

XM_HeatForecast



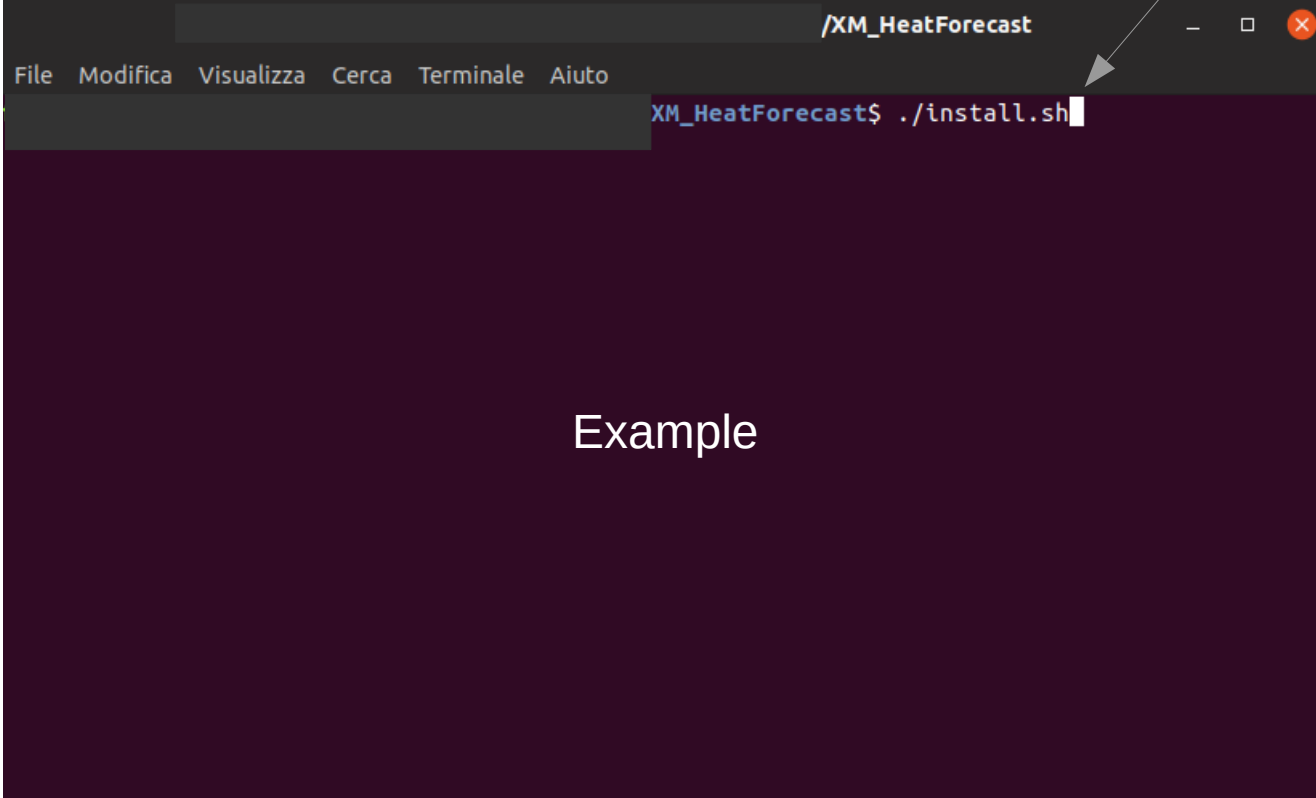
Documentation

1. How to install the software
2. How to launch XM_HeatForecast
3. Modules
 - 3.1 - Forecaster
 - 3.2 - GUI
 - 3.3 - Overview
4. Overview of folders and files

1. How to install the software

To use XM_HeatForecast, Python 3.X has to be installed.

Launch the script “install.sh” to install the libraries required, typing “**./install.sh**” on the terminal

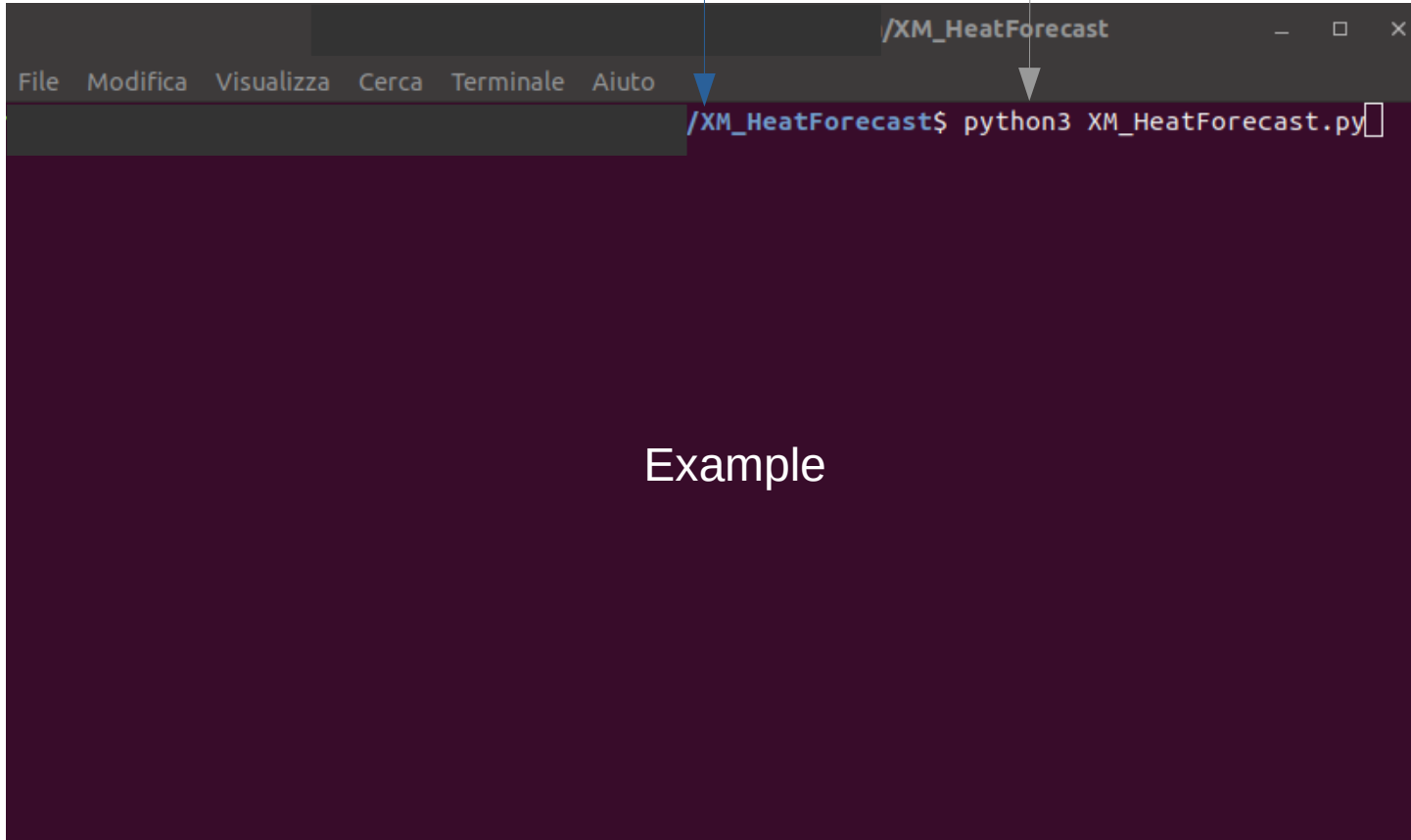


The screenshot shows a terminal window titled "/XM_HeatForecast". The menu bar includes "File", "Modifica", "Visualizza", "Cerca", "Terminale", and "Aiuto". The terminal prompt is "XM_HeatForecast\$". The command `./install.sh` has been entered, and a white cursor is at the end of the line. A grey arrow points from the text in the paragraph above to the `./install.sh` command in the terminal. The word "Example" is centered in the terminal area.

```
Example
```

2. How to launch XM_HeatForecast

In order to launch XM_HeatForecast, the user has to simply type the command “**python3 XM_HeatForecast.py**” on terminal opened in the tool **folder**

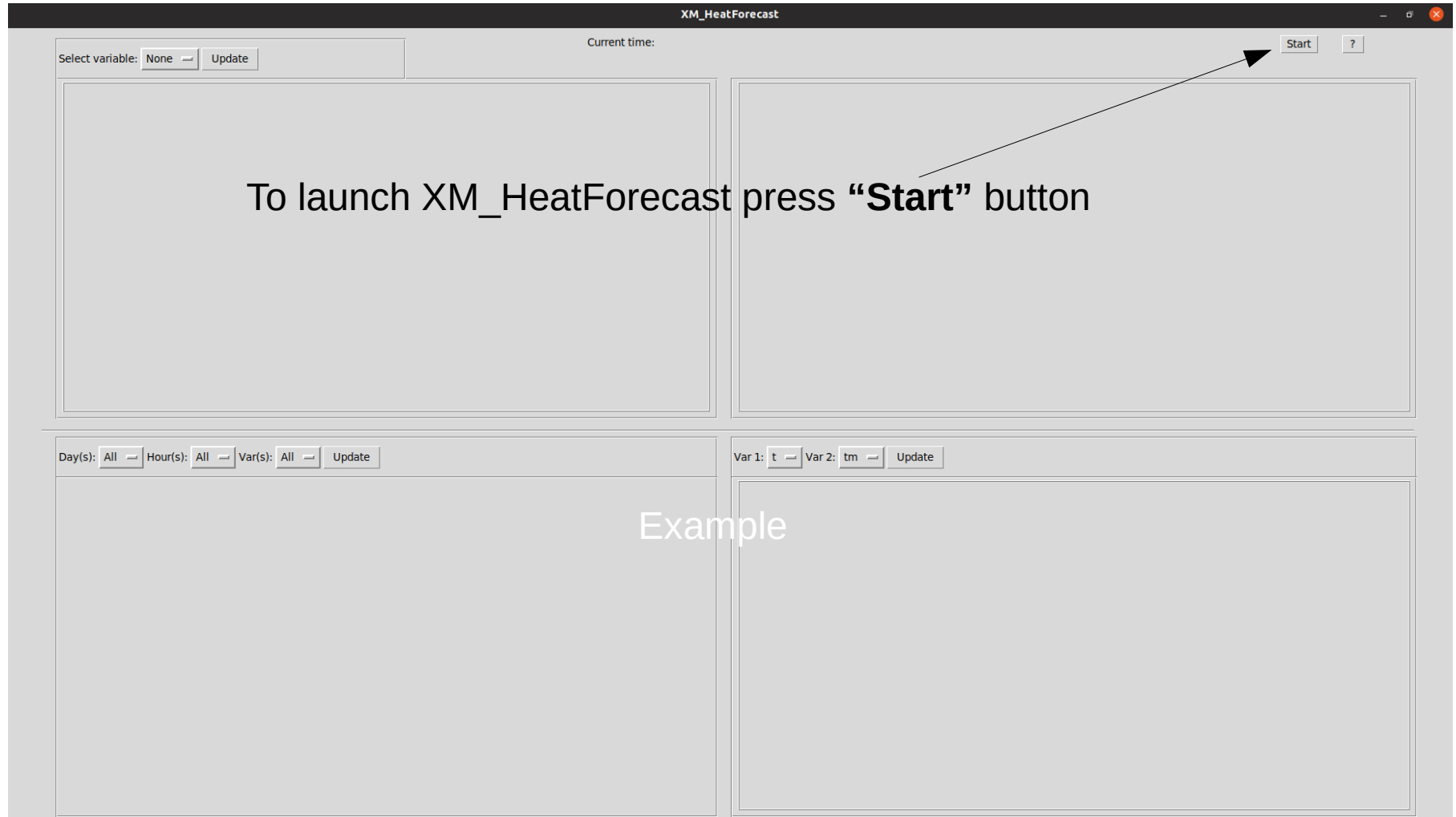


The screenshot shows a terminal window titled "/XM_HeatForecast". The menu bar includes "File", "Modifica", "Visualizza", "Cerca", "Terminale", and "Aiuto". The terminal prompt is "/XM_HeatForecast\$". The command "python3 XM_HeatForecast.py" has been entered. Two arrows point from the text above to the terminal: one points to the "Terminale" menu item, and the other points to the command "python3 XM_HeatForecast.py".

```
/XM_HeatForecast$ python3 XM_HeatForecast.py
```

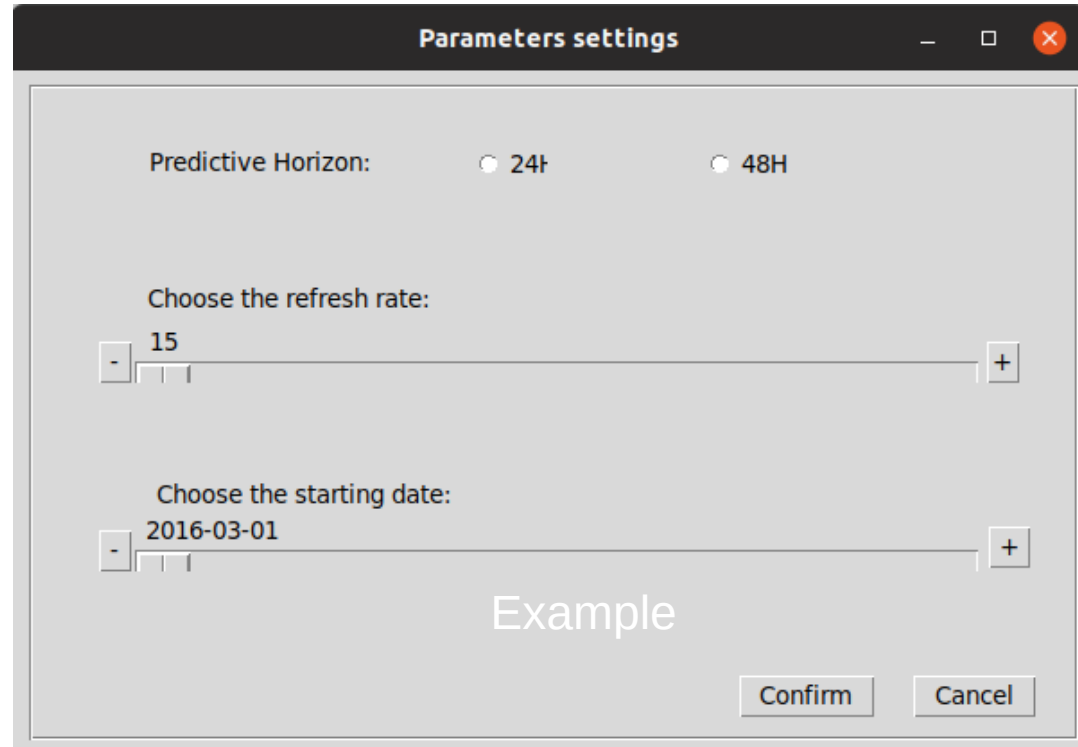
Example

2. How to launch XM_HeatForecast



2. How to launch XM_HeatForecast

A window should appear in the middle of the screen



A screenshot of a 'Parameters settings' window. The window has a dark title bar with standard minimize, maximize, and close buttons. The main content area is light gray and contains three settings sections. The first section, 'Predictive Horizon:', has two radio buttons: '24h' (selected) and '48H'. The second section, 'Choose the refresh rate:', features a horizontal slider with a minus button on the left and a plus button on the right; the value '15' is displayed in the center. The third section, 'Choose the starting date:', has a similar slider with a minus button on the left and a plus button on the right; the date '2016-03-01' is displayed in the center. At the bottom right of the window are two buttons: 'Confirm' and 'Cancel'. The word 'Example' is written in large, light gray text in the lower-middle part of the window.

Parameters settings

Predictive Horizon: ☒ 24h ☐ 48H

Choose the refresh rate:

15

Choose the starting date:

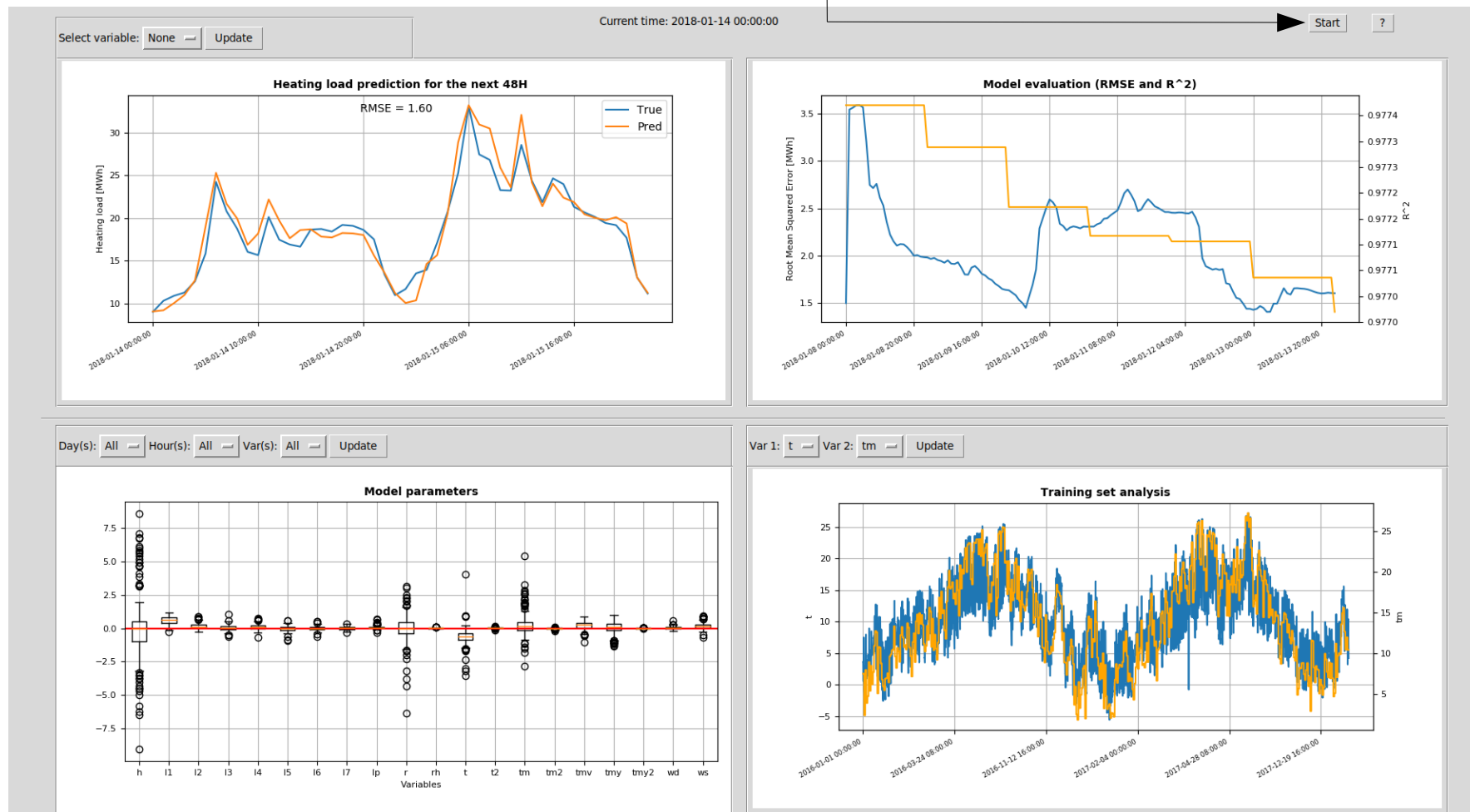
2016-03-01

Example

Confirm Cancel

2. How to launch XM_HeatForecast

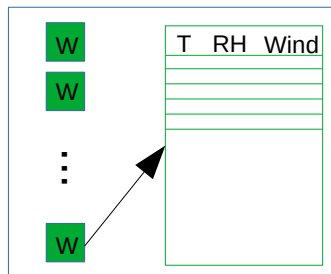
To launch XM_HeatForecast press **“Start”** button



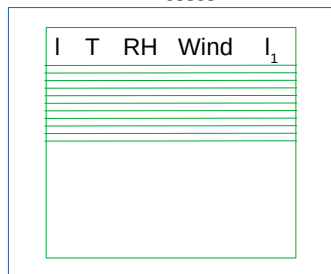
3. *Modules*

3.1 - Forecaster

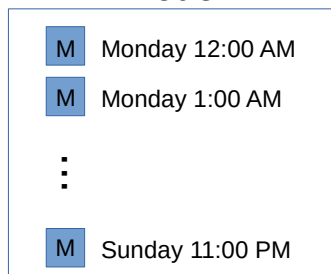
Weather forecast



Data



Model



Forecaster

Runs every hour

Data
Processing

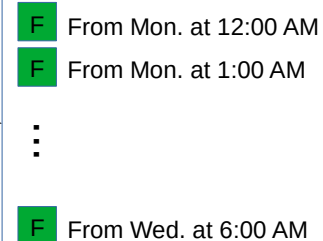
Forecasting

Training
Runs every 24 hours

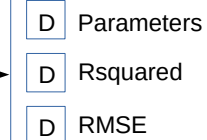
Parameters

h: Forecasting horizon

Forecast files



Performance



3.2 - GUI

Performance

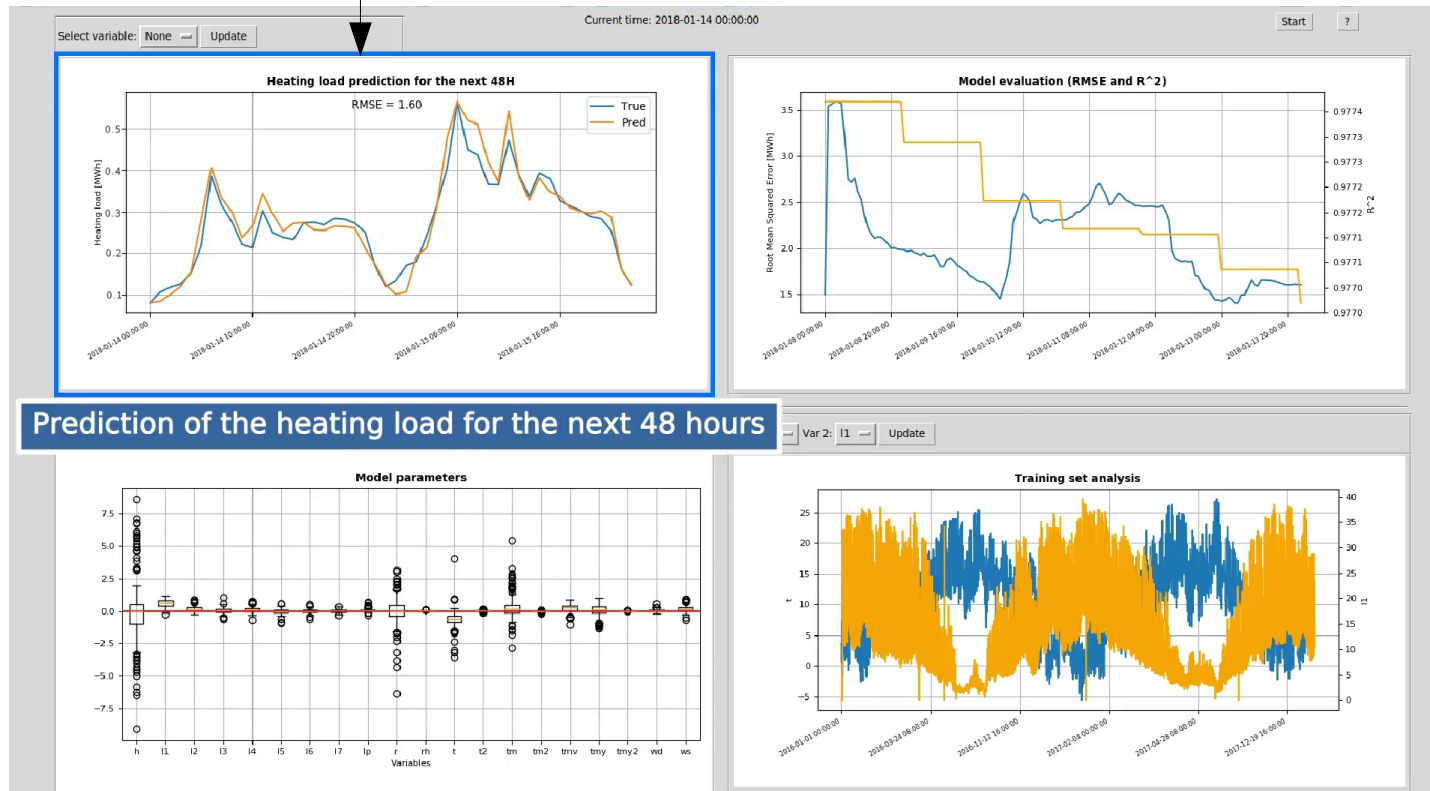
- ☐ Parameters
- ☐ Rsquared
- ☐ RMSE

Forecast files

- ☐ From Mon. at 12:00 AM
- ☐ From Mon. at 1:00 AM
- ⋮
- ☐ From Wed. at 6:00 AM

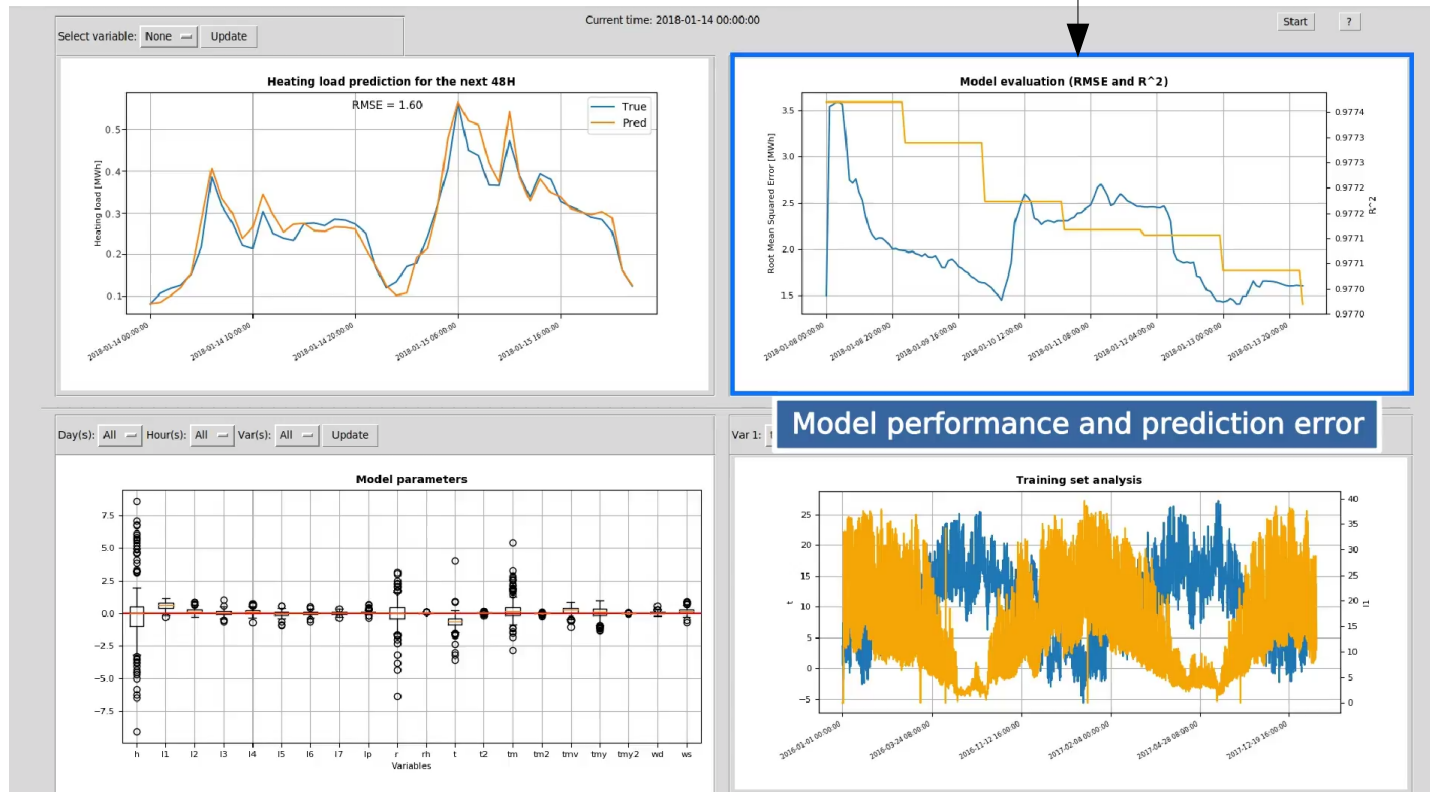
Data

I	T	RH	Wind	I ₁



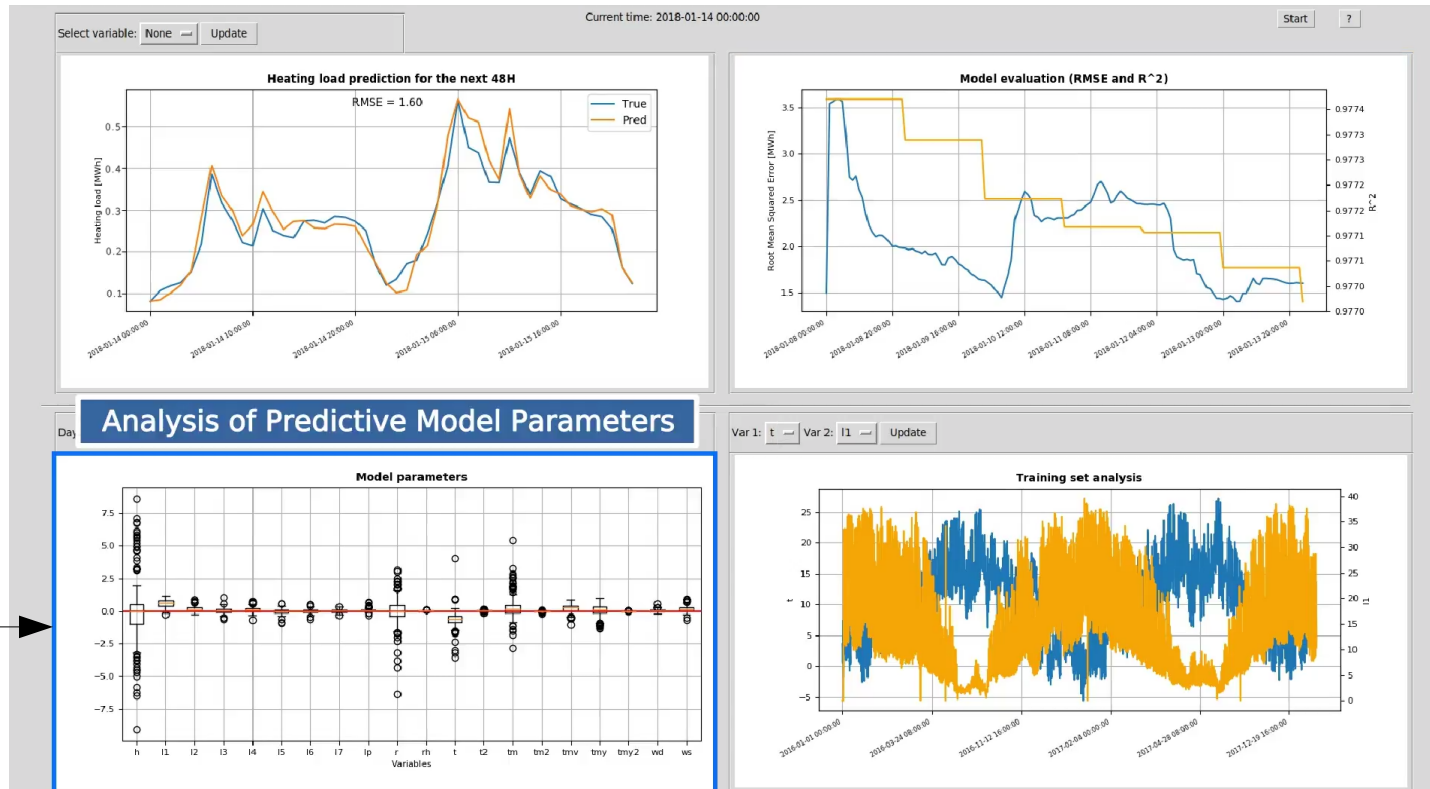
- D Parameters
- D Rsquared
- D RMSE

- F From Mon. at 12:00 AM
- F From Mon. at 1:00 AM
- ⋮
- F From Wed. at 6:00 AM

[illegible]

- ☐ Parameters
- ☐ Rsquared
- ☐ RMSE

- F From Mon. at 12:00 AM
- F From Mon. at 1:00 AM
- ⋮
- F From Wed. at 6:00 AM

[illegible]

Performance

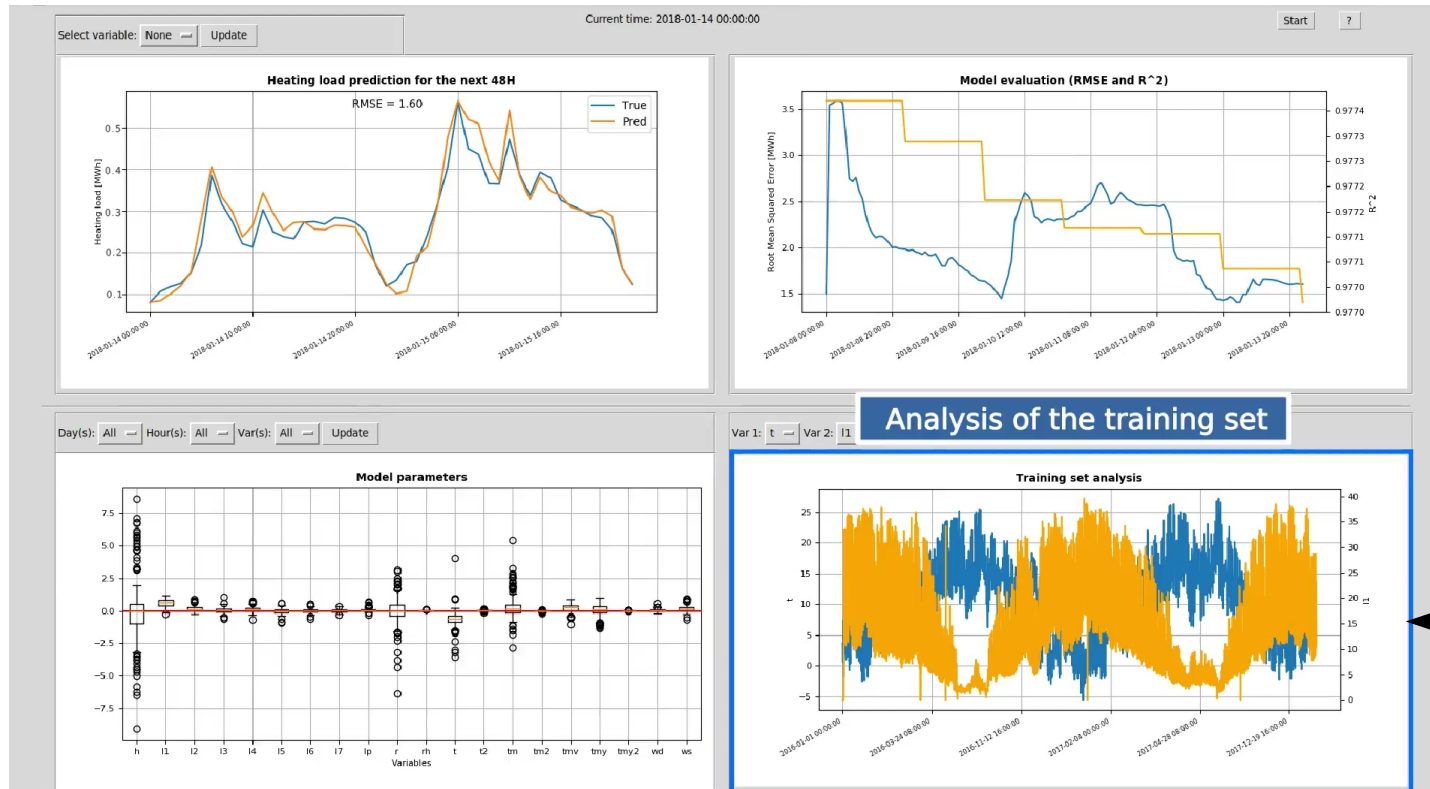
- ☐ Parameters
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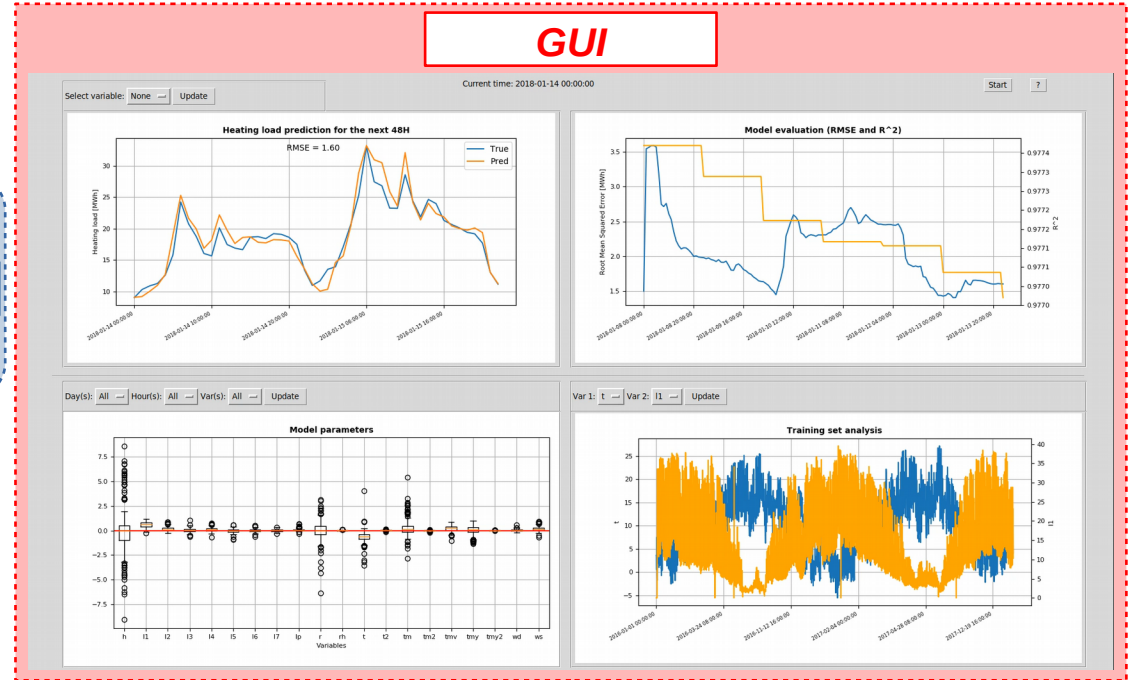
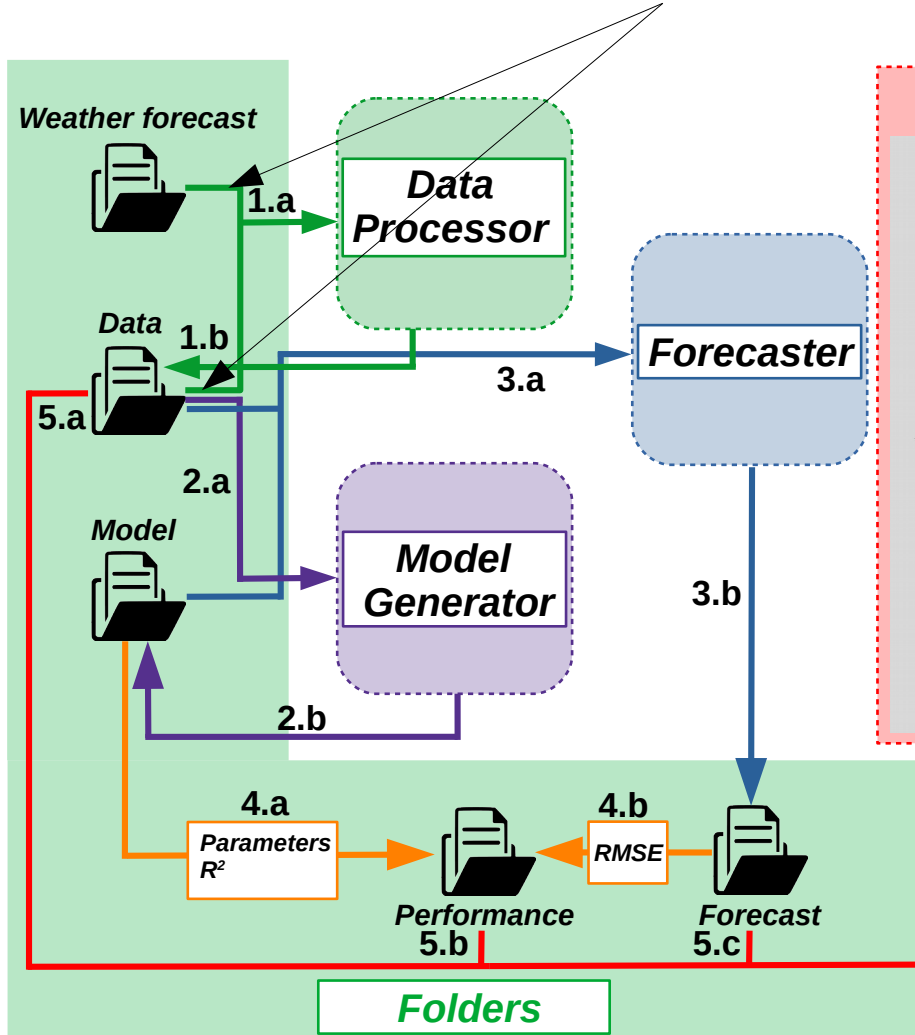
Data

I	T	RH	Wind	I ₁

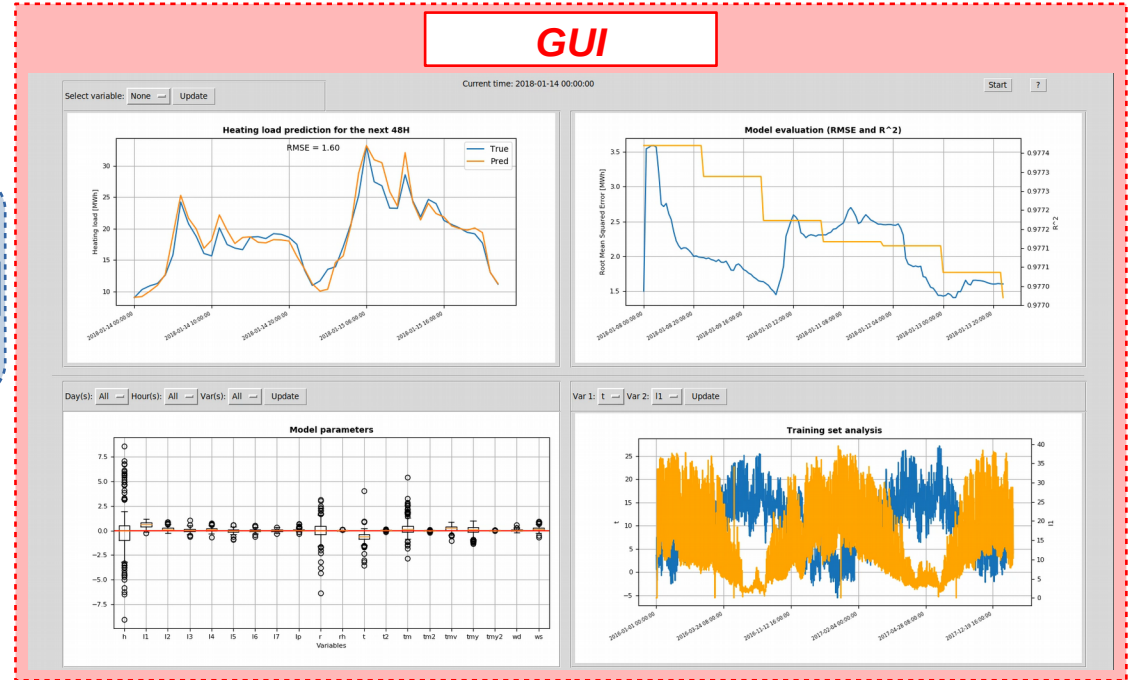
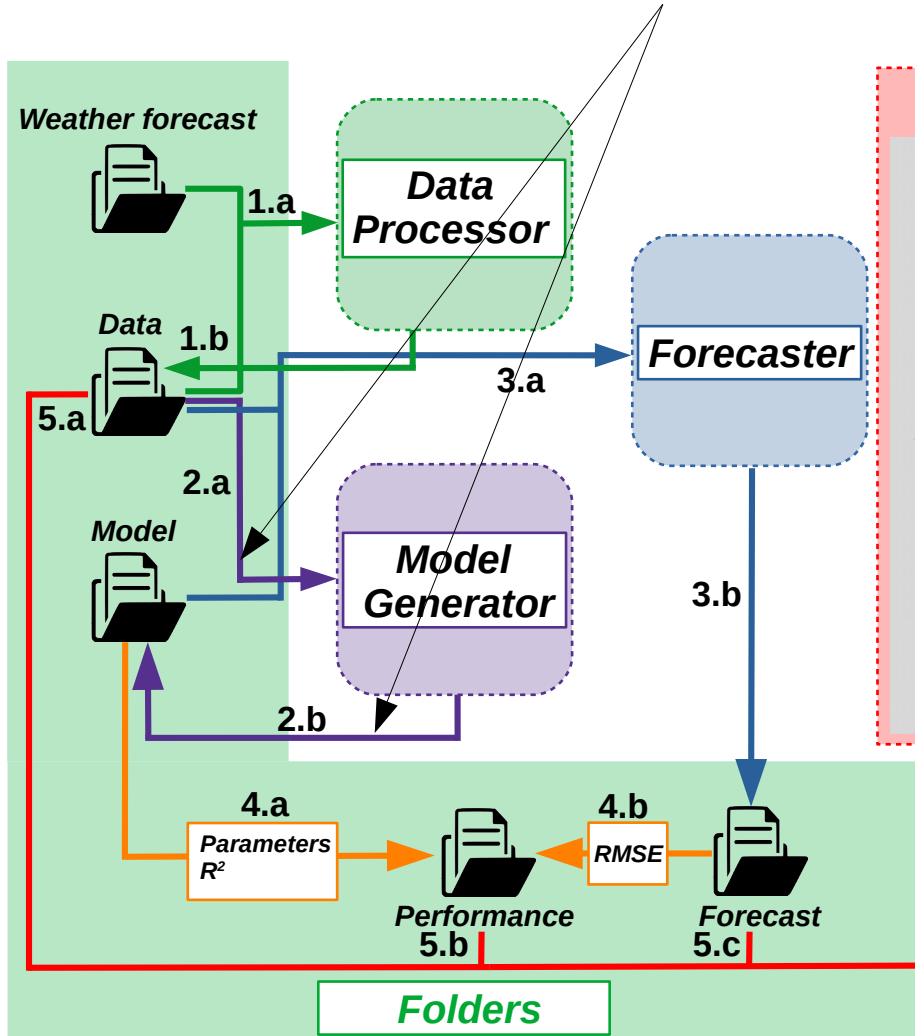


3.3 - Overview

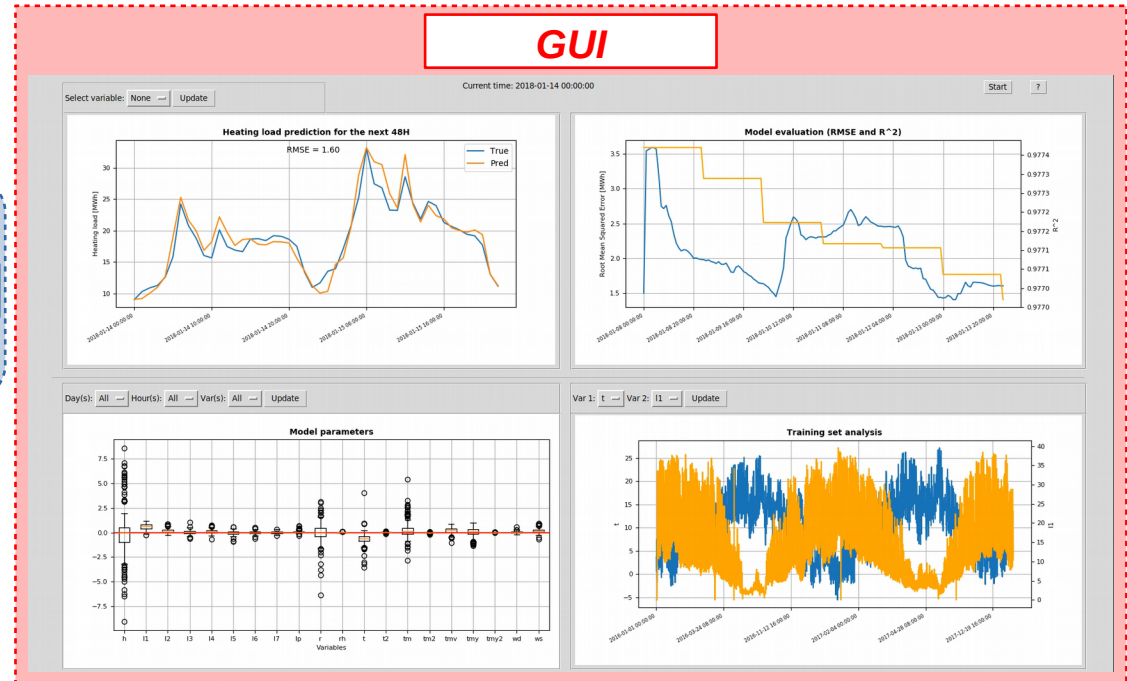
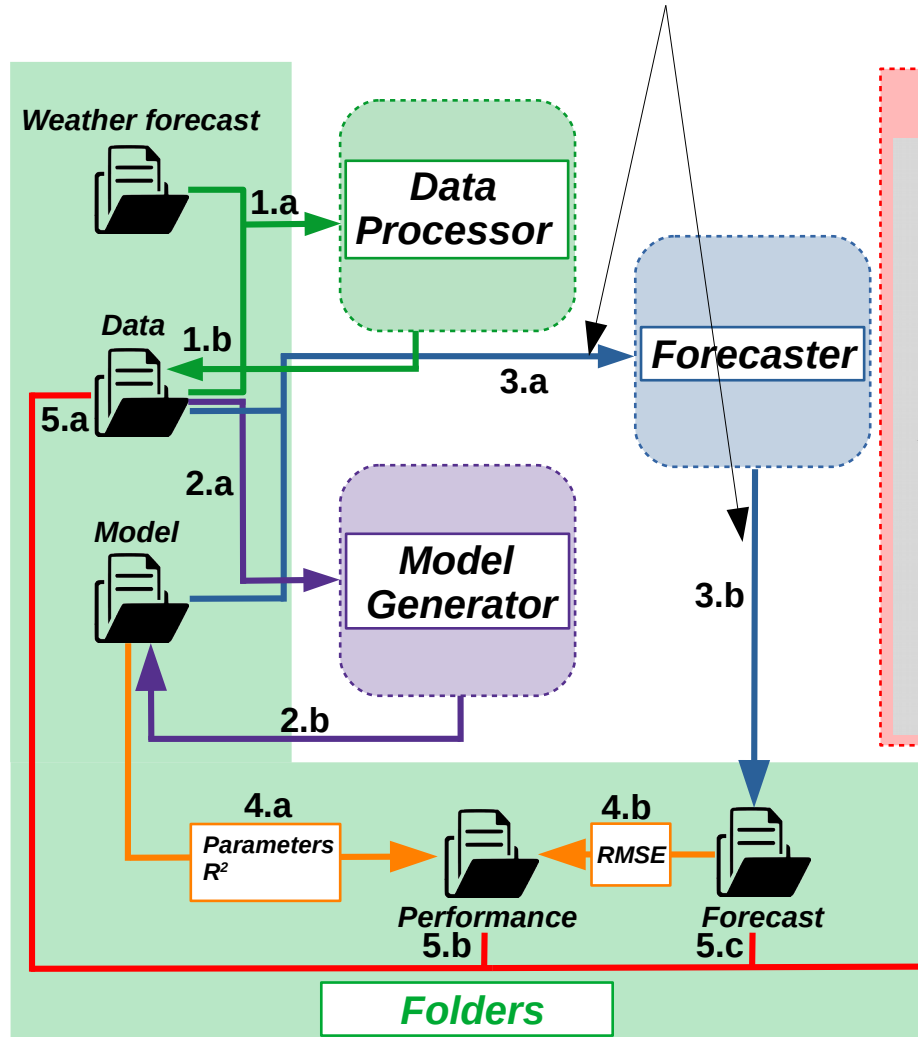
Every hour *Data Processor* takes in input *Weather forecast* files with date *d* and *Pasta data* until date *d-1* (1.a) to process them and saved into *Data* folder(1.b)



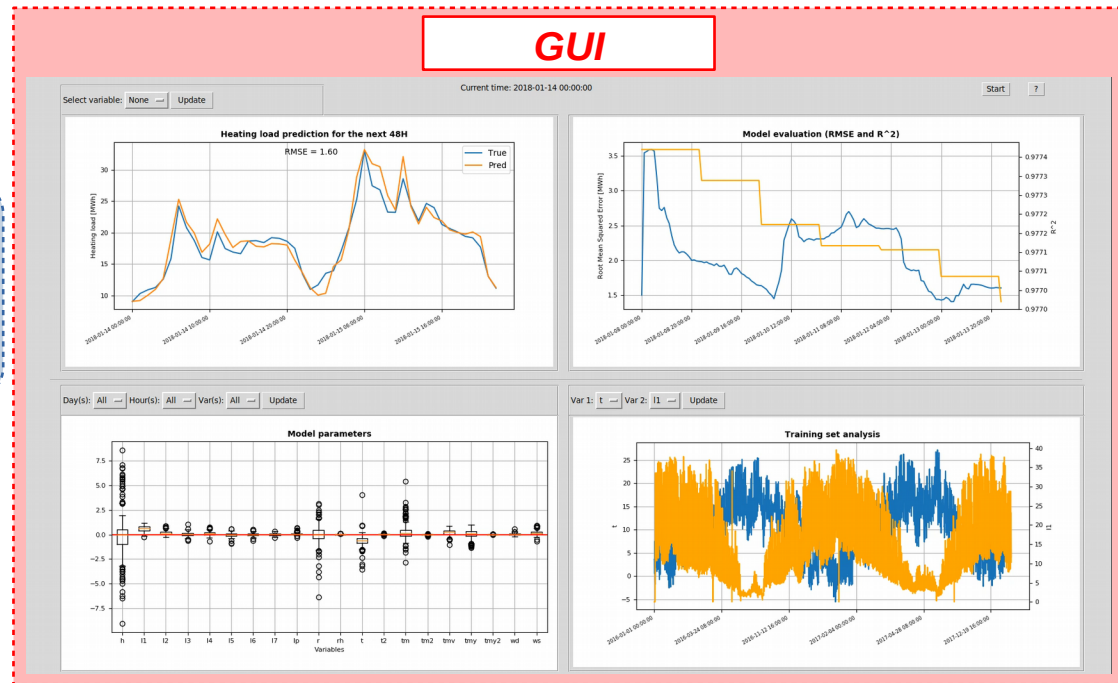
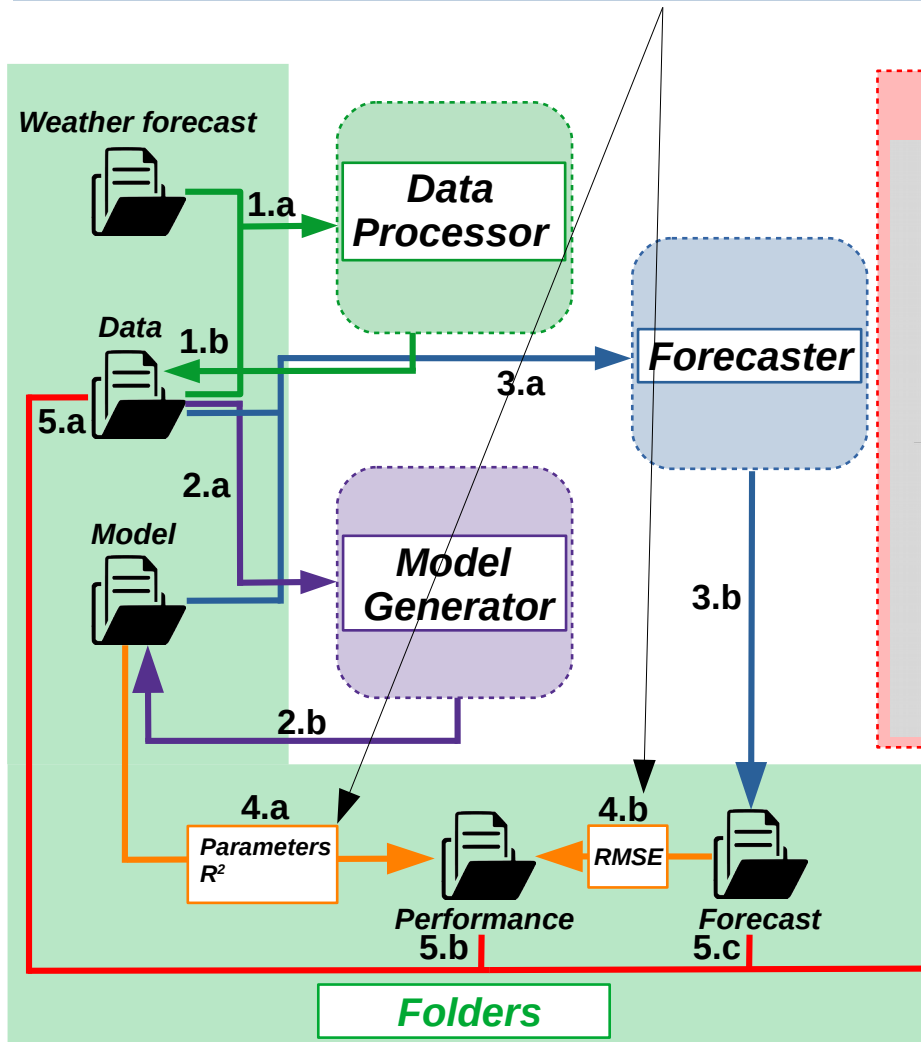
Every 24 hours *Model generator* loads processed data from *Data (2.a)* to train/re-train a model and save it into *Model* folder (2.b)



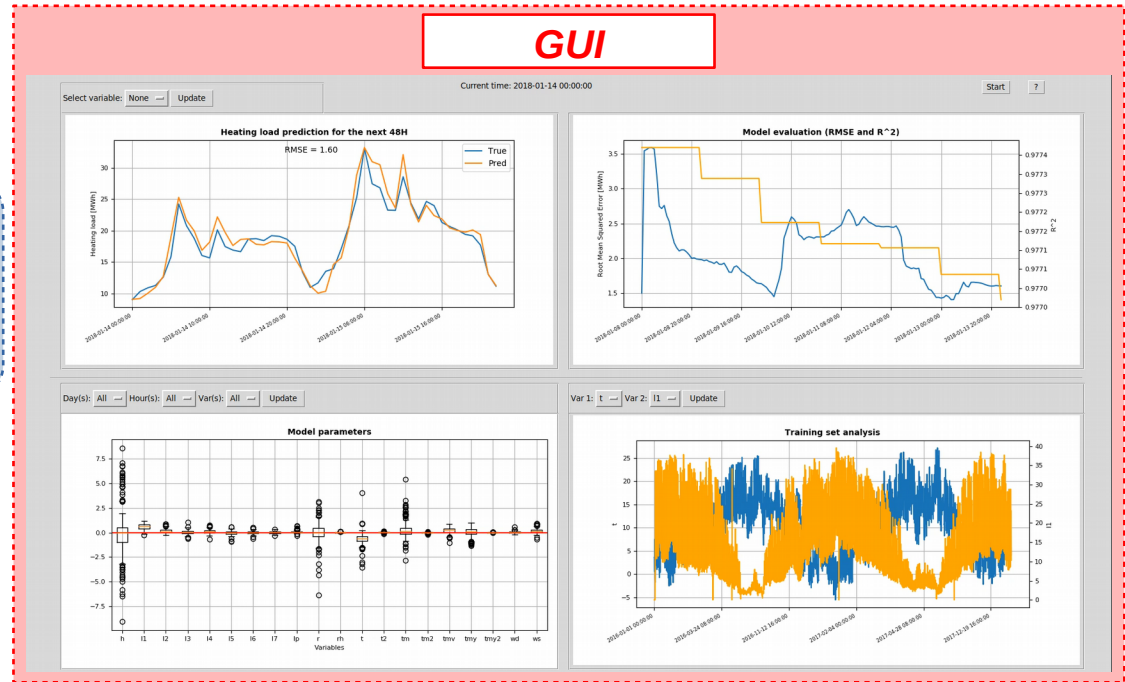
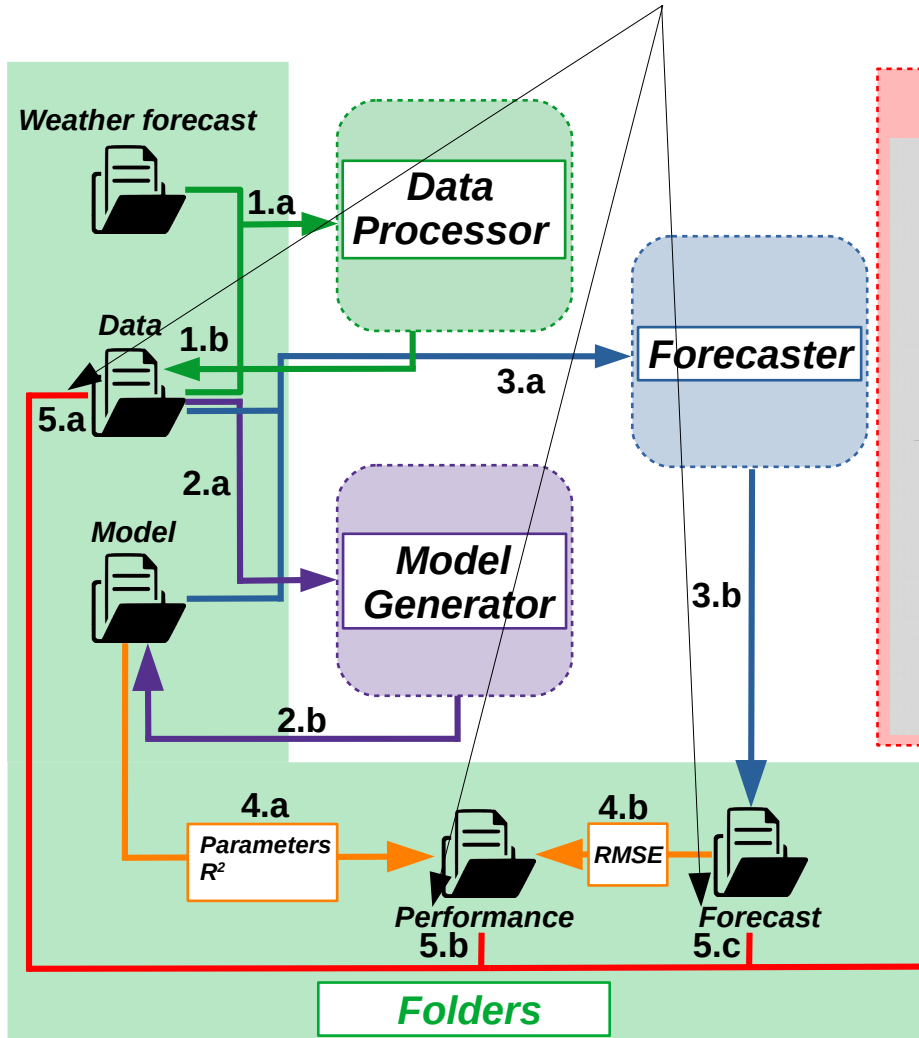
Every hour *Forecaster* loads processed data from *Data* and the current model from *Model* (3.a) to forecast the next 24/48 hours of heating load and save into *Forecast* folder (3.b)



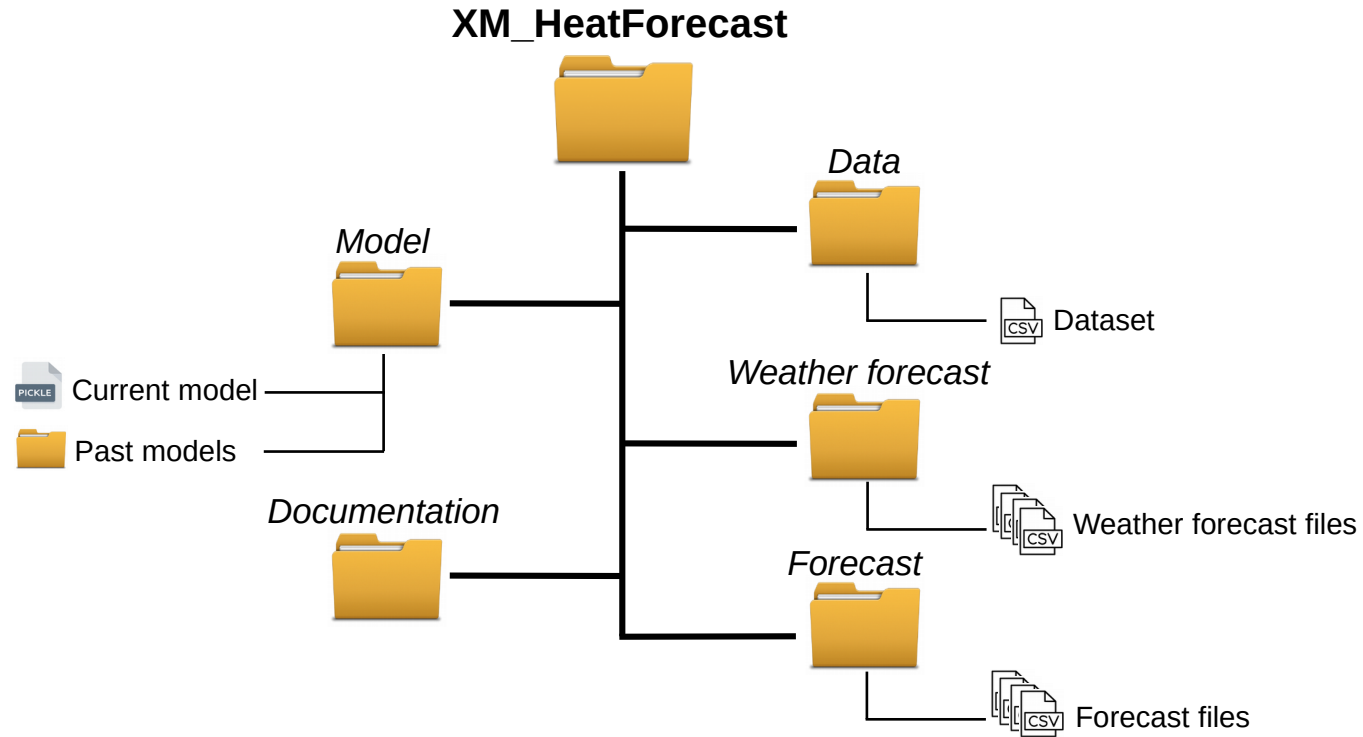
Every 24 hours Parameters and R2 are extracted from current model and saved into Performance folder (4.a). Every hour RMSE is computed (when real load is known) and saved into Performance folder too (4.b)



GUI loads data as soon as they are available (5.a, 5.b, 5.c)



4. Overview of folders and files



4. View of a forecasting file

XM_HeatForecast generates a .csv file each 24 hours

Predictions of the
next 24 or 48 hours

	A	B	C	D
1		day	I	pred
2	0	2018-01-08 00:00:00	7.79427280371094	6.29427280371094
3	1	2018-01-08 01:00:00	7.98896733398438	6.48896733398438
4	2	2018-01-08 02:00:00	9.27924220019531	7.77924220019531
5	3	2018-01-08 03:00:00	10.6418182719727	9.1418182719727
6	4	2018-01-08 04:00:00	13.4256140893555	11.9256140893555
7	5	2018-01-08 05:00:00	22.461391652832	20.961391652832
8	6	2018-01-08 06:00:00	28.8205434936523	27.3205434936523
9	7	2018-01-08 07:00:00	24.5303667480469	23.0303667480469
10	8	2018-01-08 08:00:00	23.027251796875	21.527251796875
11	9	2018-01-08 09:00:00	18.929647878418	17.429647878418
12	10	2018-01-08 10:00:00	19.0084565026855	17.5084565026855
13	11	2018-01-08 11:00:00	23.7432808679199	22.2432808679199
14	12	2018-01-08 12:00:00	18.1081666113281	16.6081666113281

Date and hour of
prediction

Real load

Predicted
load