 28.1616 - mae: 4.3863 - val_lo
ss: 28.5371 - val_mae: 4.6884
Epoch 42/100
30/30 [=====] - 0s 399us/sample - loss: 27.1789 - mae: 4.3146 - val_lo
ss: 27.8335 - val_mae: 4.6280
Epoch 43/100
30/30 [=====] - 0s 399us/sample - loss: 26.2640 - mae: 4.2463 - val_lo
ss: 27.3929 - val_mae: 4.5938
Epoch 44/100
30/30 [=====] - 0s 332us/sample - loss: 25.3740 - mae: 4.1760 - val_lo
ss: 26.9895 - val_mae: 4.5550
Epoch 45/100
30/30 [=====] - 0s 366us/sample - loss: 24.5589 - mae: 4.1094 - val_lo
ss: 26.4052 - val_mae: 4.5047
Epoch 46/100
30/30 [=====] - 0s 399us/sample - loss: 23.7570 - mae: 4.0451 - val_lo
ss: 26.1978 - val_mae: 4.4894
Epoch 47/100
30/30 [=====] - 0s 399us/sample - loss: 23.0167 - mae: 3.9813 - val_lo
ss: 25.8011 - val_mae: 4.4418
Epoch 48/100
30/30 [=====] - 0s 399us/sample - loss: 22.2860 - mae: 3.9160 - val_lo
ss: 25.4763 - val_mae: 4.4070
Epoch 49/100
30/30 [=====] - 0s 399us/sample - loss: 21.6143 - mae: 3.8545 - val_lo
ss: 25.1141 - val_mae: 4.3718
Epoch 50/100
30/30 [=====] - 0s 432us/sample - loss: 20.9629 - mae: 3.7959 - val_lo
ss: 25.0151 - val_mae: 4.3538
Epoch 51/100
30/30 [=====] - 0s 399us/sample - loss: 20.3455 - mae: 3.7371 - val_lo
ss: 24.8182 - val_mae: 4.3355
Epoch 52/100
30/30 [=====] - 0s 366us/sample - loss: 19.7427 - mae: 3.6769 - val_lo
ss: 24.6564 - val_mae: 4.3030
Epoch 53/100
30/30 [=====] - 0s 399us/sample - loss: 19.1857 - mae: 3.6185 - val_lo
ss: 24.5096 - val_mae: 4.2842
Epoch 54/100
30/30 [=====] - 0s 432us/sample - loss: 18.6374 - mae: 3.5622 - val_lo
ss: 24.3712 - val_mae: 4.2647
Epoch 55/100
30/30 [=====] - 0s 432us/sample - loss: 18.1282 - mae: 3.5096 - val_lo
ss: 24.2518 - val_mae: 4.2416
Epoch 56/100
30/30 [=====] - 0s 399us/sample - loss: 17.6313 - mae: 3.4558 - val_lo
```



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ss: 24.3054 - val_mae: 4.2367
Epoch 57/100
30/30 [=====] - 0s 399us/sample - loss: 17.1644 - mae: 3.4043 - val_lo
ss: 24.2243 - val_mae: 4.2120
Epoch 58/100
30/30 [=====] - 0s 399us/sample - loss: 16.7133 - mae: 3.3527 - val_lo
ss: 24.2058 - val_mae: 4.1939
Epoch 59/100
30/30 [=====] - 0s 366us/sample - loss: 16.2889 - mae: 3.3046 - val_lo
ss: 24.1673 - val_mae: 4.1922
Epoch 60/100
30/30 [=====] - 0s 465us/sample - loss: 15.8760 - mae: 3.2553 - val_lo
ss: 24.0489 - val_mae: 4.1571
Epoch 61/100
30/30 [=====] - 0s 432us/sample - loss: 15.4816 - mae: 3.2090 - val_lo
ss: 24.0957 - val_mae: 4.1539
Epoch 62/100
30/30 [=====] - 0s 432us/sample - loss: 15.1026 - mae: 3.1618 - val_lo
ss: 24.1637 - val_mae: 4.1449
Epoch 63/100
30/30 [=====] - 0s 366us/sample - loss: 14.7365 - mae: 3.1158 - val_lo
ss: 24.1530 - val_mae: 4.1290
Epoch 64/100
30/30 [=====] - 0s 432us/sample - loss: 14.3905 - mae: 3.0691 - val_lo
ss: 24.1861 - val_mae: 4.1265
Epoch 65/100
30/30 [=====] - 0s 366us/sample - loss: 14.0522 - mae: 3.0261 - val_lo
ss: 24.2826 - val_mae: 4.1164
Epoch 66/100
30/30 [=====] - 0s 432us/sample - loss: 13.7264 - mae: 2.9828 - val_lo
ss: 24.3094 - val_mae: 4.1065
Epoch 67/100
30/30 [=====] - 0s 432us/sample - loss: 13.4204 - mae: 2.9416 - val_lo
ss: 24.3598 - val_mae: 4.0992
Epoch 68/100
30/30 [=====] - 0s 432us/sample - loss: 13.1171 - mae: 2.8992 - val_lo
ss: 24.3840 - val_mae: 4.0861
Epoch 69/100
30/30 [=====] - 0s 432us/sample - loss: 12.8333 - mae: 2.8625 - val_lo
ss: 24.3663 - val_mae: 4.0746
Epoch 70/100
30/30 [=====] - 0s 432us/sample - loss: 12.5604 - mae: 2.8289 - val_lo
ss: 24.5616 - val_mae: 4.0792
15/15 [=====] - 0s 199us/sample - loss: 24.8745 - mae: 4.2687
[CV] learning_rate=0.0006154014789262348, n_hidden=2, n_neurons=87, total= 1.6s
[CV] learning_rate=0.0003920021771415983, n_hidden=3, n_neurons=24 ...
Train on 30 samples, validate on 5 samples
Epoch 1/100
30/30 [=====] - 0s 14ms/sample - loss: 4456.8350 - mae: 63.3045 - val_
loss: 3719.2271 - val_mae: 58.7345
Epoch 2/100
30/30 [=====] - 0s 266us/sample - loss: 4408.6172 - mae: 62.8793 - val
_loss: 3676.8171 - val_mae: 58.3230
Epoch 3/100
30/30 [=====] - 0s 267us/sample - loss: 4361.7559 - mae: 62.4529 - val
_loss: 3631.9175 - val_mae: 57.8788
Epoch 4/100
30/30 [=====] - 0s 231us/sample - loss: 4310.3081 - mae: 61.9822 - val
_loss: 3578.7493 - val_mae: 57.3581
Epoch 5/100
30/30 [=====] - 0s 266us/sample - loss: 4249.8853 - mae: 61.4301 - val
_loss: 3511.5598 - val_mae: 56.6946
Epoch 6/100
30/30 [=====] - 0s 266us/sample - loss: 4172.0840 - mae: 60.7149 - val
_loss: 3417.5547 - val_mae: 55.7621
Epoch 7/100
30/30 [=====] - 0s 267us/sample - loss: 4062.8828 - mae: 59.7081 - val
_loss: 3279.7605 - val_mae: 54.3882
Epoch 8/100
```

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Epoch 8/100
30/30 [=====] - 0s 298us/sample - loss: 3899.3154 - mae: 58.2025 - val
_loss: 3064.0334 - val_mae: 52.1994
Epoch 9/100
30/30 [=====] - 0s 264us/sample - loss: 3634.3645 - mae: 55.7539 - val
_loss: 2706.9067 - val_mae: 48.4436
Epoch 10/100
30/30 [=====] - 0s 265us/sample - loss: 3176.8296 - mae: 51.4517 - val
_loss: 2085.1987 - val_mae: 41.4829
Epoch 11/100
30/30 [=====] - 0s 266us/sample - loss: 2349.8489 - mae: 43.7776 - val
_loss: 1051.4967 - val_mae: 28.5877
Epoch 12/100
30/30 [=====] - 0s 299us/sample - loss: 1012.1701 - mae: 28.5812 - val
_loss: 135.5071 - val_mae: 10.1639
Epoch 13/100
30/30 [=====] - 0s 266us/sample - loss: 128.1183 - mae: 8.4905 - val_l
oss: 169.3457 - val_mae: 10.5659
Epoch 14/100
30/30 [=====] - 0s 266us/sample - loss: 78.4427 - mae: 6.8364 - val_lo
ss: 118.4611 - val_mae: 9.4344
Epoch 15/100
30/30 [=====] - 0s 298us/sample - loss: 69.6264 - mae: 6.7610 - val_lo
ss: 174.5987 - val_mae: 11.3849
Epoch 16/100
30/30 [=====] - 0s 264us/sample - loss: 66.2457 - mae: 6.5053 - val_lo
ss: 112.6386 - val_mae: 9.3786
Epoch 17/100
30/30 [=====] - 0s 265us/sample - loss: 63.2722 - mae: 6.5836 - val_lo
ss: 180.3173 - val_mae: 11.7278
Epoch 18/100
30/30 [=====] - 0s 266us/sample - loss: 64.6265 - mae: 6.5375 - val_lo
ss: 104.2261 - val_mae: 8.9331
Epoch 19/100
30/30 [=====] - 0s 264us/sample - loss: 63.8100 - mae: 6.6628 - val_lo
ss: 190.7809 - val_mae: 12.0497
Epoch 20/100
30/30 [=====] - 0s 300us/sample - loss: 71.2289 - mae: 6.9719 - val_lo
ss: 96.3394 - val_mae: 8.2679
Epoch 21/100
30/30 [=====] - 0s 298us/sample - loss: 71.1790 - mae: 6.9962 - val_lo
ss: 208.2312 - val_mae: 12.4417
Epoch 22/100
30/30 [=====] - 0s 300us/sample - loss: 88.3576 - mae: 8.0073 - val_lo
ss: 92.3974 - val_mae: 7.5054
Epoch 23/100
30/30 [=====] - 0s 298us/sample - loss: 85.2215 - mae: 7.6720 - val_lo
ss: 234.4151 - val_mae: 12.9270
Epoch 24/100
30/30 [=====] - 0s 265us/sample - loss: 117.6024 - mae: 9.6097 - val_l
oss: 93.0137 - val_mae: 6.8333
Epoch 25/100
30/30 [=====] - 0s 300us/sample - loss: 104.0788 - mae: 8.4594 - val_l
oss: 268.0412 - val_mae: 13.5107
Epoch 26/100
30/30 [=====] - 0s 299us/sample - loss: 156.9738 - mae: 11.3388 - val_
loss: 97.2509 - val_mae: 6.3311
Epoch 27/100
30/30 [=====] - 0s 299us/sample - loss: 122.3609 - mae: 9.1596 - val_l
oss: 296.0007 - val_mae: 14.3382
Epoch 28/100
30/30 [=====] - 0s 265us/sample - loss: 194.6425 - mae: 12.7312 - val_
loss: 99.5115 - val_mae: 5.8791
Epoch 29/100
30/30 [=====] - 0s 299us/sample - loss: 133.9107 - mae: 9.5696 - val_l
oss: 314.0258 - val_mae: 14.9201
Epoch 30/100
30/30 [=====] - 0s 264us/sample - loss: 221.1134 - mae: 13.5833 - val_
loss: 102.3131 - val_mae: 5.6373
Epoch 31/100
```

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Epoch 31/100
30/30 [=====] - 0s 299us/sample - loss: 138.0816 - mae: 9.7308 - val_l
oss: 315.4562 - val_mae: 15.0286
Epoch 32/100
30/30 [=====] - 0s 331us/sample - loss: 230.2484 - mae: 13.8687 - val_
loss: 101.4756 - val_mae: 5.3843
15/15 [=====] - 0s 132us/sample - loss: 380.0037 - mae: 13.2067
[CV] learning_rate=0.0003920021771415983, n_hidden=3, n_neurons=24, total= 0.9s
[CV] learning_rate=0.0003920021771415983, n_hidden=3, n_neurons=24 ...
Train on 30 samples, validate on 5 samples
Epoch 1/100
30/30 [=====] - 0s 13ms/sample - loss: 4159.3584 - mae: 61.6690 - val_
loss: 3725.3940 - val_mae: 58.8766
Epoch 2/100
30/30 [=====] - 0s 264us/sample - loss: 4130.2500 - mae: 61.4160 - val
_loss: 3697.0398 - val_mae: 58.6222
Epoch 3/100
30/30 [=====] - 0s 300us/sample - loss: 4097.7954 - mae: 61.1361 - val
_loss: 3663.8535 - val_mae: 58.3236
Epoch 4/100
30/30 [=====] - 0s 265us/sample - loss: 4059.2036 - mae: 60.8036 - val
_loss: 3622.8647 - val_mae: 57.9533
Epoch 5/100
30/30 [=====] - 0s 267us/sample - loss: 4011.3635 - mae: 60.3917 - val
_loss: 3568.9292 - val_mae: 57.4637
Epoch 6/100
30/30 [=====] - 0s 298us/sample - loss: 3948.0435 - mae: 59.8452 - val
_loss: 3493.7649 - val_mae: 56.7800
Epoch 7/100
30/30 [=====] - 0s 232us/sample - loss: 3859.7861 - mae: 59.0781 - val
_loss: 3384.5034 - val_mae: 55.7760
Epoch 8/100
30/30 [=====] - 0s 265us/sample - loss: 3730.2925 - mae: 57.9400 - val
_loss: 3216.7024 - val_mae: 54.2023
Epoch 9/100
30/30 [=====] - 0s 231us/sample - loss: 3528.3906 - mae: 56.1347 - val
_loss: 2939.1624 - val_mae: 51.5152
Epoch 10/100
30/30 [=====] - 0s 299us/sample - loss: 3187.6399 - mae: 52.9926 - val
_loss: 2452.3367 - val_mae: 46.4840
Epoch 11/100
30/30 [=====] - 0s 299us/sample - loss: 2580.0867 - mae: 46.9783 - val
_loss: 1628.4789 - val_mae: 36.4472
Epoch 12/100
30/30 [=====] - 0s 299us/sample - loss: 1543.9636 - mae: 34.7368 - val
_loss: 661.6990 - val_mae: 20.7495
Epoch 13/100
30/30 [=====] - 0s 265us/sample - loss: 466.9434 - mae: 15.2178 - val_
loss: 348.5759 - val_mae: 16.2037
Epoch 14/100
30/30 [=====] - 0s 265us/sample - loss: 275.3006 - mae: 12.8973 - val_
loss: 357.6498 - val_mae: 14.4711
Epoch 15/100
30/30 [=====] - 0s 266us/sample - loss: 186.8624 - mae: 10.5766 - val_
loss: 176.4068 - val_mae: 10.6971
Epoch 16/100
30/30 [=====] - 0s 266us/sample - loss: 135.1172 - mae: 9.2086 - val_l
oss: 245.3651 - val_mae: 12.0748
Epoch 17/100
30/30 [=====] - 0s 299us/sample - loss: 117.3526 - mae: 8.8865 - val_l
oss: 111.6325 - val_mae: 8.6504
Epoch 18/100
30/30 [=====] - 0s 266us/sample - loss: 95.7289 - mae: 7.4968 - val_lo
ss: 191.5878 - val_mae: 10.9344
Epoch 19/100
30/30 [=====] - 0s 265us/sample - loss: 91.4355 - mae: 7.9472 - val_lo
ss: 83.2550 - val_mae: 7.6644
Epoch 20/100
30/30 [=====] - 0s 232us/sample - loss: 76.6911 - mae: 6.6186 - val_lo
```

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ss: 158.8074 - val_mae: 10.0020
Epoch 21/100
30/30 [=====] - 0s 265us/sample - loss: 75.6049 - mae: 7.3199 - val_lo
ss: 68.3084 - val_mae: 7.1023
Epoch 22/100
30/30 [=====] - 0s 233us/sample - loss: 64.3945 - mae: 6.0748 - val_lo
ss: 136.9756 - val_mae: 9.2936
Epoch 23/100
30/30 [=====] - 0s 298us/sample - loss: 65.0748 - mae: 6.8404 - val_lo
ss: 59.2848 - val_mae: 6.7329
Epoch 24/100
30/30 [=====] - 0s 233us/sample - loss: 55.9327 - mae: 5.7804 - val_lo
ss: 121.8340 - val_mae: 8.7161
Epoch 25/100
30/30 [=====] - 0s 266us/sample - loss: 57.6918 - mae: 6.4609 - val_lo
ss: 53.2375 - val_mae: 6.4676
Epoch 26/100
30/30 [=====] - 0s 266us/sample - loss: 49.8712 - mae: 5.5797 - val_lo
ss: 110.4738 - val_mae: 8.2833
Epoch 27/100
30/30 [=====] - 0s 334us/sample - loss: 52.2944 - mae: 6.1551 - val_lo
ss: 49.0453 - val_mae: 6.2754
Epoch 28/100
30/30 [=====] - 0s 231us/sample - loss: 45.3961 - mae: 5.4010 - val_lo
ss: 101.7088 - val_mae: 7.9184
Epoch 29/100
30/30 [=====] - 0s 299us/sample - loss: 48.2273 - mae: 5.9463 - val_lo
ss: 46.0659 - val_mae: 6.1180
Epoch 30/100
30/30 [=====] - 0s 267us/sample - loss: 41.9516 - mae: 5.2274 - val_lo
ss: 95.0485 - val_mae: 7.6133
Epoch 31/100
30/30 [=====] - 0s 266us/sample - loss: 45.0677 - mae: 5.7682 - val_lo
ss: 44.0399 - val_mae: 6.0043
Epoch 32/100
30/30 [=====] - 0s 232us/sample - loss: 39.1819 - mae: 5.0728 - val_lo
ss: 89.6898 - val_mae: 7.3632
Epoch 33/100
30/30 [=====] - 0s 265us/sample - loss: 42.4715 - mae: 5.6141 - val_lo
ss: 42.5161 - val_mae: 5.9170
Epoch 34/100
30/30 [=====] - 0s 266us/sample - loss: 36.9705 - mae: 4.9474 - val_lo
ss: 85.8476 - val_mae: 7.1841
Epoch 35/100
30/30 [=====] - 0s 266us/sample - loss: 40.6826 - mae: 5.5049 - val_lo
ss: 41.3133 - val_mae: 5.8493
Epoch 36/100
30/30 [=====] - 0s 299us/sample - loss: 35.2591 - mae: 4.8418 - val_lo
ss: 82.1126 - val_mae: 7.0139
Epoch 37/100
30/30 [=====] - 0s 267us/sample - loss: 38.8489 - mae: 5.3934 - val_lo
ss: 40.3595 - val_mae: 5.7906
Epoch 38/100
30/30 [=====] - 0s 265us/sample - loss: 33.6611 - mae: 4.7565 - val_lo
ss: 79.5296 - val_mae: 6.8695
Epoch 39/100
30/30 [=====] - 0s 266us/sample - loss: 37.5352 - mae: 5.3010 - val_lo
ss: 39.6364 - val_mae: 5.7409
Epoch 40/100
30/30 [=====] - 0s 265us/sample - loss: 32.3616 - mae: 4.7092 - val_lo
ss: 77.0573 - val_mae: 6.7751
Epoch 41/100
30/30 [=====] - 0s 300us/sample - loss: 36.3305 - mae: 5.2424 - val_lo
ss: 39.0063 - val_mae: 5.6993
Epoch 42/100
30/30 [=====] - 0s 266us/sample - loss: 31.3084 - mae: 4.6704 - val_lo
ss: 75.5815 - val_mae: 6.6991
Epoch 43/100
30/30 [=====] - 0s 432us/sample - loss: 35.6859 - mae: 5.2146 - val_lo
```

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ss: 38.7075 - val_mae: 5.6709
Epoch 44/100
30/30 [=====] - 0s 331us/sample - loss: 30.6864 - mae: 4.6526 - val_lo
ss: 74.1250 - val_mae: 6.6788
Epoch 45/100
30/30 [=====] - 0s 299us/sample - loss: 35.1009 - mae: 5.2064 - val_lo
ss: 38.6165 - val_mae: 5.6549
Epoch 46/100
30/30 [=====] - 0s 266us/sample - loss: 30.0784 - mae: 4.6331 - val_lo
ss: 73.6130 - val_mae: 6.6441
Epoch 47/100
30/30 [=====] - 0s 300us/sample - loss: 35.0862 - mae: 5.2178 - val_lo
ss: 38.6338 - val_mae: 5.6431
Epoch 48/100
30/30 [=====] - 0s 298us/sample - loss: 29.8768 - mae: 4.6331 - val_lo
ss: 73.3828 - val_mae: 6.6546
Epoch 49/100
30/30 [=====] - 0s 265us/sample - loss: 34.9397 - mae: 5.2317 - val_lo
ss: 38.5788 - val_mae: 5.6363
Epoch 50/100
30/30 [=====] - 0s 265us/sample - loss: 29.5767 - mae: 4.6409 - val_lo
ss: 72.9855 - val_mae: 6.6370
Epoch 51/100
30/30 [=====] - 0s 299us/sample - loss: 34.9667 - mae: 5.2423 - val_lo
ss: 38.5443 - val_mae: 5.6176
Epoch 52/100
30/30 [=====] - 0s 299us/sample - loss: 29.3926 - mae: 4.6557 - val_lo
ss: 72.0815 - val_mae: 6.6088
Epoch 53/100
30/30 [=====] - 0s 266us/sample - loss: 34.0940 - mae: 5.1951 - val_lo
ss: 38.3515 - val_mae: 5.5981
Epoch 54/100
30/30 [=====] - 0s 299us/sample - loss: 28.8800 - mae: 4.6368 - val_lo
ss: 72.2216 - val_mae: 6.6213
Epoch 55/100
30/30 [=====] - 0s 266us/sample - loss: 34.8307 - mae: 5.2497 - val_lo
ss: 38.7605 - val_mae: 5.6137
Epoch 56/100
30/30 [=====] - 0s 298us/sample - loss: 29.0212 - mae: 4.6684 - val_lo
ss: 72.2359 - val_mae: 6.6259
Epoch 57/100
30/30 [=====] - 0s 233us/sample - loss: 34.8419 - mae: 5.2574 - val_lo
ss: 38.9634 - val_mae: 5.6185
Epoch 58/100
30/30 [=====] - 0s 266us/sample - loss: 28.9263 - mae: 4.6755 - val_lo
ss: 71.9364 - val_mae: 6.6370
Epoch 59/100
30/30 [=====] - 0s 232us/sample - loss: 34.3064 - mae: 5.2315 - val_lo
ss: 39.0010 - val_mae: 5.6004
Epoch 60/100
30/30 [=====] - 0s 265us/sample - loss: 28.5765 - mae: 4.6622 - val_lo
ss: 72.2403 - val_mae: 6.6378
Epoch 61/100
30/30 [=====] - 0s 233us/sample - loss: 35.0273 - mae: 5.2763 - val_lo
ss: 39.3008 - val_mae: 5.6145
Epoch 62/100
30/30 [=====] - 0s 299us/sample - loss: 28.7632 - mae: 4.6821 - val_lo
ss: 72.0807 - val_mae: 6.6507
Epoch 63/100
30/30 [=====] - 0s 299us/sample - loss: 34.6918 - mae: 5.2574 - val_lo
ss: 39.4729 - val_mae: 5.6115
15/15 [=====] - 0s 199us/sample - loss: 248.9710 - mae: 13.1331
[CV] learning_rate=0.0003920021771415983, n_hidden=3, n_neurons=24, total= 1.1s
[CV] learning_rate=0.0003920021771415983, n_hidden=3, n_neurons=24 ...
Train on 30 samples, validate on 5 samples
Epoch 1/100
30/30 [=====] - 1s 18ms/sample - loss: 4694.1743 - mae: 66.1740 - val_
loss: 3731.8308 - val_mae: 58.9064
Epoch 2/100
```

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30/30 [=====] - 0s 298us/sample - loss: 4664.9590 - mae: 65.9302 - val_
_loss: 3710.0730 - val_mae: 58.6829
Epoch 3/100
30/30 [=====] - 0s 265us/sample - loss: 4634.7812 - mae: 65.6757 - val_
_loss: 3685.7722 - val_mae: 58.4341
Epoch 4/100
30/30 [=====] - 0s 299us/sample - loss: 4600.6646 - mae: 65.3872 - val_
_loss: 3657.3320 - val_mae: 58.1429
Epoch 5/100
30/30 [=====] - 0s 268us/sample - loss: 4559.1113 - mae: 65.0378 - val_
_loss: 3619.9348 - val_mae: 57.7639
Epoch 6/100
30/30 [=====] - 0s 266us/sample - loss: 4503.2285 - mae: 64.5722 - val_
_loss: 3568.9668 - val_mae: 57.2515
Epoch 7/100
30/30 [=====] - 0s 233us/sample - loss: 4425.0386 - mae: 63.9252 - val_
_loss: 3496.0332 - val_mae: 56.5239
Epoch 8/100
30/30 [=====] - 0s 301us/sample - loss: 4310.0146 - mae: 62.9767 - val_
_loss: 3382.0039 - val_mae: 55.3974
Epoch 9/100
30/30 [=====] - 0s 264us/sample - loss: 4129.8428 - mae: 61.4832 - val_
_loss: 3191.3088 - val_mae: 53.5102
Epoch 10/100
30/30 [=====] - 0s 266us/sample - loss: 3819.9807 - mae: 58.8744 - val_
_loss: 2841.7793 - val_mae: 49.9734
Epoch 11/100
30/30 [=====] - 0s 266us/sample - loss: 3254.9597 - mae: 53.8799 - val_
_loss: 2169.7271 - val_mae: 42.6741
Epoch 12/100
30/30 [=====] - 0s 266us/sample - loss: 2220.5991 - mae: 43.8458 - val_
_loss: 1069.4978 - val_mae: 28.1430
Epoch 13/100
30/30 [=====] - 0s 299us/sample - loss: 762.7072 - mae: 23.7898 - val_
_loss: 388.8773 - val_mae: 15.4361
Epoch 14/100
30/30 [=====] - 0s 299us/sample - loss: 415.8114 - mae: 16.4803 - val_
_loss: 720.4218 - val_mae: 22.7023
Epoch 15/100
30/30 [=====] - 0s 265us/sample - loss: 411.3285 - mae: 17.4798 - val_
_loss: 262.7696 - val_mae: 12.3743
Epoch 16/100
30/30 [=====] - 0s 266us/sample - loss: 332.0737 - mae: 14.0744 - val_
_loss: 670.3742 - val_mae: 22.4463
Epoch 17/100
30/30 [=====] - 0s 265us/sample - loss: 400.1092 - mae: 17.6771 - val_
_loss: 211.5955 - val_mae: 11.8697
Epoch 18/100
30/30 [=====] - 0s 232us/sample - loss: 309.1322 - mae: 13.3877 - val_
_loss: 635.4985 - val_mae: 22.0512
Epoch 19/100
30/30 [=====] - 0s 266us/sample - loss: 399.8902 - mae: 17.8591 - val_
_loss: 181.8083 - val_mae: 11.6507
Epoch 20/100
30/30 [=====] - 0s 267us/sample - loss: 290.3069 - mae: 13.1474 - val_
_loss: 596.7176 - val_mae: 21.4193
Epoch 21/100
30/30 [=====] - 0s 265us/sample - loss: 393.0691 - mae: 17.8426 - val_
_loss: 162.5172 - val_mae: 11.4561
Epoch 22/100
30/30 [=====] - 0s 265us/sample - loss: 272.7396 - mae: 12.8672 - val_
_loss: 555.7619 - val_mae: 20.6398
Epoch 23/100
30/30 [=====] - 0s 298us/sample - loss: 380.9682 - mae: 17.6212 - val_
_loss: 148.7235 - val_mae: 11.2288
Epoch 24/100
30/30 [=====] - 0s 233us/sample - loss: 255.2480 - mae: 12.5979 - val_
_loss: 517.7126 - val_mae: 19.8311
Epoch 25/100
```

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30/30 [=====] - 0s 333us/sample - loss: 366.6389 - mae: 17.2903 - val_
loss: 140.6397 - val_mae: 11.0573
Epoch 26/100
30/30 [=====] - 0s 298us/sample - loss: 239.9839 - mae: 12.3104 - val_
loss: 475.3675 - val_mae: 18.9685
Epoch 27/100
30/30 [=====] - 0s 265us/sample - loss: 345.8652 - mae: 16.8014 - val_
loss: 133.1752 - val_mae: 10.8251
Epoch 28/100
30/30 [=====] - 0s 266us/sample - loss: 226.9806 - mae: 12.0230 - val_
loss: 447.5351 - val_mae: 18.3274
Epoch 29/100
30/30 [=====] - 0s 265us/sample - loss: 336.5369 - mae: 16.5552 - val_
loss: 128.7080 - val_mae: 10.6368
Epoch 30/100
30/30 [=====] - 0s 265us/sample - loss: 214.2208 - mae: 11.7230 - val_
loss: 416.0645 - val_mae: 17.6539
Epoch 31/100
30/30 [=====] - 0s 266us/sample - loss: 320.4111 - mae: 16.2074 - val_
loss: 122.3204 - val_mae: 10.3246
Epoch 32/100
30/30 [=====] - 0s 266us/sample - loss: 204.1350 - mae: 11.4567 - val_
loss: 392.4756 - val_mae: 17.1090
Epoch 33/100
30/30 [=====] - 0s 267us/sample - loss: 310.5171 - mae: 16.0086 - val_
loss: 119.3272 - val_mae: 10.0702
Epoch 34/100
30/30 [=====] - 0s 299us/sample - loss: 194.5922 - mae: 11.1826 - val_
loss: 371.0972 - val_mae: 16.6269
Epoch 35/100
30/30 [=====] - 0s 233us/sample - loss: 300.7916 - mae: 15.8143 - val_
loss: 116.1957 - val_mae: 9.7887
Epoch 36/100
30/30 [=====] - 0s 300us/sample - loss: 187.2192 - mae: 10.9341 - val_
loss: 349.4505 - val_mae: 16.1284
Epoch 37/100
30/30 [=====] - 0s 231us/sample - loss: 289.7813 - mae: 15.5855 - val_
loss: 113.8319 - val_mae: 9.5409
Epoch 38/100
30/30 [=====] - 0s 332us/sample - loss: 180.5723 - mae: 10.7677 - val_
loss: 335.1537 - val_mae: 15.7240
Epoch 39/100
30/30 [=====] - 0s 366us/sample - loss: 285.7735 - mae: 15.5064 - val_
loss: 114.0930 - val_mae: 9.3972
Epoch 40/100
30/30 [=====] - 0s 266us/sample - loss: 173.7402 - mae: 10.5998 - val_
loss: 316.2810 - val_mae: 15.2768
Epoch 41/100
30/30 [=====] - 0s 266us/sample - loss: 275.8254 - mae: 15.2804 - val_
loss: 112.1105 - val_mae: 9.1115
Epoch 42/100
30/30 [=====] - 0s 366us/sample - loss: 168.7782 - mae: 10.4138 - val_
loss: 305.0362 - val_mae: 15.0287
Epoch 43/100
30/30 [=====] - 0s 333us/sample - loss: 273.0702 - mae: 15.2418 - val_
loss: 111.5478 - val_mae: 8.8420
Epoch 44/100
30/30 [=====] - 0s 233us/sample - loss: 163.9494 - mae: 10.2453 - val_
loss: 293.4393 - val_mae: 14.7246
Epoch 45/100
30/30 [=====] - 0s 367us/sample - loss: 267.3963 - mae: 15.1046 - val_
loss: 110.7378 - val_mae: 8.6520
Epoch 46/100
30/30 [=====] - 0s 298us/sample - loss: 159.3198 - mae: 10.1140 - val_
loss: 280.1732 - val_mae: 14.4076
Epoch 47/100
30/30 [=====] - 0s 299us/sample - loss: 260.0426 - mae: 14.9349 - val_
loss: 108.6942 - val_mae: 8.3857
Epoch 48/100
```

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Epoch 47/100
30/30 [=====] - 0s 299us/sample - loss: 155.4401 - mae: 10.0115 - val_
loss: 274.0797 - val_mae: 14.2219
Epoch 49/100
30/30 [=====] - 0s 298us/sample - loss: 258.6995 - mae: 14.9016 - val_
loss: 109.0507 - val_mae: 8.2115
Epoch 50/100
30/30 [=====] - 0s 266us/sample - loss: 151.4379 - mae: 9.9415 - val_l
oss: 262.6764 - val_mae: 13.9248
Epoch 51/100
30/30 [=====] - 0s 266us/sample - loss: 250.8785 - mae: 14.7059 - val_
loss: 107.0805 - val_mae: 7.9935
Epoch 52/100
30/30 [=====] - 0s 267us/sample - loss: 147.5446 - mae: 9.9043 - val_l
oss: 253.4196 - val_mae: 13.6012
Epoch 53/100
30/30 [=====] - 0s 298us/sample - loss: 244.2658 - mae: 14.4960 - val_
loss: 107.4868 - val_mae: 7.8840
Epoch 54/100
30/30 [=====] - 0s 265us/sample - loss: 144.2949 - mae: 9.8931 - val_l
oss: 247.5671 - val_mae: 13.5054
Epoch 55/100
30/30 [=====] - 0s 299us/sample - loss: 241.2697 - mae: 14.4466 - val_
loss: 104.9978 - val_mae: 7.6408
Epoch 56/100
30/30 [=====] - 0s 232us/sample - loss: 141.2946 - mae: 9.8568 - val_l
oss: 241.7400 - val_mae: 13.2831
Epoch 57/100
30/30 [=====] - 0s 299us/sample - loss: 236.9421 - mae: 14.3027 - val_
loss: 105.6207 - val_mae: 7.5475
Epoch 58/100
30/30 [=====] - 0s 233us/sample - loss: 138.4664 - mae: 9.8446 - val_l
oss: 234.0386 - val_mae: 13.1243
Epoch 59/100
30/30 [=====] - 0s 301us/sample - loss: 231.1234 - mae: 14.1531 - val_
loss: 102.2032 - val_mae: 7.2770
Epoch 60/100
30/30 [=====] - 0s 264us/sample - loss: 135.6751 - mae: 9.7960 - val_l
oss: 231.7396 - val_mae: 12.9898
Epoch 61/100
30/30 [=====] - 0s 300us/sample - loss: 229.7372 - mae: 14.0895 - val_
loss: 102.2065 - val_mae: 7.2275
Epoch 62/100
30/30 [=====] - 0s 298us/sample - loss: 133.3974 - mae: 9.7873 - val_l
oss: 224.6698 - val_mae: 12.7838
Epoch 63/100
30/30 [=====] - 0s 266us/sample - loss: 223.1912 - mae: 13.8970 - val_
loss: 100.6548 - val_mae: 7.1873
Epoch 64/100
30/30 [=====] - 0s 298us/sample - loss: 130.4439 - mae: 9.7323 - val_l
oss: 219.3093 - val_mae: 12.6098
Epoch 65/100
30/30 [=====] - 0s 300us/sample - loss: 218.3391 - mae: 13.7504 - val_
loss: 99.2527 - val_mae: 7.1694
Epoch 66/100
30/30 [=====] - 0s 299us/sample - loss: 128.4127 - mae: 9.7078 - val_l
oss: 217.5302 - val_mae: 12.5346
Epoch 67/100
30/30 [=====] - 0s 267us/sample - loss: 216.5319 - mae: 13.6858 - val_
loss: 98.6936 - val_mae: 7.1375
Epoch 68/100
30/30 [=====] - 0s 298us/sample - loss: 126.1565 - mae: 9.6763 - val_l
oss: 210.1855 - val_mae: 12.3135
Epoch 69/100
30/30 [=====] - 0s 265us/sample - loss: 209.1277 - mae: 13.4622 - val_
loss: 97.1270 - val_mae: 7.1043
Epoch 70/100
30/30 [=====] - 0s 299us/sample - loss: 123.6520 - mae: 9.6226 - val_l
oss: 211.1794 - val_mae: 12.3231
Epoch 71/100
```



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Epoch 71/100
30/30 [=====] - 0s 299us/sample - loss: 210.0507 - mae: 13.4835 - val_
loss: 95.7779 - val_mae: 7.0350
Epoch 72/100
30/30 [=====] - 0s 300us/sample - loss: 122.2626 - mae: 9.6026 - val_l
oss: 204.5209 - val_mae: 12.0852
Epoch 73/100
30/30 [=====] - 0s 265us/sample - loss: 202.9682 - mae: 13.2565 - val_
loss: 95.4526 - val_mae: 7.0480
Epoch 74/100
30/30 [=====] - 0s 299us/sample - loss: 119.5723 - mae: 9.5362 - val_l
oss: 201.6725 - val_mae: 12.0063
Epoch 75/100
30/30 [=====] - 0s 265us/sample - loss: 199.8488 - mae: 13.1599 - val_
loss: 93.0201 - val_mae: 6.9701
Epoch 76/100
30/30 [=====] - 0s 266us/sample - loss: 117.6513 - mae: 9.4863 - val_l
oss: 199.4812 - val_mae: 11.9024
Epoch 77/100
30/30 [=====] - 0s 298us/sample - loss: 196.5511 - mae: 13.0392 - val_
loss: 93.4049 - val_mae: 6.9535
Epoch 78/100
30/30 [=====] - 0s 233us/sample - loss: 116.0138 - mae: 9.4519 - val_l
oss: 194.6756 - val_mae: 11.7242
Epoch 79/100
30/30 [=====] - 0s 300us/sample - loss: 191.3078 - mae: 12.8655 - val_
loss: 91.4721 - val_mae: 6.9179
Epoch 80/100
30/30 [=====] - 0s 265us/sample - loss: 113.8038 - mae: 9.3880 - val_l
oss: 192.1106 - val_mae: 11.6618
Epoch 81/100
30/30 [=====] - 0s 299us/sample - loss: 188.5080 - mae: 12.7837 - val_
loss: 90.6321 - val_mae: 6.8822
Epoch 82/100
30/30 [=====] - 0s 266us/sample - loss: 112.0918 - mae: 9.3407 - val_l
oss: 189.9591 - val_mae: 11.5555
Epoch 83/100
30/30 [=====] - 0s 266us/sample - loss: 185.6760 - mae: 12.6759 - val_
loss: 89.1410 - val_mae: 6.8604
Epoch 84/100
30/30 [=====] - 0s 232us/sample - loss: 110.4437 - mae: 9.2916 - val_l
oss: 189.3159 - val_mae: 11.5032
Epoch 85/100
30/30 [=====] - 0s 266us/sample - loss: 183.6975 - mae: 12.5982 - val_
loss: 89.0960 - val_mae: 6.8295
Epoch 86/100
30/30 [=====] - 0s 298us/sample - loss: 108.8611 - mae: 9.2542 - val_l
oss: 184.1258 - val_mae: 11.3345
Epoch 87/100
30/30 [=====] - 0s 231us/sample - loss: 177.8890 - mae: 12.4020 - val_
loss: 87.2096 - val_mae: 6.7660
Epoch 88/100
30/30 [=====] - 0s 299us/sample - loss: 106.8069 - mae: 9.1754 - val_l
oss: 183.5190 - val_mae: 11.3284
Epoch 89/100
30/30 [=====] - 0s 231us/sample - loss: 176.3065 - mae: 12.3548 - val_
loss: 85.7016 - val_mae: 6.7095
Epoch 90/100
30/30 [=====] - 0s 298us/sample - loss: 105.6106 - mae: 9.1391 - val_l
oss: 181.4580 - val_mae: 11.2185
Epoch 91/100
30/30 [=====] - 0s 265us/sample - loss: 172.9307 - mae: 12.2184 - val_
loss: 85.7904 - val_mae: 6.6994
Epoch 92/100
30/30 [=====] - 0s 299us/sample - loss: 104.0449 - mae: 9.0957 - val_l
oss: 179.4378 - val_mae: 11.1488
Epoch 93/100
30/30 [=====] - 0s 265us/sample - loss: 170.3612 - mae: 12.1388 - val_
loss: 83.9129 - val_mae: 6.6397
Epoch 94/100
```

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Epoch 94/100
30/30 [=====] - 0s 266us/sample - loss: 102.4769 - mae: 9.0313 - val_l
oss: 176.5395 - val_mae: 11.0257
Epoch 95/100
30/30 [=====] - 0s 265us/sample - loss: 166.5533 - mae: 11.9931 - val_
loss: 83.1519 - val_mae: 6.6120
Epoch 96/100
30/30 [=====] - 0s 299us/sample - loss: 100.8974 - mae: 8.9762 - val_l
oss: 175.4495 - val_mae: 10.9656
Epoch 97/100
30/30 [=====] - 0s 299us/sample - loss: 164.3045 - mae: 11.9115 - val_
loss: 81.6106 - val_mae: 6.5644
Epoch 98/100
30/30 [=====] - 0s 299us/sample - loss: 99.6617 - mae: 8.9332 - val_lo
ss: 173.5010 - val_mae: 10.9088
Epoch 99/100
30/30 [=====] - 0s 299us/sample - loss: 160.9147 - mae: 11.7851 - val_
loss: 81.5684 - val_mae: 6.5244
Epoch 100/100
30/30 [=====] - 0s 266us/sample - loss: 98.0072 - mae: 8.8738 - val_lo
ss: 171.0851 - val_mae: 10.8200
15/15 [=====] - 0s 199us/sample - loss: 209.3400 - mae: 12.9989
[CV] learning_rate=0.0003920021771415983, n_hidden=3, n_neurons=24, total= 1.6s
[CV] learning_rate=0.006010328378268217, n_hidden=0, n_neurons=2 .....
Train on 30 samples, validate on 5 samples
Epoch 1/100
30/30 [=====] - 0s 10ms/sample - loss: 4461.9116 - mae: 63.2705 - val_
loss: 3646.5852 - val_mae: 58.8146
Epoch 2/100
30/30 [=====] - 0s 299us/sample - loss: 4249.9717 - mae: 62.5521 - val
_loss: 3558.2898 - val_mae: 58.4961
Epoch 3/100
30/30 [=====] - 0s 299us/sample - loss: 4074.9397 - mae: 61.8166 - val
_loss: 3482.2019 - val_mae: 58.1335
Epoch 4/100
30/30 [=====] - 0s 267us/sample - loss: 3924.8381 - mae: 61.0702 - val
_loss: 3413.4641 - val_mae: 57.7363
Epoch 5/100
30/30 [=====] - 0s 299us/sample - loss: 3791.9973 - mae: 60.3177 - val
_loss: 3349.1672 - val_mae: 57.3122
Epoch 6/100
30/30 [=====] - 0s 266us/sample - loss: 3671.4814 - mae: 59.5628 - val
_loss: 3287.5972 - val_mae: 56.8676
Epoch 7/100
30/30 [=====] - 0s 265us/sample - loss: 3560.0854 - mae: 58.8085 - val
_loss: 3227.7703 - val_mae: 56.4071
Epoch 8/100
30/30 [=====] - 0s 265us/sample - loss: 3455.7075 - mae: 58.0569 - val
_loss: 3169.1406 - val_mae: 55.9349
Epoch 9/100
30/30 [=====] - 0s 265us/sample - loss: 3356.9495 - mae: 57.3098 - val
_loss: 3111.4214 - val_mae: 55.4540
Epoch 10/100
30/30 [=====] - 0s 266us/sample - loss: 3262.8625 - mae: 56.5687 - val
_loss: 3054.4771 - val_mae: 54.9670
Epoch 11/100
30/30 [=====] - 0s 232us/sample - loss: 3172.7878 - mae: 55.8344 - val
_loss: 2998.2576 - val_mae: 54.4758
Epoch 12/100
30/30 [=====] - 0s 232us/sample - loss: 3086.2542 - mae: 55.1077 - val
_loss: 2942.7581 - val_mae: 53.9822
Epoch 13/100
30/30 [=====] - 0s 232us/sample - loss: 3002.9148 - mae: 54.3893 - val
_loss: 2887.9944 - val_mae: 53.4875
Epoch 14/100
30/30 [=====] - 0s 265us/sample - loss: 2922.5037 - mae: 53.6795 - val
_loss: 2833.9927 - val_mae: 52.9926
Epoch 15/100
30/30 [=====] - 0s 232us/sample - loss: 2844.8101 - mae: 52.9786 - val
```

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_loss: 2780.7791 - val_mae: 52.4984
Epoch 16/100
30/30 [=====] - 0s 266us/sample - loss: 2769.6616 - mae: 52.2868 - val
_loss: 2728.3784 - val_mae: 52.0057
Epoch 17/100
30/30 [=====] - 0s 232us/sample - loss: 2696.9126 - mae: 51.6041 - val
_loss: 2676.8103 - val_mae: 51.5150
Epoch 18/100
30/30 [=====] - 0s 232us/sample - loss: 2626.4375 - mae: 50.9306 - val
_loss: 2626.0908 - val_mae: 51.0267
Epoch 19/100
30/30 [=====] - 0s 233us/sample - loss: 2558.1250 - mae: 50.2664 - val
_loss: 2576.2310 - val_mae: 50.5412
Epoch 20/100
30/30 [=====] - 0s 266us/sample - loss: 2491.8755 - mae: 49.6113 - val
_loss: 2527.2375 - val_mae: 50.0588
Epoch 21/100
30/30 [=====] - 0s 232us/sample - loss: 2427.5991 - mae: 48.9654 - val
_loss: 2479.1138 - val_mae: 49.5798
Epoch 22/100
30/30 [=====] - 0s 266us/sample - loss: 2365.2119 - mae: 48.3285 - val
_loss: 2431.8599 - val_mae: 49.1043
Epoch 23/100
30/30 [=====] - 0s 233us/sample - loss: 2304.6384 - mae: 47.7006 - val
_loss: 2385.4739 - val_mae: 48.6324
Epoch 24/100
30/30 [=====] - 0s 266us/sample - loss: 2245.8074 - mae: 47.0815 - val
_loss: 2339.9507 - val_mae: 48.1644
Epoch 25/100
30/30 [=====] - 0s 298us/sample - loss: 2188.6521 - mae: 46.4711 - val
_loss: 2295.2837 - val_mae: 47.7003
Epoch 26/100
30/30 [=====] - 0s 298us/sample - loss: 2133.1108 - mae: 45.8692 - val
_loss: 2251.4661 - val_mae: 47.2402
Epoch 27/100
30/30 [=====] - 0s 266us/sample - loss: 2079.1255 - mae: 45.2759 - val
_loss: 2208.4875 - val_mae: 46.7842
Epoch 28/100
30/30 [=====] - 0s 298us/sample - loss: 2026.6409 - mae: 44.6908 - val
_loss: 2166.3394 - val_mae: 46.3323
Epoch 29/100
30/30 [=====] - 0s 267us/sample - loss: 1975.6053 - mae: 44.1140 - val
_loss: 2125.0107 - val_mae: 45.8846
Epoch 30/100
30/30 [=====] - 0s 299us/sample - loss: 1925.9700 - mae: 43.5452 - val
_loss: 2084.4907 - val_mae: 45.4411
Epoch 31/100
30/30 [=====] - 0s 265us/sample - loss: 1877.6881 - mae: 42.9844 - val
_loss: 2044.7666 - val_mae: 45.0018
Epoch 32/100
30/30 [=====] - 0s 266us/sample - loss: 1830.7157 - mae: 42.4314 - val
_loss: 2005.8279 - val_mae: 44.5667
Epoch 33/100
30/30 [=====] - 0s 265us/sample - loss: 1785.0105 - mae: 41.8861 - val
_loss: 1967.6614 - val_mae: 44.1358
Epoch 34/100
30/30 [=====] - 0s 265us/sample - loss: 1740.5331 - mae: 41.3483 - val
_loss: 1930.2551 - val_mae: 43.7092
Epoch 35/100
30/30 [=====] - 0s 265us/sample - loss: 1697.2445 - mae: 40.8180 - val
_loss: 1893.5963 - val_mae: 43.2868
Epoch 36/100
30/30 [=====] - 0s 266us/sample - loss: 1655.1086 - mae: 40.2950 - val
_loss: 1857.6722 - val_mae: 42.8687
Epoch 37/100
30/30 [=====] - 0s 298us/sample - loss: 1614.0905 - mae: 39.7792 - val
_loss: 1822.4707 - val_mae: 42.4548
Epoch 38/100
30/30 [=====] - 0s 267us/sample - loss: 1574.1564 - mae: 39.2705 - val
```

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_loss: 1787.9788 - val_mae: 42.0451
Epoch 39/100
30/30 [=====] - 0s 299us/sample - loss: 1535.2745 - mae: 38.7687 - val
_loss: 1754.1836 - val_mae: 41.6396
Epoch 40/100
30/30 [=====] - 0s 265us/sample - loss: 1497.4138 - mae: 38.2738 - val
_loss: 1721.0726 - val_mae: 41.2383
Epoch 41/100
30/30 [=====] - 0s 300us/sample - loss: 1460.5444 - mae: 37.7857 - val
_loss: 1688.6335 - val_mae: 40.8412
Epoch 42/100
30/30 [=====] - 0s 265us/sample - loss: 1424.6383 - mae: 37.3042 - val
_loss: 1656.8539 - val_mae: 40.4482
Epoch 43/100
30/30 [=====] - 0s 299us/sample - loss: 1389.6674 - mae: 36.8292 - val
_loss: 1625.7208 - val_mae: 40.0593
Epoch 44/100
30/30 [=====] - 0s 266us/sample - loss: 1355.6055 - mae: 36.3607 - val
_loss: 1595.2224 - val_mae: 39.6745
Epoch 45/100
30/30 [=====] - 0s 299us/sample - loss: 1322.4269 - mae: 35.8986 - val
_loss: 1565.3464 - val_mae: 39.2938
Epoch 46/100
30/30 [=====] - 0s 266us/sample - loss: 1290.1068 - mae: 35.4426 - val
_loss: 1536.0808 - val_mae: 38.9172
Epoch 47/100
30/30 [=====] - 0s 300us/sample - loss: 1258.6217 - mae: 34.9928 - val
_loss: 1507.4138 - val_mae: 38.5445
Epoch 48/100
30/30 [=====] - 0s 331us/sample - loss: 1227.9481 - mae: 34.5491 - val
_loss: 1479.3336 - val_mae: 38.1759
Epoch 49/100
30/30 [=====] - 0s 233us/sample - loss: 1198.0640 - mae: 34.1113 - val
_loss: 1451.8284 - val_mae: 37.8112
Epoch 50/100
30/30 [=====] - 0s 299us/sample - loss: 1168.9478 - mae: 33.6794 - val
_loss: 1424.8870 - val_mae: 37.4504
Epoch 51/100
30/30 [=====] - 0s 265us/sample - loss: 1140.5784 - mae: 33.2533 - val
_loss: 1398.4978 - val_mae: 37.0936
Epoch 52/100
30/30 [=====] - 0s 266us/sample - loss: 1112.9355 - mae: 32.8329 - val
_loss: 1372.6501 - val_mae: 36.7406
Epoch 53/100
30/30 [=====] - 0s 298us/sample - loss: 1085.9996 - mae: 32.4180 - val
_loss: 1347.3328 - val_mae: 36.3914
Epoch 54/100
30/30 [=====] - 0s 299us/sample - loss: 1059.7518 - mae: 32.0088 - val
_loss: 1322.5347 - val_mae: 36.0460
Epoch 55/100
30/30 [=====] - 0s 266us/sample - loss: 1034.1735 - mae: 31.6049 - val
_loss: 1298.2457 - val_mae: 35.7044
Epoch 56/100
30/30 [=====] - 0s 266us/sample - loss: 1009.2468 - mae: 31.2064 - val
_loss: 1274.4552 - val_mae: 35.3666
Epoch 57/100
30/30 [=====] - 0s 266us/sample - loss: 984.9542 - mae: 30.8133 - val_
loss: 1251.1526 - val_mae: 35.0324
Epoch 58/100
30/30 [=====] - 0s 299us/sample - loss: 961.2790 - mae: 30.4253 - val_
loss: 1228.3284 - val_mae: 34.7020
Epoch 59/100
30/30 [=====] - 0s 265us/sample - loss: 938.2047 - mae: 30.0425 - val_
loss: 1205.9720 - val_mae: 34.3751
Epoch 60/100
30/30 [=====] - 0s 266us/sample - loss: 915.7156 - mae: 29.6647 - val_
loss: 1184.0743 - val_mae: 34.0518
Epoch 61/100
30/30 [=====] - 0s 299us/sample - loss: 893.7960 - mae: 29.2919 - val_
```

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loss: 1162.6252 - val_mae: 33.7321
Epoch 62/100
30/30 [=====] - 0s 265us/sample - loss: 872.4312 - mae: 28.9240 - val_
loss: 1141.6156 - val_mae: 33.4160
Epoch 63/100
30/30 [=====] - 0s 299us/sample - loss: 851.6062 - mae: 28.5610 - val_
loss: 1121.0361 - val_mae: 33.1033
Epoch 64/100
30/30 [=====] - 0s 266us/sample - loss: 831.3070 - mae: 28.2028 - val_
loss: 1100.8777 - val_mae: 32.7941
Epoch 65/100
30/30 [=====] - 0s 266us/sample - loss: 811.5201 - mae: 27.8492 - val_
loss: 1081.1316 - val_mae: 32.4883
Epoch 66/100
30/30 [=====] - 0s 298us/sample - loss: 792.2317 - mae: 27.5004 - val_
loss: 1061.7888 - val_mae: 32.1859
Epoch 67/100
30/30 [=====] - 0s 267us/sample - loss: 773.4289 - mae: 27.1560 - val_
loss: 1042.8411 - val_mae: 31.8869
Epoch 68/100
30/30 [=====] - 0s 298us/sample - loss: 755.0992 - mae: 26.8163 - val_
loss: 1024.2797 - val_mae: 31.5912
Epoch 69/100
30/30 [=====] - 0s 232us/sample - loss: 737.2301 - mae: 26.4809 - val_
loss: 1006.0969 - val_mae: 31.2987
Epoch 70/100
30/30 [=====] - 0s 300us/sample - loss: 719.8098 - mae: 26.1500 - val_
loss: 988.2844 - val_mae: 31.0096
Epoch 71/100
30/30 [=====] - 0s 266us/sample - loss: 702.8264 - mae: 25.8234 - val_
loss: 970.8341 - val_mae: 30.7236
Epoch 72/100
30/30 [=====] - 0s 266us/sample - loss: 686.2687 - mae: 25.5010 - val_
loss: 953.7386 - val_mae: 30.4408
Epoch 73/100
30/30 [=====] - 0s 265us/sample - loss: 670.1257 - mae: 25.1829 - val_
loss: 936.9899 - val_mae: 30.1612
Epoch 74/100
30/30 [=====] - 0s 266us/sample - loss: 654.3864 - mae: 24.8689 - val_
loss: 920.5812 - val_mae: 29.8847
Epoch 75/100
30/30 [=====] - 0s 265us/sample - loss: 639.0407 - mae: 24.5590 - val_
loss: 904.5045 - val_mae: 29.6112
Epoch 76/100
30/30 [=====] - 0s 266us/sample - loss: 624.0782 - mae: 24.2532 - val_
loss: 888.7531 - val_mae: 29.3408
Epoch 77/100
30/30 [=====] - 0s 265us/sample - loss: 609.4891 - mae: 23.9513 - val_
loss: 873.3200 - val_mae: 29.0735
Epoch 78/100
30/30 [=====] - 0s 233us/sample - loss: 595.2637 - mae: 23.6533 - val_
loss: 858.1984 - val_mae: 28.8091
Epoch 79/100
30/30 [=====] - 0s 298us/sample - loss: 581.3927 - mae: 23.3593 - val_
loss: 843.3815 - val_mae: 28.5476
Epoch 80/100
30/30 [=====] - 0s 231us/sample - loss: 567.8669 - mae: 23.0690 - val_
loss: 828.8627 - val_mae: 28.2891
Epoch 81/100
30/30 [=====] - 0s 298us/sample - loss: 554.6774 - mae: 22.7825 - val_
loss: 814.6358 - val_mae: 28.0335
Epoch 82/100
30/30 [=====] - 0s 266us/sample - loss: 541.8157 - mae: 22.4998 - val_
loss: 800.6943 - val_mae: 27.7807
Epoch 83/100
30/30 [=====] - 0s 265us/sample - loss: 529.2733 - mae: 22.2207 - val_
loss: 787.0322 - val_mae: 27.5307
Epoch 84/100
30/30 [=====] - 0s 265us/sample - loss: 517.0418 - mae: 21.9452 - val_
```

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loss: 773.6434 - val_mae: 27.2835
Epoch 85/100
30/30 [=====] - 0s 266us/sample - loss: 505.1136 - mae: 21.6733 - val_
loss: 760.5223 - val_mae: 27.0391
Epoch 86/100
30/30 [=====] - 0s 266us/sample - loss: 493.4806 - mae: 21.4049 - val_
loss: 747.6631 - val_mae: 26.7974
Epoch 87/100
30/30 [=====] - 0s 266us/sample - loss: 482.1356 - mae: 21.1400 - val_
loss: 735.0599 - val_mae: 26.5583
Epoch 88/100
30/30 [=====] - 0s 266us/sample - loss: 471.0710 - mae: 20.8785 - val_
loss: 722.7075 - val_mae: 26.3220
Epoch 89/100
30/30 [=====] - 0s 265us/sample - loss: 460.2795 - mae: 20.6204 - val_
loss: 710.6002 - val_mae: 26.0883
Epoch 90/100
30/30 [=====] - 0s 265us/sample - loss: 449.7544 - mae: 20.3656 - val_
loss: 698.7330 - val_mae: 25.8572
Epoch 91/100
30/30 [=====] - 0s 266us/sample - loss: 439.4888 - mae: 20.1142 - val_
loss: 687.1007 - val_mae: 25.6286
Epoch 92/100
30/30 [=====] - 0s 265us/sample - loss: 429.4759 - mae: 19.8659 - val_
loss: 675.6982 - val_mae: 25.4026
Epoch 93/100
30/30 [=====] - 0s 300us/sample - loss: 419.7095 - mae: 19.6209 - val_
loss: 664.5206 - val_mae: 25.1791
Epoch 94/100
30/30 [=====] - 0s 299us/sample - loss: 410.1833 - mae: 19.3790 - val_
loss: 653.5632 - val_mae: 24.9581
Epoch 95/100
30/30 [=====] - 0s 399us/sample - loss: 400.8911 - mae: 19.1402 - val_
loss: 642.8212 - val_mae: 24.7396
Epoch 96/100
30/30 [=====] - 0s 366us/sample - loss: 391.8268 - mae: 18.9046 - val_
loss: 632.2898 - val_mae: 24.5234
Epoch 97/100
30/30 [=====] - 0s 332us/sample - loss: 382.9849 - mae: 18.6719 - val_
loss: 621.9648 - val_mae: 24.3097
Epoch 98/100
30/30 [=====] - 0s 266us/sample - loss: 374.3595 - mae: 18.4422 - val_
loss: 611.8417 - val_mae: 24.0984
Epoch 99/100
30/30 [=====] - 0s 265us/sample - loss: 365.9453 - mae: 18.2155 - val_
loss: 601.9160 - val_mae: 23.8894
Epoch 100/100
30/30 [=====] - 0s 266us/sample - loss: 357.7369 - mae: 17.9918 - val_
loss: 592.1838 - val_mae: 23.6827
15/15 [=====] - 0s 199us/sample - loss: 653.7367 - mae: 23.7631
[CV] learning_rate=0.006010328378268217, n_hidden=0, n_neurons=2, total= 1.3s
[CV] learning_rate=0.006010328378268217, n_hidden=0, n_neurons=2 .....
Train on 30 samples, validate on 5 samples
Epoch 1/100
30/30 [=====] - 0s 11ms/sample - loss: 4193.0205 - mae: 61.8734 - val_
loss: 3597.2104 - val_mae: 58.2859
Epoch 2/100
30/30 [=====] - 0s 331us/sample - loss: 4043.8765 - mae: 61.2255 - val_
_loss: 3504.7720 - val_mae: 57.7843
Epoch 3/100
30/30 [=====] - 0s 266us/sample - loss: 3913.0303 - mae: 60.5548 - val_
_loss: 3420.1746 - val_mae: 57.2589
Epoch 4/100
30/30 [=====] - 0s 266us/sample - loss: 3794.7603 - mae: 59.8682 - val_
_loss: 3340.9363 - val_mae: 56.7159
Epoch 5/100
30/30 [=====] - 0s 265us/sample - loss: 3685.4441 - mae: 59.1711 - val_
_loss: 3265.5256 - val_mae: 56.1602
Epoch 6/100
```

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Epoch 6/100
30/30 [=====] - 0s 299us/sample - loss: 3582.7744 - mae: 58.4677 - val
_loss: 3192.9976 - val_mae: 55.5958
Epoch 7/100
30/30 [=====] - 0s 265us/sample - loss: 3485.2705 - mae: 57.7616 - val
_loss: 3122.7700 - val_mae: 55.0256
Epoch 8/100
30/30 [=====] - 0s 266us/sample - loss: 3391.9714 - mae: 57.0552 - val
_loss: 3054.4795 - val_mae: 54.4523
Epoch 9/100
30/30 [=====] - 0s 266us/sample - loss: 3302.2410 - mae: 56.3508 - val
_loss: 2987.9009 - val_mae: 53.8776
Epoch 10/100
30/30 [=====] - 0s 265us/sample - loss: 3215.6511 - mae: 55.6497 - val
_loss: 2922.8879 - val_mae: 53.3032
Epoch 11/100
30/30 [=====] - 0s 265us/sample - loss: 3131.9023 - mae: 54.9534 - val
_loss: 2859.3469 - val_mae: 52.7301
Epoch 12/100
30/30 [=====] - 0s 299us/sample - loss: 3050.7788 - mae: 54.2627 - val
_loss: 2797.2112 - val_mae: 52.1594
Epoch 13/100
30/30 [=====] - 0s 265us/sample - loss: 2972.1179 - mae: 53.5784 - val
_loss: 2736.4331 - val_mae: 51.5916
Epoch 14/100
30/30 [=====] - 0s 299us/sample - loss: 2895.7915 - mae: 52.9010 - val
_loss: 2676.9741 - val_mae: 51.0275
Epoch 15/100
30/30 [=====] - 0s 299us/sample - loss: 2821.6926 - mae: 52.2309 - val
_loss: 2618.8030 - val_mae: 50.4674
Epoch 16/100
30/30 [=====] - 0s 232us/sample - loss: 2749.7305 - mae: 51.5685 - val
_loss: 2561.8911 - val_mae: 49.9117
Epoch 17/100
30/30 [=====] - 0s 299us/sample - loss: 2679.8250 - mae: 50.9138 - val
_loss: 2506.2117 - val_mae: 49.3607
Epoch 18/100
30/30 [=====] - 0s 265us/sample - loss: 2611.9019 - mae: 50.2672 - val
_loss: 2451.7388 - val_mae: 48.8145
Epoch 19/100
30/30 [=====] - 0s 265us/sample - loss: 2545.8940 - mae: 49.6286 - val
_loss: 2398.4487 - val_mae: 48.2733
Epoch 20/100
30/30 [=====] - 0s 298us/sample - loss: 2481.7373 - mae: 48.9982 - val
_loss: 2346.3167 - val_mae: 47.7371
Epoch 21/100
30/30 [=====] - 0s 299us/sample - loss: 2419.3721 - mae: 48.3758 - val
_loss: 2295.3193 - val_mae: 47.2061
Epoch 22/100
30/30 [=====] - 0s 265us/sample - loss: 2358.7412 - mae: 47.7616 - val
_loss: 2245.4329 - val_mae: 46.6804
Epoch 23/100
30/30 [=====] - 0s 231us/sample - loss: 2299.7891 - mae: 47.1554 - val
_loss: 2196.6338 - val_mae: 46.1598
Epoch 24/100
30/30 [=====] - 0s 265us/sample - loss: 2242.4636 - mae: 46.5572 - val
_loss: 2148.9001 - val_mae: 45.6445
Epoch 25/100
30/30 [=====] - 0s 265us/sample - loss: 2186.7141 - mae: 45.9670 - val
_loss: 2102.2092 - val_mae: 45.1345
Epoch 26/100
30/30 [=====] - 0s 298us/sample - loss: 2132.4922 - mae: 45.3847 - val
_loss: 2056.5386 - val_mae: 44.6297
Epoch 27/100
30/30 [=====] - 0s 232us/sample - loss: 2079.7507 - mae: 44.8101 - val
_loss: 2011.8668 - val_mae: 44.1302
Epoch 28/100
30/30 [=====] - 0s 298us/sample - loss: 2028.4448 - mae: 44.2433 - val
_loss: 1968.1726 - val_mae: 43.6358
Epoch 29/100
```

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Epoch 29/100
30/30 [=====] - 0s 265us/sample - loss: 1978.5308 - mae: 43.6841 - val
_loss: 1925.4355 - val_mae: 43.1466
Epoch 30/100
30/30 [=====] - 0s 332us/sample - loss: 1929.9664 - mae: 43.1324 - val
_loss: 1883.6345 - val_mae: 42.6626
Epoch 31/100
30/30 [=====] - 0s 299us/sample - loss: 1882.7117 - mae: 42.5881 - val
_loss: 1842.7496 - val_mae: 42.1836
Epoch 32/100
30/30 [=====] - 0s 266us/sample - loss: 1836.7266 - mae: 42.0512 - val
_loss: 1802.7615 - val_mae: 41.7098
Epoch 33/100
30/30 [=====] - 0s 266us/sample - loss: 1791.9739 - mae: 41.5215 - val
_loss: 1763.6504 - val_mae: 41.2409
Epoch 34/100
30/30 [=====] - 0s 266us/sample - loss: 1748.4167 - mae: 40.9989 - val
_loss: 1725.3977 - val_mae: 40.7771
Epoch 35/100
30/30 [=====] - 0s 299us/sample - loss: 1706.0198 - mae: 40.4834 - val
_loss: 1687.9847 - val_mae: 40.3181
Epoch 36/100
30/30 [=====] - 0s 232us/sample - loss: 1664.7489 - mae: 39.9748 - val
_loss: 1651.3936 - val_mae: 39.8641
Epoch 37/100
30/30 [=====] - 0s 332us/sample - loss: 1624.5710 - mae: 39.4731 - val
_loss: 1615.6063 - val_mae: 39.4150
Epoch 38/100
30/30 [=====] - 0s 232us/sample - loss: 1585.4545 - mae: 38.9782 - val
_loss: 1580.6058 - val_mae: 38.9706
Epoch 39/100
30/30 [=====] - 0s 298us/sample - loss: 1547.3679 - mae: 38.4899 - val
_loss: 1546.3749 - val_mae: 38.5311
Epoch 40/100
30/30 [=====] - 0s 265us/sample - loss: 1510.2820 - mae: 38.0082 - val
_loss: 1512.8969 - val_mae: 38.0963
Epoch 41/100
30/30 [=====] - 0s 300us/sample - loss: 1474.1674 - mae: 37.5329 - val
_loss: 1480.1556 - val_mae: 37.6661
Epoch 42/100
30/30 [=====] - 0s 265us/sample - loss: 1438.9961 - mae: 37.0641 - val
_loss: 1448.1350 - val_mae: 37.2406
Epoch 43/100
30/30 [=====] - 0s 265us/sample - loss: 1404.7413 - mae: 36.6015 - val
_loss: 1416.8192 - val_mae: 36.8197
Epoch 44/100
30/30 [=====] - 0s 300us/sample - loss: 1371.3767 - mae: 36.1452 - val
_loss: 1386.1932 - val_mae: 36.4033
Epoch 45/100
30/30 [=====] - 0s 299us/sample - loss: 1338.8767 - mae: 35.6949 - val
_loss: 1356.2419 - val_mae: 35.9914
Epoch 46/100
30/30 [=====] - 0s 265us/sample - loss: 1307.2168 - mae: 35.2507 - val
_loss: 1326.9508 - val_mae: 35.5840
Epoch 47/100
30/30 [=====] - 0s 266us/sample - loss: 1276.3735 - mae: 34.8125 - val
_loss: 1298.3053 - val_mae: 35.1810
Epoch 48/100
30/30 [=====] - 0s 266us/sample - loss: 1246.3235 - mae: 34.3801 - val
_loss: 1270.2914 - val_mae: 34.7824
Epoch 49/100
30/30 [=====] - 0s 266us/sample - loss: 1217.0444 - mae: 33.9535 - val
_loss: 1242.8955 - val_mae: 34.3881
Epoch 50/100
30/30 [=====] - 0s 266us/sample - loss: 1188.5148 - mae: 33.5326 - val
_loss: 1216.1041 - val_mae: 33.9981
Epoch 51/100
30/30 [=====] - 0s 266us/sample - loss: 1160.7134 - mae: 33.1173 - val
_loss: 1189.9037 - val_mae: 33.6123
```



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Epoch 52/100
30/30 [=====] - 0s 298us/sample - loss: 1133.6204 - mae: 32.7076 - val_
_loss: 1164.2821 - val_mae: 33.2307
Epoch 53/100
30/30 [=====] - 0s 232us/sample - loss: 1107.2157 - mae: 32.3033 - val_
_loss: 1139.2258 - val_mae: 32.8533
Epoch 54/100
30/30 [=====] - 0s 298us/sample - loss: 1081.4803 - mae: 31.9044 - val_
_loss: 1114.7233 - val_mae: 32.4800
Epoch 55/100
30/30 [=====] - 0s 265us/sample - loss: 1056.3958 - mae: 31.5108 - val_
_loss: 1090.7620 - val_mae: 32.1107
Epoch 56/100
30/30 [=====] - 0s 299us/sample - loss: 1031.9442 - mae: 31.1224 - val_
_loss: 1067.3300 - val_mae: 31.7455
Epoch 57/100
30/30 [=====] - 0s 299us/sample - loss: 1008.1081 - mae: 30.7392 - val_
_loss: 1044.4160 - val_mae: 31.3843
Epoch 58/100
30/30 [=====] - 0s 298us/sample - loss: 984.8707 - mae: 30.3610 - val_
_loss: 1022.0085 - val_mae: 31.0270
Epoch 59/100
30/30 [=====] - 0s 298us/sample - loss: 962.2156 - mae: 29.9879 - val_
_loss: 1000.0967 - val_mae: 30.6736
Epoch 60/100
30/30 [=====] - 0s 232us/sample - loss: 940.1270 - mae: 29.6197 - val_
_loss: 978.6696 - val_mae: 30.3241
Epoch 61/100
30/30 [=====] - 0s 265us/sample - loss: 918.5892 - mae: 29.2564 - val_
_loss: 957.7163 - val_mae: 29.9784
Epoch 62/100
30/30 [=====] - 0s 266us/sample - loss: 897.5878 - mae: 28.8979 - val_
_loss: 937.2267 - val_mae: 29.6365
Epoch 63/100
30/30 [=====] - 0s 367us/sample - loss: 877.1077 - mae: 28.5442 - val_
_loss: 917.1904 - val_mae: 29.2983
Epoch 64/100
30/30 [=====] - 0s 265us/sample - loss: 857.1353 - mae: 28.1950 - val_
_loss: 897.5980 - val_mae: 28.9638
Epoch 65/100
30/30 [=====] - 0s 267us/sample - loss: 837.6568 - mae: 27.8505 - val_
_loss: 878.4395 - val_mae: 28.6330
Epoch 66/100
30/30 [=====] - 0s 265us/sample - loss: 818.6590 - mae: 27.5106 - val_
_loss: 859.7051 - val_mae: 28.3059
Epoch 67/100
30/30 [=====] - 0s 266us/sample - loss: 800.1290 - mae: 27.1751 - val_
_loss: 841.3857 - val_mae: 27.9823
Epoch 68/100
30/30 [=====] - 0s 265us/sample - loss: 782.0544 - mae: 26.8440 - val_
_loss: 823.4725 - val_mae: 27.6622
Epoch 69/100
30/30 [=====] - 0s 267us/sample - loss: 764.4232 - mae: 26.5173 - val_
_loss: 805.9562 - val_mae: 27.3457
Epoch 70/100
30/30 [=====] - 0s 265us/sample - loss: 747.2232 - mae: 26.1948 - val_
_loss: 788.8281 - val_mae: 27.0326
Epoch 71/100
30/30 [=====] - 0s 267us/sample - loss: 730.4433 - mae: 25.8766 - val_
_loss: 772.0800 - val_mae: 26.7230
Epoch 72/100
30/30 [=====] - 0s 265us/sample - loss: 714.0724 - mae: 25.5625 - val_
_loss: 755.7030 - val_mae: 26.4168
Epoch 73/100
30/30 [=====] - 0s 267us/sample - loss: 698.0999 - mae: 25.2526 - val_
_loss: 739.6898 - val_mae: 26.1139
Epoch 74/100
30/30 [=====] - 0s 266us/sample - loss: 682.5151 - mae: 24.9467 - val_
_loss: 724.0314 - val_mae: 25.8144
```

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Epoch 75/100
30/30 [=====] - 0s 265us/sample - loss: 667.3076 - mae: 24.6448 - val_
loss: 708.7206 - val_mae: 25.5181
Epoch 76/100
30/30 [=====] - 0s 232us/sample - loss: 652.4680 - mae: 24.3468 - val_
loss: 693.7499 - val_mae: 25.2251
Epoch 77/100
30/30 [=====] - 0s 265us/sample - loss: 637.9866 - mae: 24.0527 - val_
loss: 679.1113 - val_mae: 24.9354
Epoch 78/100
30/30 [=====] - 0s 266us/sample - loss: 623.8538 - mae: 23.7625 - val_
loss: 664.7979 - val_mae: 24.6488
Epoch 79/100
30/30 [=====] - 0s 267us/sample - loss: 610.0607 - mae: 23.4760 - val_
loss: 650.8023 - val_mae: 24.3653
Epoch 80/100
30/30 [=====] - 0s 265us/sample - loss: 596.5987 - mae: 23.1932 - val_
loss: 637.1178 - val_mae: 24.0850
Epoch 81/100
30/30 [=====] - 0s 232us/sample - loss: 583.4590 - mae: 22.9141 - val_
loss: 623.7372 - val_mae: 23.8078
Epoch 82/100
30/30 [=====] - 0s 232us/sample - loss: 570.6334 - mae: 22.6387 - val_
loss: 610.6540 - val_mae: 23.5336
Epoch 83/100
30/30 [=====] - 0s 232us/sample - loss: 558.1136 - mae: 22.3668 - val_
loss: 597.8617 - val_mae: 23.2625
Epoch 84/100
30/30 [=====] - 0s 233us/sample - loss: 545.8922 - mae: 22.0984 - val_
loss: 585.3539 - val_mae: 22.9943
Epoch 85/100
30/30 [=====] - 0s 299us/sample - loss: 533.9612 - mae: 21.8334 - val_
loss: 573.1244 - val_mae: 22.7291
Epoch 86/100
30/30 [=====] - 0s 299us/sample - loss: 522.3134 - mae: 21.5720 - val_
loss: 561.1667 - val_mae: 22.4668
Epoch 87/100
30/30 [=====] - 0s 299us/sample - loss: 510.9414 - mae: 21.3138 - val_
loss: 549.4752 - val_mae: 22.2074
Epoch 88/100
30/30 [=====] - 0s 233us/sample - loss: 499.8382 - mae: 21.0590 - val_
loss: 538.0438 - val_mae: 21.9508
Epoch 89/100
30/30 [=====] - 0s 233us/sample - loss: 488.9971 - mae: 20.8075 - val_
loss: 526.8668 - val_mae: 21.6971
Epoch 90/100
30/30 [=====] - 0s 233us/sample - loss: 478.4113 - mae: 20.5593 - val_
loss: 515.9388 - val_mae: 21.4461
Epoch 91/100
30/30 [=====] - 0s 299us/sample - loss: 468.0744 - mae: 20.3142 - val_
loss: 505.2541 - val_mae: 21.1980
Epoch 92/100
30/30 [=====] - 0s 266us/sample - loss: 457.9803 - mae: 20.0722 - val_
loss: 494.8075 - val_mae: 20.9525
Epoch 93/100
30/30 [=====] - 0s 233us/sample - loss: 448.1227 - mae: 19.8334 - val_
loss: 484.5936 - val_mae: 20.7098
Epoch 94/100
30/30 [=====] - 0s 300us/sample - loss: 438.4956 - mae: 19.5976 - val_
loss: 474.6073 - val_mae: 20.4698
Epoch 95/100
30/30 [=====] - 0s 266us/sample - loss: 429.0935 - mae: 19.3649 - val_
loss: 464.8437 - val_mae: 20.2324
Epoch 96/100
30/30 [=====] - 0s 299us/sample - loss: 419.9106 - mae: 19.1351 - val_
loss: 455.2978 - val_mae: 19.9976
Epoch 97/100
30/30 [=====] - 0s 231us/sample - loss: 410.9414 - mae: 18.9082 - val_
loss: 445.9645 - val_mae: 19.7654
```

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Epoch 98/100
30/30 [=====] - 0s 265us/sample - loss: 402.1805 - mae: 18.6843 - val_
loss: 436.8395 - val_mae: 19.5357
Epoch 99/100
30/30 [=====] - 0s 231us/sample - loss: 393.6229 - mae: 18.4632 - val_
loss: 427.9183 - val_mae: 19.3086
Epoch 100/100
30/30 [=====] - 0s 266us/sample - loss: 385.2635 - mae: 18.2449 - val_
loss: 419.1960 - val_mae: 19.0840
15/15 [=====] - 0s 199us/sample - loss: 723.1287 - mae: 25.7819
[CV] learning_rate=0.006010328378268217, n_hidden=0, n_neurons=2, total= 1.3s
[CV] learning_rate=0.006010328378268217, n_hidden=0, n_neurons=2 .....
Train on 30 samples, validate on 5 samples
Epoch 1/100
30/30 [=====] - 0s 11ms/sample - loss: 4873.9478 - mae: 66.9124 - val_
loss: 3645.4595 - val_mae: 58.5174
Epoch 2/100
30/30 [=====] - 0s 266us/sample - loss: 4543.0312 - mae: 65.2917 - val_
loss: 3522.0806 - val_mae: 58.1867
Epoch 3/100
30/30 [=====] - 0s 332us/sample - loss: 4272.3213 - mae: 63.7975 - val_
loss: 3426.9233 - val_mae: 57.8194
Epoch 4/100
30/30 [=====] - 0s 299us/sample - loss: 4046.8997 - mae: 62.4133 - val_
loss: 3350.5874 - val_mae: 57.4213
Epoch 5/100
30/30 [=====] - 0s 266us/sample - loss: 3855.7432 - mae: 61.1249 - val_
loss: 3286.5059 - val_mae: 56.9975
Epoch 6/100
30/30 [=====] - 0s 299us/sample - loss: 3690.6941 - mae: 59.9202 - val_
loss: 3230.1394 - val_mae: 56.5525
Epoch 7/100
30/30 [=====] - 0s 299us/sample - loss: 3545.7061 - mae: 58.7885 - val_
loss: 3178.3997 - val_mae: 56.0900
Epoch 8/100
30/30 [=====] - 0s 265us/sample - loss: 3416.2874 - mae: 57.7210 - val_
loss: 3129.2231 - val_mae: 55.6133
Epoch 9/100
30/30 [=====] - 0s 266us/sample - loss: 3299.0952 - mae: 56.7099 - val_
loss: 3081.2690 - val_mae: 55.1251
Epoch 10/100
30/30 [=====] - 0s 299us/sample - loss: 3191.6313 - mae: 55.7486 - val_
loss: 3033.7019 - val_mae: 54.6277
Epoch 11/100
30/30 [=====] - 0s 233us/sample - loss: 3092.0232 - mae: 54.8312 - val_
loss: 2986.0325 - val_mae: 54.1234
Epoch 12/100
30/30 [=====] - 0s 298us/sample - loss: 2998.8608 - mae: 53.9529 - val_
loss: 2938.0071 - val_mae: 53.6137
Epoch 13/100
30/30 [=====] - 0s 266us/sample - loss: 2911.0767 - mae: 53.1094 - val_
loss: 2889.5281 - val_mae: 53.1003
Epoch 14/100
30/30 [=====] - 0s 299us/sample - loss: 2827.8555 - mae: 52.2970 - val_
loss: 2840.5996 - val_mae: 52.5844
Epoch 15/100
30/30 [=====] - 0s 232us/sample - loss: 2748.5732 - mae: 51.5126 - val_
loss: 2791.2866 - val_mae: 52.0672
Epoch 16/100
30/30 [=====] - 0s 299us/sample - loss: 2672.7434 - mae: 50.7534 - val_
loss: 2741.6904 - val_mae: 51.5496
Epoch 17/100
30/30 [=====] - 0s 267us/sample - loss: 2599.9878 - mae: 50.0171 - val_
loss: 2691.9275 - val_mae: 51.0324
Epoch 18/100
30/30 [=====] - 0s 299us/sample - loss: 2530.0049 - mae: 49.3016 - val_
loss: 2642.1221 - val_mae: 50.5164
Epoch 19/100
30/30 [=====] - 0s 299us/sample - loss: 2462.5525 - mae: 48.6052 - val_
```

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_loss: 2592.3931 - val_mae: 50.0021
Epoch 20/100
30/30 [=====] - 0s 298us/sample - loss: 2397.4341 - mae: 47.9263 - val
_loss: 2542.8547 - val_mae: 49.4901
Epoch 21/100
30/30 [=====] - 0s 266us/sample - loss: 2334.4868 - mae: 47.2635 - val
_loss: 2493.6099 - val_mae: 48.9808
Epoch 22/100
30/30 [=====] - 0s 299us/sample - loss: 2273.5737 - mae: 46.6157 - val
_loss: 2444.7505 - val_mae: 48.4746
Epoch 23/100
30/30 [=====] - 0s 299us/sample - loss: 2214.5791 - mae: 45.9819 - val
_loss: 2396.3589 - val_mae: 47.9718
Epoch 24/100
30/30 [=====] - 0s 266us/sample - loss: 2157.4016 - mae: 45.3611 - val
_loss: 2348.5032 - val_mae: 47.4726
Epoch 25/100
30/30 [=====] - 0s 266us/sample - loss: 2101.9534 - mae: 44.7527 - val
_loss: 2301.2439 - val_mae: 46.9773
Epoch 26/100
30/30 [=====] - 0s 299us/sample - loss: 2048.1558 - mae: 44.1559 - val
_loss: 2254.6301 - val_mae: 46.4861
Epoch 27/100
30/30 [=====] - 0s 266us/sample - loss: 1995.9384 - mae: 43.5701 - val
_loss: 2208.7026 - val_mae: 45.9992
Epoch 28/100
30/30 [=====] - 0s 265us/sample - loss: 1945.2369 - mae: 42.9948 - val
_loss: 2163.4946 - val_mae: 45.5166
Epoch 29/100
30/30 [=====] - 0s 299us/sample - loss: 1895.9927 - mae: 42.4294 - val
_loss: 2119.0317 - val_mae: 45.0385
Epoch 30/100
30/30 [=====] - 0s 265us/sample - loss: 1848.1516 - mae: 41.8737 - val
_loss: 2075.3342 - val_mae: 44.5649
Epoch 31/100
30/30 [=====] - 0s 266us/sample - loss: 1801.6625 - mae: 41.3271 - val
_loss: 2032.4164 - val_mae: 44.0961
Epoch 32/100
30/30 [=====] - 0s 265us/sample - loss: 1756.4788 - mae: 40.7894 - val
_loss: 1990.2885 - val_mae: 43.6319
Epoch 33/100
30/30 [=====] - 0s 266us/sample - loss: 1712.5554 - mae: 40.2602 - val
_loss: 1948.9567 - val_mae: 43.1724
Epoch 34/100
30/30 [=====] - 0s 298us/sample - loss: 1669.8508 - mae: 39.7393 - val
_loss: 1908.4232 - val_mae: 42.7177
Epoch 35/100
30/30 [=====] - 0s 298us/sample - loss: 1628.3247 - mae: 39.2265 - val
_loss: 1868.6882 - val_mae: 42.2678
Epoch 36/100
30/30 [=====] - 0s 265us/sample - loss: 1587.9395 - mae: 38.7214 - val
_loss: 1829.7488 - val_mae: 41.8227
Epoch 37/100
30/30 [=====] - 0s 266us/sample - loss: 1548.6589 - mae: 38.2239 - val
_loss: 1791.6003 - val_mae: 41.3824
Epoch 38/100
30/30 [=====] - 0s 300us/sample - loss: 1510.4486 - mae: 37.7338 - val
_loss: 1754.2363 - val_mae: 40.9468
Epoch 39/100
30/30 [=====] - 0s 299us/sample - loss: 1473.2754 - mae: 37.2509 - val
_loss: 1717.6488 - val_mae: 40.5161
Epoch 40/100
30/30 [=====] - 0s 299us/sample - loss: 1437.1077 - mae: 36.7750 - val
_loss: 1681.8289 - val_mae: 40.0901
Epoch 41/100
30/30 [=====] - 0s 267us/sample - loss: 1401.9148 - mae: 36.3061 - val
_loss: 1646.7664 - val_mae: 39.6689
Epoch 42/100
30/30 [=====] - 0s 298us/sample - loss: 1367.6683 - mae: 35.8438 - val
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30/30 [=====] - 0s 266us/sample - loss: 1334.3394 - mae: 35.3882 - val_
_loss: 1612.4504 - val_mae: 39.2524
Epoch 43/100
30/30 [=====] - 0s 266us/sample - loss: 1334.3394 - mae: 35.3882 - val_
_loss: 1578.8699 - val_mae: 38.8406
Epoch 44/100
30/30 [=====] - 0s 299us/sample - loss: 1301.9012 - mae: 34.9390 - val_
_loss: 1546.0125 - val_mae: 38.4334
Epoch 45/100
30/30 [=====] - 0s 298us/sample - loss: 1270.3280 - mae: 34.4962 - val_
_loss: 1513.8656 - val_mae: 38.0310
Epoch 46/100
30/30 [=====] - 0s 266us/sample - loss: 1239.5940 - mae: 34.0596 - val_
_loss: 1482.4172 - val_mae: 37.6331
Epoch 47/100
30/30 [=====] - 0s 299us/sample - loss: 1209.6753 - mae: 33.6291 - val_
_loss: 1451.6541 - val_mae: 37.2398
Epoch 48/100
30/30 [=====] - 0s 265us/sample - loss: 1180.5482 - mae: 33.2046 - val_
_loss: 1421.5634 - val_mae: 36.8510
Epoch 49/100
30/30 [=====] - 0s 299us/sample - loss: 1152.1903 - mae: 32.7860 - val_
_loss: 1392.1317 - val_mae: 36.4667
Epoch 50/100
30/30 [=====] - 0s 298us/sample - loss: 1124.5795 - mae: 32.3732 - val_
_loss: 1363.3467 - val_mae: 36.0868
Epoch 51/100
30/30 [=====] - 0s 299us/sample - loss: 1097.6947 - mae: 31.9662 - val_
_loss: 1335.1947 - val_mae: 35.7114
Epoch 52/100
30/30 [=====] - 0s 265us/sample - loss: 1071.5150 - mae: 31.5647 - val_
_loss: 1307.6628 - val_mae: 35.3403
Epoch 53/100
30/30 [=====] - 0s 266us/sample - loss: 1046.0210 - mae: 31.1688 - val_
_loss: 1280.7384 - val_mae: 34.9736
Epoch 54/100
30/30 [=====] - 0s 265us/sample - loss: 1021.1930 - mae: 30.7783 - val_
_loss: 1254.4086 - val_mae: 34.6112
Epoch 55/100
30/30 [=====] - 0s 231us/sample - loss: 997.0126 - mae: 30.3931 - val_
_loss: 1228.6606 - val_mae: 34.2530
Epoch 56/100
30/30 [=====] - 0s 299us/sample - loss: 973.4616 - mae: 30.0132 - val_
_loss: 1203.4823 - val_mae: 33.8989
Epoch 57/100
30/30 [=====] - 0s 266us/sample - loss: 950.5227 - mae: 29.6385 - val_
_loss: 1178.8610 - val_mae: 33.5491
Epoch 58/100
30/30 [=====] - 0s 266us/sample - loss: 928.1786 - mae: 29.2689 - val_
_loss: 1154.7845 - val_mae: 33.2034
Epoch 59/100
30/30 [=====] - 0s 232us/sample - loss: 906.4130 - mae: 28.9043 - val_
_loss: 1131.2413 - val_mae: 32.8617
Epoch 60/100
30/30 [=====] - 0s 300us/sample - loss: 885.2098 - mae: 28.5446 - val_
_loss: 1108.2191 - val_mae: 32.5240
Epoch 61/100
30/30 [=====] - 0s 265us/sample - loss: 864.5537 - mae: 28.1899 - val_
_loss: 1085.7068 - val_mae: 32.1903
Epoch 62/100
30/30 [=====] - 0s 265us/sample - loss: 844.4293 - mae: 27.8399 - val_
_loss: 1063.6927 - val_mae: 31.8606
Epoch 63/100
30/30 [=====] - 0s 299us/sample - loss: 824.8223 - mae: 27.4947 - val_
_loss: 1042.1661 - val_mae: 31.5347
Epoch 64/100
30/30 [=====] - 0s 300us/sample - loss: 805.7185 - mae: 27.1541 - val_
_loss: 1021.1154 - val_mae: 31.2127
Epoch 65/100
30/30 [=====] - 0s 266us/sample - loss: 787.1020 - mae: 26.8182 - val_
_loss: 1000.0000 - val_mae: 30.8882
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30/30 [=====] - 0s 298us/sample - loss: 787.1038 - mae: 26.8182 - val_
loss: 1000.5303 - val_mae: 30.8944
Epoch 66/100
30/30 [=====] - 0s 300us/sample - loss: 768.9651 - mae: 26.4867 - val_
loss: 980.4004 - val_mae: 30.5800
Epoch 67/100
30/30 [=====] - 0s 298us/sample - loss: 751.2897 - mae: 26.1597 - val_
loss: 960.7152 - val_mae: 30.2692
Epoch 68/100
30/30 [=====] - 0s 300us/sample - loss: 734.0645 - mae: 25.8371 - val_
loss: 941.4642 - val_mae: 29.9621
Epoch 69/100
30/30 [=====] - 0s 332us/sample - loss: 717.2773 - mae: 25.5189 - val_
loss: 922.6383 - val_mae: 29.6586
Epoch 70/100
30/30 [=====] - 0s 265us/sample - loss: 700.9164 - mae: 25.2049 - val_
loss: 904.2275 - val_mae: 29.3587
Epoch 71/100
30/30 [=====] - 0s 265us/sample - loss: 684.9704 - mae: 24.8951 - val_
loss: 886.2223 - val_mae: 29.0624
Epoch 72/100
30/30 [=====] - 0s 265us/sample - loss: 669.4279 - mae: 24.5895 - val_
loss: 868.6132 - val_mae: 28.7695
Epoch 73/100
30/30 [=====] - 0s 299us/sample - loss: 654.2780 - mae: 24.2880 - val_
loss: 851.3914 - val_mae: 28.4801
Epoch 74/100
30/30 [=====] - 0s 266us/sample - loss: 639.5099 - mae: 23.9904 - val_
loss: 834.5480 - val_mae: 28.1941
Epoch 75/100
30/30 [=====] - 0s 299us/sample - loss: 625.1138 - mae: 23.6969 - val_
loss: 818.0745 - val_mae: 27.9115
Epoch 76/100
30/30 [=====] - 0s 266us/sample - loss: 611.0793 - mae: 23.4073 - val_
loss: 801.9620 - val_mae: 27.6322
Epoch 77/100
30/30 [=====] - 0s 266us/sample - loss: 597.3968 - mae: 23.1215 - val_
loss: 786.2025 - val_mae: 27.3562
Epoch 78/100
30/30 [=====] - 0s 265us/sample - loss: 584.0569 - mae: 22.8396 - val_
loss: 770.7877 - val_mae: 27.0834
Epoch 79/100
30/30 [=====] - 0s 233us/sample - loss: 571.0504 - mae: 22.5613 - val_
loss: 755.7098 - val_mae: 26.8139
Epoch 80/100
30/30 [=====] - 0s 297us/sample - loss: 558.3683 - mae: 22.2868 - val_
loss: 740.9611 - val_mae: 26.5475
Epoch 81/100
30/30 [=====] - 0s 233us/sample - loss: 546.0020 - mae: 22.0160 - val_
loss: 726.5341 - val_mae: 26.2842
Epoch 82/100
30/30 [=====] - 0s 332us/sample - loss: 533.9432 - mae: 21.7487 - val_
loss: 712.4212 - val_mae: 26.0241
Epoch 83/100
30/30 [=====] - 0s 265us/sample - loss: 522.1835 - mae: 21.4849 - val_
loss: 698.6152 - val_mae: 25.7670
Epoch 84/100
30/30 [=====] - 0s 266us/sample - loss: 510.7150 - mae: 21.2247 - val_
loss: 685.1091 - val_mae: 25.5129
Epoch 85/100
30/30 [=====] - 0s 265us/sample - loss: 499.5301 - mae: 20.9679 - val_
loss: 671.8959 - val_mae: 25.2618
Epoch 86/100
30/30 [=====] - 0s 267us/sample - loss: 488.6210 - mae: 20.7145 - val_
loss: 658.9691 - val_mae: 25.0136
Epoch 87/100
30/30 [=====] - 0s 298us/sample - loss: 477.9806 - mae: 20.4645 - val_
loss: 646.3220 - val_mae: 24.7683
Epoch 88/100
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30/30 [=====] - 0s 266us/sample - loss: 467.6017 - mae: 20.2177 - val_
loss: 633.9479 - val_mae: 24.5259
Epoch 89/100
30/30 [=====] - 0s 266us/sample - loss: 457.4775 - mae: 19.9742 - val_
loss: 621.8408 - val_mae: 24.2864
Epoch 90/100
30/30 [=====] - 0s 298us/sample - loss: 447.6010 - mae: 19.7339 - val_
loss: 609.9946 - val_mae: 24.0496
Epoch 91/100
30/30 [=====] - 0s 266us/sample - loss: 437.9660 - mae: 19.4968 - val_
loss: 598.4032 - val_mae: 23.8156
Epoch 92/100
30/30 [=====] - 0s 265us/sample - loss: 428.5660 - mae: 19.2628 - val_
loss: 587.0607 - val_mae: 23.5843
Epoch 93/100
30/30 [=====] - 0s 300us/sample - loss: 419.3948 - mae: 19.0318 - val_
loss: 575.9615 - val_mae: 23.3557
Epoch 94/100
30/30 [=====] - 0s 265us/sample - loss: 410.4464 - mae: 18.8039 - val_
loss: 565.0999 - val_mae: 23.1298
Epoch 95/100
30/30 [=====] - 0s 265us/sample - loss: 401.7150 - mae: 18.5790 - val_
loss: 554.4706 - val_mae: 22.9065
Epoch 96/100
30/30 [=====] - 0s 266us/sample - loss: 393.1949 - mae: 18.3571 - val_
loss: 544.0682 - val_mae: 22.6858
Epoch 97/100
30/30 [=====] - 0s 266us/sample - loss: 384.8804 - mae: 18.1380 - val_
loss: 533.8875 - val_mae: 22.4677
Epoch 98/100
30/30 [=====] - 0s 265us/sample - loss: 376.7664 - mae: 17.9218 - val_
loss: 523.9235 - val_mae: 22.2520
Epoch 99/100
30/30 [=====] - 0s 232us/sample - loss: 368.8475 - mae: 17.7085 - val_
loss: 514.1711 - val_mae: 22.0389
Epoch 100/100
30/30 [=====] - 0s 265us/sample - loss: 361.1187 - mae: 17.4979 - val_
loss: 504.6256 - val_mae: 21.8283
15/15 [=====] - 0s 199us/sample - loss: 907.7982 - mae: 29.1655
[CV] learning_rate=0.006010328378268217, n_hidden=0, n_neurons=2, total= 1.3s
[CV] learning_rate=0.008339092654580042, n_hidden=1, n_neurons=38 ....
Train on 30 samples, validate on 5 samples
Epoch 1/100
30/30 [=====] - 0s 12ms/sample - loss: 4318.7285 - mae: 62.3997 - val_
loss: 2770.6431 - val_mae: 50.4606
Epoch 2/100
30/30 [=====] - 0s 232us/sample - loss: 2908.6931 - mae: 50.8323 - val_
loss: 255.0246 - val_mae: 13.2983
Epoch 3/100
30/30 [=====] - 0s 265us/sample - loss: 429.5102 - mae: 17.7543 - val_
loss: 2023.8318 - val_mae: 41.1033
Epoch 4/100
30/30 [=====] - 0s 266us/sample - loss: 2304.1157 - mae: 43.6019 - val_
loss: 791.1003 - val_mae: 24.2477
Epoch 5/100
30/30 [=====] - 0s 264us/sample - loss: 1634.6896 - mae: 36.2743 - val_
loss: 3666.7290 - val_mae: 58.7897
Epoch 6/100
30/30 [=====] - 0s 266us/sample - loss: 4280.2188 - mae: 62.6565 - val_
loss: 5235.6982 - val_mae: 69.5418
Epoch 7/100
30/30 [=====] - 0s 233us/sample - loss: 6414.8228 - mae: 76.4475 - val_
loss: 33559.0117 - val_mae: 163.3106
Epoch 8/100
30/30 [=====] - 0s 266us/sample - loss: 54036.8984 - mae: 205.6300 - v
al_loss: 92536768.0000 - val_mae: 4449.2231
Epoch 9/100
30/30 [=====] - 0s 265us/sample - loss: 105168688.0000 - mae: 5173.844
7 - val_loss: 2101759082569400320.0000 - val_mae: 1188247680.0000
```

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Epoch 10/100
30/30 [=====] - 0s 266us/sample - loss: 3735466510555021312.0000 - mae
: 1617960448.0000 - val_loss: inf - val_mae: 5387967667144756289339392.0000
Epoch 11/100
30/30 [=====] - 0s 265us/sample - loss: inf - mae: 6291788951466247907
704832.0000 - val_loss: inf - val_mae: inf
Epoch 12/100
30/30 [=====] - 0s 266us/sample - loss: inf - mae: inf - val_loss: nan
- val_mae: nan
15/15 [=====] - 0s 198us/sample - loss: nan - mae: nan
[CV] learning_rate=0.008339092654580042, n_hidden=1, n_neurons=38, total= 0.6s
[CV] learning_rate=0.008339092654580042, n_hidden=1, n_neurons=38 ....
Train on 30 samples, validate on 5 samples
Epoch 1/100
30/30 [=====] - 0s 16ms/sample - loss: 4110.6489 - mae: 60.9886 - val_
loss: 2836.2817 - val_mae: 49.8618
Epoch 2/100
30/30 [=====] - 0s 232us/sample - loss: 2922.7283 - mae: 49.9297 - val
_loss: 559.5844 - val_mae: 17.1638
Epoch 3/100
30/30 [=====] - 0s 232us/sample - loss: 531.9139 - mae: 16.6571 - val_
loss: 439.9301 - val_mae: 19.3450
Epoch 4/100
30/30 [=====] - 0s 267us/sample - loss: 343.9978 - mae: 15.9723 - val_
loss: 813.3687 - val_mae: 22.8254
Epoch 5/100
30/30 [=====] - 0s 264us/sample - loss: 1474.3524 - mae: 32.3580 - val
_loss: 3500.6929 - val_mae: 54.1718
Epoch 6/100
30/30 [=====] - 0s 266us/sample - loss: 3765.8438 - mae: 54.5270 - val
_loss: 2785.1609 - val_mae: 46.7140
Epoch 7/100
30/30 [=====] - 0s 265us/sample - loss: 3030.1511 - mae: 48.9960 - val
_loss: 2376.5437 - val_mae: 47.3821
Epoch 8/100
30/30 [=====] - 0s 299us/sample - loss: 2679.5481 - mae: 47.3708 - val
_loss: 1697.4567 - val_mae: 39.1457
Epoch 9/100
30/30 [=====] - 0s 265us/sample - loss: 2676.9573 - mae: 49.5881 - val
_loss: 691.2047 - val_mae: 23.0428
Epoch 10/100
30/30 [=====] - 0s 266us/sample - loss: 631.9315 - mae: 21.2197 - val_
loss: 354.3898 - val_mae: 15.4520
Epoch 11/100
30/30 [=====] - 0s 266us/sample - loss: 780.1098 - mae: 24.5991 - val_
loss: 6176.8154 - val_mae: 73.4083
Epoch 12/100
30/30 [=====] - 0s 266us/sample - loss: 7366.6753 - mae: 78.9009 - val
_loss: 1281.9304 - val_mae: 26.8380
Epoch 13/100
30/30 [=====] - 0s 266us/sample - loss: 2693.5229 - mae: 34.4499 - val
_loss: 27352.4492 - val_mae: 109.3280
Epoch 14/100
30/30 [=====] - 0s 266us/sample - loss: 25371.5566 - mae: 116.5355 - v
al_loss: 6649258.0000 - val_mae: 2032.9558
Epoch 15/100
30/30 [=====] - 0s 300us/sample - loss: 10914070.0000 - mae: 2655.2852
- val_loss: 2882505828990976.0000 - val_mae: 24044484.0000
Epoch 16/100
30/30 [=====] - 0s 265us/sample - loss: 3819078208716800.0000 - mae: 3
0372002.0000 - val_loss: inf - val_mae: 266886410142719410176.0000
Epoch 17/100
30/30 [=====] - 0s 265us/sample - loss: inf - mae: 3399021801857425080
32.0000 - val_loss: inf - val_mae: inf
Epoch 18/100
30/30 [=====] - 0s 267us/sample - loss: inf - mae: inf - val_loss: nan
- val_mae: nan
Epoch 19/100
30/30 [=====] - 0s 299us/sample - loss: nan - mae: nan - val_loss: nan
```



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- val_mae: nan
Epoch 20/100
30/30 [=====] - 0s 298us/sample - loss: nan - mae: nan - val_loss: nan
- val_mae: nan
15/15 [=====] - 0s 198us/sample - loss: nan - mae: nan
[CV] learning_rate=0.008339092654580042, n_hidden=1, n_neurons=38, total= 0.8s
[CV] learning_rate=0.008339092654580042, n_hidden=1, n_neurons=38 ....
Train on 30 samples, validate on 5 samples
Epoch 1/100
30/30 [=====] - 0s 12ms/sample - loss: 4747.7803 - mae: 66.5395 - val_
loss: 2975.8862 - val_mae: 52.1821
Epoch 2/100
30/30 [=====] - 0s 231us/sample - loss: 3574.3704 - mae: 57.5156 - val
_loss: 344.5014 - val_mae: 17.1774
Epoch 3/100
30/30 [=====] - 0s 264us/sample - loss: 243.2990 - mae: 13.0986 - val_
loss: 64.4716 - val_mae: 6.7927
Epoch 4/100
30/30 [=====] - 0s 233us/sample - loss: 221.7116 - mae: 11.1079 - val_
loss: 846.1870 - val_mae: 25.8561
Epoch 5/100
30/30 [=====] - 0s 232us/sample - loss: 976.8622 - mae: 28.9479 - val_
loss: 2799.4626 - val_mae: 45.2365
Epoch 6/100
30/30 [=====] - 0s 233us/sample - loss: 5449.5703 - mae: 65.3216 - val
_loss: 205167.4844 - val_mae: 252.6585
Epoch 7/100
30/30 [=====] - 0s 266us/sample - loss: 141524.6719 - mae: 196.2389 -
val_loss: 2215378944.0000 - val_mae: 39853.3320
Epoch 8/100
30/30 [=====] - 0s 266us/sample - loss: 3771729408.0000 - mae: 53879.8
906 - val_loss: 153324112565106043256832.0000 - val_mae: 175135014912.0000
Epoch 9/100
30/30 [=====] - 0s 298us/sample - loss: 106255975045941203828736.0000
- mae: 120464908288.0000 - val_loss: inf - val_mae: 30298783143195738256599066607616.0000
Epoch 10/100
30/30 [=====] - 0s 266us/sample - loss: inf - mae: 4211743780173113063
8452945584128.0000 - val_loss: nan - val_mae: nan
Epoch 11/100
30/30 [=====] - 0s 266us/sample - loss: nan - mae: nan - val_loss: nan
- val_mae: nan
Epoch 12/100
30/30 [=====] - 0s 265us/sample - loss: nan - mae: nan - val_loss: nan
- val_mae: nan
Epoch 13/100
30/30 [=====] - 0s 266us/sample - loss: nan - mae: nan - val_loss: nan
- val_mae: nan
15/15 [=====] - 0s 198us/sample - loss: nan - mae: nan
[CV] learning_rate=0.008339092654580042, n_hidden=1, n_neurons=38, total= 0.6s
[CV] learning_rate=0.00030107783636342726, n_hidden=3, n_neurons=21 ..
Train on 30 samples, validate on 5 samples
Epoch 1/100
30/30 [=====] - 0s 14ms/sample - loss: 4512.7871 - mae: 63.8769 - val_
loss: 3789.6223 - val_mae: 59.4191
Epoch 2/100
30/30 [=====] - 0s 300us/sample - loss: 4473.7402 - mae: 63.5452 - val
_loss: 3764.7446 - val_mae: 59.1871
Epoch 3/100
30/30 [=====] - 0s 299us/sample - loss: 4441.9922 - mae: 63.2693 - val
_loss: 3742.7935 - val_mae: 58.9795
Epoch 4/100
30/30 [=====] - 0s 299us/sample - loss: 4415.2764 - mae: 63.0305 - val
_loss: 3722.2371 - val_mae: 58.7843
Epoch 5/100
30/30 [=====] - 0s 232us/sample - loss: 4390.6240 - mae: 62.8084 - val
_loss: 3701.4648 - val_mae: 58.5853
Epoch 6/100
30/30 [=====] - 0s 267us/sample - loss: 4365.3726 - mae: 62.5784 - val
loss: 3677.5098 - val_mae: 58.3535
```

```
Epoch 7/100
30/30 [=====] - 0s 265us/sample - loss: 4337.8589 - mae: 62.3258 - val
_loss: 3650.4077 - val_mae: 58.0904
Epoch 8/100
30/30 [=====] - 0s 266us/sample - loss: 4307.0723 - mae: 62.0397 - val
_loss: 3619.5781 - val_mae: 57.7902
Epoch 9/100
30/30 [=====] - 0s 233us/sample - loss: 4270.9990 - mae: 61.7053 - val
_loss: 3583.7524 - val_mae: 57.4425
Epoch 10/100
30/30 [=====] - 0s 232us/sample - loss: 4226.7354 - mae: 61.2947 - val
_loss: 3540.5774 - val_mae: 57.0209
Epoch 11/100
30/30 [=====] - 0s 265us/sample - loss: 4171.8486 - mae: 60.7878 - val
_loss: 3486.3589 - val_mae: 56.4887
Epoch 12/100
30/30 [=====] - 0s 299us/sample - loss: 4100.1313 - mae: 60.1276 - val
_loss: 3416.0481 - val_mae: 55.7947
Epoch 13/100
30/30 [=====] - 0s 233us/sample - loss: 4004.2097 - mae: 59.2468 - val
_loss: 3316.4871 - val_mae: 54.8135
Epoch 14/100
30/30 [=====] - 0s 265us/sample - loss: 3864.7136 - mae: 57.9757 - val
_loss: 3158.5571 - val_mae: 53.2606
Epoch 15/100
30/30 [=====] - 0s 299us/sample - loss: 3649.6550 - mae: 56.0206 - val
_loss: 2911.7585 - val_mae: 50.7936
Epoch 16/100
30/30 [=====] - 0s 267us/sample - loss: 3305.9619 - mae: 52.8489 - val
_loss: 2505.9058 - val_mae: 46.5913
Epoch 17/100
30/30 [=====] - 0s 232us/sample - loss: 2733.9414 - mae: 47.4957 - val
_loss: 1840.4414 - val_mae: 39.0328
Epoch 18/100
30/30 [=====] - 0s 266us/sample - loss: 1814.0742 - mae: 38.1644 - val
_loss: 934.9585 - val_mae: 26.5758
Epoch 19/100
30/30 [=====] - 0s 231us/sample - loss: 652.3499 - mae: 22.8640 - val_
loss: 328.6438 - val_mae: 13.2504
Epoch 20/100
30/30 [=====] - 0s 233us/sample - loss: 123.0890 - mae: 9.0734 - val_l
oss: 306.6290 - val_mae: 12.0262
Epoch 21/100
30/30 [=====] - 0s 232us/sample - loss: 89.2963 - mae: 7.6249 - val_lo
ss: 284.8481 - val_mae: 11.4890
Epoch 22/100
30/30 [=====] - 0s 298us/sample - loss: 77.0844 - mae: 7.1362 - val_lo
ss: 279.1829 - val_mae: 11.6962
Epoch 23/100
30/30 [=====] - 0s 299us/sample - loss: 70.5079 - mae: 6.7023 - val_lo
ss: 266.8091 - val_mae: 11.7013
Epoch 24/100
30/30 [=====] - 0s 266us/sample - loss: 66.0852 - mae: 6.4908 - val_lo
ss: 260.8683 - val_mae: 11.7945
Epoch 25/100
30/30 [=====] - 0s 232us/sample - loss: 62.6125 - mae: 6.2555 - val_lo
ss: 251.6622 - val_mae: 11.7642
Epoch 26/100
30/30 [=====] - 0s 266us/sample - loss: 59.6669 - mae: 6.0967 - val_lo
ss: 245.5643 - val_mae: 11.7774
Epoch 27/100
30/30 [=====] - 0s 298us/sample - loss: 57.0703 - mae: 5.9655 - val_lo
ss: 238.0124 - val_mae: 11.7273
Epoch 28/100
30/30 [=====] - 0s 299us/sample - loss: 54.7310 - mae: 5.8427 - val_lo
ss: 232.0975 - val_mae: 11.6977
Epoch 29/100
30/30 [=====] - 0s 300us/sample - loss: 52.6016 - mae: 5.7389 - val_lo
ss: 225.6218 - val_mae: 11.6354
```

```
Epoch 30/100
30/30 [=====] - 0s 231us/sample - loss: 50.6476 - mae: 5.6411 - val_loss: 220.0541 - val_mae: 11.5820
Epoch 31/100
30/30 [=====] - 0s 298us/sample - loss: 48.8419 - mae: 5.5443 - val_loss: 214.3833 - val_mae: 11.5139
Epoch 32/100
30/30 [=====] - 0s 265us/sample - loss: 47.1652 - mae: 5.4522 - val_loss: 209.2485 - val_mae: 11.4527
Epoch 33/100
30/30 [=====] - 0s 267us/sample - loss: 45.6361 - mae: 5.3649 - val_loss: 204.2744 - val_mae: 11.3837
Epoch 34/100
30/30 [=====] - 0s 264us/sample - loss: 44.2067 - mae: 5.2844 - val_loss: 199.5105 - val_mae: 11.3108
Epoch 35/100
30/30 [=====] - 0s 300us/sample - loss: 42.8636 - mae: 5.2142 - val_loss: 194.9779 - val_mae: 11.2362
Epoch 36/100
30/30 [=====] - 0s 298us/sample - loss: 41.5822 - mae: 5.1452 - val_loss: 190.6224 - val_mae: 11.1614
Epoch 37/100
30/30 [=====] - 0s 299us/sample - loss: 40.3597 - mae: 5.0780 - val_loss: 186.4532 - val_mae: 11.0857
Epoch 38/100
30/30 [=====] - 0s 266us/sample - loss: 39.2007 - mae: 5.0165 - val_loss: 182.3882 - val_mae: 11.0062
Epoch 39/100
30/30 [=====] - 0s 300us/sample - loss: 38.0928 - mae: 4.9554 - val_loss: 178.5780 - val_mae: 10.9291
Epoch 40/100
30/30 [=====] - 0s 298us/sample - loss: 37.0361 - mae: 4.8956 - val_loss: 174.7990 - val_mae: 10.8508
Epoch 41/100
30/30 [=====] - 0s 266us/sample - loss: 36.0271 - mae: 4.8363 - val_loss: 171.2502 - val_mae: 10.7737
Epoch 42/100
30/30 [=====] - 0s 299us/sample - loss: 35.0554 - mae: 4.7767 - val_loss: 167.7951 - val_mae: 10.6950
Epoch 43/100
30/30 [=====] - 0s 299us/sample - loss: 34.1262 - mae: 4.7192 - val_loss: 164.4229 - val_mae: 10.6177
Epoch 44/100
30/30 [=====] - 0s 298us/sample - loss: 33.2285 - mae: 4.6621 - val_loss: 161.2055 - val_mae: 10.5396
Epoch 45/100
30/30 [=====] - 0s 266us/sample - loss: 32.3642 - mae: 4.6059 - val_loss: 158.0467 - val_mae: 10.4607
Epoch 46/100
30/30 [=====] - 0s 265us/sample - loss: 31.5355 - mae: 4.5500 - val_loss: 155.0820 - val_mae: 10.3872
Epoch 47/100
30/30 [=====] - 0s 265us/sample - loss: 30.7340 - mae: 4.4952 - val_loss: 152.1009 - val_mae: 10.3099
Epoch 48/100
30/30 [=====] - 0s 299us/sample - loss: 29.9586 - mae: 4.4412 - val_loss: 149.3279 - val_mae: 10.2382
Epoch 49/100
30/30 [=====] - 0s 266us/sample - loss: 29.2134 - mae: 4.3876 - val_loss: 146.5582 - val_mae: 10.1631
Epoch 50/100
30/30 [=====] - 0s 299us/sample - loss: 28.4912 - mae: 4.3340 - val_loss: 143.9160 - val_mae: 10.0896
Epoch 51/100
30/30 [=====] - 0s 265us/sample - loss: 27.7948 - mae: 4.2823 - val_loss: 141.2823 - val_mae: 10.0153
Epoch 52/100
30/30 [=====] - 0s 267us/sample - loss: 27.1199 - mae: 4.2309 - val_loss: 138.7881 - val_mae: 9.9436
```

```
ss: 136.7981 - val_mae: 9.7436
Epoch 53/100
30/30 [=====] - 0s 266us/sample - loss: 26.4677 - mae: 4.1801 - val_lo
ss: 136.3269 - val_mae: 9.8714
Epoch 54/100
30/30 [=====] - 0s 266us/sample - loss: 25.8702 - mae: 4.1312 - val_lo
ss: 134.2237 - val_mae: 9.8075
Epoch 55/100
30/30 [=====] - 0s 297us/sample - loss: 25.2724 - mae: 4.0897 - val_lo
ss: 131.9787 - val_mae: 9.7454
Epoch 56/100
30/30 [=====] - 0s 299us/sample - loss: 24.7153 - mae: 4.0438 - val_lo
ss: 129.6249 - val_mae: 9.6564
Epoch 57/100
30/30 [=====] - 0s 266us/sample - loss: 24.1824 - mae: 4.0045 - val_lo
ss: 127.6030 - val_mae: 9.6033
Epoch 58/100
30/30 [=====] - 0s 266us/sample - loss: 23.6702 - mae: 3.9608 - val_lo
ss: 125.5894 - val_mae: 9.5293
Epoch 59/100
30/30 [=====] - 0s 266us/sample - loss: 23.1791 - mae: 3.9307 - val_lo
ss: 123.2368 - val_mae: 9.4405
Epoch 60/100
30/30 [=====] - 0s 267us/sample - loss: 22.6983 - mae: 3.8956 - val_lo
ss: 121.3796 - val_mae: 9.3764
Epoch 61/100
30/30 [=====] - 0s 266us/sample - loss: 22.2296 - mae: 3.8649 - val_lo
ss: 119.1127 - val_mae: 9.2930
Epoch 62/100
30/30 [=====] - 0s 299us/sample - loss: 21.7862 - mae: 3.8294 - val_lo
ss: 117.5107 - val_mae: 9.2393
Epoch 63/100
30/30 [=====] - 0s 231us/sample - loss: 21.3424 - mae: 3.7968 - val_lo
ss: 115.5422 - val_mae: 9.1692
Epoch 64/100
30/30 [=====] - 0s 300us/sample - loss: 20.9165 - mae: 3.7645 - val_lo
ss: 113.5852 - val_mae: 9.0956
Epoch 65/100
30/30 [=====] - 0s 264us/sample - loss: 20.5145 - mae: 3.7308 - val_lo
ss: 111.7556 - val_mae: 9.0295
Epoch 66/100
30/30 [=====] - 0s 334us/sample - loss: 20.1085 - mae: 3.6988 - val_lo
ss: 110.1330 - val_mae: 8.9723
Epoch 67/100
30/30 [=====] - 0s 265us/sample - loss: 19.7144 - mae: 3.6661 - val_lo
ss: 108.1708 - val_mae: 8.8977
Epoch 68/100
30/30 [=====] - 0s 299us/sample - loss: 19.3468 - mae: 3.6324 - val_lo
ss: 106.6626 - val_mae: 8.8423
Epoch 69/100
30/30 [=====] - 0s 299us/sample - loss: 18.9771 - mae: 3.6047 - val_lo
ss: 104.8983 - val_mae: 8.7773
Epoch 70/100
30/30 [=====] - 0s 265us/sample - loss: 18.6167 - mae: 3.5761 - val_lo
ss: 103.1801 - val_mae: 8.7072
Epoch 71/100
30/30 [=====] - 0s 265us/sample - loss: 18.2784 - mae: 3.5453 - val_lo
ss: 101.7956 - val_mae: 8.6707
Epoch 72/100
30/30 [=====] - 0s 266us/sample - loss: 17.9400 - mae: 3.5208 - val_lo
ss: 100.2998 - val_mae: 8.6102
Epoch 73/100
30/30 [=====] - 0s 266us/sample - loss: 17.6092 - mae: 3.4929 - val_lo
ss: 98.6046 - val_mae: 8.5381
Epoch 74/100
30/30 [=====] - 0s 266us/sample - loss: 17.2956 - mae: 3.4637 - val_lo
ss: 97.2742 - val_mae: 8.4845
Epoch 75/100
30/30 [=====] - 0s 300us/sample - loss: 16.9799 - mae: 3.4374 - val_lo
ss: 95.9363 - val_mae: 8.4264
```

```
ss: 95.7293 - val_mae: 8.4224
Epoch 76/100
30/30 [=====] - 0s 265us/sample - loss: 16.6796 - mae: 3.4109 - val_lo
ss: 94.2153 - val_mae: 8.3552
Epoch 77/100
30/30 [=====] - 0s 332us/sample - loss: 16.3841 - mae: 3.3798 - val_lo
ss: 92.9399 - val_mae: 8.3040
Epoch 78/100
30/30 [=====] - 0s 233us/sample - loss: 16.0934 - mae: 3.3552 - val_lo
ss: 91.5326 - val_mae: 8.2465
Epoch 79/100
30/30 [=====] - 0s 298us/sample - loss: 15.8115 - mae: 3.3289 - val_lo
ss: 90.1523 - val_mae: 8.1870
Epoch 80/100
30/30 [=====] - 0s 266us/sample - loss: 15.5403 - mae: 3.3007 - val_lo
ss: 88.8577 - val_mae: 8.1296
Epoch 81/100
30/30 [=====] - 0s 265us/sample - loss: 15.2706 - mae: 3.2750 - val_lo
ss: 87.6008 - val_mae: 8.0775
Epoch 82/100
30/30 [=====] - 0s 265us/sample - loss: 15.0084 - mae: 3.2499 - val_lo
ss: 86.2381 - val_mae: 8.0165
Epoch 83/100
30/30 [=====] - 0s 300us/sample - loss: 14.7618 - mae: 3.2234 - val_lo
ss: 85.1072 - val_mae: 7.9691
Epoch 84/100
30/30 [=====] - 0s 298us/sample - loss: 14.5140 - mae: 3.1998 - val_lo
ss: 83.9778 - val_mae: 7.9271
Epoch 85/100
30/30 [=====] - 0s 300us/sample - loss: 14.2748 - mae: 3.1749 - val_lo
ss: 82.7181 - val_mae: 7.8664
Epoch 86/100
30/30 [=====] - 0s 300us/sample - loss: 14.0415 - mae: 3.1497 - val_lo
ss: 81.6066 - val_mae: 7.8159
Epoch 87/100
30/30 [=====] - 0s 265us/sample - loss: 13.8051 - mae: 3.1246 - val_lo
ss: 80.5122 - val_mae: 7.7651
Epoch 88/100
30/30 [=====] - 0s 300us/sample - loss: 13.5900 - mae: 3.1021 - val_lo
ss: 79.2130 - val_mae: 7.7011
Epoch 89/100
30/30 [=====] - 0s 300us/sample - loss: 13.3693 - mae: 3.0748 - val_lo
ss: 78.4355 - val_mae: 7.6796
Epoch 90/100
30/30 [=====] - 0s 299us/sample - loss: 13.1579 - mae: 3.0537 - val_lo
ss: 77.3136 - val_mae: 7.6223
Epoch 91/100
30/30 [=====] - 0s 300us/sample - loss: 12.9522 - mae: 3.0308 - val_lo
ss: 76.2028 - val_mae: 7.5665
Epoch 92/100
30/30 [=====] - 0s 298us/sample - loss: 12.7502 - mae: 3.0058 - val_lo
ss: 75.2599 - val_mae: 7.5172
Epoch 93/100
30/30 [=====] - 0s 266us/sample - loss: 12.5548 - mae: 2.9840 - val_lo
ss: 74.2291 - val_mae: 7.4665
Epoch 94/100
30/30 [=====] - 0s 266us/sample - loss: 12.3635 - mae: 2.9606 - val_lo
ss: 73.2302 - val_mae: 7.4158
Epoch 95/100
30/30 [=====] - 0s 298us/sample - loss: 12.1824 - mae: 2.9373 - val_lo
ss: 72.4170 - val_mae: 7.3878
Epoch 96/100
30/30 [=====] - 0s 266us/sample - loss: 11.9973 - mae: 2.9173 - val_lo
ss: 71.3609 - val_mae: 7.3276
Epoch 97/100
30/30 [=====] - 0s 299us/sample - loss: 11.8280 - mae: 2.8936 - val_lo
ss: 70.5500 - val_mae: 7.2853
Epoch 98/100
30/30 [=====] - 0s 231us/sample - loss: 11.6495 - mae: 2.8734 - val_lo
```

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ss: 69.6245 - val_mae: 7.2387
Epoch 99/100
30/30 [=====] - 0s 267us/sample - loss: 11.4834 - mae: 2.8524 - val_lo
ss: 68.7015 - val_mae: 7.1886
Epoch 100/100
30/30 [=====] - 0s 264us/sample - loss: 11.3250 - mae: 2.8311 - val_lo
ss: 67.8956 - val_mae: 7.1538
15/15 [=====] - 0s 200us/sample - loss: 187.0635 - mae: 10.2649
[CV] learning_rate=0.00030107783636342726, n_hidden=3, n_neurons=21, total= 1.4s
[CV] learning_rate=0.00030107783636342726, n_hidden=3, n_neurons=21 ..
Train on 30 samples, validate on 5 samples
Epoch 1/100
30/30 [=====] - 0s 14ms/sample - loss: 4156.9922 - mae: 61.6138 - val_
loss: 3728.7246 - val_mae: 58.8911
Epoch 2/100
30/30 [=====] - 0s 266us/sample - loss: 4133.1113 - mae: 61.4188 - val
_loss: 3710.3633 - val_mae: 58.7273
Epoch 3/100
30/30 [=====] - 0s 233us/sample - loss: 4109.1270 - mae: 61.2193 - val
_loss: 3689.9355 - val_mae: 58.5446
Epoch 4/100
30/30 [=====] - 0s 299us/sample - loss: 4082.8474 - mae: 60.9997 - val
_loss: 3666.6606 - val_mae: 58.3335
Epoch 5/100
30/30 [=====] - 0s 265us/sample - loss: 4053.5374 - mae: 60.7524 - val
_loss: 3639.5776 - val_mae: 58.0870
Epoch 6/100
30/30 [=====] - 0s 266us/sample - loss: 4019.5474 - mae: 60.4643 - val
_loss: 3606.5503 - val_mae: 57.7843
Epoch 7/100
30/30 [=====] - 0s 264us/sample - loss: 3978.4016 - mae: 60.1128 - val
_loss: 3565.3550 - val_mae: 57.4057
Epoch 8/100
30/30 [=====] - 0s 266us/sample - loss: 3927.2468 - mae: 59.6741 - val
_loss: 3512.2585 - val_mae: 56.9151
Epoch 9/100
30/30 [=====] - 0s 265us/sample - loss: 3860.7007 - mae: 59.0985 - val
_loss: 3441.7515 - val_mae: 56.2564
Epoch 10/100
30/30 [=====] - 0s 265us/sample - loss: 3771.8264 - mae: 58.3212 - val
_loss: 3345.0872 - val_mae: 55.3461
Epoch 11/100
30/30 [=====] - 0s 266us/sample - loss: 3648.1199 - mae: 57.2307 - val
_loss: 3206.5210 - val_mae: 54.0239
Epoch 12/100
30/30 [=====] - 0s 233us/sample - loss: 3467.8257 - mae: 55.6179 - val
_loss: 2999.1572 - val_mae: 52.0078
Epoch 13/100
30/30 [=====] - 0s 298us/sample - loss: 3195.4744 - mae: 53.1196 - val
_loss: 2673.9075 - val_mae: 48.7382
Epoch 14/100
30/30 [=====] - 0s 265us/sample - loss: 2771.4167 - mae: 49.0411 - val
_loss: 2152.9280 - val_mae: 43.1188
Epoch 15/100
30/30 [=====] - 0s 265us/sample - loss: 2106.2666 - mae: 41.9924 - val
_loss: 1378.0675 - val_mae: 33.3825
Epoch 16/100
30/30 [=====] - 0s 265us/sample - loss: 1171.6857 - mae: 30.2213 - val
_loss: 557.5591 - val_mae: 20.6890
Epoch 17/100
30/30 [=====] - 0s 299us/sample - loss: 357.4181 - mae: 14.9861 - val_
loss: 218.7290 - val_mae: 11.7391
Epoch 18/100
30/30 [=====] - 0s 300us/sample - loss: 190.8365 - mae: 11.1306 - val_
loss: 214.7112 - val_mae: 11.9390
Epoch 19/100
30/30 [=====] - 0s 233us/sample - loss: 144.2408 - mae: 9.8048 - val_l
oss: 147.0517 - val_mae: 9.4161
Epoch 20/100
```

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30/30 [=====] - 0s 332us/sample - loss: 117.9748 - mae: 8.5033 - val_loss: 135.8931 - val_mae: 9.0655
Epoch 21/100
30/30 [=====] - 0s 266us/sample - loss: 101.3791 - mae: 7.9389 - val_loss: 109.8473 - val_mae: 7.8699
Epoch 22/100
30/30 [=====] - 0s 300us/sample - loss: 89.5580 - mae: 7.3985 - val_loss: 99.3384 - val_mae: 7.3732
Epoch 23/100
30/30 [=====] - 0s 265us/sample - loss: 80.5402 - mae: 7.0379 - val_loss: 86.4646 - val_mae: 6.6693
Epoch 24/100
30/30 [=====] - 0s 299us/sample - loss: 73.3789 - mae: 6.7239 - val_loss: 78.6324 - val_mae: 6.2508
Epoch 25/100
30/30 [=====] - 0s 265us/sample - loss: 67.4807 - mae: 6.4986 - val_loss: 71.2501 - val_mae: 6.0095
Epoch 26/100
30/30 [=====] - 0s 265us/sample - loss: 62.5615 - mae: 6.3003 - val_loss: 65.5442 - val_mae: 5.8147
Epoch 27/100
30/30 [=====] - 0s 298us/sample - loss: 58.3570 - mae: 6.1185 - val_loss: 60.8079 - val_mae: 5.6364
Epoch 28/100
30/30 [=====] - 0s 300us/sample - loss: 54.7407 - mae: 5.9507 - val_loss: 56.6809 - val_mae: 5.4667
Epoch 29/100
30/30 [=====] - 0s 299us/sample - loss: 51.5963 - mae: 5.7919 - val_loss: 53.4207 - val_mae: 5.3229
Epoch 30/100
30/30 [=====] - 0s 266us/sample - loss: 48.8132 - mae: 5.6468 - val_loss: 50.3858 - val_mae: 5.1762
Epoch 31/100
30/30 [=====] - 0s 299us/sample - loss: 46.3252 - mae: 5.5061 - val_loss: 47.9093 - val_mae: 5.0512
Epoch 32/100
30/30 [=====] - 0s 265us/sample - loss: 44.0959 - mae: 5.3763 - val_loss: 45.6875 - val_mae: 4.9327
Epoch 33/100
30/30 [=====] - 0s 299us/sample - loss: 42.0610 - mae: 5.2508 - val_loss: 43.8234 - val_mae: 4.8268
Epoch 34/100
30/30 [=====] - 0s 266us/sample - loss: 40.1451 - mae: 5.1271 - val_loss: 42.0545 - val_mae: 4.7255
Epoch 35/100
30/30 [=====] - 0s 266us/sample - loss: 38.4065 - mae: 5.0077 - val_loss: 40.6258 - val_mae: 4.6463
Epoch 36/100
30/30 [=====] - 0s 265us/sample - loss: 36.7522 - mae: 4.8920 - val_loss: 39.1996 - val_mae: 4.5648
Epoch 37/100
30/30 [=====] - 0s 299us/sample - loss: 35.2296 - mae: 4.7831 - val_loss: 38.0938 - val_mae: 4.5000
Epoch 38/100
30/30 [=====] - 0s 299us/sample - loss: 33.8377 - mae: 4.6981 - val_loss: 37.0080 - val_mae: 4.4470
Epoch 39/100
30/30 [=====] - 0s 298us/sample - loss: 32.4826 - mae: 4.6122 - val_loss: 36.1281 - val_mae: 4.4413
Epoch 40/100
30/30 [=====] - 0s 299us/sample - loss: 31.2235 - mae: 4.5311 - val_loss: 35.2856 - val_mae: 4.4553
Epoch 41/100
30/30 [=====] - 0s 266us/sample - loss: 30.0312 - mae: 4.4552 - val_loss: 34.5204 - val_mae: 4.4472
Epoch 42/100
30/30 [=====] - 0s 298us/sample - loss: 28.9204 - mae: 4.3767 - val_loss: 33.8756 - val_mae: 4.4579
Epoch 43/100
```

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30/30 [=====] - 0s 266us/sample - loss: 27.8748 - mae: 4.3076 - val_loss: 33.2910 - val_mae: 4.4553
Epoch 44/100
30/30 [=====] - 0s 333us/sample - loss: 26.9502 - mae: 4.2505 - val_loss: 32.7334 - val_mae: 4.4670
Epoch 45/100
30/30 [=====] - 0s 298us/sample - loss: 26.0696 - mae: 4.1958 - val_loss: 32.2490 - val_mae: 4.4755
Epoch 46/100
30/30 [=====] - 0s 300us/sample - loss: 25.2468 - mae: 4.1449 - val_loss: 31.7427 - val_mae: 4.4501
Epoch 47/100
30/30 [=====] - 0s 299us/sample - loss: 24.4652 - mae: 4.0879 - val_loss: 31.3474 - val_mae: 4.4488
Epoch 48/100
30/30 [=====] - 0s 299us/sample - loss: 23.7105 - mae: 4.0364 - val_loss: 30.8699 - val_mae: 4.4412
Epoch 49/100
30/30 [=====] - 0s 299us/sample - loss: 22.9834 - mae: 3.9817 - val_loss: 30.5079 - val_mae: 4.4385
Epoch 50/100
30/30 [=====] - 0s 267us/sample - loss: 22.2981 - mae: 3.9288 - val_loss: 30.1859 - val_mae: 4.4230
Epoch 51/100
30/30 [=====] - 0s 298us/sample - loss: 21.6189 - mae: 3.8713 - val_loss: 29.9034 - val_mae: 4.4309
Epoch 52/100
30/30 [=====] - 0s 266us/sample - loss: 20.9699 - mae: 3.8195 - val_loss: 29.6094 - val_mae: 4.4351
Epoch 53/100
30/30 [=====] - 0s 299us/sample - loss: 20.3523 - mae: 3.7672 - val_loss: 29.3679 - val_mae: 4.4206
Epoch 54/100
30/30 [=====] - 0s 299us/sample - loss: 19.7680 - mae: 3.7152 - val_loss: 29.1201 - val_mae: 4.4289
Epoch 55/100
30/30 [=====] - 0s 266us/sample - loss: 19.2042 - mae: 3.6665 - val_loss: 28.8849 - val_mae: 4.4325
Epoch 56/100
30/30 [=====] - 0s 298us/sample - loss: 18.6639 - mae: 3.6173 - val_loss: 28.6704 - val_mae: 4.4308
Epoch 57/100
30/30 [=====] - 0s 266us/sample - loss: 18.1478 - mae: 3.5699 - val_loss: 28.4152 - val_mae: 4.4074
Epoch 58/100
30/30 [=====] - 0s 266us/sample - loss: 17.6612 - mae: 3.5204 - val_loss: 28.1746 - val_mae: 4.3998
Epoch 59/100
30/30 [=====] - 0s 266us/sample - loss: 17.1921 - mae: 3.4764 - val_loss: 27.8674 - val_mae: 4.3839
Epoch 60/100
30/30 [=====] - 0s 265us/sample - loss: 16.7433 - mae: 3.4312 - val_loss: 27.6262 - val_mae: 4.3746
Epoch 61/100
30/30 [=====] - 0s 266us/sample - loss: 16.3158 - mae: 3.3873 - val_loss: 27.3873 - val_mae: 4.3604
Epoch 62/100
30/30 [=====] - 0s 233us/sample - loss: 15.9079 - mae: 3.3450 - val_loss: 27.1419 - val_mae: 4.3350
Epoch 63/100
30/30 [=====] - 0s 266us/sample - loss: 15.5211 - mae: 3.3012 - val_loss: 26.9909 - val_mae: 4.3465
Epoch 64/100
30/30 [=====] - 0s 266us/sample - loss: 15.1544 - mae: 3.2632 - val_loss: 26.7254 - val_mae: 4.3254
Epoch 65/100
30/30 [=====] - 0s 266us/sample - loss: 14.7971 - mae: 3.2221 - val_loss: 26.5922 - val_mae: 4.3299
Epoch 66/100
```



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30/30 [=====] - 0s 232us/sample - loss: 14.4535 - mae: 3.1847 - val_loss: 26.3756 - val_mae: 4.3206
Epoch 67/100
30/30 [=====] - 0s 265us/sample - loss: 14.1295 - mae: 3.1456 - val_loss: 26.1482 - val_mae: 4.2935
Epoch 68/100
30/30 [=====] - 0s 267us/sample - loss: 13.8137 - mae: 3.1072 - val_loss: 26.0087 - val_mae: 4.2962
Epoch 69/100
30/30 [=====] - 0s 266us/sample - loss: 13.5072 - mae: 3.0720 - val_loss: 25.8386 - val_mae: 4.2901
Epoch 70/100
30/30 [=====] - 0s 266us/sample - loss: 13.2142 - mae: 3.0355 - val_loss: 25.6104 - val_mae: 4.2565
Epoch 71/100
30/30 [=====] - 0s 233us/sample - loss: 12.9342 - mae: 2.9988 - val_loss: 25.5205 - val_mae: 4.2690
Epoch 72/100
30/30 [=====] - 0s 300us/sample - loss: 12.6484 - mae: 2.9646 - val_loss: 25.3719 - val_mae: 4.2491
Epoch 73/100
30/30 [=====] - 0s 265us/sample - loss: 12.3716 - mae: 2.9272 - val_loss: 25.2351 - val_mae: 4.2439
Epoch 74/100
30/30 [=====] - 0s 299us/sample - loss: 12.1075 - mae: 2.8936 - val_loss: 25.0095 - val_mae: 4.2129
Epoch 75/100
30/30 [=====] - 0s 233us/sample - loss: 11.8543 - mae: 2.8578 - val_loss: 24.9251 - val_mae: 4.2173
Epoch 76/100
30/30 [=====] - 0s 265us/sample - loss: 11.6029 - mae: 2.8254 - val_loss: 24.7818 - val_mae: 4.2103
Epoch 77/100
30/30 [=====] - 0s 233us/sample - loss: 11.3616 - mae: 2.7922 - val_loss: 24.6339 - val_mae: 4.1964
Epoch 78/100
30/30 [=====] - 0s 265us/sample - loss: 11.1282 - mae: 2.7593 - val_loss: 24.4870 - val_mae: 4.1761
Epoch 79/100
30/30 [=====] - 0s 232us/sample - loss: 10.8980 - mae: 2.7246 - val_loss: 24.4239 - val_mae: 4.1794
Epoch 80/100
30/30 [=====] - 0s 233us/sample - loss: 10.6698 - mae: 2.6937 - val_loss: 24.2922 - val_mae: 4.1691
Epoch 81/100
30/30 [=====] - 0s 231us/sample - loss: 10.4515 - mae: 2.6625 - val_loss: 24.1988 - val_mae: 4.1626
Epoch 82/100
30/30 [=====] - 0s 265us/sample - loss: 10.2379 - mae: 2.6329 - val_loss: 24.0953 - val_mae: 4.1530
Epoch 83/100
30/30 [=====] - 0s 265us/sample - loss: 10.0328 - mae: 2.6045 - val_loss: 23.9508 - val_mae: 4.1271
Epoch 84/100
30/30 [=====] - 0s 265us/sample - loss: 9.8362 - mae: 2.5751 - val_loss: 23.8337 - val_mae: 4.1141
Epoch 85/100
30/30 [=====] - 0s 233us/sample - loss: 9.6531 - mae: 2.5491 - val_loss: 23.7907 - val_mae: 4.1235
Epoch 86/100
30/30 [=====] - 0s 267us/sample - loss: 9.4668 - mae: 2.5216 - val_loss: 23.6591 - val_mae: 4.1017
Epoch 87/100
30/30 [=====] - 0s 231us/sample - loss: 9.2837 - mae: 2.4945 - val_loss: 23.5702 - val_mae: 4.0875
Epoch 88/100
30/30 [=====] - 0s 265us/sample - loss: 9.1104 - mae: 2.4658 - val_loss: 23.4901 - val_mae: 4.0796
Epoch 89/100
```

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Epoch 89/100
30/30 [=====] - 0s 233us/sample - loss: 8.9327 - mae: 2.4406 - val_loss: 23.4424 - val_mae: 4.0837
Epoch 90/100
30/30 [=====] - 0s 298us/sample - loss: 8.7675 - mae: 2.4130 - val_loss: 23.3281 - val_mae: 4.0643
Epoch 91/100
30/30 [=====] - 0s 266us/sample - loss: 8.6020 - mae: 2.3873 - val_loss: 23.2789 - val_mae: 4.0586
Epoch 92/100
30/30 [=====] - 0s 299us/sample - loss: 8.4498 - mae: 2.3599 - val_loss: 23.2115 - val_mae: 4.0498
Epoch 93/100
30/30 [=====] - 0s 266us/sample - loss: 8.2894 - mae: 2.3369 - val_loss: 23.1036 - val_mae: 4.0396
Epoch 94/100
30/30 [=====] - 0s 266us/sample - loss: 8.1393 - mae: 2.3094 - val_loss: 23.1062 - val_mae: 4.0483
Epoch 95/100
30/30 [=====] - 0s 299us/sample - loss: 7.9930 - mae: 2.2856 - val_loss: 22.9608 - val_mae: 4.0128
Epoch 96/100
30/30 [=====] - 0s 266us/sample - loss: 7.8499 - mae: 2.2587 - val_loss: 22.9646 - val_mae: 4.0272
Epoch 97/100
30/30 [=====] - 0s 299us/sample - loss: 7.7114 - mae: 2.2366 - val_loss: 22.8618 - val_mae: 4.0100
Epoch 98/100
30/30 [=====] - 0s 266us/sample - loss: 7.5728 - mae: 2.2118 - val_loss: 22.8177 - val_mae: 4.0057
Epoch 99/100
30/30 [=====] - 0s 265us/sample - loss: 7.4455 - mae: 2.1885 - val_loss: 22.6996 - val_mae: 3.9765
Epoch 100/100
30/30 [=====] - 0s 298us/sample - loss: 7.3150 - mae: 2.1635 - val_loss: 22.7185 - val_mae: 3.9913
15/15 [=====] - 0s 200us/sample - loss: 134.5252 - mae: 9.6307
[CV] learning_rate=0.00030107783636342726, n_hidden=3, n_neurons=21, total= 1.4s
[CV] learning_rate=0.00030107783636342726, n_hidden=3, n_neurons=21 ..
Train on 30 samples, validate on 5 samples
Epoch 1/100
30/30 [=====] - 0s 14ms/sample - loss: 4722.7920 - mae: 66.3686 - val_loss: 3735.4895 - val_mae: 58.9262
Epoch 2/100
30/30 [=====] - 0s 232us/sample - loss: 4699.4360 - mae: 66.1945 - val_loss: 3718.8462 - val_mae: 58.7864
Epoch 3/100
30/30 [=====] - 0s 264us/sample - loss: 4675.5420 - mae: 66.0144 - val_loss: 3700.8789 - val_mae: 58.6334
Epoch 4/100
30/30 [=====] - 0s 268us/sample - loss: 4649.2681 - mae: 65.8158 - val_loss: 3680.4102 - val_mae: 58.4578
Epoch 5/100
30/30 [=====] - 0s 264us/sample - loss: 4619.7534 - mae: 65.5923 - val_loss: 3655.8215 - val_mae: 58.2400
Epoch 6/100
30/30 [=====] - 0s 266us/sample - loss: 4584.2676 - mae: 65.3171 - val_loss: 3622.6157 - val_mae: 57.9492
Epoch 7/100
30/30 [=====] - 0s 297us/sample - loss: 4539.4409 - mae: 64.9686 - val_loss: 3580.0366 - val_mae: 57.5782
Epoch 8/100
30/30 [=====] - 0s 300us/sample - loss: 4481.8179 - mae: 64.5216 - val_loss: 3524.4824 - val_mae: 57.0940
Epoch 9/100
30/30 [=====] - 0s 298us/sample - loss: 4405.5303 - mae: 63.9281 - val_loss: 3448.1621 - val_mae: 56.4316
Epoch 10/100
30/30 [=====] - 0s 299us/sample - loss: 4298.9365 - mae: 63.0975 - val_loss: 3326.3313 - val_mae: 55.4560
```

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_loss: 3336.3313 - val_mae: 55.4569
Epoch 11/100
30/30 [=====] - 0s 266us/sample - loss: 4142.1602 - mae: 61.8634 - val
_loss: 3164.5503 - val_mae: 53.9464
Epoch 12/100
30/30 [=====] - 0s 265us/sample - loss: 3900.6226 - mae: 59.9286 - val
_loss: 2883.1736 - val_mae: 51.4138
Epoch 13/100
30/30 [=====] - 0s 298us/sample - loss: 3505.6887 - mae: 56.6444 - val
_loss: 2405.4583 - val_mae: 46.8590
Epoch 14/100
30/30 [=====] - 0s 266us/sample - loss: 2835.9756 - mae: 50.6170 - val
_loss: 1618.9064 - val_mae: 38.2644
Epoch 15/100
30/30 [=====] - 0s 266us/sample - loss: 1763.1893 - mae: 39.0273 - val
_loss: 634.0149 - val_mae: 23.1967
Epoch 16/100
30/30 [=====] - 0s 265us/sample - loss: 585.7195 - mae: 21.0991 - val_
loss: 191.1355 - val_mae: 10.0516
Epoch 17/100
30/30 [=====] - 0s 298us/sample - loss: 268.1040 - mae: 12.4205 - val_
loss: 249.8036 - val_mae: 13.5825
Epoch 18/100
30/30 [=====] - 0s 299us/sample - loss: 181.5703 - mae: 11.5602 - val_
loss: 145.0536 - val_mae: 9.2457
Epoch 19/100
30/30 [=====] - 0s 266us/sample - loss: 146.1974 - mae: 10.1702 - val_
loss: 180.3671 - val_mae: 11.1450
Epoch 20/100
30/30 [=====] - 0s 265us/sample - loss: 129.9293 - mae: 9.6171 - val_l
oss: 123.1751 - val_mae: 8.3700
Epoch 21/100
30/30 [=====] - 0s 266us/sample - loss: 118.7013 - mae: 9.1745 - val_l
oss: 138.9859 - val_mae: 9.4315
Epoch 22/100
30/30 [=====] - 0s 299us/sample - loss: 110.2922 - mae: 8.6965 - val_l
oss: 105.2089 - val_mae: 7.8890
Epoch 23/100
30/30 [=====] - 0s 266us/sample - loss: 103.1388 - mae: 8.5282 - val_l
oss: 111.2191 - val_mae: 8.4050
Epoch 24/100
30/30 [=====] - 0s 299us/sample - loss: 97.0225 - mae: 8.1762 - val_lo
ss: 90.6277 - val_mae: 7.4111
Epoch 25/100
30/30 [=====] - 0s 266us/sample - loss: 91.5907 - mae: 7.9984 - val_lo
ss: 91.9535 - val_mae: 7.6157
Epoch 26/100
30/30 [=====] - 0s 265us/sample - loss: 86.7925 - mae: 7.7019 - val_lo
ss: 78.3668 - val_mae: 6.9046
Epoch 27/100
30/30 [=====] - 0s 298us/sample - loss: 82.6020 - mae: 7.5606 - val_lo
ss: 78.1975 - val_mae: 6.9774
Epoch 28/100
30/30 [=====] - 0s 299us/sample - loss: 78.5948 - mae: 7.3364 - val_lo
ss: 68.9489 - val_mae: 6.4460
Epoch 29/100
30/30 [=====] - 0s 298us/sample - loss: 75.1180 - mae: 7.1672 - val_lo
ss: 68.1179 - val_mae: 6.4435
Epoch 30/100
30/30 [=====] - 0s 267us/sample - loss: 71.6577 - mae: 7.0031 - val_lo
ss: 61.6541 - val_mae: 6.0328
Epoch 31/100
30/30 [=====] - 0s 267us/sample - loss: 68.5763 - mae: 6.8348 - val_lo
ss: 59.8007 - val_mae: 5.9627
Epoch 32/100
30/30 [=====] - 0s 265us/sample - loss: 65.5961 - mae: 6.6934 - val_lo
ss: 55.7746 - val_mae: 5.6880
Epoch 33/100
30/30 [=====] - 0s 266us/sample - loss: 62.7304 - mae: 6.5615 - val_lo
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ss: 53.4259 - val_mae: 5.5581
Epoch 34/100
30/30 [=====] - 0s 265us/sample - loss: 60.1415 - mae: 6.4371 - val_lo
ss: 50.7019 - val_mae: 5.3713
Epoch 35/100
30/30 [=====] - 0s 299us/sample - loss: 57.5585 - mae: 6.3081 - val_lo
ss: 48.7669 - val_mae: 5.3581
Epoch 36/100
30/30 [=====] - 0s 299us/sample - loss: 55.2170 - mae: 6.1849 - val_lo
ss: 46.2292 - val_mae: 5.2847
Epoch 37/100
30/30 [=====] - 0s 266us/sample - loss: 52.9672 - mae: 6.0718 - val_lo
ss: 44.7929 - val_mae: 5.2861
Epoch 38/100
30/30 [=====] - 0s 299us/sample - loss: 50.7729 - mae: 5.9486 - val_lo
ss: 43.0117 - val_mae: 5.2692
Epoch 39/100
30/30 [=====] - 0s 266us/sample - loss: 48.8019 - mae: 5.8366 - val_lo
ss: 41.2253 - val_mae: 5.2165
Epoch 40/100
30/30 [=====] - 0s 299us/sample - loss: 46.8467 - mae: 5.7267 - val_lo
ss: 39.9865 - val_mae: 5.2116
Epoch 41/100
30/30 [=====] - 0s 267us/sample - loss: 45.1654 - mae: 5.6228 - val_lo
ss: 38.8136 - val_mae: 5.1994
Epoch 42/100
30/30 [=====] - 0s 298us/sample - loss: 43.5762 - mae: 5.5260 - val_lo
ss: 37.5854 - val_mae: 5.1784
Epoch 43/100
30/30 [=====] - 0s 233us/sample - loss: 42.0632 - mae: 5.4278 - val_lo
ss: 37.0630 - val_mae: 5.2078
Epoch 44/100
30/30 [=====] - 0s 299us/sample - loss: 40.5848 - mae: 5.3278 - val_lo
ss: 35.2324 - val_mae: 5.1197
Epoch 45/100
30/30 [=====] - 0s 266us/sample - loss: 39.2748 - mae: 5.2458 - val_lo
ss: 35.2895 - val_mae: 5.1642
Epoch 46/100
30/30 [=====] - 0s 265us/sample - loss: 37.8994 - mae: 5.1461 - val_lo
ss: 33.9158 - val_mae: 5.1227
Epoch 47/100
30/30 [=====] - 0s 265us/sample - loss: 36.6303 - mae: 5.0590 - val_lo
ss: 33.9207 - val_mae: 5.1551
Epoch 48/100
30/30 [=====] - 0s 265us/sample - loss: 35.3798 - mae: 4.9649 - val_lo
ss: 32.6120 - val_mae: 5.0960
Epoch 49/100
30/30 [=====] - 0s 266us/sample - loss: 34.2355 - mae: 4.8862 - val_lo
ss: 32.5003 - val_mae: 5.1124
Epoch 50/100
30/30 [=====] - 0s 299us/sample - loss: 33.0479 - mae: 4.8061 - val_lo
ss: 31.9154 - val_mae: 5.1097
Epoch 51/100
30/30 [=====] - 0s 266us/sample - loss: 31.9560 - mae: 4.7192 - val_lo
ss: 31.5236 - val_mae: 5.1007
Epoch 52/100
30/30 [=====] - 0s 297us/sample - loss: 30.8999 - mae: 4.6462 - val_lo
ss: 30.8403 - val_mae: 5.0674
Epoch 53/100
30/30 [=====] - 0s 298us/sample - loss: 29.9024 - mae: 4.5765 - val_lo
ss: 30.6149 - val_mae: 5.0708
Epoch 54/100
30/30 [=====] - 0s 266us/sample - loss: 28.9179 - mae: 4.5010 - val_lo
ss: 30.5052 - val_mae: 5.0888
Epoch 55/100
30/30 [=====] - 0s 332us/sample - loss: 27.9866 - mae: 4.4218 - val_lo
ss: 29.9730 - val_mae: 5.0620
Epoch 56/100
30/30 [=====] - 0s 232us/sample - loss: 27.0928 - mae: 4.3508 - val_lo
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ss: 29.6643 - val_mae: 5.0465
Epoch 57/100
30/30 [=====] - 0s 299us/sample - loss: 26.2537 - mae: 4.2885 - val_lo
ss: 29.3450 - val_mae: 5.0369
Epoch 58/100
30/30 [=====] - 0s 265us/sample - loss: 25.4302 - mae: 4.2193 - val_lo
ss: 29.5401 - val_mae: 5.0636
Epoch 59/100
30/30 [=====] - 0s 265us/sample - loss: 24.6249 - mae: 4.1451 - val_lo
ss: 29.2123 - val_mae: 5.0573
Epoch 60/100
30/30 [=====] - 0s 265us/sample - loss: 23.8372 - mae: 4.0762 - val_lo
ss: 29.0951 - val_mae: 5.0503
Epoch 61/100
30/30 [=====] - 0s 299us/sample - loss: 23.0904 - mae: 4.0227 - val_lo
ss: 28.8037 - val_mae: 5.0320
Epoch 62/100
30/30 [=====] - 0s 299us/sample - loss: 22.3686 - mae: 3.9575 - val_lo
ss: 29.1549 - val_mae: 5.0648
Epoch 63/100
30/30 [=====] - 0s 266us/sample - loss: 21.6582 - mae: 3.9008 - val_lo
ss: 28.6460 - val_mae: 5.0343
Epoch 64/100
30/30 [=====] - 0s 333us/sample - loss: 21.0010 - mae: 3.8335 - val_lo
ss: 29.2550 - val_mae: 5.0862
Epoch 65/100
30/30 [=====] - 0s 298us/sample - loss: 20.3566 - mae: 3.7865 - val_lo
ss: 28.3896 - val_mae: 5.0171
Epoch 66/100
30/30 [=====] - 0s 300us/sample - loss: 19.7586 - mae: 3.7208 - val_lo
ss: 29.1233 - val_mae: 5.0728
Epoch 67/100
30/30 [=====] - 0s 265us/sample - loss: 19.1443 - mae: 3.6771 - val_lo
ss: 28.5449 - val_mae: 5.0370
Epoch 68/100
30/30 [=====] - 0s 300us/sample - loss: 18.5619 - mae: 3.6035 - val_lo
ss: 29.2139 - val_mae: 5.0835
Epoch 69/100
30/30 [=====] - 0s 299us/sample - loss: 17.9886 - mae: 3.5608 - val_lo
ss: 28.8139 - val_mae: 5.0558
Epoch 70/100
30/30 [=====] - 0s 332us/sample - loss: 17.4492 - mae: 3.4895 - val_lo
ss: 28.8229 - val_mae: 5.0467
Epoch 71/100
30/30 [=====] - 0s 298us/sample - loss: 16.9448 - mae: 3.4541 - val_lo
ss: 29.0878 - val_mae: 5.0705
Epoch 72/100
30/30 [=====] - 0s 300us/sample - loss: 16.4414 - mae: 3.3931 - val_lo
ss: 28.9147 - val_mae: 5.0503
Epoch 73/100
30/30 [=====] - 0s 331us/sample - loss: 15.9640 - mae: 3.3390 - val_lo
ss: 29.3470 - val_mae: 5.0824
Epoch 74/100
30/30 [=====] - 0s 265us/sample - loss: 15.4977 - mae: 3.2905 - val_lo
ss: 29.0596 - val_mae: 5.0555
Epoch 75/100
30/30 [=====] - 0s 298us/sample - loss: 15.0692 - mae: 3.2428 - val_lo
ss: 29.5531 - val_mae: 5.0920
15/15 [=====] - 0s 197us/sample - loss: 17.6883 - mae: 3.3758
[CV] learning_rate=0.00030107783636342726, n_hidden=3, n_neurons=21, total= 1.2s
[CV] learning_rate=0.005153286333701512, n_hidden=1, n_neurons=22 ....
Train on 30 samples, validate on 5 samples
Epoch 1/100
30/30 [=====] - 0s 12ms/sample - loss: 4466.2134 - mae: 63.5243 - val_
loss: 3333.4243 - val_mae: 55.4120
Epoch 2/100
30/30 [=====] - 0s 267us/sample - loss: 3860.8416 - mae: 58.4734 - val
_loss: 2277.7329 - val_mae: 45.3308
Epoch 3/100
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30/30 [=====] - 0s 299us/sample - loss: 2380.0320 - mae: 44.9689 - val_
_loss: 436.0574 - val_mae: 16.5307
Epoch 4/100
30/30 [=====] - 0s 265us/sample - loss: 292.2535 - mae: 13.0283 - val_
_loss: 270.8104 - val_mae: 14.2113
Epoch 5/100
30/30 [=====] - 0s 299us/sample - loss: 104.0970 - mae: 8.1934 - val_l
oss: 198.6214 - val_mae: 10.8095
Epoch 6/100
30/30 [=====] - 0s 266us/sample - loss: 68.2221 - mae: 6.7359 - val_lo
ss: 163.9647 - val_mae: 10.2233
Epoch 7/100
30/30 [=====] - 0s 266us/sample - loss: 55.1431 - mae: 6.1874 - val_lo
ss: 123.8022 - val_mae: 8.4417
Epoch 8/100
30/30 [=====] - 0s 266us/sample - loss: 48.3964 - mae: 5.6035 - val_lo
ss: 127.2759 - val_mae: 8.8124
Epoch 9/100
30/30 [=====] - 0s 299us/sample - loss: 44.9454 - mae: 5.6465 - val_lo
ss: 80.8452 - val_mae: 7.2540
Epoch 10/100
30/30 [=====] - 0s 266us/sample - loss: 44.8239 - mae: 5.3780 - val_lo
ss: 127.5088 - val_mae: 9.1806
Epoch 11/100
30/30 [=====] - 0s 300us/sample - loss: 51.6035 - mae: 6.3944 - val_lo
ss: 53.0889 - val_mae: 6.4476
Epoch 12/100
30/30 [=====] - 0s 298us/sample - loss: 71.4218 - mae: 6.7925 - val_lo
ss: 210.4571 - val_mae: 12.6999
Epoch 13/100
30/30 [=====] - 0s 300us/sample - loss: 139.7474 - mae: 10.6924 - val_
_loss: 93.2332 - val_mae: 7.4497
Epoch 14/100
30/30 [=====] - 0s 331us/sample - loss: 251.3839 - mae: 13.6189 - val_
_loss: 647.5223 - val_mae: 22.7614
Epoch 15/100
30/30 [=====] - 0s 267us/sample - loss: 705.3343 - mae: 24.0697 - val_
_loss: 259.5223 - val_mae: 12.5373
Epoch 16/100
30/30 [=====] - 0s 298us/sample - loss: 625.3592 - mae: 21.7190 - val_
_loss: 1415.2770 - val_mae: 33.5094
Epoch 17/100
30/30 [=====] - 0s 266us/sample - loss: 1756.5470 - mae: 37.4300 - val_
_loss: 48.2141 - val_mae: 5.8466
Epoch 18/100
30/30 [=====] - 0s 299us/sample - loss: 120.3252 - mae: 9.1496 - val_l
oss: 298.5690 - val_mae: 15.2309
Epoch 19/100
30/30 [=====] - 0s 266us/sample - loss: 282.0177 - mae: 15.1874 - val_
_loss: 175.7671 - val_mae: 10.1190
Epoch 20/100
30/30 [=====] - 0s 298us/sample - loss: 411.4138 - mae: 17.5998 - val_
_loss: 946.9600 - val_mae: 27.2971
Epoch 21/100
30/30 [=====] - 0s 232us/sample - loss: 1148.3752 - mae: 30.3418 - val_
_loss: 177.2513 - val_mae: 10.4302
Epoch 22/100
30/30 [=====] - 0s 299us/sample - loss: 407.4142 - mae: 17.4911 - val_
_loss: 905.5258 - val_mae: 26.7229
Epoch 23/100
30/30 [=====] - 0s 232us/sample - loss: 1108.5823 - mae: 29.7593 - val_
_loss: 183.3964 - val_mae: 10.7330
Epoch 24/100
30/30 [=====] - 0s 266us/sample - loss: 405.1635 - mae: 17.4899 - val_
_loss: 882.9906 - val_mae: 26.3809
Epoch 25/100
30/30 [=====] - 0s 232us/sample - loss: 1091.3445 - mae: 29.4935 - val_
_loss: 181.1073 - val_mae: 10.8011
Epoch 26/100
```

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30/30 [=====] - 0s 299us/sample - loss: 392.3059 - mae: 17.2109 - val_
loss: 852.3691 - val_mae: 25.7905
Epoch 27/100
30/30 [=====] - 0s 266us/sample - loss: 1059.9182 - mae: 29.0493 - val_
_loss: 186.0392 - val_mae: 10.9723
15/15 [=====] - 0s 265us/sample - loss: 458.3200 - mae: 13.1226
[CV] learning_rate=0.005153286333701512, n_hidden=1, n_neurons=22, total= 0.8s
[CV] learning_rate=0.005153286333701512, n_hidden=1, n_neurons=22 ....
Train on 30 samples, validate on 5 samples
Epoch 1/100
30/30 [=====] - 0s 12ms/sample - loss: 4197.5591 - mae: 62.0676 - val_
loss: 3421.1875 - val_mae: 56.3041
Epoch 2/100
30/30 [=====] - 0s 300us/sample - loss: 3758.0627 - mae: 58.4941 - val_
_loss: 2680.4458 - val_mae: 49.6061
Epoch 3/100
30/30 [=====] - 0s 264us/sample - loss: 2776.7297 - mae: 50.0270 - val_
_loss: 1018.8846 - val_mae: 28.3941
Epoch 4/100
30/30 [=====] - 0s 298us/sample - loss: 826.1074 - mae: 23.7858 - val_
loss: 339.7174 - val_mae: 15.5380
Epoch 5/100
30/30 [=====] - 0s 198us/sample - loss: 466.7215 - mae: 17.3073 - val_
loss: 582.5999 - val_mae: 21.8730
Epoch 6/100
30/30 [=====] - 0s 299us/sample - loss: 534.2800 - mae: 20.1411 - val_
loss: 215.9364 - val_mae: 11.2581
Epoch 7/100
30/30 [=====] - 0s 266us/sample - loss: 426.6781 - mae: 16.0726 - val_
loss: 781.5306 - val_mae: 25.6922
Epoch 8/100
30/30 [=====] - 0s 265us/sample - loss: 886.0865 - mae: 26.5102 - val_
loss: 195.2646 - val_mae: 11.0088
Epoch 9/100
30/30 [=====] - 0s 266us/sample - loss: 311.3997 - mae: 13.8359 - val_
loss: 557.0978 - val_mae: 21.5803
Epoch 10/100
30/30 [=====] - 0s 298us/sample - loss: 642.4177 - mae: 22.5015 - val_
loss: 232.3961 - val_mae: 11.7553
Epoch 11/100
30/30 [=====] - 0s 233us/sample - loss: 330.2735 - mae: 14.2728 - val_
loss: 587.5154 - val_mae: 22.1502
Epoch 12/100
30/30 [=====] - 0s 266us/sample - loss: 700.2782 - mae: 23.4381 - val_
loss: 221.0616 - val_mae: 11.3158
Epoch 13/100
30/30 [=====] - 0s 299us/sample - loss: 299.4679 - mae: 13.9311 - val_
loss: 523.9453 - val_mae: 20.8831
Epoch 14/100
30/30 [=====] - 0s 298us/sample - loss: 625.9809 - mae: 22.1429 - val_
loss: 222.1599 - val_mae: 11.1664
Epoch 15/100
30/30 [=====] - 0s 233us/sample - loss: 294.1897 - mae: 14.0916 - val_
loss: 513.4491 - val_mae: 20.6876
Epoch 16/100
30/30 [=====] - 0s 266us/sample - loss: 616.7803 - mae: 21.9559 - val_
loss: 217.2954 - val_mae: 10.8868
Epoch 17/100
30/30 [=====] - 0s 266us/sample - loss: 282.1771 - mae: 13.9830 - val_
loss: 489.8911 - val_mae: 20.2248
Epoch 18/100
30/30 [=====] - 0s 300us/sample - loss: 589.1433 - mae: 21.4478 - val_
loss: 213.7195 - val_mae: 10.6539
15/15 [=====] - 0s 197us/sample - loss: 558.3466 - mae: 18.9456
[CV] learning_rate=0.005153286333701512, n_hidden=1, n_neurons=22, total= 0.6s
[CV] learning_rate=0.005153286333701512, n_hidden=1, n_neurons=22 ....
Train on 30 samples, validate on 5 samples
Epoch 1/100
30/30 [=====] - 0s 12ms/sample - loss: 4834.9355 - mae: 67.2028 - val_
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30/30 [=====] - 0s 12ms/sample - loss: 1004.1004 - mae: 67.1200 - val_
loss: 3498.5308 - val_mae: 56.9671
Epoch 2/100
30/30 [=====] - 0s 298us/sample - loss: 4333.1821 - mae: 63.4464 - val_
_loss: 2799.9741 - val_mae: 50.7744
Epoch 3/100
30/30 [=====] - 0s 333us/sample - loss: 3324.5625 - mae: 55.1379 - val_
_loss: 961.9982 - val_mae: 28.7893
Epoch 4/100
30/30 [=====] - 0s 265us/sample - loss: 862.4091 - mae: 25.7103 - val_
loss: 263.6360 - val_mae: 15.2770
Epoch 5/100
30/30 [=====] - 0s 266us/sample - loss: 642.6024 - mae: 20.3282 - val_
loss: 1365.4843 - val_mae: 34.4514
Epoch 6/100
30/30 [=====] - 0s 332us/sample - loss: 1489.2151 - mae: 36.6481 - val_
_loss: 211.6849 - val_mae: 12.5951
Epoch 7/100
30/30 [=====] - 0s 265us/sample - loss: 582.2136 - mae: 18.7117 - val_
loss: 1306.0107 - val_mae: 31.9300
Epoch 8/100
30/30 [=====] - 0s 266us/sample - loss: 1538.9258 - mae: 36.7839 - val_
_loss: 211.4135 - val_mae: 11.6391
Epoch 9/100
30/30 [=====] - 0s 266us/sample - loss: 467.0664 - mae: 16.9560 - val_
loss: 1056.3236 - val_mae: 29.0428
Epoch 10/100
30/30 [=====] - 0s 266us/sample - loss: 1257.9410 - mae: 33.1606 - val_
_loss: 283.1315 - val_mae: 11.6447
Epoch 11/100
30/30 [=====] - 0s 265us/sample - loss: 558.5992 - mae: 19.0600 - val_
loss: 1227.9773 - val_mae: 31.3430
Epoch 12/100
30/30 [=====] - 0s 266us/sample - loss: 1531.0804 - mae: 36.5509 - val_
_loss: 183.3501 - val_mae: 10.0473
Epoch 13/100
30/30 [=====] - 0s 267us/sample - loss: 325.2847 - mae: 14.2244 - val_
loss: 701.7433 - val_mae: 23.1155
Epoch 14/100
30/30 [=====] - 0s 299us/sample - loss: 836.1466 - mae: 26.8992 - val_
loss: 361.6242 - val_mae: 13.4186
Epoch 15/100
30/30 [=====] - 0s 299us/sample - loss: 610.9836 - mae: 20.8785 - val_
loss: 1294.6360 - val_mae: 32.3665
Epoch 16/100
30/30 [=====] - 0s 265us/sample - loss: 1656.9850 - mae: 37.8939 - val_
_loss: 128.3943 - val_mae: 8.5313
Epoch 17/100
30/30 [=====] - 0s 265us/sample - loss: 185.9692 - mae: 10.8788 - val_
loss: 382.6120 - val_mae: 16.2165
Epoch 18/100
30/30 [=====] - 0s 299us/sample - loss: 416.8423 - mae: 18.7012 - val_
loss: 322.1761 - val_mae: 12.6200
Epoch 19/100
30/30 [=====] - 0s 299us/sample - loss: 483.9279 - mae: 18.7950 - val_
loss: 1004.2394 - val_mae: 28.1943
Epoch 20/100
30/30 [=====] - 0s 266us/sample - loss: 1278.6840 - mae: 33.2708 - val_
_loss: 210.8798 - val_mae: 10.0123
Epoch 21/100
30/30 [=====] - 0s 266us/sample - loss: 322.9888 - mae: 15.1656 - val_
loss: 668.3364 - val_mae: 22.5578
Epoch 22/100
30/30 [=====] - 0s 265us/sample - loss: 819.4362 - mae: 26.5052 - val_
loss: 332.0641 - val_mae: 13.3490
Epoch 23/100
30/30 [=====] - 0s 266us/sample - loss: 487.0445 - mae: 19.1391 - val_
loss: 977.4570 - val_mae: 27.6860
Epoch 24/100
30/30 [=====] - 0s 266us/sample - loss: 1247.7516 - mae: 20.8134 - val_
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30/30 [=====] - 0s 266us/sample - loss: 1247.7516 - mae: 32.8134 - val_
_loss: 207.3591 - val_mae: 9.9502
Epoch 25/100
30/30 [=====] - 0s 266us/sample - loss: 299.2025 - mae: 14.8342 - val_
_loss: 599.6243 - val_mae: 21.1135
Epoch 26/100
30/30 [=====] - 0s 266us/sample - loss: 733.2864 - mae: 25.0419 - val_
_loss: 325.7708 - val_mae: 13.3683
15/15 [=====] - 0s 197us/sample - loss: 200.2293 - mae: 12.3310
[CV] learning_rate=0.005153286333701512, n_hidden=1, n_neurons=22, total= 0.7s
[CV] learning_rate=0.0003099230412972121, n_hidden=0, n_neurons=49 ...
Train on 30 samples, validate on 5 samples
Epoch 1/100
30/30 [=====] - 0s 10ms/sample - loss: 4380.8198 - mae: 63.2768 - val_
_loss: 3751.1421 - val_mae: 59.4884
Epoch 2/100
30/30 [=====] - 0s 265us/sample - loss: 4370.6318 - mae: 63.2388 - val_
_loss: 3745.9448 - val_mae: 59.4728
Epoch 3/100
30/30 [=====] - 0s 332us/sample - loss: 4360.5356 - mae: 63.2008 - val_
_loss: 3740.7976 - val_mae: 59.4571
Epoch 4/100
30/30 [=====] - 0s 299us/sample - loss: 4350.5293 - mae: 63.1627 - val_
_loss: 3735.6980 - val_mae: 59.4412
Epoch 5/100
30/30 [=====] - 0s 266us/sample - loss: 4340.6118 - mae: 63.1246 - val_
_loss: 3730.6470 - val_mae: 59.4252
Epoch 6/100
30/30 [=====] - 0s 266us/sample - loss: 4330.7808 - mae: 63.0865 - val_
_loss: 3725.6414 - val_mae: 59.4090
Epoch 7/100
30/30 [=====] - 0s 264us/sample - loss: 4321.0347 - mae: 63.0483 - val_
_loss: 3720.6812 - val_mae: 59.3928
Epoch 8/100
30/30 [=====] - 0s 265us/sample - loss: 4311.3726 - mae: 63.0101 - val_
_loss: 3715.7656 - val_mae: 59.3764
Epoch 9/100
30/30 [=====] - 0s 266us/sample - loss: 4301.7935 - mae: 62.9719 - val_
_loss: 3710.8933 - val_mae: 59.3599
Epoch 10/100
30/30 [=====] - 0s 266us/sample - loss: 4292.2939 - mae: 62.9336 - val_
_loss: 3706.0632 - val_mae: 59.3433
Epoch 11/100
30/30 [=====] - 0s 233us/sample - loss: 4282.8740 - mae: 62.8953 - val_
_loss: 3701.2747 - val_mae: 59.3266
Epoch 12/100
30/30 [=====] - 0s 266us/sample - loss: 4273.5322 - mae: 62.8570 - val_
_loss: 3696.5266 - val_mae: 59.3098
Epoch 13/100
30/30 [=====] - 0s 233us/sample - loss: 4264.2666 - mae: 62.8187 - val_
_loss: 3691.8176 - val_mae: 59.2928
Epoch 14/100
30/30 [=====] - 0s 265us/sample - loss: 4255.0762 - mae: 62.7803 - val_
_loss: 3687.1477 - val_mae: 59.2758
Epoch 15/100
30/30 [=====] - 0s 266us/sample - loss: 4245.9590 - mae: 62.7419 - val_
_loss: 3682.5151 - val_mae: 59.2586
Epoch 16/100
30/30 [=====] - 0s 266us/sample - loss: 4236.9150 - mae: 62.7035 - val_
_loss: 3677.9194 - val_mae: 59.2413
Epoch 17/100
30/30 [=====] - 0s 266us/sample - loss: 4227.9419 - mae: 62.6650 - val_
_loss: 3673.3601 - val_mae: 59.2239
Epoch 18/100
30/30 [=====] - 0s 266us/sample - loss: 4219.0381 - mae: 62.6266 - val_
_loss: 3668.8359 - val_mae: 59.2064
Epoch 19/100
30/30 [=====] - 0s 266us/sample - loss: 4210.2036 - mae: 62.5881 - val_
_loss: 3664.3464 - val_mae: 59.1888
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Epoch 20/100
30/30 [=====] - 0s 300us/sample - loss: 4201.4360 - mae: 62.5496 - val
_loss: 3659.8899 - val_mae: 59.1711
Epoch 21/100
30/30 [=====] - 0s 266us/sample - loss: 4192.7354 - mae: 62.5110 - val
_loss: 3655.4663 - val_mae: 59.1533
Epoch 22/100
30/30 [=====] - 0s 299us/sample - loss: 4184.0996 - mae: 62.4725 - val
_loss: 3651.0754 - val_mae: 59.1354
Epoch 23/100
30/30 [=====] - 0s 265us/sample - loss: 4175.5278 - mae: 62.4339 - val
_loss: 3646.7161 - val_mae: 59.1173
Epoch 24/100
30/30 [=====] - 0s 266us/sample - loss: 4167.0186 - mae: 62.3953 - val
_loss: 3642.3867 - val_mae: 59.0992
Epoch 25/100
30/30 [=====] - 0s 298us/sample - loss: 4158.5718 - mae: 62.3566 - val
_loss: 3638.0874 - val_mae: 59.0810
Epoch 26/100
30/30 [=====] - 0s 298us/sample - loss: 4150.1851 - mae: 62.3180 - val
_loss: 3633.8179 - val_mae: 59.0627
Epoch 27/100
30/30 [=====] - 0s 266us/sample - loss: 4141.8579 - mae: 62.2793 - val
_loss: 3629.5769 - val_mae: 59.0443
Epoch 28/100
30/30 [=====] - 0s 300us/sample - loss: 4133.5903 - mae: 62.2407 - val
_loss: 3625.3638 - val_mae: 59.0257
Epoch 29/100
30/30 [=====] - 0s 298us/sample - loss: 4125.3794 - mae: 62.2020 - val
_loss: 3621.1782 - val_mae: 59.0071
Epoch 30/100
30/30 [=====] - 0s 266us/sample - loss: 4117.2256 - mae: 62.1632 - val
_loss: 3617.0190 - val_mae: 58.9884
Epoch 31/100
30/30 [=====] - 0s 331us/sample - loss: 4109.1274 - mae: 62.1245 - val
_loss: 3612.8862 - val_mae: 58.9696
Epoch 32/100
30/30 [=====] - 0s 266us/sample - loss: 4101.0840 - mae: 62.0858 - val
_loss: 3608.7793 - val_mae: 58.9508
Epoch 33/100
30/30 [=====] - 0s 266us/sample - loss: 4093.0947 - mae: 62.0470 - val
_loss: 3604.6968 - val_mae: 58.9318
Epoch 34/100
30/30 [=====] - 0s 265us/sample - loss: 4085.1580 - mae: 62.0082 - val
_loss: 3600.6392 - val_mae: 58.9127
Epoch 35/100
30/30 [=====] - 0s 265us/sample - loss: 4077.2737 - mae: 61.9694 - val
_loss: 3596.6055 - val_mae: 58.8936
Epoch 36/100
30/30 [=====] - 0s 265us/sample - loss: 4069.4402 - mae: 61.9306 - val
_loss: 3592.5945 - val_mae: 58.8743
Epoch 37/100
30/30 [=====] - 0s 299us/sample - loss: 4061.6572 - mae: 61.8918 - val
_loss: 3588.6067 - val_mae: 58.8550
Epoch 38/100
30/30 [=====] - 0s 265us/sample - loss: 4053.9241 - mae: 61.8530 - val
_loss: 3584.6411 - val_mae: 58.8356
Epoch 39/100
30/30 [=====] - 0s 266us/sample - loss: 4046.2390 - mae: 61.8141 - val
_loss: 3580.6973 - val_mae: 58.8161
Epoch 40/100
30/30 [=====] - 0s 266us/sample - loss: 4038.6021 - mae: 61.7752 - val
_loss: 3576.7747 - val_mae: 58.7965
Epoch 41/100
30/30 [=====] - 0s 265us/sample - loss: 4031.0125 - mae: 61.7364 - val
_loss: 3572.8730 - val_mae: 58.7769
Epoch 42/100
30/30 [=====] - 0s 299us/sample - loss: 4023.4690 - mae: 61.6975 - val
_loss: 3568.9917 - val_mae: 58.7571
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Epoch 43/100
30/30 [=====] - 0s 266us/sample - loss: 4015.9709 - mae: 61.6586 - val
_loss: 3565.1301 - val_mae: 58.7373
Epoch 44/100
30/30 [=====] - 0s 299us/sample - loss: 4008.5181 - mae: 61.6197 - val
_loss: 3561.2883 - val_mae: 58.7174
Epoch 45/100
30/30 [=====] - 0s 266us/sample - loss: 4001.1091 - mae: 61.5808 - val
_loss: 3557.4653 - val_mae: 58.6974
Epoch 46/100
30/30 [=====] - 0s 265us/sample - loss: 3993.7432 - mae: 61.5418 - val
_loss: 3553.6606 - val_mae: 58.6773
Epoch 47/100
30/30 [=====] - 0s 265us/sample - loss: 3986.4209 - mae: 61.5029 - val
_loss: 3549.8743 - val_mae: 58.6572
Epoch 48/100
30/30 [=====] - 0s 301us/sample - loss: 3979.1399 - mae: 61.4640 - val
_loss: 3546.1060 - val_mae: 58.6370
Epoch 49/100
30/30 [=====] - 0s 298us/sample - loss: 3971.9001 - mae: 61.4250 - val
_loss: 3542.3542 - val_mae: 58.6167
Epoch 50/100
30/30 [=====] - 0s 300us/sample - loss: 3964.7019 - mae: 61.3860 - val
_loss: 3538.6204 - val_mae: 58.5963
Epoch 51/100
30/30 [=====] - 0s 331us/sample - loss: 3957.5432 - mae: 61.3471 - val
_loss: 3534.9023 - val_mae: 58.5759
Epoch 52/100
30/30 [=====] - 0s 233us/sample - loss: 3950.4241 - mae: 61.3081 - val
_loss: 3531.2012 - val_mae: 58.5554
Epoch 53/100
30/30 [=====] - 0s 299us/sample - loss: 3943.3440 - mae: 61.2691 - val
_loss: 3527.5151 - val_mae: 58.5348
Epoch 54/100
30/30 [=====] - 0s 232us/sample - loss: 3936.3015 - mae: 61.2301 - val
_loss: 3523.8450 - val_mae: 58.5142
Epoch 55/100
30/30 [=====] - 0s 266us/sample - loss: 3929.2976 - mae: 61.1911 - val
_loss: 3520.1902 - val_mae: 58.4935
Epoch 56/100
30/30 [=====] - 0s 299us/sample - loss: 3922.3306 - mae: 61.1521 - val
_loss: 3516.5500 - val_mae: 58.4727
Epoch 57/100
30/30 [=====] - 0s 299us/sample - loss: 3915.3994 - mae: 61.1131 - val
_loss: 3512.9243 - val_mae: 58.4518
Epoch 58/100
30/30 [=====] - 0s 299us/sample - loss: 3908.5046 - mae: 61.0741 - val
_loss: 3509.3130 - val_mae: 58.4309
Epoch 59/100
30/30 [=====] - 0s 299us/sample - loss: 3901.6450 - mae: 61.0351 - val
_loss: 3505.7153 - val_mae: 58.4099
Epoch 60/100
30/30 [=====] - 0s 267us/sample - loss: 3894.8203 - mae: 60.9961 - val
_loss: 3502.1309 - val_mae: 58.3888
Epoch 61/100
30/30 [=====] - 0s 265us/sample - loss: 3888.0303 - mae: 60.9571 - val
_loss: 3498.5601 - val_mae: 58.3677
Epoch 62/100
30/30 [=====] - 0s 266us/sample - loss: 3881.2734 - mae: 60.9180 - val
_loss: 3495.0020 - val_mae: 58.3465
Epoch 63/100
30/30 [=====] - 0s 266us/sample - loss: 3874.5505 - mae: 60.8790 - val
_loss: 3491.4565 - val_mae: 58.3253
Epoch 64/100
30/30 [=====] - 0s 298us/sample - loss: 3867.8604 - mae: 60.8400 - val
_loss: 3487.9233 - val_mae: 58.3040
Epoch 65/100
30/30 [=====] - 0s 266us/sample - loss: 3861.2026 - mae: 60.8010 - val
_loss: 3484.4031 - val_mae: 58.2826
```

```
Epoch 66/100
30/30 [=====] - 0s 265us/sample - loss: 3854.5767 - mae: 60.7619 - val
_loss: 3480.8940 - val_mae: 58.2612
Epoch 67/100
30/30 [=====] - 0s 232us/sample - loss: 3847.9817 - mae: 60.7229 - val
_loss: 3477.3965 - val_mae: 58.2397
Epoch 68/100
30/30 [=====] - 0s 298us/sample - loss: 3841.4182 - mae: 60.6839 - val
_loss: 3473.9106 - val_mae: 58.2181
Epoch 69/100
30/30 [=====] - 0s 231us/sample - loss: 3834.8850 - mae: 60.6448 - val
_loss: 3470.4360 - val_mae: 58.1965
Epoch 70/100
30/30 [=====] - 0s 266us/sample - loss: 3828.3816 - mae: 60.6058 - val
_loss: 3466.9719 - val_mae: 58.1748
Epoch 71/100
30/30 [=====] - 0s 265us/sample - loss: 3821.9084 - mae: 60.5667 - val
_loss: 3463.5183 - val_mae: 58.1531
Epoch 72/100
30/30 [=====] - 0s 265us/sample - loss: 3815.4639 - mae: 60.5277 - val
_loss: 3460.0754 - val_mae: 58.1313
Epoch 73/100
30/30 [=====] - 0s 266us/sample - loss: 3809.0491 - mae: 60.4887 - val
_loss: 3456.6426 - val_mae: 58.1094
Epoch 74/100
30/30 [=====] - 0s 299us/sample - loss: 3802.6614 - mae: 60.4496 - val
_loss: 3453.2200 - val_mae: 58.0875
Epoch 75/100
30/30 [=====] - 0s 266us/sample - loss: 3796.3025 - mae: 60.4106 - val
_loss: 3449.8066 - val_mae: 58.0656
Epoch 76/100
30/30 [=====] - 0s 299us/sample - loss: 3789.9714 - mae: 60.3716 - val
_loss: 3446.4031 - val_mae: 58.0436
Epoch 77/100
30/30 [=====] - 0s 333us/sample - loss: 3783.6670 - mae: 60.3325 - val
_loss: 3443.0085 - val_mae: 58.0215
Epoch 78/100
30/30 [=====] - 0s 265us/sample - loss: 3777.3899 - mae: 60.2935 - val
_loss: 3439.6235 - val_mae: 57.9994
Epoch 79/100
30/30 [=====] - 0s 298us/sample - loss: 3771.1392 - mae: 60.2545 - val
_loss: 3436.2476 - val_mae: 57.9772
Epoch 80/100
30/30 [=====] - 0s 265us/sample - loss: 3764.9143 - mae: 60.2155 - val
_loss: 3432.8801 - val_mae: 57.9550
Epoch 81/100
30/30 [=====] - 0s 266us/sample - loss: 3758.7156 - mae: 60.1764 - val
_loss: 3429.5210 - val_mae: 57.9328
Epoch 82/100
30/30 [=====] - 0s 265us/sample - loss: 3752.5422 - mae: 60.1374 - val
_loss: 3426.1704 - val_mae: 57.9104
Epoch 83/100
30/30 [=====] - 0s 266us/sample - loss: 3746.3938 - mae: 60.0984 - val
_loss: 3422.8281 - val_mae: 57.8881
Epoch 84/100
30/30 [=====] - 0s 232us/sample - loss: 3740.2703 - mae: 60.0594 - val
_loss: 3419.4937 - val_mae: 57.8656
Epoch 85/100
30/30 [=====] - 0s 300us/sample - loss: 3734.1714 - mae: 60.0204 - val
_loss: 3416.1675 - val_mae: 57.8432
Epoch 86/100
30/30 [=====] - 0s 265us/sample - loss: 3728.0962 - mae: 59.9814 - val
_loss: 3412.8489 - val_mae: 57.8207
Epoch 87/100
30/30 [=====] - 0s 299us/sample - loss: 3722.0452 - mae: 59.9424 - val
_loss: 3409.5378 - val_mae: 57.7981
Epoch 88/100
30/30 [=====] - 0s 265us/sample - loss: 3716.0178 - mae: 59.9034 - val
_loss: 3406.2339 - val_mae: 57.7755
```

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Epoch 89/100
30/30 [=====] - 0s 300us/sample - loss: 3710.0132 - mae: 59.8644 - val
_loss: 3402.9375 - val_mae: 57.7528
Epoch 90/100
30/30 [=====] - 0s 298us/sample - loss: 3704.0317 - mae: 59.8254 - val
_loss: 3399.6484 - val_mae: 57.7301
Epoch 91/100
30/30 [=====] - 0s 232us/sample - loss: 3698.0730 - mae: 59.7864 - val
_loss: 3396.3657 - val_mae: 57.7074
Epoch 92/100
30/30 [=====] - 0s 298us/sample - loss: 3692.1362 - mae: 59.7475 - val
_loss: 3393.0903 - val_mae: 57.6846
Epoch 93/100
30/30 [=====] - 0s 232us/sample - loss: 3686.2217 - mae: 59.7085 - val
_loss: 3389.8210 - val_mae: 57.6618
Epoch 94/100
30/30 [=====] - 0s 298us/sample - loss: 3680.3289 - mae: 59.6696 - val
_loss: 3386.5591 - val_mae: 57.6389
Epoch 95/100
30/30 [=====] - 0s 231us/sample - loss: 3674.4578 - mae: 59.6306 - val
_loss: 3383.3032 - val_mae: 57.6160
Epoch 96/100
30/30 [=====] - 0s 299us/sample - loss: 3668.6079 - mae: 59.5917 - val
_loss: 3380.0535 - val_mae: 57.5930
Epoch 97/100
30/30 [=====] - 0s 266us/sample - loss: 3662.7788 - mae: 59.5527 - val
_loss: 3376.8101 - val_mae: 57.5700
Epoch 98/100
30/30 [=====] - 0s 265us/sample - loss: 3656.9702 - mae: 59.5138 - val
_loss: 3373.5728 - val_mae: 57.5470
Epoch 99/100
30/30 [=====] - 0s 266us/sample - loss: 3651.1829 - mae: 59.4749 - val
_loss: 3370.3413 - val_mae: 57.5239
Epoch 100/100
30/30 [=====] - 0s 264us/sample - loss: 3645.4153 - mae: 59.4360 - val
_loss: 3367.1157 - val_mae: 57.5008
15/15 [=====] - 0s 197us/sample - loss: 3748.8999 - mae: 60.4937
[CV] learning_rate=0.0003099230412972121, n_hidden=0, n_neurons=49, total= 1.3s
[CV] learning_rate=0.0003099230412972121, n_hidden=0, n_neurons=49 ...
Train on 30 samples, validate on 5 samples
Epoch 1/100
30/30 [=====] - 0s 11ms/sample - loss: 4147.5352 - mae: 61.8560 - val_
loss: 3694.1831 - val_mae: 58.8859
Epoch 2/100
30/30 [=====] - 0s 299us/sample - loss: 4140.1450 - mae: 61.8217 - val
_loss: 3688.9712 - val_mae: 58.8605
Epoch 3/100
30/30 [=====] - 0s 299us/sample - loss: 4132.8018 - mae: 61.7873 - val
_loss: 3683.7883 - val_mae: 58.8350
Epoch 4/100
30/30 [=====] - 0s 265us/sample - loss: 4125.5044 - mae: 61.7529 - val
_loss: 3678.6360 - val_mae: 58.8095
Epoch 5/100
30/30 [=====] - 0s 266us/sample - loss: 4118.2524 - mae: 61.7184 - val
_loss: 3673.5129 - val_mae: 58.7839
Epoch 6/100
30/30 [=====] - 0s 264us/sample - loss: 4111.0444 - mae: 61.6839 - val
_loss: 3668.4180 - val_mae: 58.7583
Epoch 7/100
30/30 [=====] - 0s 266us/sample - loss: 4103.8799 - mae: 61.6494 - val
_loss: 3663.3511 - val_mae: 58.7325
Epoch 8/100
30/30 [=====] - 0s 300us/sample - loss: 4096.7583 - mae: 61.6148 - val
_loss: 3658.3118 - val_mae: 58.7067
Epoch 9/100
30/30 [=====] - 0s 265us/sample - loss: 4089.6785 - mae: 61.5802 - val
_loss: 3653.2996 - val_mae: 58.6809
Epoch 10/100
30/30 [=====] - 0s 299us/sample - loss: 4082.6399 - mae: 61.5455 - val
```

```
_loss: 3648.3140 - val_mae: 58.6549
Epoch 11/100
30/30 [=====] - 0s 265us/sample - loss: 4075.6423 - mae: 61.5108 - val
_loss: 3643.3540 - val_mae: 58.6289
Epoch 12/100
30/30 [=====] - 0s 265us/sample - loss: 4068.6843 - mae: 61.4760 - val
_loss: 3638.4194 - val_mae: 58.6029
Epoch 13/100
30/30 [=====] - 0s 265us/sample - loss: 4061.7659 - mae: 61.4412 - val
_loss: 3633.5098 - val_mae: 58.5768
Epoch 14/100
30/30 [=====] - 0s 299us/sample - loss: 4054.8855 - mae: 61.4063 - val
_loss: 3628.6245 - val_mae: 58.5506
Epoch 15/100
30/30 [=====] - 0s 267us/sample - loss: 4048.0432 - mae: 61.3714 - val
_loss: 3623.7637 - val_mae: 58.5244
Epoch 16/100
30/30 [=====] - 0s 265us/sample - loss: 4041.2383 - mae: 61.3365 - val
_loss: 3618.9265 - val_mae: 58.4980
Epoch 17/100
30/30 [=====] - 0s 232us/sample - loss: 4034.4695 - mae: 61.3015 - val
_loss: 3614.1125 - val_mae: 58.4717
Epoch 18/100
30/30 [=====] - 0s 265us/sample - loss: 4027.7373 - mae: 61.2665 - val
_loss: 3609.3210 - val_mae: 58.4453
Epoch 19/100
30/30 [=====] - 0s 265us/sample - loss: 4021.0400 - mae: 61.2315 - val
_loss: 3604.5522 - val_mae: 58.4188
Epoch 20/100
30/30 [=====] - 0s 267us/sample - loss: 4014.3777 - mae: 61.1964 - val
_loss: 3599.8052 - val_mae: 58.3923
Epoch 21/100
30/30 [=====] - 0s 298us/sample - loss: 4007.7498 - mae: 61.1613 - val
_loss: 3595.0796 - val_mae: 58.3657
Epoch 22/100
30/30 [=====] - 0s 265us/sample - loss: 4001.1555 - mae: 61.1261 - val
_loss: 3590.3755 - val_mae: 58.3390
Epoch 23/100
30/30 [=====] - 0s 299us/sample - loss: 3994.5942 - mae: 61.0909 - val
_loss: 3585.6919 - val_mae: 58.3124
Epoch 24/100
30/30 [=====] - 0s 265us/sample - loss: 3988.0654 - mae: 61.0557 - val
_loss: 3581.0286 - val_mae: 58.2856
Epoch 25/100
30/30 [=====] - 0s 266us/sample - loss: 3981.5688 - mae: 61.0205 - val
_loss: 3576.3855 - val_mae: 58.2588
Epoch 26/100
30/30 [=====] - 0s 264us/sample - loss: 3975.1038 - mae: 60.9852 - val
_loss: 3571.7622 - val_mae: 58.2319
Epoch 27/100
30/30 [=====] - 0s 299us/sample - loss: 3968.6694 - mae: 60.9498 - val
_loss: 3567.1582 - val_mae: 58.2050
Epoch 28/100
30/30 [=====] - 0s 266us/sample - loss: 3962.2656 - mae: 60.9145 - val
_loss: 3562.5730 - val_mae: 58.1781
Epoch 29/100
30/30 [=====] - 0s 300us/sample - loss: 3955.8918 - mae: 60.8791 - val
_loss: 3558.0066 - val_mae: 58.1511
Epoch 30/100
30/30 [=====] - 0s 298us/sample - loss: 3949.5479 - mae: 60.8437 - val
_loss: 3553.4583 - val_mae: 58.1240
Epoch 31/100
30/30 [=====] - 0s 266us/sample - loss: 3943.2329 - mae: 60.8082 - val
_loss: 3548.9282 - val_mae: 58.0969
Epoch 32/100
30/30 [=====] - 0s 265us/sample - loss: 3936.9463 - mae: 60.7728 - val
_loss: 3544.4160 - val_mae: 58.0698
Epoch 33/100
30/30 [=====] - 0s 266us/sample - loss: 3930.6885 - mae: 60.7373 - val
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30/30 [=====] - 0s 260us/sample - loss: 3530.6883 - mae: 60.7373 - val
_loss: 3539.9211 - val_mae: 58.0426
Epoch 34/100
30/30 [=====] - 0s 267us/sample - loss: 3924.4578 - mae: 60.7017 - val
_loss: 3535.4434 - val_mae: 58.0153
Epoch 35/100
30/30 [=====] - 0s 233us/sample - loss: 3918.2546 - mae: 60.6662 - val
_loss: 3530.9819 - val_mae: 57.9880
Epoch 36/100
30/30 [=====] - 0s 265us/sample - loss: 3912.0781 - mae: 60.6306 - val
_loss: 3526.5371 - val_mae: 57.9607
Epoch 37/100
30/30 [=====] - 0s 266us/sample - loss: 3905.9285 - mae: 60.5950 - val
_loss: 3522.1094 - val_mae: 57.9333
Epoch 38/100
30/30 [=====] - 0s 334us/sample - loss: 3899.8047 - mae: 60.5593 - val
_loss: 3517.6968 - val_mae: 57.9059
Epoch 39/100
30/30 [=====] - 0s 265us/sample - loss: 3893.7063 - mae: 60.5237 - val
_loss: 3513.3000 - val_mae: 57.8784
Epoch 40/100
30/30 [=====] - 0s 334us/sample - loss: 3887.6331 - mae: 60.4880 - val
_loss: 3508.9192 - val_mae: 57.8509
Epoch 41/100
30/30 [=====] - 0s 265us/sample - loss: 3881.5850 - mae: 60.4523 - val
_loss: 3504.5532 - val_mae: 57.8234
Epoch 42/100
30/30 [=====] - 0s 299us/sample - loss: 3875.5618 - mae: 60.4165 - val
_loss: 3500.2017 - val_mae: 57.7958
Epoch 43/100
30/30 [=====] - 0s 265us/sample - loss: 3869.5627 - mae: 60.3808 - val
_loss: 3495.8657 - val_mae: 57.7682
Epoch 44/100
30/30 [=====] - 0s 266us/sample - loss: 3863.5869 - mae: 60.3450 - val
_loss: 3491.5437 - val_mae: 57.7405
Epoch 45/100
30/30 [=====] - 0s 266us/sample - loss: 3857.6350 - mae: 60.3092 - val
_loss: 3487.2356 - val_mae: 57.7128
Epoch 46/100
30/30 [=====] - 0s 298us/sample - loss: 3851.7063 - mae: 60.2734 - val
_loss: 3482.9419 - val_mae: 57.6850
Epoch 47/100
30/30 [=====] - 0s 266us/sample - loss: 3845.8000 - mae: 60.2375 - val
_loss: 3478.6616 - val_mae: 57.6573
Epoch 48/100
30/30 [=====] - 0s 300us/sample - loss: 3839.9158 - mae: 60.2017 - val
_loss: 3474.3958 - val_mae: 57.6294
Epoch 49/100
30/30 [=====] - 0s 298us/sample - loss: 3834.0544 - mae: 60.1658 - val
_loss: 3470.1421 - val_mae: 57.6016
Epoch 50/100
30/30 [=====] - 0s 265us/sample - loss: 3828.2148 - mae: 60.1299 - val
_loss: 3465.9023 - val_mae: 57.5737
Epoch 51/100
30/30 [=====] - 0s 299us/sample - loss: 3822.3962 - mae: 60.0940 - val
_loss: 3461.6753 - val_mae: 57.5457
Epoch 52/100
30/30 [=====] - 0s 298us/sample - loss: 3816.5991 - mae: 60.0580 - val
_loss: 3457.4609 - val_mae: 57.5178
Epoch 53/100
30/30 [=====] - 0s 300us/sample - loss: 3810.8232 - mae: 60.0221 - val
_loss: 3453.2590 - val_mae: 57.4898
Epoch 54/100
30/30 [=====] - 0s 298us/sample - loss: 3805.0674 - mae: 59.9861 - val
_loss: 3449.0696 - val_mae: 57.4617
Epoch 55/100
30/30 [=====] - 0s 299us/sample - loss: 3799.3323 - mae: 59.9501 - val
_loss: 3444.8921 - val_mae: 57.4337
Epoch 56/100
30/30 [=====] - 0s 265us/sample - loss: 3793.6168 - mae: 59.9144 - val
_loss: 3440.7244 - val_mae: 57.4057
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30/30 [=====] - 0s 265us/sample - loss: 3793.6169 - mae: 59.9141 - val
_loss: 3440.7266 - val_mae: 57.4056
Epoch 57/100
30/30 [=====] - 0s 266us/sample - loss: 3787.9216 - mae: 59.8781 - val
_loss: 3436.5730 - val_mae: 57.3774
Epoch 58/100
30/30 [=====] - 0s 266us/sample - loss: 3782.2458 - mae: 59.8420 - val
_loss: 3432.4309 - val_mae: 57.3493
Epoch 59/100
30/30 [=====] - 0s 265us/sample - loss: 3776.5891 - mae: 59.8060 - val
_loss: 3428.3003 - val_mae: 57.3211
Epoch 60/100
30/30 [=====] - 0s 265us/sample - loss: 3770.9514 - mae: 59.7699 - val
_loss: 3424.1809 - val_mae: 57.2928
Epoch 61/100
30/30 [=====] - 0s 266us/sample - loss: 3765.3323 - mae: 59.7338 - val
_loss: 3420.0728 - val_mae: 57.2646
Epoch 62/100
30/30 [=====] - 0s 266us/sample - loss: 3759.7322 - mae: 59.6977 - val
_loss: 3415.9751 - val_mae: 57.2363
Epoch 63/100
30/30 [=====] - 0s 265us/sample - loss: 3754.1499 - mae: 59.6616 - val
_loss: 3411.8892 - val_mae: 57.2079
Epoch 64/100
30/30 [=====] - 0s 266us/sample - loss: 3748.5862 - mae: 59.6255 - val
_loss: 3407.8130 - val_mae: 57.1796
Epoch 65/100
30/30 [=====] - 0s 233us/sample - loss: 3743.0396 - mae: 59.5894 - val
_loss: 3403.7473 - val_mae: 57.1512
Epoch 66/100
30/30 [=====] - 0s 267us/sample - loss: 3737.5110 - mae: 59.5532 - val
_loss: 3399.6919 - val_mae: 57.1228
Epoch 67/100
30/30 [=====] - 0s 265us/sample - loss: 3731.9998 - mae: 59.5171 - val
_loss: 3395.6470 - val_mae: 57.0944
Epoch 68/100
30/30 [=====] - 0s 266us/sample - loss: 3726.5051 - mae: 59.4809 - val
_loss: 3391.6118 - val_mae: 57.0659
Epoch 69/100
30/30 [=====] - 0s 232us/sample - loss: 3721.0278 - mae: 59.4447 - val
_loss: 3387.5872 - val_mae: 57.0374
Epoch 70/100
30/30 [=====] - 0s 265us/sample - loss: 3715.5671 - mae: 59.4085 - val
_loss: 3383.5718 - val_mae: 57.0089
Epoch 71/100
30/30 [=====] - 0s 233us/sample - loss: 3710.1228 - mae: 59.3723 - val
_loss: 3379.5657 - val_mae: 56.9804
Epoch 72/100
30/30 [=====] - 0s 267us/sample - loss: 3704.6951 - mae: 59.3361 - val
_loss: 3375.5696 - val_mae: 56.9518
Epoch 73/100
30/30 [=====] - 0s 398us/sample - loss: 3699.2834 - mae: 59.2999 - val
_loss: 3371.5828 - val_mae: 56.9232
Epoch 74/100
30/30 [=====] - 0s 300us/sample - loss: 3693.8875 - mae: 59.2637 - val
_loss: 3367.6047 - val_mae: 56.8946
Epoch 75/100
30/30 [=====] - 0s 332us/sample - loss: 3688.5073 - mae: 59.2274 - val
_loss: 3363.6367 - val_mae: 56.8660
Epoch 76/100
30/30 [=====] - 0s 266us/sample - loss: 3683.1428 - mae: 59.1912 - val
_loss: 3359.6770 - val_mae: 56.8373
Epoch 77/100
30/30 [=====] - 0s 266us/sample - loss: 3677.7935 - mae: 59.1549 - val
_loss: 3355.7266 - val_mae: 56.8086
Epoch 78/100
30/30 [=====] - 0s 265us/sample - loss: 3672.4595 - mae: 59.1186 - val
_loss: 3351.7847 - val_mae: 56.7799
Epoch 79/100
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30/30 [=====] - 0s 266us/sample - loss: 3667.1406 - mae: 59.0824 - val
_loss: 3347.8516 - val_mae: 56.7512
Epoch 80/100
30/30 [=====] - 0s 267us/sample - loss: 3661.8362 - mae: 59.0461 - val
_loss: 3343.9272 - val_mae: 56.7224
Epoch 81/100
30/30 [=====] - 0s 265us/sample - loss: 3656.5466 - mae: 59.0098 - val
_loss: 3340.0110 - val_mae: 56.6937
Epoch 82/100
30/30 [=====] - 0s 233us/sample - loss: 3651.2717 - mae: 58.9735 - val
_loss: 3336.1030 - val_mae: 56.6649
Epoch 83/100
30/30 [=====] - 0s 299us/sample - loss: 3646.0110 - mae: 58.9372 - val
_loss: 3332.2039 - val_mae: 56.6361
Epoch 84/100
30/30 [=====] - 0s 266us/sample - loss: 3640.7644 - mae: 58.9009 - val
_loss: 3328.3125 - val_mae: 56.6072
Epoch 85/100
30/30 [=====] - 0s 298us/sample - loss: 3635.5320 - mae: 58.8646 - val
_loss: 3324.4290 - val_mae: 56.5784
Epoch 86/100
30/30 [=====] - 0s 299us/sample - loss: 3630.3132 - mae: 58.8283 - val
_loss: 3320.5540 - val_mae: 56.5495
Epoch 87/100
30/30 [=====] - 0s 266us/sample - loss: 3625.1082 - mae: 58.7920 - val
_loss: 3316.6860 - val_mae: 56.5206
Epoch 88/100
30/30 [=====] - 0s 266us/sample - loss: 3619.9167 - mae: 58.7557 - val
_loss: 3312.8267 - val_mae: 56.4917
Epoch 89/100
30/30 [=====] - 0s 266us/sample - loss: 3614.7390 - mae: 58.7194 - val
_loss: 3308.9751 - val_mae: 56.4628
Epoch 90/100
30/30 [=====] - 0s 299us/sample - loss: 3609.5745 - mae: 58.6831 - val
_loss: 3305.1304 - val_mae: 56.4338
Epoch 91/100
30/30 [=====] - 0s 266us/sample - loss: 3604.4231 - mae: 58.6467 - val
_loss: 3301.2935 - val_mae: 56.4048
Epoch 92/100
30/30 [=====] - 0s 299us/sample - loss: 3599.2849 - mae: 58.6104 - val
_loss: 3297.4641 - val_mae: 56.3759
Epoch 93/100
30/30 [=====] - 0s 264us/sample - loss: 3594.1597 - mae: 58.5741 - val
_loss: 3293.6418 - val_mae: 56.3469
Epoch 94/100
30/30 [=====] - 0s 333us/sample - loss: 3589.0469 - mae: 58.5377 - val
_loss: 3289.8269 - val_mae: 56.3178
Epoch 95/100
30/30 [=====] - 0s 265us/sample - loss: 3583.9468 - mae: 58.5014 - val
_loss: 3286.0190 - val_mae: 56.2888
Epoch 96/100
30/30 [=====] - 0s 265us/sample - loss: 3578.8591 - mae: 58.4651 - val
_loss: 3282.2188 - val_mae: 56.2598
Epoch 97/100
30/30 [=====] - 0s 265us/sample - loss: 3573.7842 - mae: 58.4287 - val
_loss: 3278.4253 - val_mae: 56.2307
Epoch 98/100
30/30 [=====] - 0s 300us/sample - loss: 3568.7212 - mae: 58.3924 - val
_loss: 3274.6384 - val_mae: 56.2016
Epoch 99/100
30/30 [=====] - 0s 264us/sample - loss: 3563.6702 - mae: 58.3561 - val
_loss: 3270.8589 - val_mae: 56.1725
Epoch 100/100
30/30 [=====] - 0s 267us/sample - loss: 3558.6318 - mae: 58.3197 - val
_loss: 3267.0862 - val_mae: 56.1434
15/15 [=====] - 0s 133us/sample - loss: 4235.4878 - mae: 63.4337
[CV] learning_rate=0.0003099230412972121, n_hidden=0, n_neurons=49, total= 1.3s
[CV] learning_rate=0.0003099230412972121, n_hidden=0, n_neurons=49 ...
Train on 30 samples, validate on 5 samples
```

```
Epoch 1/100
30/30 [=====] - 0s 10ms/sample - loss: 4680.9771 - mae: 66.3186 - val_
_loss: 3720.0742 - val_mae: 59.1102
Epoch 2/100
30/30 [=====] - 0s 298us/sample - loss: 4665.8647 - mae: 66.2401 - val
_loss: 3712.9102 - val_mae: 59.0927
Epoch 3/100
30/30 [=====] - 0s 299us/sample - loss: 4650.8950 - mae: 66.1619 - val
_loss: 3705.8406 - val_mae: 59.0752
Epoch 4/100
30/30 [=====] - 0s 265us/sample - loss: 4636.0659 - mae: 66.0840 - val
_loss: 3698.8657 - val_mae: 59.0576
Epoch 5/100
30/30 [=====] - 0s 299us/sample - loss: 4621.3760 - mae: 66.0063 - val
_loss: 3691.9824 - val_mae: 59.0399
Epoch 6/100
30/30 [=====] - 0s 267us/sample - loss: 4606.8232 - mae: 65.9290 - val
_loss: 3685.1895 - val_mae: 59.0221
Epoch 7/100
30/30 [=====] - 0s 266us/sample - loss: 4592.4058 - mae: 65.8519 - val
_loss: 3678.4858 - val_mae: 59.0042
Epoch 8/100
30/30 [=====] - 0s 266us/sample - loss: 4578.1216 - mae: 65.7752 - val
_loss: 3671.8691 - val_mae: 58.9862
Epoch 9/100
30/30 [=====] - 0s 266us/sample - loss: 4563.9683 - mae: 65.6987 - val
_loss: 3665.3374 - val_mae: 58.9681
Epoch 10/100
30/30 [=====] - 0s 266us/sample - loss: 4549.9453 - mae: 65.6225 - val
_loss: 3658.8901 - val_mae: 58.9499
Epoch 11/100
30/30 [=====] - 0s 266us/sample - loss: 4536.0503 - mae: 65.5466 - val
_loss: 3652.5259 - val_mae: 58.9316
Epoch 12/100
30/30 [=====] - 0s 266us/sample - loss: 4522.2822 - mae: 65.4710 - val
_loss: 3646.2417 - val_mae: 58.9133
Epoch 13/100
30/30 [=====] - 0s 266us/sample - loss: 4508.6382 - mae: 65.3956 - val
_loss: 3640.0378 - val_mae: 58.8948
Epoch 14/100
30/30 [=====] - 0s 266us/sample - loss: 4495.1167 - mae: 65.3206 - val
_loss: 3633.9109 - val_mae: 58.8763
Epoch 15/100
30/30 [=====] - 0s 267us/sample - loss: 4481.7168 - mae: 65.2458 - val
_loss: 3627.8613 - val_mae: 58.8576
Epoch 16/100
30/30 [=====] - 0s 300us/sample - loss: 4468.4360 - mae: 65.1713 - val
_loss: 3621.8867 - val_mae: 58.8389
Epoch 17/100
30/30 [=====] - 0s 298us/sample - loss: 4455.2739 - mae: 65.0970 - val
_loss: 3615.9858 - val_mae: 58.8201
Epoch 18/100
30/30 [=====] - 0s 333us/sample - loss: 4442.2280 - mae: 65.0231 - val
_loss: 3610.1575 - val_mae: 58.8012
Epoch 19/100
30/30 [=====] - 0s 265us/sample - loss: 4429.2969 - mae: 64.9494 - val
_loss: 3604.3999 - val_mae: 58.7822
Epoch 20/100
30/30 [=====] - 0s 266us/sample - loss: 4416.4790 - mae: 64.8759 - val
_loss: 3598.7122 - val_mae: 58.7632
Epoch 21/100
30/30 [=====] - 0s 298us/sample - loss: 4403.7729 - mae: 64.8027 - val
_loss: 3593.0930 - val_mae: 58.7440
Epoch 22/100
30/30 [=====] - 0s 233us/sample - loss: 4391.1772 - mae: 64.7299 - val
_loss: 3587.5410 - val_mae: 58.7248
Epoch 23/100
30/30 [=====] - 0s 265us/sample - loss: 4378.6899 - mae: 64.6572 - val
_loss: 3582.0542 - val_mae: 58.7055
```

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Epoch 24/100
30/30 [=====] - 0s 233us/sample - loss: 4366.3110 - mae: 64.5848 - val
_loss: 3576.6328 - val_mae: 58.6860
Epoch 25/100
30/30 [=====] - 0s 298us/sample - loss: 4354.0371 - mae: 64.5127 - val
_loss: 3571.2749 - val_mae: 58.6666
Epoch 26/100
30/30 [=====] - 0s 266us/sample - loss: 4341.8682 - mae: 64.4408 - val
_loss: 3565.9790 - val_mae: 58.6470
Epoch 27/100
30/30 [=====] - 0s 298us/sample - loss: 4329.8027 - mae: 64.3692 - val
_loss: 3560.7437 - val_mae: 58.6274
Epoch 28/100
30/30 [=====] - 0s 265us/sample - loss: 4317.8384 - mae: 64.2978 - val
_loss: 3555.5688 - val_mae: 58.6076
Epoch 29/100
30/30 [=====] - 0s 300us/sample - loss: 4305.9751 - mae: 64.2267 - val
_loss: 3550.4526 - val_mae: 58.5878
Epoch 30/100
30/30 [=====] - 0s 265us/sample - loss: 4294.2100 - mae: 64.1559 - val
_loss: 3545.3940 - val_mae: 58.5680
Epoch 31/100
30/30 [=====] - 0s 299us/sample - loss: 4282.5430 - mae: 64.0853 - val
_loss: 3540.3918 - val_mae: 58.5480
Epoch 32/100
30/30 [=====] - 0s 298us/sample - loss: 4270.9727 - mae: 64.0149 - val
_loss: 3535.4458 - val_mae: 58.5280
Epoch 33/100
30/30 [=====] - 0s 299us/sample - loss: 4259.4976 - mae: 63.9448 - val
_loss: 3530.5532 - val_mae: 58.5079
Epoch 34/100
30/30 [=====] - 0s 265us/sample - loss: 4248.1167 - mae: 63.8749 - val
_loss: 3525.7144 - val_mae: 58.4877
Epoch 35/100
30/30 [=====] - 0s 266us/sample - loss: 4236.8276 - mae: 63.8053 - val
_loss: 3520.9282 - val_mae: 58.4674
Epoch 36/100
30/30 [=====] - 0s 298us/sample - loss: 4225.6309 - mae: 63.7359 - val
_loss: 3516.1926 - val_mae: 58.4471
Epoch 37/100
30/30 [=====] - 0s 267us/sample - loss: 4214.5244 - mae: 63.6667 - val
_loss: 3511.5078 - val_mae: 58.4267
Epoch 38/100
30/30 [=====] - 0s 332us/sample - loss: 4203.5063 - mae: 63.5978 - val
_loss: 3506.8730 - val_mae: 58.4062
Epoch 39/100
30/30 [=====] - 0s 233us/sample - loss: 4192.5767 - mae: 63.5291 - val
_loss: 3502.2859 - val_mae: 58.3856
Epoch 40/100
30/30 [=====] - 0s 299us/sample - loss: 4181.7334 - mae: 63.4606 - val
_loss: 3497.7461 - val_mae: 58.3650
Epoch 41/100
30/30 [=====] - 0s 266us/sample - loss: 4170.9766 - mae: 63.3924 - val
_loss: 3493.2532 - val_mae: 58.3443
Epoch 42/100
30/30 [=====] - 0s 300us/sample - loss: 4160.3037 - mae: 63.3244 - val
_loss: 3488.8059 - val_mae: 58.3235
Epoch 43/100
30/30 [=====] - 0s 298us/sample - loss: 4149.7148 - mae: 63.2567 - val
_loss: 3484.4031 - val_mae: 58.3027
Epoch 44/100
30/30 [=====] - 0s 266us/sample - loss: 4139.2075 - mae: 63.1892 - val
_loss: 3480.0442 - val_mae: 58.2818
Epoch 45/100
30/30 [=====] - 0s 265us/sample - loss: 4128.7817 - mae: 63.1219 - val
_loss: 3475.7290 - val_mae: 58.2608
Epoch 46/100
30/30 [=====] - 0s 300us/sample - loss: 4118.4355 - mae: 63.0548 - val
_loss: 3471.4546 - val_mae: 58.2398
```

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Epoch 47/100
30/30 [=====] - 0s 265us/sample - loss: 4108.1694 - mae: 62.9879 - val
_loss: 3467.2222 - val_mae: 58.2187
Epoch 48/100
30/30 [=====] - 0s 266us/sample - loss: 4097.9810 - mae: 62.9213 - val
_loss: 3463.0305 - val_mae: 58.1975
Epoch 49/100
30/30 [=====] - 0s 299us/sample - loss: 4087.8696 - mae: 62.8549 - val
_loss: 3458.8782 - val_mae: 58.1763
Epoch 50/100
30/30 [=====] - 0s 298us/sample - loss: 4077.8345 - mae: 62.7887 - val
_loss: 3454.7651 - val_mae: 58.1550
Epoch 51/100
30/30 [=====] - 0s 301us/sample - loss: 4067.8745 - mae: 62.7227 - val
_loss: 3450.6895 - val_mae: 58.1336
Epoch 52/100
30/30 [=====] - 0s 265us/sample - loss: 4057.9885 - mae: 62.6570 - val
_loss: 3446.6519 - val_mae: 58.1122
Epoch 53/100
30/30 [=====] - 0s 265us/sample - loss: 4048.1758 - mae: 62.5914 - val
_loss: 3442.6504 - val_mae: 58.0906
Epoch 54/100
30/30 [=====] - 0s 266us/sample - loss: 4038.4351 - mae: 62.5261 - val
_loss: 3438.6851 - val_mae: 58.0691
Epoch 55/100
30/30 [=====] - 0s 266us/sample - loss: 4028.7661 - mae: 62.4610 - val
_loss: 3434.7546 - val_mae: 58.0475
Epoch 56/100
30/30 [=====] - 0s 266us/sample - loss: 4019.1675 - mae: 62.3961 - val
_loss: 3430.8586 - val_mae: 58.0258
Epoch 57/100
30/30 [=====] - 0s 298us/sample - loss: 4009.6384 - mae: 62.3314 - val
_loss: 3426.9966 - val_mae: 58.0040
Epoch 58/100
30/30 [=====] - 0s 298us/sample - loss: 4000.1782 - mae: 62.2669 - val
_loss: 3423.1667 - val_mae: 57.9822
Epoch 59/100
30/30 [=====] - 0s 266us/sample - loss: 3990.7852 - mae: 62.2026 - val
_loss: 3419.3699 - val_mae: 57.9604
Epoch 60/100
30/30 [=====] - 0s 299us/sample - loss: 3981.4592 - mae: 62.1386 - val
_loss: 3415.6047 - val_mae: 57.9384
Epoch 61/100
30/30 [=====] - 0s 299us/sample - loss: 3972.1992 - mae: 62.0747 - val
_loss: 3411.8711 - val_mae: 57.9164
Epoch 62/100
30/30 [=====] - 0s 265us/sample - loss: 3963.0044 - mae: 62.0110 - val
_loss: 3408.1667 - val_mae: 57.8944
Epoch 63/100
30/30 [=====] - 0s 266us/sample - loss: 3953.8745 - mae: 61.9476 - val
_loss: 3404.4929 - val_mae: 57.8723
Epoch 64/100
30/30 [=====] - 0s 299us/sample - loss: 3944.8076 - mae: 61.8843 - val
_loss: 3400.8477 - val_mae: 57.8501
Epoch 65/100
30/30 [=====] - 0s 265us/sample - loss: 3935.8035 - mae: 61.8212 - val
_loss: 3397.2312 - val_mae: 57.8279
Epoch 66/100
30/30 [=====] - 0s 300us/sample - loss: 3926.8616 - mae: 61.7584 - val
_loss: 3393.6431 - val_mae: 57.8056
Epoch 67/100
30/30 [=====] - 0s 298us/sample - loss: 3917.9805 - mae: 61.6957 - val
_loss: 3390.0813 - val_mae: 57.7833
Epoch 68/100
30/30 [=====] - 0s 266us/sample - loss: 3909.1599 - mae: 61.6332 - val
_loss: 3386.5476 - val_mae: 57.7609
Epoch 69/100
30/30 [=====] - 0s 299us/sample - loss: 3900.3989 - mae: 61.5710 - val
_loss: 3383.0391 - val_mae: 57.7385
```

```
_loss: 3363.0331 - val_mae: 57.7363
Epoch 70/100
30/30 [=====] - 0s 266us/sample - loss: 3891.6968 - mae: 61.5089 - val
_loss: 3379.5566 - val_mae: 57.7160
Epoch 71/100
30/30 [=====] - 0s 266us/sample - loss: 3883.0530 - mae: 61.4470 - val
_loss: 3376.0989 - val_mae: 57.6934
Epoch 72/100
30/30 [=====] - 0s 233us/sample - loss: 3874.4666 - mae: 61.3853 - val
_loss: 3372.6660 - val_mae: 57.6708
Epoch 73/100
30/30 [=====] - 0s 300us/sample - loss: 3865.9370 - mae: 61.3238 - val
_loss: 3369.2571 - val_mae: 57.6481
Epoch 74/100
30/30 [=====] - 0s 299us/sample - loss: 3857.4634 - mae: 61.2624 - val
_loss: 3365.8718 - val_mae: 57.6254
Epoch 75/100
30/30 [=====] - 0s 300us/sample - loss: 3849.0447 - mae: 61.2013 - val
_loss: 3362.5090 - val_mae: 57.6027
Epoch 76/100
30/30 [=====] - 0s 266us/sample - loss: 3840.6807 - mae: 61.1403 - val
_loss: 3359.1694 - val_mae: 57.5798
Epoch 77/100
30/30 [=====] - 0s 266us/sample - loss: 3832.3708 - mae: 61.0796 - val
_loss: 3355.8516 - val_mae: 57.5570
Epoch 78/100
30/30 [=====] - 0s 266us/sample - loss: 3824.1145 - mae: 61.0190 - val
_loss: 3352.5552 - val_mae: 57.5341
Epoch 79/100
30/30 [=====] - 0s 266us/sample - loss: 3815.9099 - mae: 60.9586 - val
_loss: 3349.2798 - val_mae: 57.5111
Epoch 80/100
30/30 [=====] - 0s 334us/sample - loss: 3807.7581 - mae: 60.8984 - val
_loss: 3346.0247 - val_mae: 57.4881
Epoch 81/100
30/30 [=====] - 0s 265us/sample - loss: 3799.6572 - mae: 60.8383 - val
_loss: 3342.7898 - val_mae: 57.4650
Epoch 82/100
30/30 [=====] - 0s 298us/sample - loss: 3791.6072 - mae: 60.7785 - val
_loss: 3339.5754 - val_mae: 57.4419
Epoch 83/100
30/30 [=====] - 0s 266us/sample - loss: 3783.6072 - mae: 60.7188 - val
_loss: 3336.3796 - val_mae: 57.4187
Epoch 84/100
30/30 [=====] - 0s 299us/sample - loss: 3775.6565 - mae: 60.6593 - val
_loss: 3333.2026 - val_mae: 57.3955
Epoch 85/100
30/30 [=====] - 0s 233us/sample - loss: 3767.7546 - mae: 60.6000 - val
_loss: 3330.0442 - val_mae: 57.3723
Epoch 86/100
30/30 [=====] - 0s 299us/sample - loss: 3759.9016 - mae: 60.5408 - val
_loss: 3326.9036 - val_mae: 57.3490
Epoch 87/100
30/30 [=====] - 0s 266us/sample - loss: 3752.0959 - mae: 60.4818 - val
_loss: 3323.7805 - val_mae: 57.3256
Epoch 88/100
30/30 [=====] - 0s 298us/sample - loss: 3744.3367 - mae: 60.4230 - val
_loss: 3320.6746 - val_mae: 57.3022
Epoch 89/100
30/30 [=====] - 0s 299us/sample - loss: 3736.6250 - mae: 60.3644 - val
_loss: 3317.5859 - val_mae: 57.2788
Epoch 90/100
30/30 [=====] - 0s 266us/sample - loss: 3728.9583 - mae: 60.3059 - val
_loss: 3314.5129 - val_mae: 57.2553
Epoch 91/100
30/30 [=====] - 0s 266us/sample - loss: 3721.3376 - mae: 60.2476 - val
_loss: 3311.4565 - val_mae: 57.2318
Epoch 92/100
30/30 [=====] - 0s 233us/sample - loss: 3713.7615 - mae: 60.1895 - val
_loss: 3308.4153 - val_mae: 57.2083
```

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_loss: 3308.4153 - val_mae: 57.2082
Epoch 93/100
30/30 [=====] - 0s 331us/sample - loss: 3706.2300 - mae: 60.1315 - val
_loss: 3305.3894 - val_mae: 57.1846
Epoch 94/100
30/30 [=====] - 0s 267us/sample - loss: 3698.7419 - mae: 60.0737 - val
_loss: 3302.3789 - val_mae: 57.1609
Epoch 95/100
30/30 [=====] - 0s 332us/sample - loss: 3691.2971 - mae: 60.0161 - val
_loss: 3299.3828 - val_mae: 57.1372
Epoch 96/100
30/30 [=====] - 0s 265us/sample - loss: 3683.8955 - mae: 59.9586 - val
_loss: 3296.4004 - val_mae: 57.1134
Epoch 97/100
30/30 [=====] - 0s 300us/sample - loss: 3676.5354 - mae: 59.9013 - val
_loss: 3293.4324 - val_mae: 57.0896
Epoch 98/100
30/30 [=====] - 0s 265us/sample - loss: 3669.2175 - mae: 59.8441 - val
_loss: 3290.4780 - val_mae: 57.0658
Epoch 99/100
30/30 [=====] - 0s 266us/sample - loss: 3661.9407 - mae: 59.7871 - val
_loss: 3287.5364 - val_mae: 57.0419
Epoch 100/100
30/30 [=====] - 0s 299us/sample - loss: 3654.7043 - mae: 59.7303 - val
_loss: 3284.6079 - val_mae: 57.0180
15/15 [=====] - 0s 263us/sample - loss: 3629.3982 - mae: 59.7949
[CV] learning_rate=0.0003099230412972121, n_hidden=0, n_neurons=49, total= 1.5s
[CV] learning_rate=0.0033625641252688094, n_hidden=2, n_neurons=42 ...
Train on 30 samples, validate on 5 samples
Epoch 1/100
30/30 [=====] - 0s 12ms/sample - loss: 4434.4902 - mae: 63.2237 - val_
loss: 3397.7280 - val_mae: 55.4130
Epoch 2/100
30/30 [=====] - 0s 264us/sample - loss: 3985.4111 - mae: 58.8603 - val
_loss: 2352.0791 - val_mae: 43.7641
Epoch 3/100
30/30 [=====] - 0s 266us/sample - loss: 2517.4258 - mae: 45.1649 - val
_loss: 2173.9558 - val_mae: 38.3820
Epoch 4/100
30/30 [=====] - 0s 267us/sample - loss: 7069.0874 - mae: 72.6155 - val
_loss: 3700.7039 - val_mae: 58.8003
Epoch 5/100
30/30 [=====] - 0s 265us/sample - loss: 4392.5620 - mae: 63.0338 - val
_loss: 3630.8628 - val_mae: 58.0910
Epoch 6/100
30/30 [=====] - 0s 266us/sample - loss: 4306.3643 - mae: 62.2088 - val
_loss: 3573.0249 - val_mae: 57.5994
Epoch 7/100
30/30 [=====] - 0s 265us/sample - loss: 4243.9019 - mae: 61.7159 - val
_loss: 3508.5649 - val_mae: 57.0521
Epoch 8/100
30/30 [=====] - 0s 267us/sample - loss: 4173.9575 - mae: 61.1668 - val
_loss: 3425.8835 - val_mae: 56.3540
Epoch 9/100
30/30 [=====] - 0s 298us/sample - loss: 4085.3384 - mae: 60.4783 - val
_loss: 3303.4343 - val_mae: 55.3259
Epoch 10/100
30/30 [=====] - 0s 300us/sample - loss: 3946.4717 - mae: 59.4156 - val
_loss: 3041.7119 - val_mae: 53.1179
Epoch 11/100
30/30 [=====] - 0s 331us/sample - loss: 3634.2556 - mae: 57.0102 - val
_loss: 2139.0591 - val_mae: 44.5724
Epoch 12/100
30/30 [=====] - 0s 266us/sample - loss: 2447.4917 - mae: 46.6671 - val
_loss: 2223.8665 - val_mae: 38.3235
Epoch 13/100
30/30 [=====] - 0s 299us/sample - loss: 4756.5967 - mae: 58.3530 - val
_loss: 4167.1377 - val_mae: 61.7878
Epoch 14/100
```

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30/30 [=====] - 0s 265us/sample - loss: 4896.8340 - mae: 65.8568 - val
_loss: 3310.2280 - val_mae: 55.2564
Epoch 15/100
30/30 [=====] - 0s 265us/sample - loss: 3963.5872 - mae: 59.3783 - val
_loss: 3266.1680 - val_mae: 54.8565
Epoch 16/100
30/30 [=====] - 0s 265us/sample - loss: 3913.4951 - mae: 58.9596 - val
_loss: 3222.7195 - val_mae: 54.4592
Epoch 17/100
30/30 [=====] - 0s 265us/sample - loss: 3866.0222 - mae: 58.5576 - val
_loss: 3179.7949 - val_mae: 54.0640
Epoch 18/100
30/30 [=====] - 0s 265us/sample - loss: 3819.5142 - mae: 58.1602 - val
_loss: 3137.3257 - val_mae: 53.6703
Epoch 19/100
30/30 [=====] - 0s 266us/sample - loss: 3773.2307 - mae: 57.7629 - val
_loss: 3095.0833 - val_mae: 53.2764
Epoch 20/100
30/30 [=====] - 0s 265us/sample - loss: 3726.5715 - mae: 57.3615 - val
_loss: 3052.3687 - val_mae: 52.8766
Epoch 21/100
30/30 [=====] - 0s 300us/sample - loss: 3678.3020 - mae: 56.9476 - val
_loss: 3007.9795 - val_mae: 52.4605
15/15 [=====] - 0s 202us/sample - loss: 3602.8789 - mae: 58.0147
[CV] learning_rate=0.0033625641252688094, n_hidden=2, n_neurons=42, total= 0.7s
[CV] learning_rate=0.0033625641252688094, n_hidden=2, n_neurons=42 ...
Train on 30 samples, validate on 5 samples
Epoch 1/100
30/30 [=====] - 0s 13ms/sample - loss: 4153.1221 - mae: 61.5883 - val_
loss: 3386.0884 - val_mae: 55.7007
Epoch 2/100
30/30 [=====] - 0s 232us/sample - loss: 3712.2073 - mae: 57.7581 - val
_loss: 2261.0825 - val_mae: 44.2452
Epoch 3/100
30/30 [=====] - 0s 232us/sample - loss: 2241.9214 - mae: 43.3322 - val
_loss: 2490.2271 - val_mae: 43.0112
Epoch 4/100
30/30 [=====] - 0s 267us/sample - loss: 6153.0054 - mae: 69.2810 - val
_loss: 3713.7144 - val_mae: 58.9477
Epoch 5/100
30/30 [=====] - 0s 264us/sample - loss: 4142.2476 - mae: 61.7069 - val
_loss: 3633.5220 - val_mae: 58.1124
Epoch 6/100
30/30 [=====] - 0s 266us/sample - loss: 4037.9717 - mae: 60.6853 - val
_loss: 3577.5051 - val_mae: 57.6358
Epoch 7/100
30/30 [=====] - 0s 264us/sample - loss: 3980.2156 - mae: 60.2145 - val
_loss: 3515.5300 - val_mae: 57.1090
Epoch 8/100
30/30 [=====] - 0s 232us/sample - loss: 3916.8806 - mae: 59.7000 - val
_loss: 3438.2583 - val_mae: 56.4579
Epoch 9/100
30/30 [=====] - 0s 264us/sample - loss: 3836.2539 - mae: 59.0527 - val
_loss: 3318.5735 - val_mae: 55.4600
Epoch 10/100
30/30 [=====] - 0s 232us/sample - loss: 3704.1555 - mae: 58.0077 - val
_loss: 3036.8445 - val_mae: 53.0850
Epoch 11/100
30/30 [=====] - 0s 266us/sample - loss: 3373.4119 - mae: 55.3528 - val
_loss: 1947.3113 - val_mae: 42.1499
Epoch 12/100
30/30 [=====] - 0s 233us/sample - loss: 2022.1091 - mae: 41.9724 - val
_loss: 4136.4194 - val_mae: 52.1787
Epoch 13/100
30/30 [=====] - 0s 264us/sample - loss: 7675.4019 - mae: 75.7961 - val
_loss: 3793.4624 - val_mae: 59.0673
Epoch 14/100
30/30 [=====] - 0s 299us/sample - loss: 4237.7012 - mae: 61.8499 - val
_loss: 3318.6296 - val_mae: 55.3433
```

```
Epoch 15/100
30/30 [=====] - 0s 265us/sample - loss: 3715.3315 - mae: 57.9752 - val
_loss: 3264.9602 - val_mae: 54.8675
Epoch 16/100
30/30 [=====] - 0s 265us/sample - loss: 3656.0100 - mae: 57.4644 - val
_loss: 3205.3296 - val_mae: 54.3402
Epoch 17/100
30/30 [=====] - 0s 298us/sample - loss: 3596.3228 - mae: 56.9578 - val
_loss: 3134.7754 - val_mae: 53.7197
Epoch 18/100
30/30 [=====] - 0s 232us/sample - loss: 3525.5898 - mae: 56.3639 - val
_loss: 3034.2820 - val_mae: 52.8467
Epoch 19/100
30/30 [=====] - 0s 298us/sample - loss: 3376.1028 - mae: 55.2258 - val
_loss: 4202.4385 - val_mae: 63.3159
Epoch 20/100
30/30 [=====] - 0s 265us/sample - loss: 5108.9365 - mae: 68.0109 - val
_loss: 4601.8320 - val_mae: 64.1694
Epoch 21/100
30/30 [=====] - 0s 299us/sample - loss: 5255.5420 - mae: 67.9907 - val
_loss: 3234.1099 - val_mae: 54.2171
15/15 [=====] - 0s 199us/sample - loss: 4703.7266 - mae: 65.2411
[CV] learning_rate=0.0033625641252688094, n_hidden=2, n_neurons=42, total= 0.7s
[CV] learning_rate=0.0033625641252688094, n_hidden=2, n_neurons=42 ...
Train on 30 samples, validate on 5 samples
Epoch 1/100
30/30 [=====] - 0s 13ms/sample - loss: 4630.8882 - mae: 65.7514 - val_
loss: 3286.6392 - val_mae: 54.9194
Epoch 2/100
30/30 [=====] - 0s 299us/sample - loss: 3939.0344 - mae: 60.4096 - val
_loss: 939.9453 - val_mae: 28.1830
Epoch 3/100
30/30 [=====] - 0s 266us/sample - loss: 612.6474 - mae: 21.9652 - val_
loss: 11118.0635 - val_mae: 90.8125
Epoch 4/100
30/30 [=====] - 0s 299us/sample - loss: 26249.4160 - mae: 144.8662 - v
al_loss: 3767.2708 - val_mae: 59.2481
Epoch 5/100
30/30 [=====] - 0s 265us/sample - loss: 4718.6562 - mae: 66.3851 - val
_loss: 3707.5261 - val_mae: 58.7427
Epoch 6/100
30/30 [=====] - 0s 266us/sample - loss: 4648.9653 - mae: 65.8579 - val
_loss: 3650.2856 - val_mae: 58.2561
Epoch 7/100
30/30 [=====] - 0s 232us/sample - loss: 4581.0811 - mae: 65.3453 - val
_loss: 3590.8364 - val_mae: 57.7502
Epoch 8/100
30/30 [=====] - 0s 266us/sample - loss: 4507.8965 - mae: 64.7939 - val
_loss: 3520.3997 - val_mae: 57.1519
Epoch 9/100
30/30 [=====] - 0s 264us/sample - loss: 4420.0938 - mae: 64.1353 - val
_loss: 3426.6426 - val_mae: 56.3583
Epoch 10/100
30/30 [=====] - 0s 267us/sample - loss: 4298.3950 - mae: 63.2261 - val
_loss: 3273.0300 - val_mae: 55.0472
Epoch 11/100
30/30 [=====] - 0s 298us/sample - loss: 4081.9875 - mae: 61.5749 - val
_loss: 2922.4692 - val_mae: 51.9244
Epoch 12/100
30/30 [=====] - 0s 266us/sample - loss: 3564.7625 - mae: 57.3313 - val
_loss: 1823.0729 - val_mae: 39.0535
15/15 [=====] - 0s 199us/sample - loss: 1643.6841 - mae: 37.2347
[CV] learning_rate=0.0033625641252688094, n_hidden=2, n_neurons=42, total= 0.6s
Train on 45 samples, validate on 5 samples
Epoch 1/100
[=====]
```

[Parallel(n_jobs=1)]: Done 30 out of 30 | elapsed: 35.6s finished

C:\Users\hyhan\Anaconda3\envs\tf2\lib\site-packages\sklearn\model_selection\search.py:813: De


```
DeprecationWarning: The default of the `iid` parameter will change from True to False in version 0.22 and will be removed in 0.24. This will change numeric results when test-set sizes are unequal.
```

```
DeprecationWarning)
```

```
45/45 [=====] - 1s 12ms/sample - loss: 4462.0637 - mae: 63.9419 - val_
loss: 3714.9812 - val_mae: 58.8050
Epoch 2/100
45/45 [=====] - 0s 243us/sample - loss: 4369.6602 - mae: 63.2097 - val_
loss: 3654.0320 - val_mae: 58.2797
Epoch 3/100
45/45 [=====] - 0s 222us/sample - loss: 4260.1790 - mae: 62.3362 - val_
loss: 3554.1987 - val_mae: 57.4260
Epoch 4/100
45/45 [=====] - 0s 221us/sample - loss: 4083.6792 - mae: 60.9237 - val_
loss: 3355.9214 - val_mae: 55.7286
Epoch 5/100
45/45 [=====] - 0s 221us/sample - loss: 3739.3339 - mae: 58.0884 - val_
loss: 2890.5696 - val_mae: 51.5517
Epoch 6/100
45/45 [=====] - 0s 244us/sample - loss: 2942.8971 - mae: 50.8108 - val_
loss: 1734.3743 - val_mae: 38.8951
Epoch 7/100
45/45 [=====] - 0s 222us/sample - loss: 1384.2396 - mae: 32.0563 - val_
loss: 621.8524 - val_mae: 19.7001
Epoch 8/100
45/45 [=====] - 0s 244us/sample - loss: 613.6746 - mae: 19.6124 - val_
loss: 291.0771 - val_mae: 13.6322
Epoch 9/100
45/45 [=====] - 0s 244us/sample - loss: 319.6223 - mae: 13.4683 - val_
loss: 235.5140 - val_mae: 10.4248
Epoch 10/100
45/45 [=====] - 0s 222us/sample - loss: 142.3343 - mae: 9.6221 - val_l
oss: 296.7529 - val_mae: 13.4929
Epoch 11/100
45/45 [=====] - 0s 266us/sample - loss: 172.9084 - mae: 10.7402 - val_
loss: 284.8156 - val_mae: 13.3563
Epoch 12/100
45/45 [=====] - 0s 267us/sample - loss: 137.9186 - mae: 9.5331 - val_l
oss: 167.3778 - val_mae: 8.4673
Epoch 13/100
45/45 [=====] - 0s 221us/sample - loss: 104.3532 - mae: 8.2760 - val_l
oss: 146.9146 - val_mae: 8.4440
Epoch 14/100
45/45 [=====] - 0s 244us/sample - loss: 102.2820 - mae: 8.3090 - val_l
oss: 99.6295 - val_mae: 8.9770
Epoch 15/100
45/45 [=====] - 0s 244us/sample - loss: 129.3519 - mae: 8.5870 - val_l
oss: 108.0585 - val_mae: 8.0717
Epoch 16/100
45/45 [=====] - 0s 221us/sample - loss: 85.9543 - mae: 7.4209 - val_lo
ss: 126.4704 - val_mae: 7.8237
Epoch 17/100
45/45 [=====] - 0s 244us/sample - loss: 80.3424 - mae: 7.2738 - val_lo
ss: 102.7198 - val_mae: 8.6572
Epoch 18/100
45/45 [=====] - 0s 266us/sample - loss: 85.4511 - mae: 7.0472 - val_lo
ss: 100.7141 - val_mae: 8.1565
Epoch 19/100
45/45 [=====] - 0s 221us/sample - loss: 71.0385 - mae: 6.4114 - val_lo
ss: 125.6072 - val_mae: 8.6324
Epoch 20/100
45/45 [=====] - 0s 244us/sample - loss: 73.3283 - mae: 7.3628 - val_lo
ss: 70.4201 - val_mae: 6.9302
Epoch 21/100
45/45 [=====] - 0s 244us/sample - loss: 67.7437 - mae: 6.2428 - val_lo
ss: 70.3937 - val_mae: 7.5626
```

```
Epoch 22/100
45/45 [=====] - 0s 221us/sample - loss: 67.9712 - mae: 6.1615 - val_loss: 65.1530 - val_mae: 6.9100
Epoch 23/100
45/45 [=====] - 0s 222us/sample - loss: 58.9151 - mae: 5.5139 - val_loss: 78.2807 - val_mae: 6.6329
Epoch 24/100
45/45 [=====] - 0s 265us/sample - loss: 59.1729 - mae: 6.4276 - val_loss: 56.7823 - val_mae: 6.8861
Epoch 25/100
45/45 [=====] - 0s 243us/sample - loss: 61.2418 - mae: 5.8864 - val_loss: 63.1371 - val_mae: 6.6557
Epoch 26/100
45/45 [=====] - 0s 222us/sample - loss: 50.4837 - mae: 5.3590 - val_loss: 60.0263 - val_mae: 6.4413
Epoch 27/100
45/45 [=====] - 0s 222us/sample - loss: 47.5291 - mae: 5.0277 - val_loss: 69.8880 - val_mae: 6.4263
Epoch 28/100
45/45 [=====] - 0s 243us/sample - loss: 54.2441 - mae: 6.0196 - val_loss: 66.8383 - val_mae: 6.2671
Epoch 29/100
45/45 [=====] - 0s 199us/sample - loss: 46.3552 - mae: 5.5536 - val_loss: 57.0957 - val_mae: 6.8428
Epoch 30/100
45/45 [=====] - 0s 244us/sample - loss: 59.8023 - mae: 5.6807 - val_loss: 57.2234 - val_mae: 6.7167
Epoch 31/100
45/45 [=====] - 0s 244us/sample - loss: 51.7574 - mae: 5.3960 - val_loss: 49.0114 - val_mae: 6.1009
Epoch 32/100
45/45 [=====] - 0s 221us/sample - loss: 39.9680 - mae: 4.4989 - val_loss: 53.9180 - val_mae: 5.6420
Epoch 33/100
45/45 [=====] - 0s 221us/sample - loss: 46.3711 - mae: 5.4959 - val_loss: 57.4182 - val_mae: 5.9432
Epoch 34/100
45/45 [=====] - 0s 221us/sample - loss: 48.7136 - mae: 5.4899 - val_loss: 68.2945 - val_mae: 6.5868
Epoch 35/100
45/45 [=====] - 0s 222us/sample - loss: 39.5559 - mae: 4.8936 - val_loss: 55.8614 - val_mae: 6.1180
Epoch 36/100
45/45 [=====] - 0s 222us/sample - loss: 33.9391 - mae: 4.3190 - val_loss: 51.4806 - val_mae: 5.6912
Epoch 37/100
45/45 [=====] - 0s 221us/sample - loss: 31.9212 - mae: 4.2422 - val_loss: 43.1307 - val_mae: 5.7466
Epoch 38/100
45/45 [=====] - 0s 244us/sample - loss: 32.1384 - mae: 4.0268 - val_loss: 45.8089 - val_mae: 6.1034
Epoch 39/100
45/45 [=====] - 0s 244us/sample - loss: 38.4582 - mae: 4.6903 - val_loss: 40.4372 - val_mae: 5.5000
Epoch 40/100
45/45 [=====] - 0s 243us/sample - loss: 32.5512 - mae: 4.2094 - val_loss: 37.9380 - val_mae: 5.4180
Epoch 41/100
45/45 [=====] - 0s 221us/sample - loss: 29.0693 - mae: 3.7363 - val_loss: 55.6178 - val_mae: 6.2338
Epoch 42/100
45/45 [=====] - 0s 243us/sample - loss: 34.3701 - mae: 4.6802 - val_loss: 41.0152 - val_mae: 5.2406
Epoch 43/100
45/45 [=====] - 0s 243us/sample - loss: 24.7655 - mae: 3.8005 - val_loss: 39.0743 - val_mae: 5.3826
Epoch 44/100
45/45 [=====] - 0s 243us/sample - loss: 25.6611 - mae: 3.6006 - val_loss: 35.9007 - val_mae: 5.1936
```

```

Epoch 45/100
45/45 [=====] - 0s 243us/sample - loss: 25.3793 - mae: 3.9357 - val_loss: 37.0293 - val_mae: 4.9592
Epoch 46/100
45/45 [=====] - 0s 266us/sample - loss: 22.7193 - mae: 3.6138 - val_loss: 36.3180 - val_mae: 5.0431
Epoch 47/100
45/45 [=====] - 0s 243us/sample - loss: 22.7063 - mae: 3.3675 - val_loss: 44.2083 - val_mae: 5.4392
Epoch 48/100
45/45 [=====] - 0s 244us/sample - loss: 38.3412 - mae: 5.0739 - val_loss: 33.9865 - val_mae: 4.7041
Epoch 49/100
45/45 [=====] - 0s 244us/sample - loss: 23.9510 - mae: 3.7800 - val_loss: 24.6675 - val_mae: 3.9810
Epoch 50/100
45/45 [=====] - 0s 266us/sample - loss: 21.4614 - mae: 3.4949 - val_loss: 29.7496 - val_mae: 4.3213
Epoch 51/100
45/45 [=====] - 0s 266us/sample - loss: 19.2588 - mae: 3.2086 - val_loss: 27.3338 - val_mae: 4.4607
Epoch 52/100
45/45 [=====] - 0s 244us/sample - loss: 25.2700 - mae: 4.0940 - val_loss: 32.5056 - val_mae: 5.0888
Epoch 53/100
45/45 [=====] - 0s 221us/sample - loss: 23.8851 - mae: 4.1170 - val_loss: 33.7018 - val_mae: 4.8143
Epoch 54/100
45/45 [=====] - 0s 221us/sample - loss: 18.7079 - mae: 3.1753 - val_loss: 30.4546 - val_mae: 4.8601
Epoch 55/100
45/45 [=====] - 0s 244us/sample - loss: 23.7324 - mae: 4.0200 - val_loss: 24.9805 - val_mae: 3.9304
Epoch 56/100
45/45 [=====] - 0s 222us/sample - loss: 18.4813 - mae: 3.1936 - val_loss: 26.7013 - val_mae: 3.9619
Epoch 57/100
45/45 [=====] - 0s 222us/sample - loss: 15.4317 - mae: 2.9809 - val_loss: 29.0738 - val_mae: 4.4822
Epoch 58/100
45/45 [=====] - 0s 244us/sample - loss: 15.8674 - mae: 3.0501 - val_loss: 27.4694 - val_mae: 4.0119
Epoch 59/100
45/45 [=====] - 0s 243us/sample - loss: 13.9241 - mae: 2.7850 - val_loss: 25.6909 - val_mae: 4.1711

```

```

RandomizedSearchCV(cv=3, error_score='raise-deprecating',
                    estimator=<tensorflow.python.keras.wrappers.scikit_learn.KerasRegressor object at 0x000001E2401FCBA8>,
                    iid='warn', n_iter=10, n_jobs=None,
                    param_distributions={'learning_rate': <scipy.stats._distn_infrastructure.rv_frozen object at 0x000001E2407CA898>,
                                         'n_hidden': [0, 1, 2, 3],
                                         'n_neurons': array([ 1, 2, 3, 4, 5, 6, 7...
18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34,
35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51,
52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68,
69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85,
86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99])},
                    pre_dispatch='2*n_jobs', random_state=None, refit=True,
                    return_train_score=False, scoring=None, verbose=2)

```

In [22]:

```
rnd_search_cv.best_params_ # best parameter 탐색
```

```
 {'learning_rate': 0.00030107783636342726, 'n_hidden': 3, 'n_neurons': 21}
```

```
In [23]:
```

```
rnd_search_cv.best_score_
```

```
-113.09233792622884
```

```
In [24]:
```

```
rnd_search_cv.best_estimator_
```

```
<tensorflow.python.keras.wrappers.scikit_learn.KerasRegressor at 0x1e244997fd0>
```

```
In [25]:
```

```
rnd_search_cv.score(X_test, y_test)
```

```
5/5 [=====] - 0s 594us/sample - loss: 25.6909 - mae: 4.1711
```

```
-25.6909236907959
```

```
In [26]:
```

```
model = rnd_search_cv.best_estimator_.model  
model
```

```
<tensorflow.python.keras.engine.sequential.Sequential at 0x1e244904a90>
```

```
In [27]:
```

```
model.evaluate(X_test, y_test)
```

```
5/5 [=====] - 0s 606us/sample - loss: 25.6909 - mae: 4.1711
```

```
[25.6909236907959, 4.1710863]
```