

MW2

_WEEK_Xarxa_walkForward_multivariate2-tempmin_4

December 21, 2019

1 Xarxa neuronal

```
In [1]: import pandas as pd
import numpy as np
from pandas import datetime
from matplotlib import pyplot as plt

import keras
from keras.models import Sequential
from keras.layers import Dense
from keras.layers import LSTM

from keras.optimizers import SGD
from sklearn.model_selection import StratifiedKFold
from scipy.stats import uniform as sp_rand
from scipy.stats import randint
from time import time
from sklearn import preprocessing

import math
from sklearn.metrics import mean_squared_error
```

Using TensorFlow backend.

1.1 Consum setmanal total multivariate one-step

```
In [2]: daily=pd.read_csv('C:/Users/Laura/Desktop/Smart meters London/workspace R/Dades netes/1
daily.head(5)
```

```
Out[2]:
```

	date	apparentTemperatureMax	apparentTemperatureMin	sunsetTimeHour	\
0	2014-02-08	5.67	2.19	17	
1	2013-12-24	11.93	2.68	15	
2	2012-11-01	11.46	0.85	16	
3	2014-02-05	5.86	1.03	16	
4	2012-04-17	10.01	2.76	19	

	weekday	season	cloudCover	humidity	visibility	month	dewPoint	\
0	6	winter	0.47	0.77	11.20	2	3.99	
1	2	winter	0.40	0.81	10.86	12	5.42	
2	4	autumn	0.44	0.85	12.54	11	5.06	
3	3	winter	0.73	0.77	10.91	2	4.06	
4	2	spring	0.60	0.87	11.86	4	5.74	

	pressure	energy_sum
0	979.25	11.569300
1	979.52	11.981672
2	979.63	10.781689
3	982.20	11.415105
4	982.22	10.617443

```
In [3]: #Ens quedem amb date i energy_sum, ordenem valors per data i resetejem index
daily_dia=daily[['date','energy_sum','apparentTemperatureMax','apparentTemperatureMin']
daily_dia=daily_dia[['date','energy_sum','apparentTemperatureMax','apparentTemperatureMin']]
daily_dia.head(20)
```

```
Out[3]:
```

	date	energy_sum	apparentTemperatureMax	apparentTemperatureMin	\
0	2011-11-23	6.952692	10.36	2.18	
1	2011-11-24	8.536480	12.93	7.01	
2	2011-11-25	9.499781	13.03	4.84	
3	2011-11-26	10.267707	12.96	4.69	
4	2011-11-27	10.850805	13.54	2.94	
5	2011-11-28	9.103382	12.58	1.31	
6	2011-11-29	9.274873	13.47	3.39	
7	2011-11-30	8.813513	11.87	3.34	
8	2011-12-01	9.227707	12.15	5.29	
9	2011-12-02	10.145910	5.33	0.46	
10	2011-12-03	10.780273	11.42	4.71	
11	2011-12-04	12.163127	6.66	1.03	
12	2011-12-05	10.609714	3.13	-1.69	
13	2011-12-06	11.673417	3.77	-1.61	
14	2011-12-07	10.889362	5.14	0.94	
15	2011-12-08	11.525150	12.89	0.63	
16	2011-12-09	11.759837	3.99	-1.42	
17	2011-12-10	12.633801	3.14	-3.42	
18	2011-12-11	13.749174	5.72	0.11	
19	2011-12-12	11.951958	5.94	-0.64	

	humidity
0	0.93
1	0.89
2	0.79
3	0.81
4	0.72

```

5      0.86
6      0.82
7      0.78
8      0.82
9      0.87
10     0.79
11     0.82
12     0.77
13     0.83
14     0.68
15     0.81
16     0.71
17     0.81
18     0.88
19     0.84

```

```

In [4]: #Passez data a datetime
        daily_dia["date"] = pd.to_datetime(daily["date"], format='%Y-%m-%d')

```

```

In [5]: import datetime
        daily_dia['week']=0
        daily_dia['year']=0
        for i in range(len(daily_dia)):

            daily_dia['week'][i]= daily_dia['date'][i].strftime('%W')
            daily_dia['year'][i]= daily_dia['date'][i].strftime('%Y')
        daily_dia

```

c:\users\laura\appdata\local\programs\python\python37\lib\site-packages\ipykernel_launcher.py:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: <http://pandas.pydata.org/pandas-docs/stable/indexing.html>

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A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: <http://pandas.pydata.org/pandas-docs/stable/indexing.html>
import sys

```

Out[5]:

```

	date	energy_sum	apparentTemperatureMax	apparentTemperatureMin	\
0	2014-02-08	6.952692	10.36	2.18	
1	2013-12-24	8.536480	12.93	7.01	
2	2012-11-01	9.499781	13.03	4.84	
3	2014-02-05	10.267707	12.96	4.69	
4	2012-04-17	10.850805	13.54	2.94	
5	2012-04-18	9.103382	12.58	1.31	
6	2013-12-25	9.274873	13.47	3.39	
7	2014-02-09	8.813513	11.87	3.34	

8	2014-01-28	9.227707	12.15	5.29
9	2012-12-14	10.145910	5.33	0.46
10	2013-12-27	10.780273	11.42	4.71
11	2011-12-16	12.163127	6.66	1.03
12	2012-04-24	10.609714	3.13	-1.69
13	2014-02-15	11.673417	3.77	-1.61
14	2014-02-07	10.889362	5.14	0.94
15	2012-09-24	11.525150	12.89	0.63
16	2012-09-23	11.759837	3.99	-1.42
17	2014-01-27	12.633801	3.14	-3.42
18	2014-02-06	13.749174	5.72	0.11
19	2012-10-31	11.951958	5.94	-0.64
20	2012-04-09	11.957446	12.08	0.22
21	2014-02-01	12.392776	2.88	0.78
22	2011-12-13	12.307079	4.38	1.07
23	2014-02-14	13.376080	0.99	-2.65
24	2013-03-17	13.511968	1.72	-3.56
25	2014-01-16	14.732271	1.98	-4.12
26	2014-01-17	13.774471	4.02	-3.67
27	2013-03-18	12.709106	4.98	1.68
28	2012-11-02	12.148570	12.14	3.84
29	2012-12-15	11.839403	12.14	5.37
..
800	2011-12-26	11.800777	2.53	0.18
801	2012-01-10	11.685169	5.86	0.61
802	2012-03-25	11.857957	5.27	0.29
803	2013-12-02	11.710582	6.86	1.10
804	2013-11-27	12.078164	6.48	3.21
805	2012-03-21	11.280011	4.59	1.96
806	2013-02-27	11.095584	5.63	1.12
807	2012-02-12	11.415105	5.86	1.03
808	2012-03-13	11.445403	7.34	1.96
809	2013-11-28	10.972318	8.44	-0.86
810	2012-03-09	11.569300	5.67	2.19
811	2012-03-20	12.202967	3.91	1.38
812	2012-03-12	11.264175	7.07	0.89
813	2013-01-05	11.452649	4.06	-0.57
814	2012-02-02	11.679099	4.73	-1.20
815	2012-02-04	11.285737	3.42	0.05
816	2012-03-25	11.816914	12.02	0.45
817	2012-03-26	11.490470	5.79	1.77
818	2012-03-10	11.582159	7.88	-1.03
819	2012-05-11	10.979566	10.67	2.84
820	2012-02-11	10.781898	10.13	3.83
821	2012-03-11	10.674624	10.13	2.65
822	2013-01-04	10.573835	12.50	3.95
823	2013-11-25	10.518126	10.15	0.19
824	2012-02-10	10.776242	11.63	1.59

825	2013-11-26	11.480411	11.94	5.53
826	2012-02-03	10.411403	14.23	5.52
827	2012-02-09	10.294997	11.43	3.89
828	2012-02-07	10.202945	11.29	1.67
829	2012-02-08	10.356350	10.31	1.41

	humidity	week	year
0	0.93	5	2014
1	0.89	51	2013
2	0.79	44	2012
3	0.81	5	2014
4	0.72	16	2012
5	0.86	16	2012
6	0.82	51	2013
7	0.78	5	2014
8	0.82	4	2014
9	0.87	50	2012
10	0.79	51	2013
11	0.82	50	2011
12	0.77	17	2012
13	0.83	6	2014
14	0.68	5	2014
15	0.81	39	2012
16	0.71	38	2012
17	0.81	4	2014
18	0.88	5	2014
19	0.84	44	2012
20	0.75	15	2012
21	0.79	4	2014
22	0.77	50	2011
23	0.88	6	2014
24	0.86	10	2013
25	0.84	2	2014
26	0.94	2	2014
27	0.81	11	2013
28	0.94	44	2012
29	0.87	50	2012
..
800	0.90	52	2011
801	0.91	2	2012
802	0.91	12	2012
803	0.76	48	2013
804	0.72	47	2013
805	0.79	12	2012
806	0.75	8	2013
807	0.77	6	2012
808	0.82	11	2012
809	0.79	47	2013

810	0.77	10	2012
811	0.66	12	2012
812	0.84	11	2012
813	0.76	0	2013
814	0.75	5	2012
815	0.68	5	2012
816	0.81	12	2012
817	0.69	13	2012
818	0.76	10	2012
819	0.83	19	2012
820	0.87	6	2012
821	0.87	10	2012
822	0.84	0	2013
823	0.72	47	2013
824	0.71	6	2012
825	0.76	47	2013
826	0.74	5	2012
827	0.78	6	2012
828	0.73	6	2012
829	0.74	6	2012

[830 rows x 7 columns]

In [21]: daily_dia.energy_sum[5]+daily_dia.energy_sum[6]+daily_dia.energy_sum[7]+daily_dia.ener

Out[21]: 69.50878453206002

In [6]: daily_week= daily_dia.groupby(by=['year', 'week']).sum()

In [7]: daily_week

Out[7]:

		energy_sum	apparentTemperatureMax	apparentTemperatureMin	\
year	week				
2011	47	51.114714	70.67	41.73	
	48	65.571115	111.13	63.16	
	49	63.016513	117.25	57.62	
	50	82.034950	68.42	26.70	
	51	75.672988	77.77	23.58	
	52	59.108348	78.15	42.57	
2012	0	10.675958	7.28	4.53	
	1	69.481120	104.06	53.30	
	2	81.510830	65.40	14.72	
	3	69.813180	97.48	41.30	
	4	70.707853	84.95	38.71	
	5	76.962281	61.81	24.32	
	6	75.172341	66.99	15.38	
	7	69.506432	109.90	56.36	
	8	73.889743	90.33	35.41	
	9	69.289775	88.84	34.64	

10	73.896709	95.91	38.71
11	74.495490	81.83	28.21
12	93.630022	53.57	5.47
13	67.918920	112.48	57.91
14	77.113029	77.07	23.69
15	71.793072	106.22	51.59
16	80.333027	65.84	8.96
17	77.781531	69.61	28.21
18	71.854679	90.02	55.94
19	65.779445	104.08	55.79
20	67.507820	101.91	51.37
21	63.278685	123.67	69.41
22	71.630877	65.12	25.98
23	81.842540	70.05	17.85
...
2013 32	65.696722	121.75	66.28
33	71.339482	93.73	40.54
34	65.437931	104.52	61.85
35	69.160818	102.64	53.02
36	65.619442	121.08	55.72
37	69.474258	112.72	65.23
38	72.644275	79.24	48.42
39	61.162204	138.10	73.43
40	61.307206	118.27	68.44
41	68.287755	105.45	48.73
42	86.817619	38.43	-4.35
43	74.077658	108.12	46.54
44	78.895956	73.66	27.47
45	71.739465	88.71	38.36
46	72.005948	88.04	40.53
47	80.713782	61.95	22.52
48	76.877442	68.29	14.59
49	69.451989	110.00	50.26
50	70.245566	108.00	63.73
51	82.914623	50.61	11.13
52	18.612574	29.51	10.63
2014 0	62.324195	60.50	33.09
1	75.867974	85.48	26.51
2	90.607556	49.60	-3.94
3	71.472853	96.40	52.84
4	84.648671	50.44	6.50
5	75.038481	70.13	11.97
6	81.339806	72.08	23.30
7	65.270613	131.84	75.08
8	42.866392	52.60	20.80

humidity

year week

2011	47	3.840000
	48	5.330000
	49	5.040000
	50	5.490000
	51	5.670000
	52	4.620000
2012	0	0.860000
	1	5.510000
	2	5.900000
	3	5.580000
	4	5.330000
	5	5.490000
	6	5.430000
	7	5.720000
	8	5.730000
	9	5.560000
	10	5.460000
	11	5.800000
	12	6.580000
	13	5.160000
	14	5.250000
	15	5.490000
	16	5.440000
	17	5.570000
	18	5.930000
	19	5.410000
	20	5.410000
	21	5.510000
	22	5.630000
	23	5.450000
...		...
2013	32	5.610000
	33	5.130000
	34	5.430000
	35	5.280000
	36	4.930000
	37	5.340000
	38	5.870000
	39	4.872917
	40	5.160000
	41	5.720000
	42	5.660000
	43	5.110000
	44	5.400000
	45	5.610000
	46	5.360000
	47	5.520000
	48	5.430000


```

49    5.260000
50    5.330000
51    5.910000
52    1.470000
2014 0    4.220000
1     5.630000
2     5.780000
3     5.740000
4     5.660000
5     5.410000
6     5.570000
7     4.980000
8     3.380000

```

[122 rows x 4 columns]

In [8]: *#Passem de mitjana per llar de consum diari a mitjana per llar de consum setmanal*

```

daily_week['apparentTemperatureMax']=daily_week['apparentTemperatureMax']/7
daily_week['humidity']=daily_week['humidity']/7
daily_week['apparentTemperatureMin']=daily_week['apparentTemperatureMin']/7
daily_week

```

```

Out [8]:
energy_sum  apparentTemperatureMax  apparentTemperatureMin  \
year week
2011 47    51.114714                10.095714                5.961429
      48    65.571115                15.875714                9.022857
      49    63.016513                16.750000                8.231429
      50    82.034950                 9.774286                3.814286
      51    75.672988                11.110000                3.368571
      52    59.108348                11.164286                6.081429
2012 0     10.675958                 1.040000                0.647143
      1     69.481120                14.865714                7.614286
      2     81.510830                 9.342857                2.102857
      3     69.813180                13.925714                5.900000
      4     70.707853                12.135714                5.530000
      5     76.962281                 8.830000                3.474286
      6     75.172341                 9.570000                2.197143
      7     69.506432                15.700000                8.051429
      8     73.889743                12.904286                5.058571
      9     69.289775                12.691429                4.948571
     10     73.896709                13.701429                5.530000
     11     74.495490                11.690000                4.030000
     12     93.630022                 7.652857                0.781429
     13     67.918920                16.068571                8.272857
     14     77.113029                11.010000                3.384286
     15     71.793072                15.174286                7.370000
     16     80.333027                 9.405714                1.280000

```

17	77.781531	9.944286	4.030000	
18	71.854679	12.860000	7.991429	
19	65.779445	14.868571	7.970000	
20	67.507820	14.558571	7.338571	
21	63.278685	17.667143	9.915714	
22	71.630877	9.302857	3.711429	
23	81.842540	10.007143	2.550000	
...	
2013	32	65.696722	17.392857	9.468571
	33	71.339482	13.390000	5.791429
	34	65.437931	14.931429	8.835714
	35	69.160818	14.662857	7.574286
	36	65.619442	17.297143	7.960000
	37	69.474258	16.102857	9.318571
	38	72.644275	11.320000	6.917143
	39	61.162204	19.728571	10.490000
	40	61.307206	16.895714	9.777143
	41	68.287755	15.064286	6.961429
	42	86.817619	5.490000	-0.621429
	43	74.077658	15.445714	6.648571
	44	78.895956	10.522857	3.924286
	45	71.739465	12.672857	5.480000
	46	72.005948	12.577143	5.790000
	47	80.713782	8.850000	3.217143
	48	76.877442	9.755714	2.084286
	49	69.451989	15.714286	7.180000
	50	70.245566	15.428571	9.104286
	51	82.914623	7.230000	1.590000
	52	18.612574	4.215714	1.518571
2014	0	62.324195	8.642857	4.727143
	1	75.867974	12.211429	3.787143
	2	90.607556	7.085714	-0.562857
	3	71.472853	13.771429	7.548571
	4	84.648671	7.205714	0.928571
	5	75.038481	10.018571	1.710000
	6	81.339806	10.297143	3.328571
	7	65.270613	18.834286	10.725714
	8	42.866392	7.514286	2.971429

		humidity
year	week	
2011	47	0.548571
	48	0.761429
	49	0.720000
	50	0.784286
	51	0.810000
	52	0.660000
2012	0	0.122857

	1	0.787143
	2	0.842857
	3	0.797143
	4	0.761429
	5	0.784286
	6	0.775714
	7	0.817143
	8	0.818571
	9	0.794286
	10	0.780000
	11	0.828571
	12	0.940000
	13	0.737143
	14	0.750000
	15	0.784286
	16	0.777143
	17	0.795714
	18	0.847143
	19	0.772857
	20	0.772857
	21	0.787143
	22	0.804286
	23	0.778571
...		...
2013	32	0.801429
	33	0.732857
	34	0.775714
	35	0.754286
	36	0.704286
	37	0.762857
	38	0.838571
	39	0.696131
	40	0.737143
	41	0.817143
	42	0.808571
	43	0.730000
	44	0.771429
	45	0.801429
	46	0.765714
	47	0.788571
	48	0.775714
	49	0.751429
	50	0.761429
	51	0.844286
	52	0.210000
2014	0	0.602857
	1	0.804286
	2	0.825714

```

3      0.820000
4      0.808571
5      0.772857
6      0.795714
7      0.711429
8      0.482857

```

[122 rows x 4 columns]

```

In [9]: daily_week=daily_week.reset_index()
        daily_week

```

```

Out[9]:
   year  week  energy_sum  apparentTemperatureMax  apparentTemperatureMin  \
0  2011    47    51.114714                10.095714                5.961429
1  2011    48    65.571115                15.875714                9.022857
2  2011    49    63.016513                16.750000                8.231429
3  2011    50    82.034950                 9.774286                3.814286
4  2011    51    75.672988                11.110000                3.368571
5  2011    52    59.108348                11.164286                6.081429
6  2012     0    10.675958                 1.040000                0.647143
7  2012     1    69.481120                14.865714                7.614286
8  2012     2    81.510830                 9.342857                2.102857
9  2012     3    69.813180                13.925714                5.900000
10 2012     4    70.707853                12.135714                5.530000
11 2012     5    76.962281                 8.830000                3.474286
12 2012     6    75.172341                 9.570000                2.197143
13 2012     7    69.506432                15.700000                8.051429
14 2012     8    73.889743                12.904286                5.058571
15 2012     9    69.289775                12.691429                4.948571
16 2012    10    73.896709                13.701429                5.530000
17 2012    11    74.495490                11.690000                4.030000
18 2012    12    93.630022                 7.652857                0.781429
19 2012    13    67.918920                16.068571                8.272857
20 2012    14    77.113029                11.010000                3.384286
21 2012    15    71.793072                15.174286                7.370000
22 2012    16    80.333027                 9.405714                1.280000
23 2012    17    77.781531                 9.944286                4.030000
24 2012    18    71.854679                12.860000                7.991429
25 2012    19    65.779445                14.868571                7.970000
26 2012    20    67.507820                14.558571                7.338571
27 2012    21    63.278685                17.667143                9.915714
28 2012    22    71.630877                 9.302857                3.711429
29 2012    23    81.842540                10.007143                2.550000
..    ...    ...    ...    ...    ...
92 2013    32    65.696722                17.392857                9.468571
93 2013    33    71.339482                13.390000                5.791429
94 2013    34    65.437931                14.931429                8.835714
95 2013    35    69.160818                14.662857                7.574286

```

96	2013	36	65.619442	17.297143	7.960000
97	2013	37	69.474258	16.102857	9.318571
98	2013	38	72.644275	11.320000	6.917143
99	2013	39	61.162204	19.728571	10.490000
100	2013	40	61.307206	16.895714	9.777143
101	2013	41	68.287755	15.064286	6.961429
102	2013	42	86.817619	5.490000	-0.621429
103	2013	43	74.077658	15.445714	6.648571
104	2013	44	78.895956	10.522857	3.924286
105	2013	45	71.739465	12.672857	5.480000
106	2013	46	72.005948	12.577143	5.790000
107	2013	47	80.713782	8.850000	3.217143
108	2013	48	76.877442	9.755714	2.084286
109	2013	49	69.451989	15.714286	7.180000
110	2013	50	70.245566	15.428571	9.104286
111	2013	51	82.914623	7.230000	1.590000
112	2013	52	18.612574	4.215714	1.518571
113	2014	0	62.324195	8.642857	4.727143
114	2014	1	75.867974	12.211429	3.787143
115	2014	2	90.607556	7.085714	-0.562857
116	2014	3	71.472853	13.771429	7.548571
117	2014	4	84.648671	7.205714	0.928571
118	2014	5	75.038481	10.018571	1.710000
119	2014	6	81.339806	10.297143	3.328571
120	2014	7	65.270613	18.834286	10.725714
121	2014	8	42.866392	7.514286	2.971429

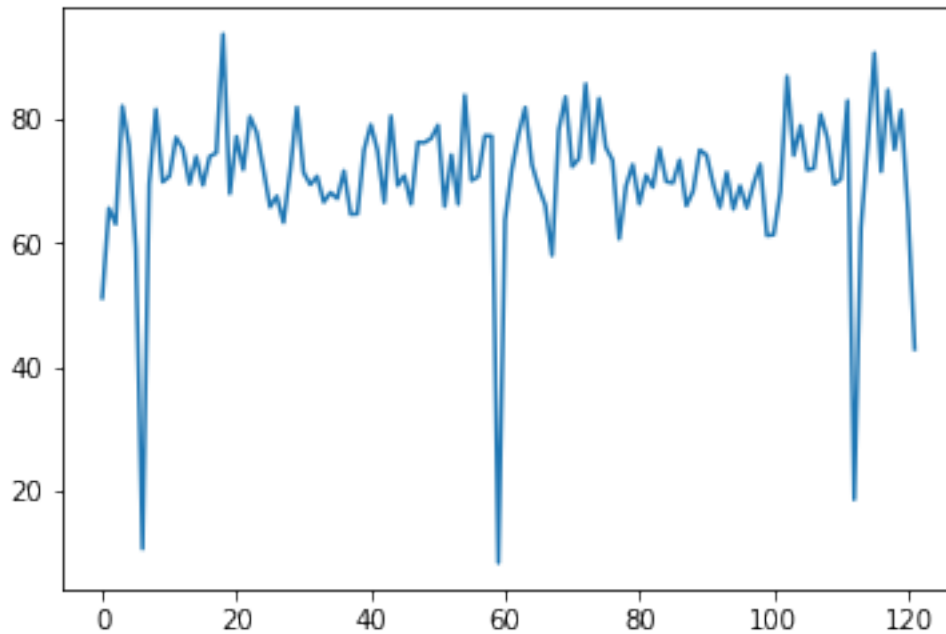
	humidity
0	0.548571
1	0.761429
2	0.720000
3	0.784286
4	0.810000
5	0.660000
6	0.122857
7	0.787143
8	0.842857
9	0.797143
10	0.761429
11	0.784286
12	0.775714
13	0.817143
14	0.818571
15	0.794286
16	0.780000
17	0.828571
18	0.940000
19	0.737143

```
20    0.750000
21    0.784286
22    0.777143
23    0.795714
24    0.847143
25    0.772857
26    0.772857
27    0.787143
28    0.804286
29    0.778571
..      ...
92    0.801429
93    0.732857
94    0.775714
95    0.754286
96    0.704286
97    0.762857
98    0.838571
99    0.696131
100   0.737143
101   0.817143
102   0.808571
103   0.730000
104   0.771429
105   0.801429
106   0.765714
107   0.788571
108   0.775714
109   0.751429
110   0.761429
111   0.844286
112   0.210000
113   0.602857
114   0.804286
115   0.825714
116   0.820000
117   0.808571
118   0.772857
119   0.795714
120   0.711429
121   0.482857
```

```
[122 rows x 6 columns]
```

```
In [10]: plt.plot(daily_week.energy_sum)
```

```
Out[10]: [<matplotlib.lines.Line2D at 0x1a3443d06d8>]
```



```
In [11]: #Comprovem quines son les setmanes 0
         (daily_week[daily_week.week==0])
```

```
Out[11]:
```

	year	week	energy_sum	apparentTemperatureMax	apparentTemperatureMin	\
6	2012	0	10.675958	1.040000	0.647143	
60	2013	0	63.657653	7.481429	2.308571	
113	2014	0	62.324195	8.642857	4.727143	

	humidity
6	0.122857
60	0.654286
113	0.602857

```
In [12]: (daily_week[daily_week.week==52])
```

```
Out[12]:
```

	year	week	energy_sum	apparentTemperatureMax	apparentTemperatureMin	\
5	2011	52	59.108348	11.164286	6.081429	
58	2012	52	77.198766	10.284286	3.937143	
112	2013	52	18.612574	4.215714	1.518571	

	humidity
5	0.660000
58	0.758571
112	0.210000

```
In [13]: (daily_week[daily_week.week==53])
```

```
Out [13]:
```

	year	week	energy_sum	apparentTemperatureMax	apparentTemperatureMin	\
59	2012	53	8.405077	2.504286	1.634286	
			humidity			
59			0.111429			

```
In [14]: #Sumem les setmanes 52 i la 0 següent ja que son la mateixa però de diferents anys
```

```
n1_52=daily_week.energy_sum[(daily_week.year==2011) & (daily_week.week==52)]
n1_0= daily_week.energy_sum[(daily_week.year==2012) & (daily_week.week==0)]
nombre1= n1_52.item() + n1_0.item()

n2_52=daily_week.energy_sum[(daily_week.year==2012) & (daily_week.week==53)]
n2_0=daily_week.energy_sum[(daily_week.year==2013) & (daily_week.week==0)]

nombre2=n2_52.item() + n2_0.item()

n3_52=daily_week.energy_sum[(daily_week.year==2013) & (daily_week.week==52)]
n3_0=daily_week.energy_sum[(daily_week.year==2014) & (daily_week.week==0)]
nombre3=n3_52.item() + n3_0.item()

daily_week.energy_sum[(daily_week.year==2011) & (daily_week.week==52)]=nombre1

daily_week.energy_sum[(daily_week.year==2013) & (daily_week.week==0)]=nombre2
daily_week.energy_sum[(daily_week.year==2014) & (daily_week.week==0)]=nombre3

daily_week
```

```
c:\users\laura\appdata\local\programs\python\python37\lib\site-packages\ipykernel_launcher.py:
A value is trying to be set on a copy of a slice from a DataFrame
```

```
See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/indexing.html
app.launch_new_instance()
```

```
c:\users\laura\appdata\local\programs\python\python37\lib\site-packages\ipykernel_launcher.py:
A value is trying to be set on a copy of a slice from a DataFrame
```

```
See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/indexing.html
c:\users\laura\appdata\local\programs\python\python37\lib\site-packages\ipykernel_launcher.py:
A value is trying to be set on a copy of a slice from a DataFrame
```

```
See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/indexing.html
```

```
Out [14]:
```

	year	week	energy_sum	apparentTemperatureMax	apparentTemperatureMin	\
0	2011	47	51.114714	10.095714	5.961429	
1	2011	48	65.571115	15.875714	9.022857	
2	2011	49	63.016513	16.750000	8.231429	

3	2011	50	82.034950	9.774286	3.814286
4	2011	51	75.672988	11.110000	3.368571
5	2011	52	69.784306	11.164286	6.081429
6	2012	0	10.675958	1.040000	0.647143
7	2012	1	69.481120	14.865714	7.614286
8	2012	2	81.510830	9.342857	2.102857
9	2012	3	69.813180	13.925714	5.900000
10	2012	4	70.707853	12.135714	5.530000
11	2012	5	76.962281	8.830000	3.474286
12	2012	6	75.172341	9.570000	2.197143
13	2012	7	69.506432	15.700000	8.051429
14	2012	8	73.889743	12.904286	5.058571
15	2012	9	69.289775	12.691429	4.948571
16	2012	10	73.896709	13.701429	5.530000
17	2012	11	74.495490	11.690000	4.030000
18	2012	12	93.630022	7.652857	0.781429
19	2012	13	67.918920	16.068571	8.272857
20	2012	14	77.113029	11.010000	3.384286
21	2012	15	71.793072	15.174286	7.370000
22	2012	16	80.333027	9.405714	1.280000
23	2012	17	77.781531	9.944286	4.030000
24	2012	18	71.854679	12.860000	7.991429
25	2012	19	65.779445	14.868571	7.970000
26	2012	20	67.507820	14.558571	7.338571
27	2012	21	63.278685	17.667143	9.915714
28	2012	22	71.630877	9.302857	3.711429
29	2012	23	81.842540	10.007143	2.550000
..
92	2013	32	65.696722	17.392857	9.468571
93	2013	33	71.339482	13.390000	5.791429
94	2013	34	65.437931	14.931429	8.835714
95	2013	35	69.160818	14.662857	7.574286
96	2013	36	65.619442	17.297143	7.960000
97	2013	37	69.474258	16.102857	9.318571
98	2013	38	72.644275	11.320000	6.917143
99	2013	39	61.162204	19.728571	10.490000
100	2013	40	61.307206	16.895714	9.777143
101	2013	41	68.287755	15.064286	6.961429
102	2013	42	86.817619	5.490000	-0.621429
103	2013	43	74.077658	15.445714	6.648571
104	2013	44	78.895956	10.522857	3.924286
105	2013	45	71.739465	12.672857	5.480000
106	2013	46	72.005948	12.577143	5.790000
107	2013	47	80.713782	8.850000	3.217143
108	2013	48	76.877442	9.755714	2.084286
109	2013	49	69.451989	15.714286	7.180000
110	2013	50	70.245566	15.428571	9.104286
111	2013	51	82.914623	7.230000	1.590000

112	2013	52	18.612574	4.215714	1.518571
113	2014	0	80.936769	8.642857	4.727143
114	2014	1	75.867974	12.211429	3.787143
115	2014	2	90.607556	7.085714	-0.562857
116	2014	3	71.472853	13.771429	7.548571
117	2014	4	84.648671	7.205714	0.928571
118	2014	5	75.038481	10.018571	1.710000
119	2014	6	81.339806	10.297143	3.328571
120	2014	7	65.270613	18.834286	10.725714
121	2014	8	42.866392	7.514286	2.971429

	humidity
0	0.548571
1	0.761429
2	0.720000
3	0.784286
4	0.810000
5	0.660000
6	0.122857
7	0.787143
8	0.842857
9	0.797143
10	0.761429
11	0.784286
12	0.775714
13	0.817143
14	0.818571
15	0.794286
16	0.780000
17	0.828571
18	0.940000
19	0.737143
20	0.750000
21	0.784286
22	0.777143
23	0.795714
24	0.847143
25	0.772857
26	0.772857
27	0.787143
28	0.804286
29	0.778571
..	...
92	0.801429
93	0.732857
94	0.775714
95	0.754286
96	0.704286

```

97  0.762857
98  0.838571
99  0.696131
100 0.737143
101 0.817143
102 0.808571
103 0.730000
104 0.771429
105 0.801429
106 0.765714
107 0.788571
108 0.775714
109 0.751429
110 0.761429
111 0.844286
112 0.210000
113 0.602857
114 0.804286
115 0.825714
116 0.820000
117 0.808571
118 0.772857
119 0.795714
120 0.711429
121 0.482857

```

```
[122 rows x 6 columns]
```

```

In [15]: #Les eliminem (setmana 0 del 2012, setmana 53 del 2012 i setmana 52 del 2013)
daily_week=daily_week.drop([6,59,112])
daily_week

```

```

Out[15]:
   year  week  energy_sum  apparentTemperatureMax  apparentTemperatureMin  \
0  2011   47   51.114714                10.095714                5.961429
1  2011   48   65.571115                15.875714                9.022857
2  2011   49   63.016513                16.750000                8.231429
3  2011   50   82.034950                 9.774286                3.814286
4  2011   51   75.672988                11.110000                3.368571
5  2011   52   69.784306                11.164286                6.081429
7  2012    1   69.481120                14.865714                7.614286
8  2012    2   81.510830                 9.342857                2.102857
9  2012    3   69.813180                13.925714                5.900000
10 2012    4   70.707853                12.135714                5.530000
11 2012    5   76.962281                 8.830000                3.474286
12 2012    6   75.172341                 9.570000                2.197143
13 2012    7   69.506432                15.700000                8.051429
14 2012    8   73.889743                12.904286                5.058571
15 2012    9   69.289775                12.691429                4.948571

```

16	2012	10	73.896709	13.701429	5.530000
17	2012	11	74.495490	11.690000	4.030000
18	2012	12	93.630022	7.652857	0.781429
19	2012	13	67.918920	16.068571	8.272857
20	2012	14	77.113029	11.010000	3.384286
21	2012	15	71.793072	15.174286	7.370000
22	2012	16	80.333027	9.405714	1.280000
23	2012	17	77.781531	9.944286	4.030000
24	2012	18	71.854679	12.860000	7.991429
25	2012	19	65.779445	14.868571	7.970000
26	2012	20	67.507820	14.558571	7.338571
27	2012	21	63.278685	17.667143	9.915714
28	2012	22	71.630877	9.302857	3.711429
29	2012	23	81.842540	10.007143	2.550000
30	2012	24	71.303870	10.495714	5.360000
..
91	2013	31	69.440865	11.535714	3.524286
92	2013	32	65.696722	17.392857	9.468571
93	2013	33	71.339482	13.390000	5.791429
94	2013	34	65.437931	14.931429	8.835714
95	2013	35	69.160818	14.662857	7.574286
96	2013	36	65.619442	17.297143	7.960000
97	2013	37	69.474258	16.102857	9.318571
98	2013	38	72.644275	11.320000	6.917143
99	2013	39	61.162204	19.728571	10.490000
100	2013	40	61.307206	16.895714	9.777143
101	2013	41	68.287755	15.064286	6.961429
102	2013	42	86.817619	5.490000	-0.621429
103	2013	43	74.077658	15.445714	6.648571
104	2013	44	78.895956	10.522857	3.924286
105	2013	45	71.739465	12.672857	5.480000
106	2013	46	72.005948	12.577143	5.790000
107	2013	47	80.713782	8.850000	3.217143
108	2013	48	76.877442	9.755714	2.084286
109	2013	49	69.451989	15.714286	7.180000
110	2013	50	70.245566	15.428571	9.104286
111	2013	51	82.914623	7.230000	1.590000
113	2014	0	80.936769	8.642857	4.727143
114	2014	1	75.867974	12.211429	3.787143
115	2014	2	90.607556	7.085714	-0.562857
116	2014	3	71.472853	13.771429	7.548571
117	2014	4	84.648671	7.205714	0.928571
118	2014	5	75.038481	10.018571	1.710000
119	2014	6	81.339806	10.297143	3.328571
120	2014	7	65.270613	18.834286	10.725714
121	2014	8	42.866392	7.514286	2.971429

humidity

0	0.548571
1	0.761429
2	0.720000
3	0.784286
4	0.810000
5	0.660000
7	0.787143
8	0.842857
9	0.797143
10	0.761429
11	0.784286
12	0.775714
13	0.817143
14	0.818571
15	0.794286
16	0.780000
17	0.828571
18	0.940000
19	0.737143
20	0.750000
21	0.784286
22	0.777143
23	0.795714
24	0.847143
25	0.772857
26	0.772857
27	0.787143
28	0.804286
29	0.778571
30	0.792857
..	...
91	0.672857
92	0.801429
93	0.732857
94	0.775714
95	0.754286
96	0.704286
97	0.762857
98	0.838571
99	0.696131
100	0.737143
101	0.817143
102	0.808571
103	0.730000
104	0.771429
105	0.801429
106	0.765714
107	0.788571

```
108  0.775714
109  0.751429
110  0.761429
111  0.844286
113  0.602857
114  0.804286
115  0.825714
116  0.820000
117  0.808571
118  0.772857
119  0.795714
120  0.711429
121  0.482857
```

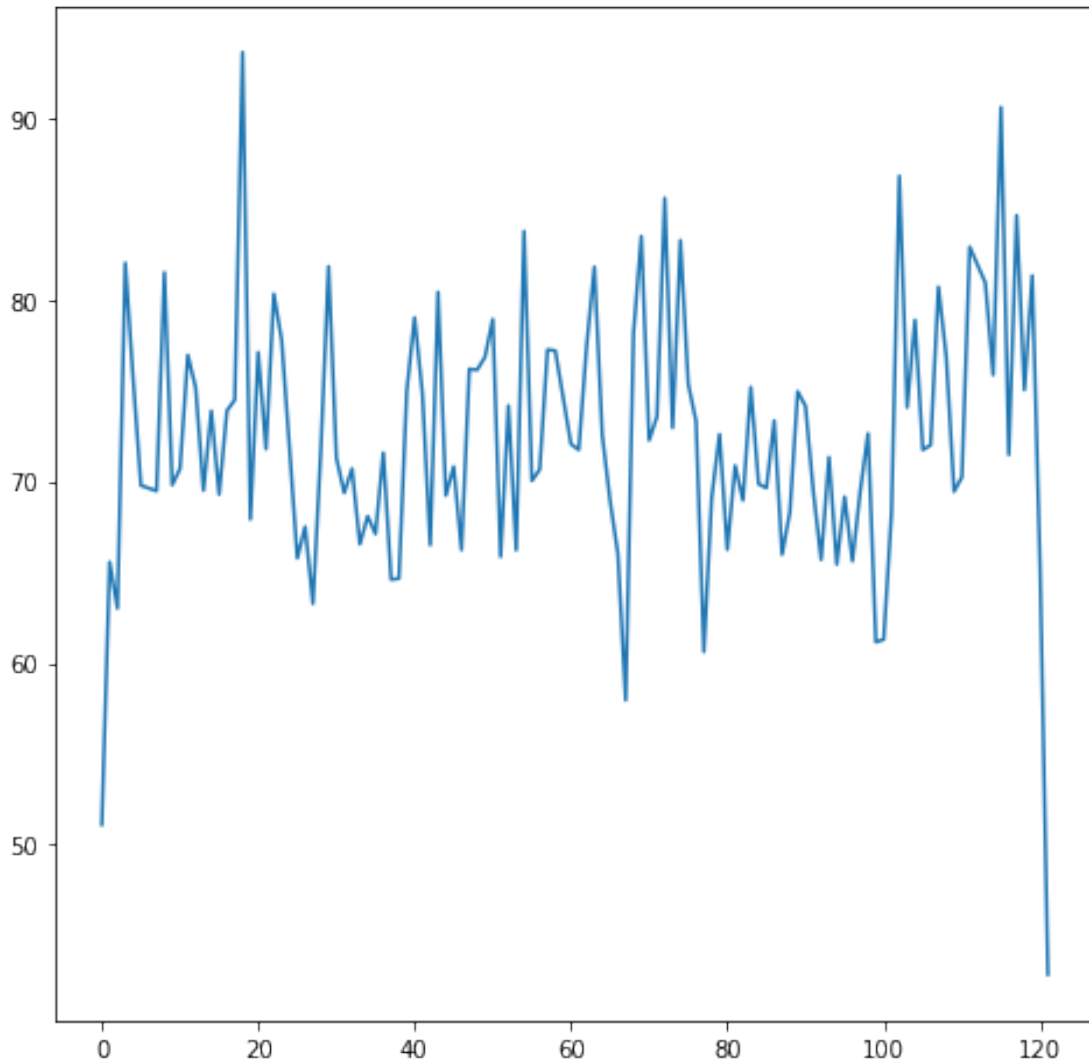
```
[119 rows x 6 columns]
```

```
In [ ]:
```

```
In [16]: plt.figure(figsize=(8,8))
```

```
plt.plot(daily_week.energy_sum )
```

```
Out[16]: [<matplotlib.lines.Line2D at 0x1a344481080>]
```



Ja tenim el fitxer preparat.

```
In [17]: daily_week['t-1']=daily_week['energy_sum'].shift(1)
daily_week['t-2']=daily_week['energy_sum'].shift(2)
daily_week['t-3']=daily_week['energy_sum'].shift(3)
daily_week['t-4']=daily_week['energy_sum'].shift(4)
```

```
daily_week['temp(t-1)']=daily_week['apparentTemperatureMax'].shift(1)
daily_week['temp(t-2)']=daily_week['apparentTemperatureMax'].shift(2)
daily_week['temp(t-3)']=daily_week['apparentTemperatureMax'].shift(3)
daily_week['temp(t-4)']=daily_week['apparentTemperatureMax'].shift(4)
```

```
daily_week['tempmin(t-1)']=daily_week['apparentTemperatureMin'].shift(1)
```

```

daily_week['tempmin(t-2)']=daily_week['apparentTemperatureMin'].shift(2)
daily_week['tempmin(t-3)']=daily_week['apparentTemperatureMin'].shift(3)
daily_week['tempmin(t-4)']=daily_week['apparentTemperatureMin'].shift(4)

```

```

daily_week['humidity(t-1)']=daily_week['humidity'].shift(1)
daily_week['humidity(t-2)']=daily_week['humidity'].shift(2)
daily_week['humidity(t-3)']=daily_week['humidity'].shift(3)
daily_week['humidity(t-4)']=daily_week['humidity'].shift(4)

```

daily_week

```

Out[17]:

```

	year	week	energy_sum	apparentTemperatureMax	apparentTemperatureMin	\
0	2011	47	51.114714	10.095714	5.961429	
1	2011	48	65.571115	15.875714	9.022857	
2	2011	49	63.016513	16.750000	8.231429	
3	2011	50	82.034950	9.774286	3.814286	
4	2011	51	75.672988	11.110000	3.368571	
5	2011	52	69.784306	11.164286	6.081429	
7	2012	1	69.481120	14.865714	7.614286	
8	2012	2	81.510830	9.342857	2.102857	
9	2012	3	69.813180	13.925714	5.900000	
10	2012	4	70.707853	12.135714	5.530000	
11	2012	5	76.962281	8.830000	3.474286	
12	2012	6	75.172341	9.570000	2.197143	
13	2012	7	69.506432	15.700000	8.051429	
14	2012	8	73.889743	12.904286	5.058571	
15	2012	9	69.289775	12.691429	4.948571	
16	2012	10	73.896709	13.701429	5.530000	
17	2012	11	74.495490	11.690000	4.030000	
18	2012	12	93.630022	7.652857	0.781429	
19	2012	13	67.918920	16.068571	8.272857	
20	2012	14	77.113029	11.010000	3.384286	
21	2012	15	71.793072	15.174286	7.370000	
22	2012	16	80.333027	9.405714	1.280000	
23	2012	17	77.781531	9.944286	4.030000	
24	2012	18	71.854679	12.860000	7.991429	
25	2012	19	65.779445	14.868571	7.970000	
26	2012	20	67.507820	14.558571	7.338571	
27	2012	21	63.278685	17.667143	9.915714	
28	2012	22	71.630877	9.302857	3.711429	
29	2012	23	81.842540	10.007143	2.550000	
30	2012	24	71.303870	10.495714	5.360000	
..	
91	2013	31	69.440865	11.535714	3.524286	
92	2013	32	65.696722	17.392857	9.468571	

93	2013	33	71.339482	13.390000	5.791429
94	2013	34	65.437931	14.931429	8.835714
95	2013	35	69.160818	14.662857	7.574286
96	2013	36	65.619442	17.297143	7.960000
97	2013	37	69.474258	16.102857	9.318571
98	2013	38	72.644275	11.320000	6.917143
99	2013	39	61.162204	19.728571	10.490000
100	2013	40	61.307206	16.895714	9.777143
101	2013	41	68.287755	15.064286	6.961429
102	2013	42	86.817619	5.490000	-0.621429
103	2013	43	74.077658	15.445714	6.648571
104	2013	44	78.895956	10.522857	3.924286
105	2013	45	71.739465	12.672857	5.480000
106	2013	46	72.005948	12.577143	5.790000
107	2013	47	80.713782	8.850000	3.217143
108	2013	48	76.877442	9.755714	2.084286
109	2013	49	69.451989	15.714286	7.180000
110	2013	50	70.245566	15.428571	9.104286
111	2013	51	82.914623	7.230000	1.590000
113	2014	0	80.936769	8.642857	4.727143
114	2014	1	75.867974	12.211429	3.787143
115	2014	2	90.607556	7.085714	-0.562857
116	2014	3	71.472853	13.771429	7.548571
117	2014	4	84.648671	7.205714	0.928571
118	2014	5	75.038481	10.018571	1.710000
119	2014	6	81.339806	10.297143	3.328571
120	2014	7	65.270613	18.834286	10.725714
121	2014	8	42.866392	7.514286	2.971429

	humidity	t-1	t-2	t-3	t-4	...	temp(t-3) \
0	0.548571	NaN	NaN	NaN	NaN	...	NaN
1	0.761429	51.114714	NaN	NaN	NaN	...	NaN
2	0.720000	65.571115	51.114714	NaN	NaN	...	NaN
3	0.784286	63.016513	65.571115	51.114714	NaN	...	10.095714
4	0.810000	82.034950	63.016513	65.571115	51.114714	...	15.875714
5	0.660000	75.672988	82.034950	63.016513	65.571115	...	16.750000
7	0.787143	69.784306	75.672988	82.034950	63.016513	...	9.774286
8	0.842857	69.481120	69.784306	75.672988	82.034950	...	11.110000
9	0.797143	81.510830	69.481120	69.784306	75.672988	...	11.164286
10	0.761429	69.813180	81.510830	69.481120	69.784306	...	14.865714
11	0.784286	70.707853	69.813180	81.510830	69.481120	...	9.342857
12	0.775714	76.962281	70.707853	69.813180	81.510830	...	13.925714
13	0.817143	75.172341	76.962281	70.707853	69.813180	...	12.135714
14	0.818571	69.506432	75.172341	76.962281	70.707853	...	8.830000
15	0.794286	73.889743	69.506432	75.172341	76.962281	...	9.570000
16	0.780000	69.289775	73.889743	69.506432	75.172341	...	15.700000
17	0.828571	73.896709	69.289775	73.889743	69.506432	...	12.904286
18	0.940000	74.495490	73.896709	69.289775	73.889743	...	12.691429

19	0.737143	93.630022	74.495490	73.896709	69.289775	...	13.701429
20	0.750000	67.918920	93.630022	74.495490	73.896709	...	11.690000
21	0.784286	77.113029	67.918920	93.630022	74.495490	...	7.652857
22	0.777143	71.793072	77.113029	67.918920	93.630022	...	16.068571
23	0.795714	80.333027	71.793072	77.113029	67.918920	...	11.010000
24	0.847143	77.781531	80.333027	71.793072	77.113029	...	15.174286
25	0.772857	71.854679	77.781531	80.333027	71.793072	...	9.405714
26	0.772857	65.779445	71.854679	77.781531	80.333027	...	9.944286
27	0.787143	67.507820	65.779445	71.854679	77.781531	...	12.860000
28	0.804286	63.278685	67.507820	65.779445	71.854679	...	14.868571
29	0.778571	71.630877	63.278685	67.507820	65.779445	...	14.558571
30	0.792857	81.842540	71.630877	63.278685	67.507820	...	17.667143
...
91	0.672857	74.145410	74.954583	68.316695	65.981932	...	14.591429
92	0.801429	69.440865	74.145410	74.954583	68.316695	...	12.694286
93	0.732857	65.696722	69.440865	74.145410	74.954583	...	10.715714
94	0.775714	71.339482	65.696722	69.440865	74.145410	...	11.535714
95	0.754286	65.437931	71.339482	65.696722	69.440865	...	17.392857
96	0.704286	69.160818	65.437931	71.339482	65.696722	...	13.390000
97	0.762857	65.619442	69.160818	65.437931	71.339482	...	14.931429
98	0.838571	69.474258	65.619442	69.160818	65.437931	...	14.662857
99	0.696131	72.644275	69.474258	65.619442	69.160818	...	17.297143
100	0.737143	61.162204	72.644275	69.474258	65.619442	...	16.102857
101	0.817143	61.307206	61.162204	72.644275	69.474258	...	11.320000
102	0.808571	68.287755	61.307206	61.162204	72.644275	...	19.728571
103	0.730000	86.817619	68.287755	61.307206	61.162204	...	16.895714
104	0.771429	74.077658	86.817619	68.287755	61.307206	...	15.064286
105	0.801429	78.895956	74.077658	86.817619	68.287755	...	5.490000
106	0.765714	71.739465	78.895956	74.077658	86.817619	...	15.445714
107	0.788571	72.005948	71.739465	78.895956	74.077658	...	10.522857
108	0.775714	80.713782	72.005948	71.739465	78.895956	...	12.672857
109	0.751429	76.877442	80.713782	72.005948	71.739465	...	12.577143
110	0.761429	69.451989	76.877442	80.713782	72.005948	...	8.850000
111	0.844286	70.245566	69.451989	76.877442	80.713782	...	9.755714
113	0.602857	82.914623	70.245566	69.451989	76.877442	...	15.714286
114	0.804286	80.936769	82.914623	70.245566	69.451989	...	15.428571
115	0.825714	75.867974	80.936769	82.914623	70.245566	...	7.230000
116	0.820000	90.607556	75.867974	80.936769	82.914623	...	8.642857
117	0.808571	71.472853	90.607556	75.867974	80.936769	...	12.211429
118	0.772857	84.648671	71.472853	90.607556	75.867974	...	7.085714
119	0.795714	75.038481	84.648671	71.472853	90.607556	...	13.771429
120	0.711429	81.339806	75.038481	84.648671	71.472853	...	7.205714
121	0.482857	65.270613	81.339806	75.038481	84.648671	...	10.018571

	temp(t-4)	tempmin(t-1)	tempmin(t-2)	tempmin(t-3)	tempmin(t-4)	\
0	NaN	NaN	NaN	NaN	NaN	
1	NaN	5.961429	NaN	NaN	NaN	
2	NaN	9.022857	5.961429	NaN	NaN	

3	NaN	8.231429	9.022857	5.961429	NaN
4	10.095714	3.814286	8.231429	9.022857	5.961429
5	15.875714	3.368571	3.814286	8.231429	9.022857
7	16.750000	6.081429	3.368571	3.814286	8.231429
8	9.774286	7.614286	6.081429	3.368571	3.814286
9	11.110000	2.102857	7.614286	6.081429	3.368571
10	11.164286	5.900000	2.102857	7.614286	6.081429
11	14.865714	5.530000	5.900000	2.102857	7.614286
12	9.342857	3.474286	5.530000	5.900000	2.102857
13	13.925714	2.197143	3.474286	5.530000	5.900000
14	12.135714	8.051429	2.197143	3.474286	5.530000
15	8.830000	5.058571	8.051429	2.197143	3.474286
16	9.570000	4.948571	5.058571	8.051429	2.197143
17	15.700000	5.530000	4.948571	5.058571	8.051429
18	12.904286	4.030000	5.530000	4.948571	5.058571
19	12.691429	0.781429	4.030000	5.530000	4.948571
20	13.701429	8.272857	0.781429	4.030000	5.530000
21	11.690000	3.384286	8.272857	0.781429	4.030000
22	7.652857	7.370000	3.384286	8.272857	0.781429
23	16.068571	1.280000	7.370000	3.384286	8.272857
24	11.010000	4.030000	1.280000	7.370000	3.384286
25	15.174286	7.991429	4.030000	1.280000	7.370000
26	9.405714	7.970000	7.991429	4.030000	1.280000
27	9.944286	7.338571	7.970000	7.991429	4.030000
28	12.860000	9.915714	7.338571	7.970000	7.991429
29	14.868571	3.711429	9.915714	7.338571	7.970000
30	14.558571	2.550000	3.711429	9.915714	7.338571
..
91	17.635714	4.417143	4.267143	8.422857	9.957143
92	14.591429	3.524286	4.417143	4.267143	8.422857
93	12.694286	9.468571	3.524286	4.417143	4.267143
94	10.715714	5.791429	9.468571	3.524286	4.417143
95	11.535714	8.835714	5.791429	9.468571	3.524286
96	17.392857	7.574286	8.835714	5.791429	9.468571
97	13.390000	7.960000	7.574286	8.835714	5.791429
98	14.931429	9.318571	7.960000	7.574286	8.835714
99	14.662857	6.917143	9.318571	7.960000	7.574286
100	17.297143	10.490000	6.917143	9.318571	7.960000
101	16.102857	9.777143	10.490000	6.917143	9.318571
102	11.320000	6.961429	9.777143	10.490000	6.917143
103	19.728571	-0.621429	6.961429	9.777143	10.490000
104	16.895714	6.648571	-0.621429	6.961429	9.777143
105	15.064286	3.924286	6.648571	-0.621429	6.961429
106	5.490000	5.480000	3.924286	6.648571	-0.621429
107	15.445714	5.790000	5.480000	3.924286	6.648571
108	10.522857	3.217143	5.790000	5.480000	3.924286
109	12.672857	2.084286	3.217143	5.790000	5.480000
110	12.577143	7.180000	2.084286	3.217143	5.790000

111	8.850000	9.104286	7.180000	2.084286	3.217143
113	9.755714	1.590000	9.104286	7.180000	2.084286
114	15.714286	4.727143	1.590000	9.104286	7.180000
115	15.428571	3.787143	4.727143	1.590000	9.104286
116	7.230000	-0.562857	3.787143	4.727143	1.590000
117	8.642857	7.548571	-0.562857	3.787143	4.727143
118	12.211429	0.928571	7.548571	-0.562857	3.787143
119	7.085714	1.710000	0.928571	7.548571	-0.562857
120	13.771429	3.328571	1.710000	0.928571	7.548571
121	7.205714	10.725714	3.328571	1.710000	0.928571

	humidity(t-1)	humidity(t-2)	humidity(t-3)	humidity(t-4)
0	NaN	NaN	NaN	NaN
1	0.548571	NaN	NaN	NaN
2	0.761429	0.548571	NaN	NaN
3	0.720000	0.761429	0.548571	NaN
4	0.784286	0.720000	0.761429	0.548571
5	0.810000	0.784286	0.720000	0.761429
7	0.660000	0.810000	0.784286	0.720000
8	0.787143	0.660000	0.810000	0.784286
9	0.842857	0.787143	0.660000	0.810000
10	0.797143	0.842857	0.787143	0.660000
11	0.761429	0.797143	0.842857	0.787143
12	0.784286	0.761429	0.797143	0.842857
13	0.775714	0.784286	0.761429	0.797143
14	0.817143	0.775714	0.784286	0.761429
15	0.818571	0.817143	0.775714	0.784286
16	0.794286	0.818571	0.817143	0.775714
17	0.780000	0.794286	0.818571	0.817143
18	0.828571	0.780000	0.794286	0.818571
19	0.940000	0.828571	0.780000	0.794286
20	0.737143	0.940000	0.828571	0.780000
21	0.750000	0.737143	0.940000	0.828571
22	0.784286	0.750000	0.737143	0.940000
23	0.777143	0.784286	0.750000	0.737143
24	0.795714	0.777143	0.784286	0.750000
25	0.847143	0.795714	0.777143	0.784286
26	0.772857	0.847143	0.795714	0.777143
27	0.772857	0.772857	0.847143	0.795714
28	0.787143	0.772857	0.772857	0.847143
29	0.804286	0.787143	0.772857	0.772857
30	0.778571	0.804286	0.787143	0.772857
..
91	0.787143	0.804286	0.761429	0.838571
92	0.672857	0.787143	0.804286	0.761429
93	0.801429	0.672857	0.787143	0.804286
94	0.732857	0.801429	0.672857	0.787143
95	0.775714	0.732857	0.801429	0.672857

96	0.754286	0.775714	0.732857	0.801429
97	0.704286	0.754286	0.775714	0.732857
98	0.762857	0.704286	0.754286	0.775714
99	0.838571	0.762857	0.704286	0.754286
100	0.696131	0.838571	0.762857	0.704286
101	0.737143	0.696131	0.838571	0.762857
102	0.817143	0.737143	0.696131	0.838571
103	0.808571	0.817143	0.737143	0.696131
104	0.730000	0.808571	0.817143	0.737143
105	0.771429	0.730000	0.808571	0.817143
106	0.801429	0.771429	0.730000	0.808571
107	0.765714	0.801429	0.771429	0.730000
108	0.788571	0.765714	0.801429	0.771429
109	0.775714	0.788571	0.765714	0.801429
110	0.751429	0.775714	0.788571	0.765714
111	0.761429	0.751429	0.775714	0.788571
113	0.844286	0.761429	0.751429	0.775714
114	0.602857	0.844286	0.761429	0.751429
115	0.804286	0.602857	0.844286	0.761429
116	0.825714	0.804286	0.602857	0.844286
117	0.820000	0.825714	0.804286	0.602857
118	0.808571	0.820000	0.825714	0.804286
119	0.772857	0.808571	0.820000	0.825714
120	0.795714	0.772857	0.808571	0.820000
121	0.711429	0.795714	0.772857	0.808571

[119 rows x 22 columns]

In [18]: *#Ens quedem amb energies i temperatures passades*

```
daily_week=daily_week[['energy_sum','t-1','t-2','t-3','t-4','temp(t-1)','temp(t-2)','t-3']
daily_week.head(5)
```

Out [18]:

	energy_sum	t-1	t-2	t-3	t-4	temp(t-1)	\
--	------------	-----	-----	-----	-----	-----------	---

0	51.114714	NaN	NaN	NaN	NaN	NaN	
1	65.571115	51.114714	NaN	NaN	NaN	10.095714	
2	63.016513	65.571115	51.114714	NaN	NaN	15.875714	
3	82.034950	63.016513	65.571115	51.114714	NaN	16.750000	
4	75.672988	82.034950	63.016513	65.571115	51.114714	9.774286	

	temp(t-2)	temp(t-3)	temp(t-4)	tempmin(t-1)	tempmin(t-2)	tempmin(t-3)	\
--	-----------	-----------	-----------	--------------	--------------	--------------	---

0	NaN	NaN	NaN	NaN	NaN	NaN	
1	NaN	NaN	NaN	5.961429	NaN	NaN	
2	10.095714	NaN	NaN	9.022857	5.961429	NaN	
3	15.875714	10.095714	NaN	8.231429	9.022857	5.961429	
4	16.750000	15.875714	10.095714	3.814286	8.231429	9.022857	

	tempmin(t-4)	humidity(t-1)	humidity(t-2)	humidity(t-3)	humidity(t-4)
--	--------------	---------------	---------------	---------------	---------------

0	NaN	NaN	NaN	NaN	NaN
---	-----	-----	-----	-----	-----

1	NaN	0.548571	NaN	NaN	NaN
2	NaN	0.761429	0.548571	NaN	NaN
3	NaN	0.720000	0.761429	0.548571	NaN
4	5.961429	0.784286	0.720000	0.761429	0.548571

```
In [19]: daily_week=daily_week.reset_index()
daily_week=daily_week[['energy_sum','t-1','t-2','t-3','t-4','temp(t-1)','temp(t-2)','temp(t-3)']]
daily_week.head(5)
```

```
Out [19]:
```

	energy_sum	t-1	t-2	t-3	t-4	temp(t-1)	\
0	51.114714	NaN	NaN	NaN	NaN	NaN	
1	65.571115	51.114714	NaN	NaN	NaN	10.095714	
2	63.016513	65.571115	51.114714	NaN	NaN	15.875714	
3	82.034950	63.016513	65.571115	51.114714	NaN	16.750000	
4	75.672988	82.034950	63.016513	65.571115	51.114714	9.774286	

	temp(t-2)	temp(t-3)	temp(t-4)	tempmin(t-1)	tempmin(t-2)	tempmin(t-3)	\
0	NaN	NaN	NaN	NaN	NaN	NaN	
1	NaN	NaN	NaN	5.961429	NaN	NaN	
2	10.095714	NaN	NaN	9.022857	5.961429	NaN	
3	15.875714	10.095714	NaN	8.231429	9.022857	5.961429	
4	16.750000	15.875714	10.095714	3.814286	8.231429	9.022857	

	tempmin(t-4)	humidity(t-1)	humidity(t-2)	humidity(t-3)	humidity(t-4)
0	NaN	NaN	NaN	NaN	NaN
1	NaN	0.548571	NaN	NaN	NaN
2	NaN	0.761429	0.548571	NaN	NaN
3	NaN	0.720000	0.761429	0.548571	NaN
4	5.961429	0.784286	0.720000	0.761429	0.548571

```
In [20]: #Eliminem les 7 primeres files ja que contenen NaN (valors buits)
daily_week=daily_week.drop([0,1,2,3,4])
daily_week.head(5)
```

```
Out [20]:
```

	energy_sum	t-1	t-2	t-3	t-4	temp(t-1)	\
5	69.784306	75.672988	82.034950	63.016513	65.571115	11.110000	
6	69.481120	69.784306	75.672988	82.034950	63.016513	11.164286	
7	81.510830	69.481120	69.784306	75.672988	82.034950	14.865714	
8	69.813180	81.510830	69.481120	69.784306	75.672988	9.342857	
9	70.707853	69.813180	81.510830	69.481120	69.784306	13.925714	

	temp(t-2)	temp(t-3)	temp(t-4)	tempmin(t-1)	tempmin(t-2)	tempmin(t-3)	\
5	9.774286	16.750000	15.875714	3.368571	3.814286	8.231429	
6	11.110000	9.774286	16.750000	6.081429	3.368571	3.814286	
7	11.164286	11.110000	9.774286	7.614286	6.081429	3.368571	
8	14.865714	11.164286	11.110000	2.102857	7.614286	6.081429	
9	9.342857	14.865714	11.164286	5.900000	2.102857	7.614286	

	tempmin(t-4)	humidity(t-1)	humidity(t-2)	humidity(t-3)	humidity(t-4)
5	9.022857	0.810000	0.784286	0.720000	0.761429
6	8.231429	0.660000	0.810000	0.784286	0.720000
7	3.814286	0.787143	0.660000	0.810000	0.784286
8	3.368571	0.842857	0.787143	0.660000	0.810000
9	6.081429	0.797143	0.842857	0.787143	0.660000

```
In [124]: len(daily_week)
```

```
Out[124]: 112
```

```
In [15]:
```

```
WARNING:tensorflow:From c:\users\laura\appdata\local\programs\python\python37\lib\site-packages:
Instructions for updating:
Colocations handled automatically by placer.
```

```
In [21]: #normalitzem
```

```
scaler=preprocessing.MinMaxScaler(feature_range=(0, 1))
daily_week_norm=scaler.fit_transform(daily_week)
```

```
In [22]: #Partim en X i y(valor a predir)
```

```
#Seleccionem dades per y i X
y_week=daily_week_norm[:,0]
X_week=daily_week_norm[:,1:29]

#Reshape de [samples,timesteps] a [samples,timesteps,features]
#X_daily_list=X_daily.values#.tolist()
X_week=np.reshape(X_week, (X_week.shape[0],4,4))
```

```
In [18]: len(X_week)
```

```
Out[18]: 112
```

```
In [23]: # definim model
```

```
import tensorflow as tf
model =Sequential()
model.add(LSTM(50, activation='relu', input_shape=(4, 4)))
model.add(Dense(1))
model.compile(optimizer='adam', loss='mse')
```

```
#Walk forward per test i train
minim=2
n_train=55
lenght=len(daily_week)-2
```

```

llista_evaluate=list()
llista_prediccions=list()
llista_preditrain=list()
llista_scores=list()
llista_scoretrain=list()
sumScores=0

for i in range(n_train,lenght):
    minim=minim+1
    X_train,X_test= X_week[minim:i],X_week[i:i+1]
    y_train,y_test= y_week[minim:i],y_week[i:i+1]

    #fem fit al model
    model.fit(X_train, y_train, epochs=50, verbose=0)

    #mostrem score per cada model
    score=model.evaluate(X_test,y_test,verbose=0)
    llista_evaluate.append(score)

    #Predim per cadascun
    preditest=model.predict(X_test)
    llista_prediccions.append(preditest)

    preditrain=model.predict(X_train)
    llista_preditrain.append(preditrain)

    trainScore = math.sqrt(mean_squared_error(y_train, preditrain))
    llista_scoretrain.append(trainScore )

    testScore = math.sqrt(mean_squared_error(y_test, preditest))
    llista_scores.append(testScore)

    sumScores=sumScores+testScore

```

WARNING:tensorflow:From c:\users\laura\appdata\local\programs\python\python37\lib\site-packages\tensorflow\python\ops\colocation.py:119: Colocations handled automatically by placer.

WARNING:tensorflow:From c:\users\laura\appdata\local\programs\python\python37\lib\site-packages\tensorflow\python\ops\colocation.py:119: Colocations handled automatically by placer.

Instructions for updating:
Use tf.cast instead.

In [24]: *#Dividim la suma de scores de test entre el nombre de prediccions per obtenir la mitjana*
sumScores/(lenght-n_train)

Out[24]: 0.15868456230386607


```
In [26]: predis=list()
```

```
for i in range(len(llista_prediccions)):  
    predi=llista_prediccions[i].tolist()  
    predis.append(predi)
```

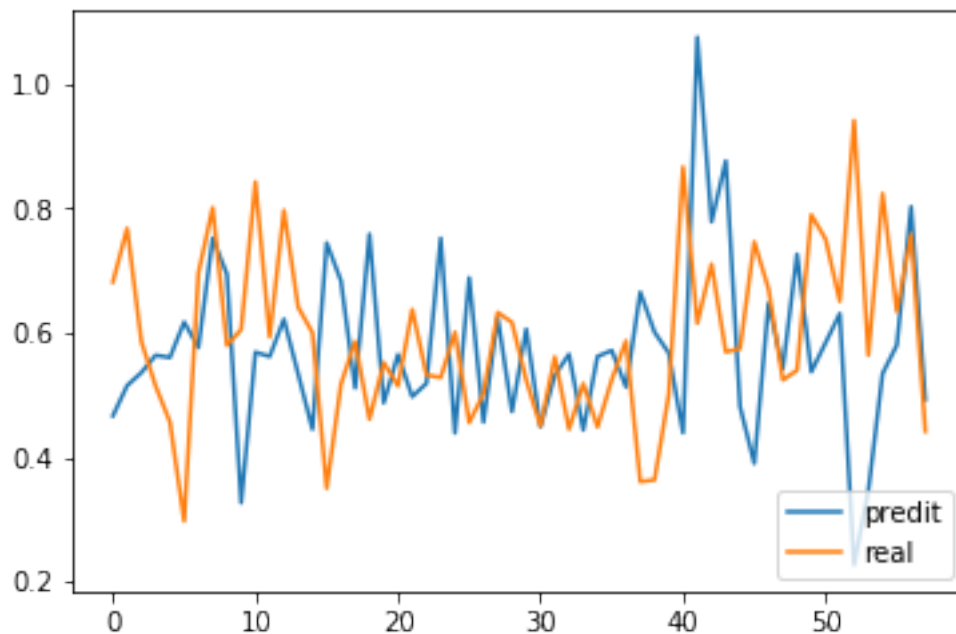
```
predis=np.reshape(predis, (58))
```

```
predis
```

```
Out[26]: array([0.46615487, 0.51471901, 0.53554231, 0.56343651, 0.55979919,  
                0.61665589, 0.57583052, 0.75142217, 0.69359946, 0.32651219,  
                0.56833786, 0.56138921, 0.62128377, 0.5333463 , 0.44457063,  
                0.74386793, 0.68302119, 0.51076514, 0.75795346, 0.48705414,  
                0.56446189, 0.49693224, 0.51818824, 0.751531 , 0.4385196 ,  
                0.68801087, 0.45614687, 0.62410623, 0.47301623, 0.60539931,  
                0.44869736, 0.5311994 , 0.56502616, 0.44337425, 0.5614925 ,  
                0.57110542, 0.51260328, 0.66461885, 0.6005767 , 0.56697059,  
                0.43887249, 1.07433772, 0.7776891 , 0.87542135, 0.48096213,  
                0.38976932, 0.64699262, 0.54207897, 0.725784 , 0.53683358,  
                0.5835306 , 0.6301977 , 0.22669008, 0.34568205, 0.53395426,  
                0.5796873 , 0.80198258, 0.49229088])
```

```
In [27]: ##Mostrem
```

```
plt.plot(predis, label="predit")  
plt.plot(y_week[n_train:lenght], label="real")  
plt.legend(loc="lower right")  
plt.show()
```



```
In [29]: prova=daily_week.iloc[n_train:lenght]
        prova
        #len(predis)
        #lenght-n_train
        prova['predi']=predis
        prova['y']=y_week[n_train:lenght]
        prova=prova.drop(['energy_sum','t-1'], axis=1)
        prova

        prova=prova[['predi','y','t-2','t-3','t-4','temp(t-1)','temp(t-2)','temp(t-3)','temp(t-4)']]
        prova
```

c:\users\laura\appdata\local\programs\python\python37\lib\site-packages\ipykernel_launcher.py:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: <http://pandas.pydata.org/pandas-docs/stable/indexing.html>

c:\users\laura\appdata\local\programs\python\python37\lib\site-packages\ipykernel_launcher.py:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: <http://pandas.pydata.org/pandas-docs/stable/indexing.html>
import sys

```
Out [29]:
```

	predi	y	t-2	t-3	t-4	temp(t-1)	\
60	0.466155	0.681024	72.062731	77.198766	77.260768	11.415714	
61	0.514719	0.767167	71.744692	72.062731	77.198766	12.012857	
62	0.535542	0.585234	77.437620	71.744692	72.062731	10.950000	
63	0.563437	0.513990	81.810558	77.437620	71.744692	10.742857	
64	0.559799	0.456374	72.574976	81.810558	77.437620	15.165714	
65	0.616656	0.297209	68.958373	72.574976	81.810558	16.284286	
66	0.575831	0.695217	66.033571	68.958373	72.574976	23.265714	
67	0.751422	0.800479	57.953783	66.033571	68.958373	10.168571	
68	0.693599	0.579275	78.158107	57.953783	66.033571	8.278571	
69	0.326512	0.604790	83.501617	78.158107	57.953783	12.042857	
70	0.568338	0.841917	72.272519	83.501617	78.158107	14.291429	
71	0.561389	0.592762	73.567716	72.272519	83.501617	12.585714	
72	0.621284	0.796123	85.605174	73.567716	72.272519	12.380000	
73	0.533346	0.640497	72.957145	85.605174	73.567716	5.622857	
74	0.444571	0.599801	83.280488	72.957145	85.605174	10.575714	
75	0.743868	0.349847	75.380342	83.280488	72.957145	12.288571	
76	0.683021	0.516987	73.314447	75.380342	83.280488	20.107143	
77	0.510765	0.585745	60.625875	73.314447	75.380342	12.655714	

78	0.757953	0.460769	69.110532	60.625875	73.314447	12.462857
79	0.487054	0.551698	72.600922	69.110532	60.625875	15.947143
80	0.564462	0.514140	66.256717	72.600922	69.110532	13.524286
81	0.496932	0.636863	70.872598	66.256717	72.600922	14.741429
82	0.518188	0.531834	68.965995	70.872598	66.256717	12.220000
83	0.751531	0.527565	75.195854	68.965995	70.872598	14.254286
84	0.438520	0.600453	69.864196	75.195854	68.965995	13.762857
85	0.688011	0.455356	69.647524	69.864196	75.195854	11.821429
86	0.456147	0.501349	73.347557	69.647524	69.864196	17.635714
87	0.624106	0.632110	65.981932	73.347557	69.647524	14.591429
88	0.473016	0.616170	68.316695	65.981932	73.347557	12.694286
89	0.605399	0.523494	74.954583	68.316695	65.981932	10.715714
90	0.448697	0.449738	74.145410	74.954583	68.316695	11.535714
91	0.531199	0.560895	69.440865	74.145410	74.954583	17.392857
92	0.565026	0.444640	65.696722	69.440865	74.145410	13.390000
93	0.443374	0.517978	71.339482	65.696722	69.440865	14.931429
94	0.561493	0.448216	65.437931	71.339482	65.696722	14.662857
95	0.571105	0.524152	69.160818	65.437931	71.339482	17.297143
96	0.512603	0.586599	65.619442	69.160818	65.437931	16.102857
97	0.664619	0.360412	69.474258	65.619442	69.160818	11.320000
98	0.600577	0.363268	72.644275	69.474258	65.619442	19.728571
99	0.566971	0.500779	61.162204	72.644275	69.474258	16.895714
100	0.438872	0.865802	61.307206	61.162204	72.644275	15.064286
101	1.074338	0.614835	68.287755	61.307206	61.162204	5.490000
102	0.777689	0.709752	86.817619	68.287755	61.307206	15.445714
103	0.875421	0.568775	74.077658	86.817619	68.287755	10.522857
104	0.480962	0.574024	78.895956	74.077658	86.817619	12.672857
105	0.389769	0.745561	71.739465	78.895956	74.077658	12.577143
106	0.646993	0.669989	72.005948	71.739465	78.895956	8.850000
107	0.542079	0.523713	80.713782	72.005948	71.739465	9.755714
108	0.725784	0.539346	76.877442	80.713782	72.005948	15.714286
109	0.536834	0.788916	69.451989	76.877442	80.713782	15.428571
110	0.583531	0.749954	70.245566	69.451989	76.877442	7.230000
111	0.630198	0.650103	82.914623	70.245566	69.451989	8.642857
112	0.226690	0.940460	80.936769	82.914623	70.245566	12.211429
113	0.345682	0.563523	75.867974	80.936769	82.914623	7.085714
114	0.533954	0.823075	90.607556	75.867974	80.936769	13.771429
115	0.579687	0.633763	71.472853	90.607556	75.867974	7.205714
116	0.801983	0.757893	84.648671	71.472853	90.607556	10.018571
117	0.492291	0.441344	75.038481	84.648671	71.472853	10.297143

	temp(t-2)	temp(t-3)	temp(t-4)	tempmin(t-1)	tempmin(t-2)	\
60	7.481429	10.284286	11.920000	5.054286	2.308571	
61	11.415714	7.481429	10.284286	4.364286	5.054286	
62	12.012857	11.415714	7.481429	4.078571	4.364286	
63	10.950000	12.012857	11.415714	3.617143	4.078571	
64	10.742857	10.950000	12.012857	6.892857	3.617143	
65	15.165714	10.742857	10.950000	8.255714	6.892857	

66	16.284286	15.165714	10.742857	13.784286	8.255714
67	23.265714	16.284286	15.165714	2.300000	13.784286
68	10.168571	23.265714	16.284286	0.571429	2.300000
69	8.278571	10.168571	23.265714	5.510000	0.571429
70	12.042857	8.278571	10.168571	8.212857	5.510000
71	14.291429	12.042857	8.278571	3.828571	8.212857
72	12.585714	14.291429	12.042857	5.085714	3.828571
73	12.380000	12.585714	14.291429	0.192857	5.085714
74	5.622857	12.380000	12.585714	3.547143	0.192857
75	10.575714	5.622857	12.380000	4.511429	3.547143
76	12.288571	10.575714	5.622857	10.581429	4.511429
77	20.107143	12.288571	10.575714	6.118571	10.581429
78	12.655714	20.107143	12.288571	5.967143	6.118571
79	12.462857	12.655714	20.107143	7.852857	5.967143
80	15.947143	12.462857	12.655714	5.730000	7.852857
81	13.524286	15.947143	12.462857	8.095714	5.730000
82	14.741429	13.524286	15.947143	4.847143	8.095714
83	12.220000	14.741429	13.524286	9.315714	4.847143
84	14.254286	12.220000	14.741429	6.275714	9.315714
85	13.762857	14.254286	12.220000	6.450000	6.275714
86	11.821429	13.762857	14.254286	9.957143	6.450000
87	17.635714	11.821429	13.762857	8.422857	9.957143
88	14.591429	17.635714	11.821429	4.267143	8.422857
89	12.694286	14.591429	17.635714	4.417143	4.267143
90	10.715714	12.694286	14.591429	3.524286	4.417143
91	11.535714	10.715714	12.694286	9.468571	3.524286
92	17.392857	11.535714	10.715714	5.791429	9.468571
93	13.390000	17.392857	11.535714	8.835714	5.791429
94	14.931429	13.390000	17.392857	7.574286	8.835714
95	14.662857	14.931429	13.390000	7.960000	7.574286
96	17.297143	14.662857	14.931429	9.318571	7.960000
97	16.102857	17.297143	14.662857	6.917143	9.318571
98	11.320000	16.102857	17.297143	10.490000	6.917143
99	19.728571	11.320000	16.102857	9.777143	10.490000
100	16.895714	19.728571	11.320000	6.961429	9.777143
101	15.064286	16.895714	19.728571	-0.621429	6.961429
102	5.490000	15.064286	16.895714	6.648571	-0.621429
103	15.445714	5.490000	15.064286	3.924286	6.648571
104	10.522857	15.445714	5.490000	5.480000	3.924286
105	12.672857	10.522857	15.445714	5.790000	5.480000
106	12.577143	12.672857	10.522857	3.217143	5.790000
107	8.850000	12.577143	12.672857	2.084286	3.217143
108	9.755714	8.850000	12.577143	7.180000	2.084286
109	15.714286	9.755714	8.850000	9.104286	7.180000
110	15.428571	15.714286	9.755714	1.590000	9.104286
111	7.230000	15.428571	15.714286	4.727143	1.590000
112	8.642857	7.230000	15.428571	3.787143	4.727143
113	12.211429	8.642857	7.230000	-0.562857	3.787143

114	7.085714	12.211429	8.642857	7.548571	-0.562857
115	13.771429	7.085714	12.211429	0.928571	7.548571
116	7.205714	13.771429	7.085714	1.710000	0.928571
117	10.018571	7.205714	13.771429	3.328571	1.710000

	tempmin(t-3)	tempmin(t-4)	humidity(t-1)	humidity(t-2)	humidity(t-3)	\
60	3.937143	4.064286	0.771429	0.654286	0.758571	
61	2.308571	3.937143	0.818571	0.771429	0.654286	
62	5.054286	2.308571	0.845714	0.818571	0.771429	
63	4.364286	5.054286	0.740000	0.845714	0.818571	
64	4.078571	4.364286	0.722857	0.740000	0.845714	
65	3.617143	4.078571	0.777143	0.722857	0.740000	
66	6.892857	3.617143	0.697143	0.777143	0.722857	
67	8.255714	6.892857	0.798571	0.697143	0.777143	
68	13.784286	8.255714	0.817143	0.798571	0.697143	
69	2.300000	13.784286	0.775714	0.817143	0.798571	
70	0.571429	2.300000	0.767143	0.775714	0.817143	
71	5.510000	0.571429	0.937143	0.767143	0.775714	
72	8.212857	5.510000	0.757143	0.937143	0.767143	
73	3.828571	8.212857	0.742857	0.757143	0.937143	
74	5.085714	3.828571	0.808571	0.742857	0.757143	
75	0.192857	5.085714	0.737143	0.808571	0.742857	
76	3.547143	0.192857	0.735714	0.737143	0.808571	
77	4.511429	3.547143	0.775714	0.735714	0.737143	
78	10.581429	4.511429	0.811429	0.775714	0.735714	
79	6.118571	10.581429	0.770000	0.811429	0.775714	
80	5.967143	6.118571	0.795714	0.770000	0.811429	
81	7.852857	5.967143	0.680000	0.795714	0.770000	
82	5.730000	7.852857	0.851429	0.680000	0.795714	
83	8.095714	5.730000	0.800000	0.851429	0.680000	
84	4.847143	8.095714	0.737143	0.800000	0.851429	
85	9.315714	4.847143	0.835714	0.737143	0.800000	
86	6.275714	9.315714	0.838571	0.835714	0.737143	
87	6.450000	6.275714	0.761429	0.838571	0.835714	
88	9.957143	6.450000	0.804286	0.761429	0.838571	
89	8.422857	9.957143	0.787143	0.804286	0.761429	
90	4.267143	8.422857	0.672857	0.787143	0.804286	
91	4.417143	4.267143	0.801429	0.672857	0.787143	
92	3.524286	4.417143	0.732857	0.801429	0.672857	
93	9.468571	3.524286	0.775714	0.732857	0.801429	
94	5.791429	9.468571	0.754286	0.775714	0.732857	
95	8.835714	5.791429	0.704286	0.754286	0.775714	
96	7.574286	8.835714	0.762857	0.704286	0.754286	
97	7.960000	7.574286	0.838571	0.762857	0.704286	
98	9.318571	7.960000	0.696131	0.838571	0.762857	
99	6.917143	9.318571	0.737143	0.696131	0.838571	
100	10.490000	6.917143	0.817143	0.737143	0.696131	
101	9.777143	10.490000	0.808571	0.817143	0.737143	

102	6.961429	9.777143	0.730000	0.808571	0.817143
103	-0.621429	6.961429	0.771429	0.730000	0.808571
104	6.648571	-0.621429	0.801429	0.771429	0.730000
105	3.924286	6.648571	0.765714	0.801429	0.771429
106	5.480000	3.924286	0.788571	0.765714	0.801429
107	5.790000	5.480000	0.775714	0.788571	0.765714
108	3.217143	5.790000	0.751429	0.775714	0.788571
109	2.084286	3.217143	0.761429	0.751429	0.775714
110	7.180000	2.084286	0.844286	0.761429	0.751429
111	9.104286	7.180000	0.602857	0.844286	0.761429
112	1.590000	9.104286	0.804286	0.602857	0.844286
113	4.727143	1.590000	0.825714	0.804286	0.602857
114	3.787143	4.727143	0.820000	0.825714	0.804286
115	-0.562857	3.787143	0.808571	0.820000	0.825714
116	7.548571	-0.562857	0.772857	0.808571	0.820000
117	0.928571	7.548571	0.795714	0.772857	0.808571

humidity(t-4)

60	0.715714
61	0.758571
62	0.654286
63	0.771429
64	0.818571
65	0.845714
66	0.740000
67	0.722857
68	0.777143
69	0.697143
70	0.798571
71	0.817143
72	0.775714
73	0.767143
74	0.937143
75	0.757143
76	0.742857
77	0.808571
78	0.737143
79	0.735714
80	0.775714
81	0.811429
82	0.770000
83	0.795714
84	0.680000
85	0.851429
86	0.800000
87	0.737143
88	0.835714
89	0.838571

```

90         0.761429
91         0.804286
92         0.787143
93         0.672857
94         0.801429
95         0.732857
96         0.775714
97         0.754286
98         0.704286
99         0.762857
100        0.838571
101        0.696131
102        0.737143
103        0.817143
104        0.808571
105        0.730000
106        0.771429
107        0.801429
108        0.765714
109        0.788571
110        0.775714
111        0.751429
112        0.761429
113        0.844286
114        0.602857
115        0.804286
116        0.825714
117        0.820000

```

```
In [30]: predi = scaler.inverse_transform(prova)
```

```
In [31]: #Fem una llista amb les prediccions i una llista amb y(valor real)
```

```

listpredi=list()
for i in range(len(predi)):
    listpredi.append(predi[i][0])

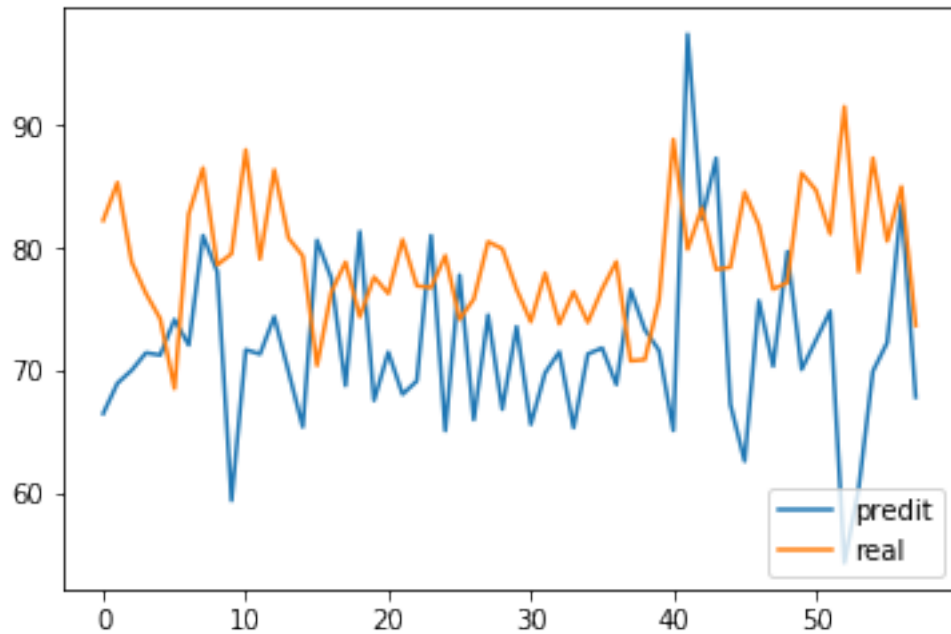
```

```

listy=list()
for i in range(len(predi)):
    listy.append(predi[i][1])

```

```
In [32]: ##Mostrem
plt.plot(listpredi, label="predict")
plt.plot(listy, label="real")
plt.legend(loc="lower right")
plt.show()
```

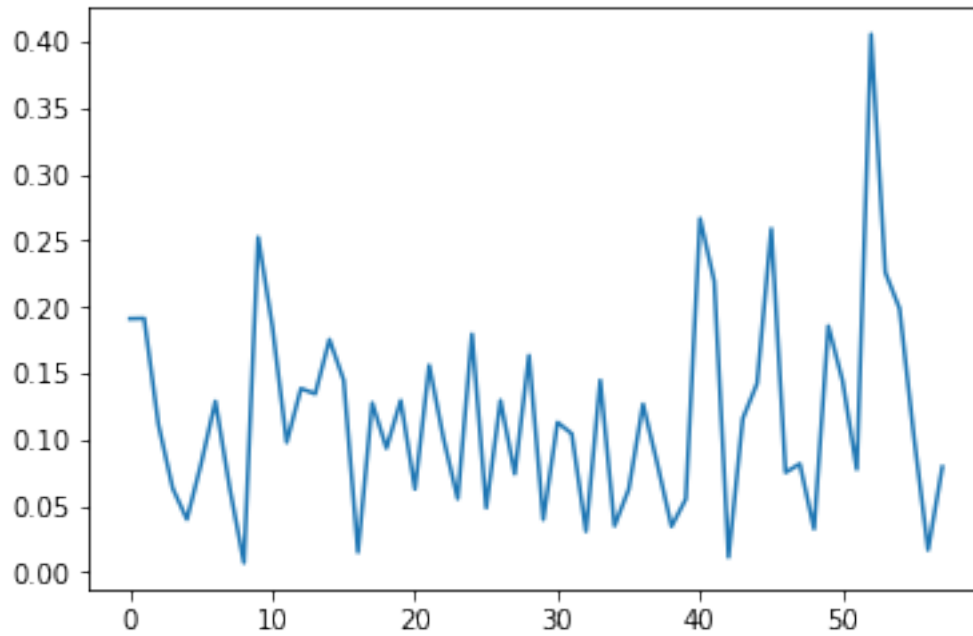


```
In [33]: llista_errors=list()
         llista_errorsabs=list()
         llista_errorsres=list()

         for i in range(len(listpredi)):
             valor=listy[i]-listpredi[i]
             valorabs=math.fabs(valor)
             valorrespecte=valorabs/listy[i]
             llista_errors.append(valor)
             llista_errorsabs.append(valorabs)
             llista_errorsres.append(valorrespecte)
```

```
In [34]: plt.plot(llista_errorsres)
```

```
Out[34]: [<matplotlib.lines.Line2D at 0x1a348414780>]
```

```
In [35]: sum(llista_errorsres)/(len(llista_errorsres))
```

```
Out[35]: 0.11738416226901081
```

```
In [ ]:
```