

# Heatmap\_np

January 12, 2021

## 1 Heatmap determining data quality for Energy Production

```
[7]: #Import modules:
import numpy as np
import pandas as pd
from tqdm import tqdm
import matplotlib.pyplot as plt
import glob
import seaborn as sns

from sklearn.svm import SVR
from sklearn.model_selection import train_test_split
from statsmodels.tsa.arima_model import ARMA

[8]: #functions
def nParse3(n):
    """output a string that is 3 decimals long. Levy en Jefry kunnen uitleg_
    ↳geven"""
    number = str(n)
    if len(number) == 1:
        number = "00" + number
    elif len(number) == 2:
        number = "0" + number
    elif len(number) == 3:
        number = number
    return str(number)

def check_eq_w_range(Numpy_Sum,Excel_Sum,abs_diff):
    """Check if a value is equal within a certain range."""
    if abs(Numpy_Sum-Excel_Sum) < abs_diff:
        return True
    else:
        return False

def open_file_append_sentence(msg):
    """open the file, append the sentence, and then close the file."""
    with open("DataCheck_info_NEW.txt",'a') as f:
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f.write(str(msg))
f.close()
```

Heatmap #1 (mean, max, min)

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[ ]: #Select the path to the datasets and the sheets to be collected.
path = '/home/18062814/notebooks/zero/DATA/'

sheets = [
    → ['energyImmersion', 'energyHeatpump', 'smartMeter', 'energyWtwReg', 'solar']

#Define a function with which to compute the difference in timestep per sheet.
def add_diff(df):
    try:
        df[len(df.columns)+1] = abs(df[0].diff()-300).fillna(0)
    except:
        df[len(df.columns)+1] = 0
    return df

#Create an empty dictionary object; Key = sheetname, Value = house number.
#Start a for loop to add dictionaries to it for each house; Key = house number,
→ Value = dataframe containing data of selected sheet.
D = {}

for i in range(1,121):
    for sheet in sheets:
        df = pd.DataFrame(np.load(path + sheet + '_' + nParse3(i) + '.npy'))
        df = add_diff(df)

        col_names = list(df.columns)
        col_names[-1] = "diff_ts"
        df.columns = col_names

        if sheet in D.keys():
            D[sheet][nParse3(i)] = df
        else:
            D[sheet] = {nParse3(i):df}

#Create an empty dataframe object; containing the mean, max and min value of
→ diff_ts per sheet for each house.
#Loop over the data stored in dictionary.
#data_df_mean = pd.DataFrame()
#data_df_min = pd.DataFrame()
#data_df_max = pd.DataFrame()

data_list = []
```

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for i in range(1, 121):
    for sheet in sheets:
        data = D[sheet][nParse3(i)]['diff_ts']

        row = [sheet,i,data.mean(),data.min(),data.max()]
        data_list.append(row)

        #data_df_mean[sheet + '_ts_mean'] = data.mean()
        #data_df_min[sheet + '_ts_min'] = data.min()
        #data_df_max[sheet + '_ts_max'] = data.max()

data_df = pd.
↳DataFrame(data_list,columns=["Sheet","HouseNumber","MEAN","MIN","MAX"])
data_df_mean = data_df.pivot('HouseNumber','Sheet','MEAN')
data_df_min = data_df.pi

# %matplotlib notebook
# plt.subplots(figsize=(30,7))
# st_df = st_df.pivot(0,1,3)
# ax = sns.heatmap(dick[:,:]['diff_ts'], vmin=0, vmax=0.25, xticklabels=np.
↳arange(121))
# ax.set_yticks(np.arange(len(st_df.index)))
# ax.set_yticklabels(st_df.index)
# ax.set_xticks(np.arange(121))
# ax.set_xlim(0,120)
# plt.title('HEATMAP SHOWING HOW THE SUM OF THE EXCEL & NUMPY DATASETS DIFFER_
↳PER SHEET FOR EVERY HOUSE')
# ax.set_ylabel(None)
# ax.set_xlabel(None)
# plt.savefig('heetmapje_week5_v1.0.png', dpi=1200)

```

Heatmap #2 (count of ts-diff  $\geq$  1 hr)

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[ ]: #Select the path to the datasets and the sheets to be collected.
path = '/home/18062814/notebooks/zero/DATA/'

sheets = _
↳['energyImmersion','energyHeatpump','smartMeter','energyWtwReg','solar']

#Define a function with which to compute the difference in timestep per sheet.

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```

def add_diff(df):
    try:
        df[len(df.columns)+1] = abs(df[0].diff()-300).fillna(0)
    except:
        df[len(df.columns)+1] = 0

    return df

#Create an empty dictionary object; Key = sheetname, Value = house number.
#Start a for loop to add dictionaries to it for each house; Key = house number,
    ↳ Value = dataframe containing data of selected sheet.
D = {}

for i in range(1,121):
    for sheet in sheets:
        df = pd.DataFrame(np.load(path + sheet + '_' + nParse3(i) + '.npy'))
        df = add_diff(df)

        col_names = list(df.columns)
        col_names[-1] = "diff_ts"
        df.columns = col_names

        if sheet in D.keys():
            D[sheet][nParse3(i)] = df
        else:
            D[sheet] = {nParse3(i):df}

#Create an empty list; containing the mean, max and min value of diff_ts per
    ↳ sheet for each house.
#Loop over the data stored in dictionary.
data_list = []

for i in range(1, 121):
    for sheet in sheets:
        data = D[sheet][nParse3(i)]["diff_ts"]

        row = [sheet,i,data.mean(),data.min(),data.max(), np.count_nonzero(data
            ↳ >= 3600)]
        data_list.append(row)

#Create a dataframe for each of the values for diff_ts in the list; MEAN, MIN,
    ↳ MAX, Count
data_df = pd.
    ↳ DataFrame(data_list,columns=["Sheet","HouseNumber","MEAN","MIN","MAX",
    ↳ "Count"])
data_df_mean = data_df.pivot('Sheet','HouseNumber','MEAN')

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data_df_min = data_df.pivot('Sheet', 'HouseNumber', 'MIN')
data_df_max = data_df.pivot('Sheet', 'HouseNumber', 'MAX')
data_df_count = data_df.pivot('Sheet', 'HouseNumber', 'Count')

%matplotlib notebook
plt.subplots(figsize=(30,4))
ax = sns.heatmap(data_df_count, xticklabels=range(121))
ax.set_yticks(np.arange(5))
ax.set_xticks(np.arange(121))
plt.tight_layout()
plt.title('HEATMAP SHOWING THE COUNT OF WHEN THE DIFFERENCE IN TIMESTAMP PER_
→SHEET FOR EACH HOUSE IS GREATER OR EQUAL TO 1 HOUR')
# plt.savefig('heetmappie_count_np.png', dpi=600)

```

Heatmap #3 (count of ts-diff >= 1 hr for the calmer regions in the data)

```

[95]: #list of houses to remove
h_ext = [27, 29, 31, 32, 33, 34, 35, 36, 44, 66, 82, 101, 103, 110, 116]

#Select the path to the datasets and the sheets to be collected.
path = '/home/18062814/notebooks/zero/DATA/'

sheets =
→['energyImmersion', 'energyHeatpump', 'smartMeter', 'energyWtwReg', 'solar']

#Define a function with which to compute the difference in timestep per sheet.
def add_diff(df):
    try:
        df[len(df.columns)+1] = abs(df[0].diff()-300).fillna(0)
    except:
        df[len(df.columns)+1] = 0
    return df

#Create an empty dictionary object; Key = sheetname, Value = house number.
#Start a for loop to add dictionaries to it for each house; Key = house number,
→Value = dataframe containing data of selected sheet.
D = {}

for i in range(1,121):
    for sheet in sheets:
        df = pd.DataFrame(np.load(path + sheet + '_' + nParse3(i) + '.npy'))
        df = add_diff(df)

        col_names = list(df.columns)
        col_names[-1] = "diff_ts"
        df.columns = col_names

```

```

        if sheet in D.keys():
            D[sheet][nParse3(i)] = df
        else:
            D[sheet] = {nParse3(i):df}

#Create an empty list; containing the mean, max and min value of diff_ts per
→sheet for each house.
#Loop over the data stored in dictionary.
data_list = []

for i in range(1, 121):
    if i in h_ext:
        row = ["solar",i,np.nan]
        data_list.append(row)
        continue
    for sheet in sheets:
        data = D[sheet][nParse3(i)]['diff_ts']

        row = [sheet,i,np.count_nonzero(data >= 3600)]
        data_list.append(row)

#Create a dataframe for each of the values for diff_ts in the list; MEAN, MIN,
→MAX, Count
data_df = pd.DataFrame(data_list,columns=["Sheet","HouseNumber","Count"])
data_df_count = data_df.pivot('Sheet','HouseNumber', 'Count')

# data_df_count.columns = np.where(data_df_count.columns in h_ext,
→data_df_count.columns, np.nan)

%matplotlib notebook
plt.subplots(figsize=(30,4))
ax = sns.heatmap(data_df_count, xticklabels=range(121), cmap='flare')
ax.set_yticks(np.arange(6))
ax.set_xticks(np.arange(121))
plt.tight_layout()
plt.title('HEATMAP SHOWING THE COUNT OF WHEN THE DIFFERENCE IN TIMESTAMP PER
→SHEET FOR EACH HOUSE IS GREATER OR EQUAL TO 1 HOUR')
plt.savefig('heetmappie_count_np_calm.png', dpi=600)

```

<IPython.core.display.Javascript object>

<IPython.core.display.HTML object>

[96]: df.columns

```
[96]: Index([0, 1, 2, 3, 'diff_ts'], dtype='object')
```

```
[42]: data_df_count.columns
```

```
[42]: Int64Index([ 1,  2,  3,  4,  5,  6,  7,  8,  9, 10,
                ...
                111, 112, 113, 114, 115, 116, 117, 118, 119, 120],
                dtype='int64', name='HouseNumber', length=120)
```

```
[21]: np.shape(data_df_count)
```

```
[21]: (5, 120)
```

```
[30]: data_df_count.index
```

```
[30]: Index(['energyHeatpump', 'energyImmersion', 'energyWtwReg', 'smartMeter',
          'solar'],
          dtype='object', name='Sheet')
```

```
[32]: data_df_count.columns
```

```
[32]: Int64Index([ 1,  2,  3,  4,  5,  6,  7,  8,  9, 10,
                ...
                111, 112, 113, 114, 115, 116, 117, 118, 119, 120],
                dtype='int64', name='HouseNumber', length=120)
```

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[ ]:
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