XM_HeatForecast

Documentation

Overview

1. How to install the software

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3. Modules
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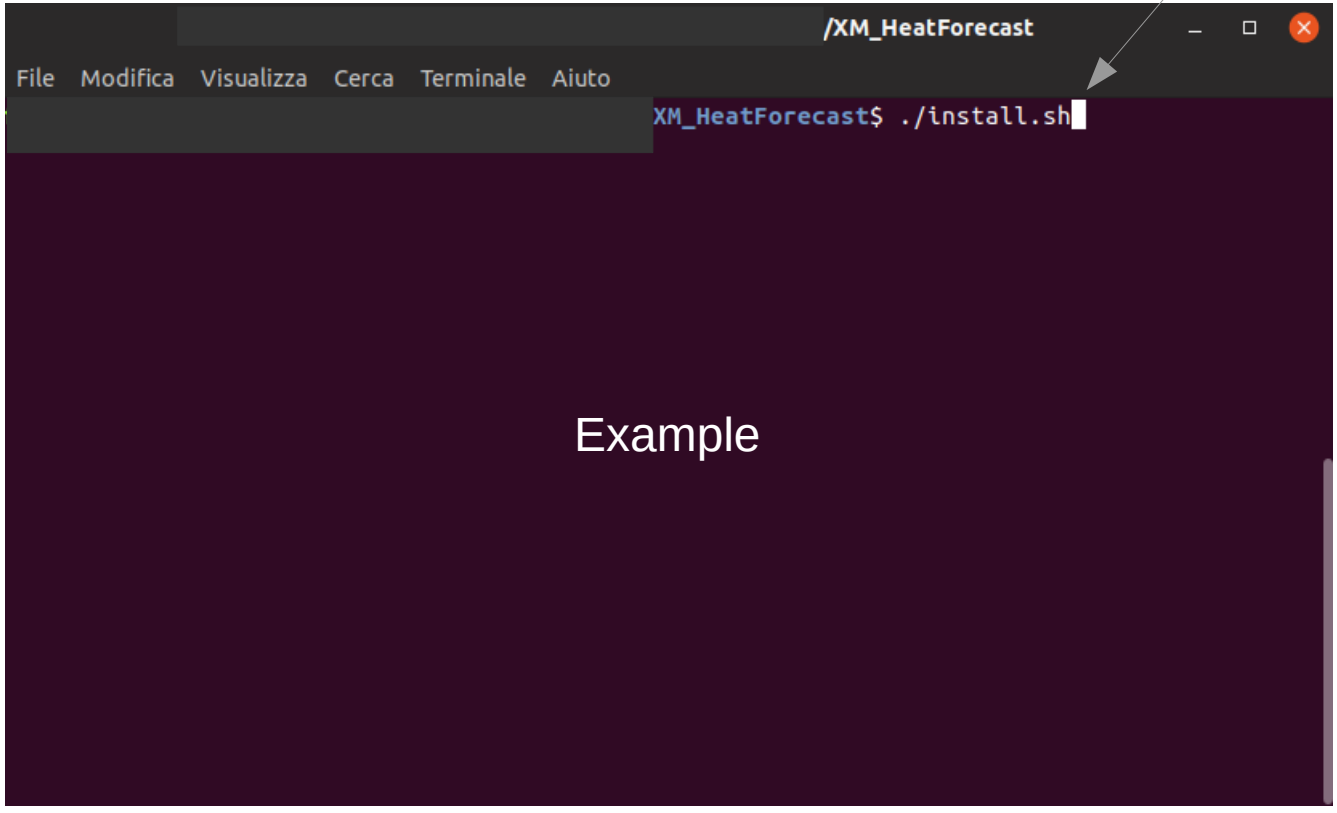
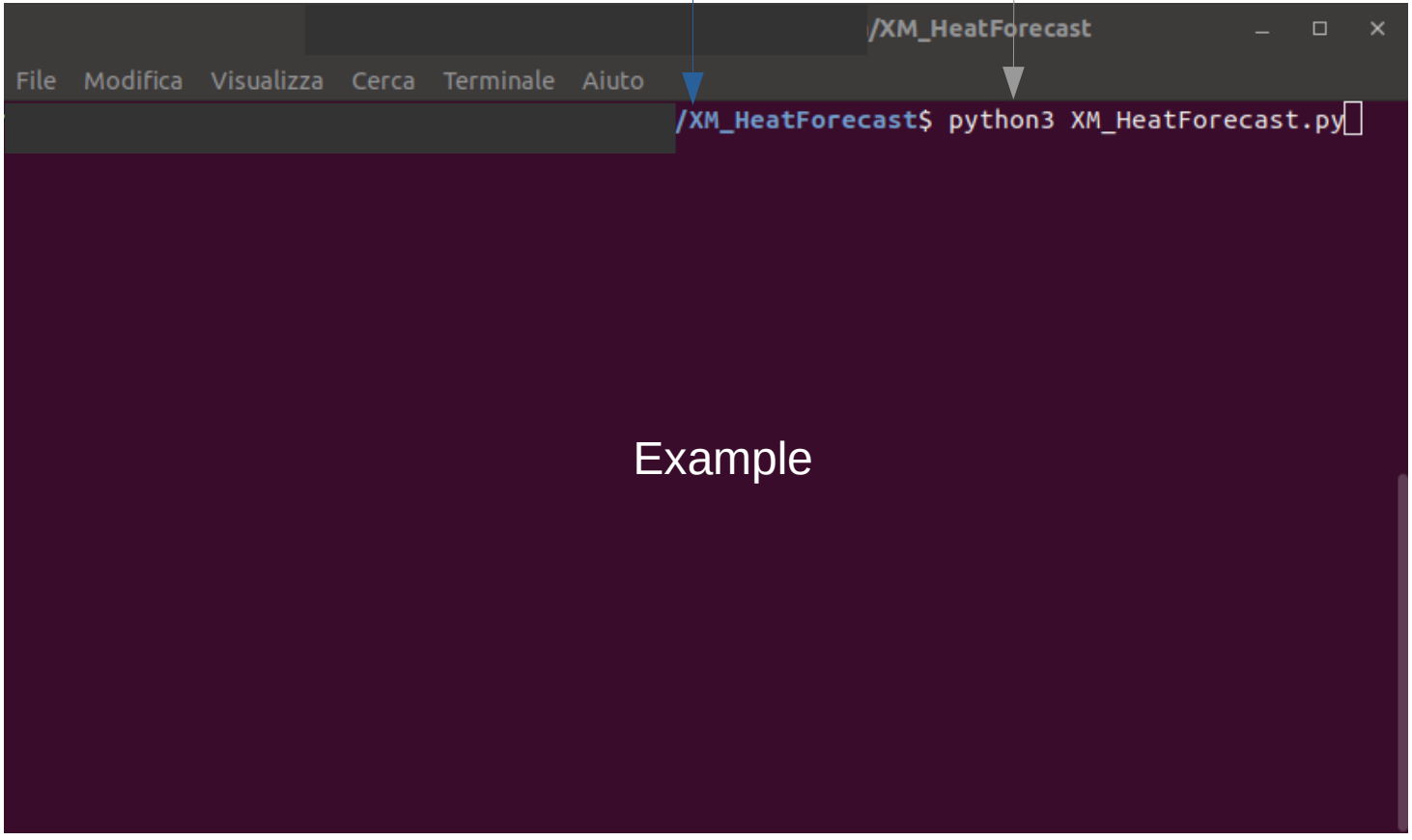
1. How to install the software

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



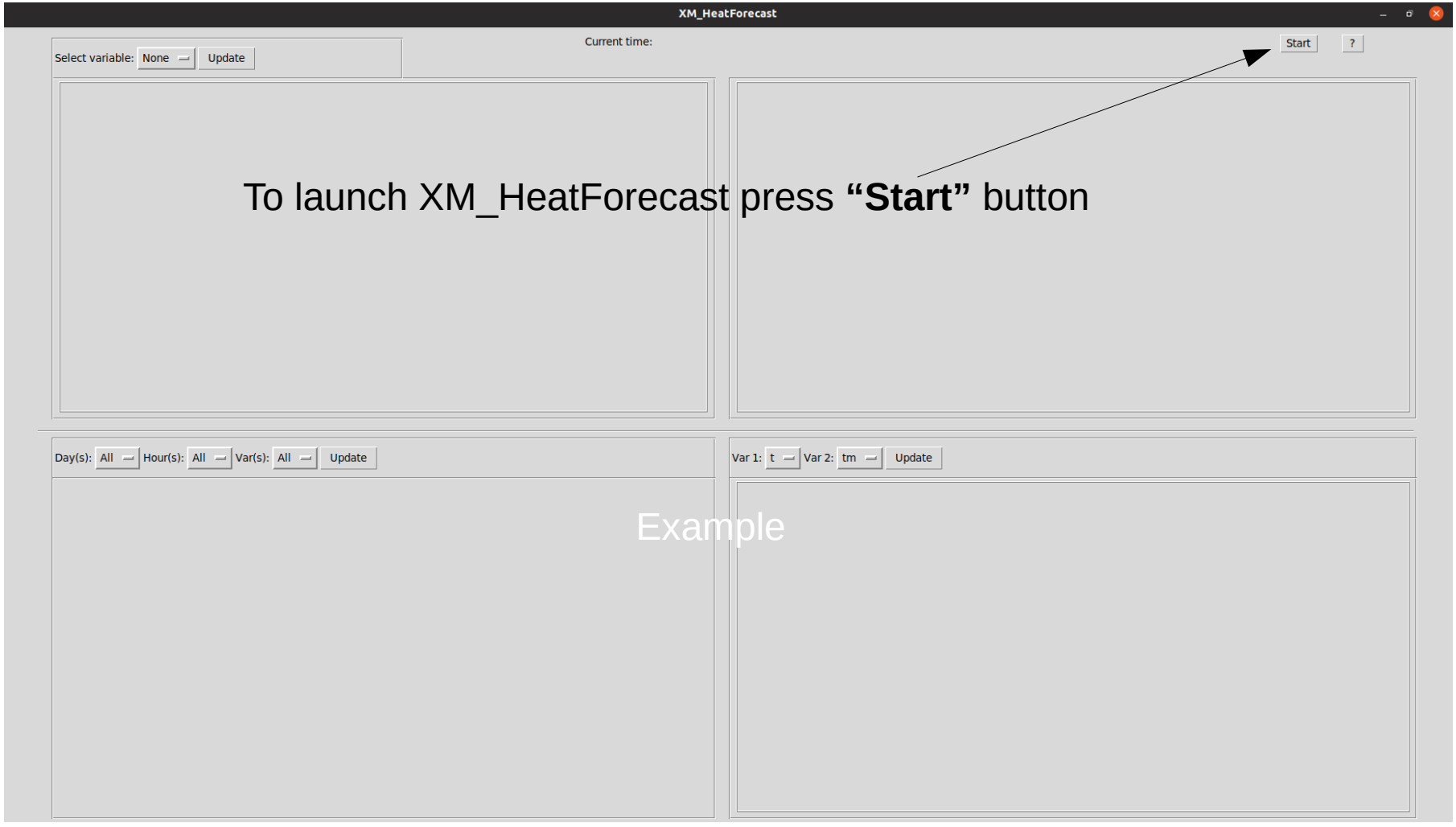
2. How to launch XM_HeatForecast

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**



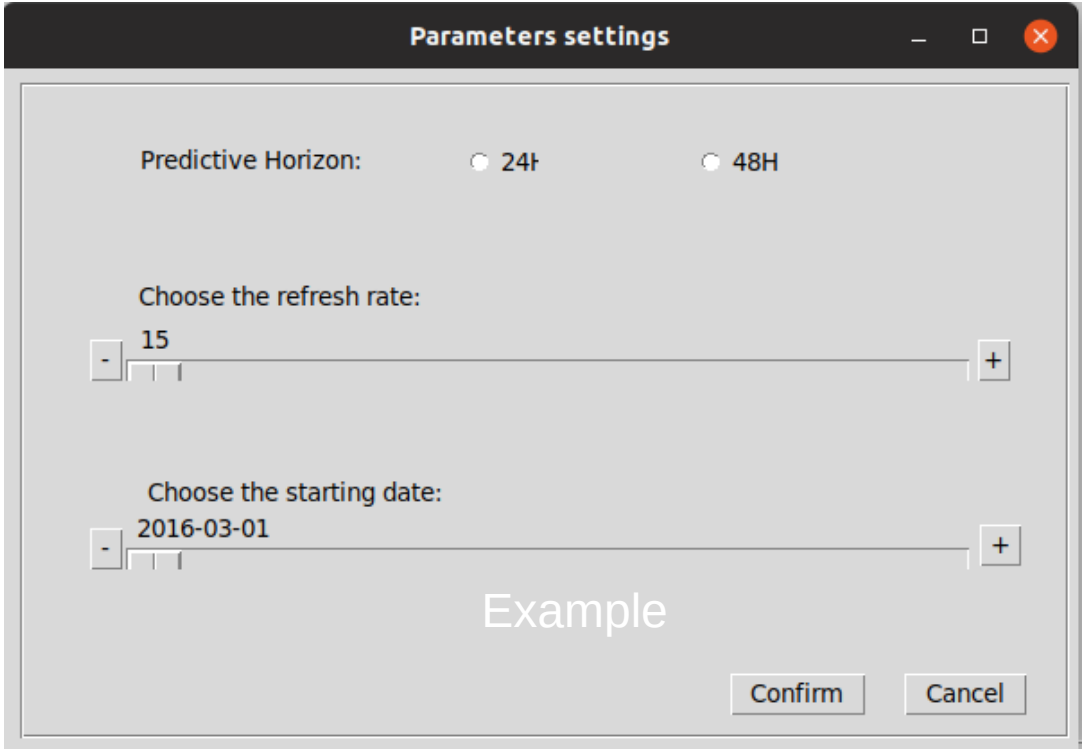
Example

2. How to launch XM_HeatForecast



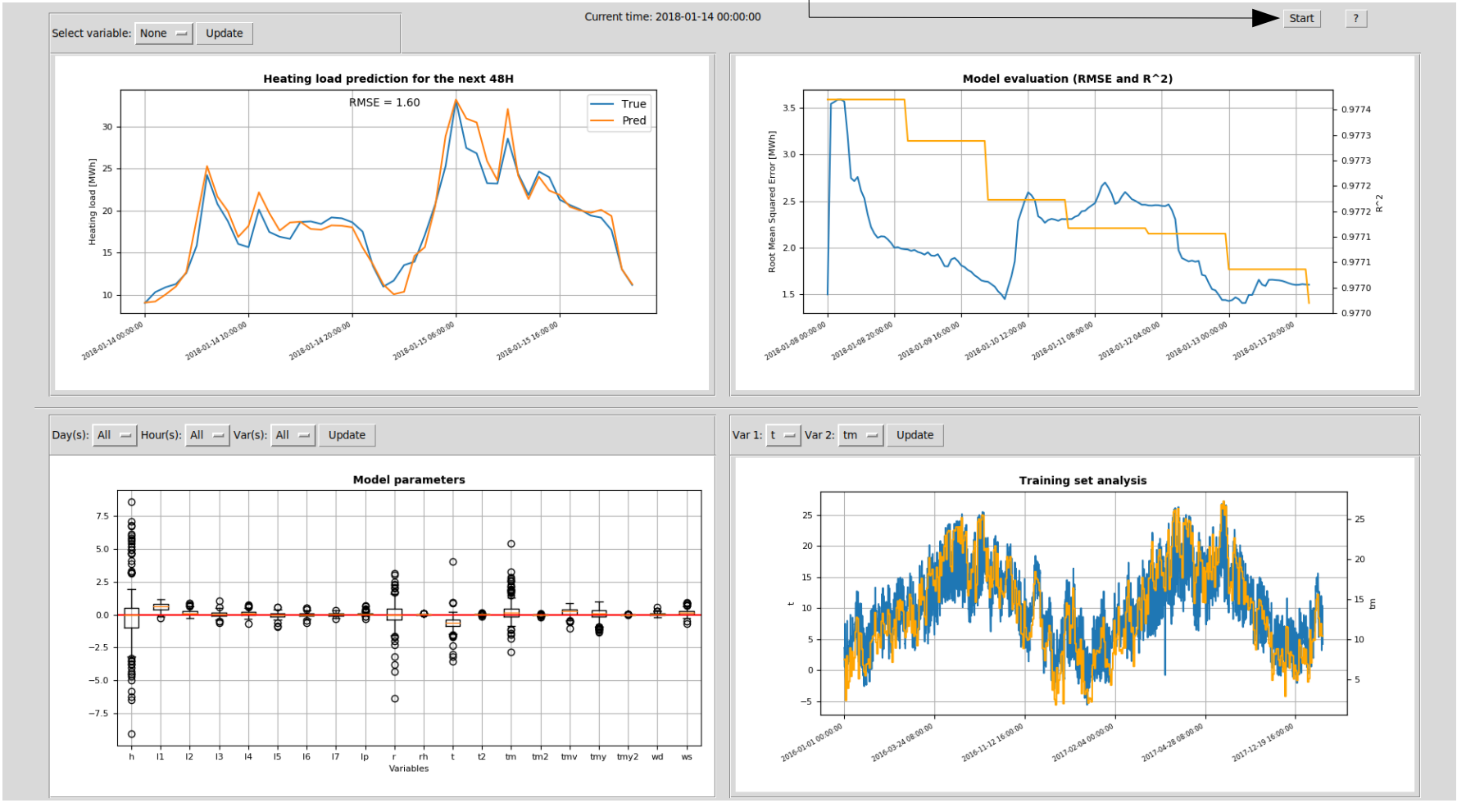
2. How to launch XM_HeatForecast

A window should appear in the middle of the screen



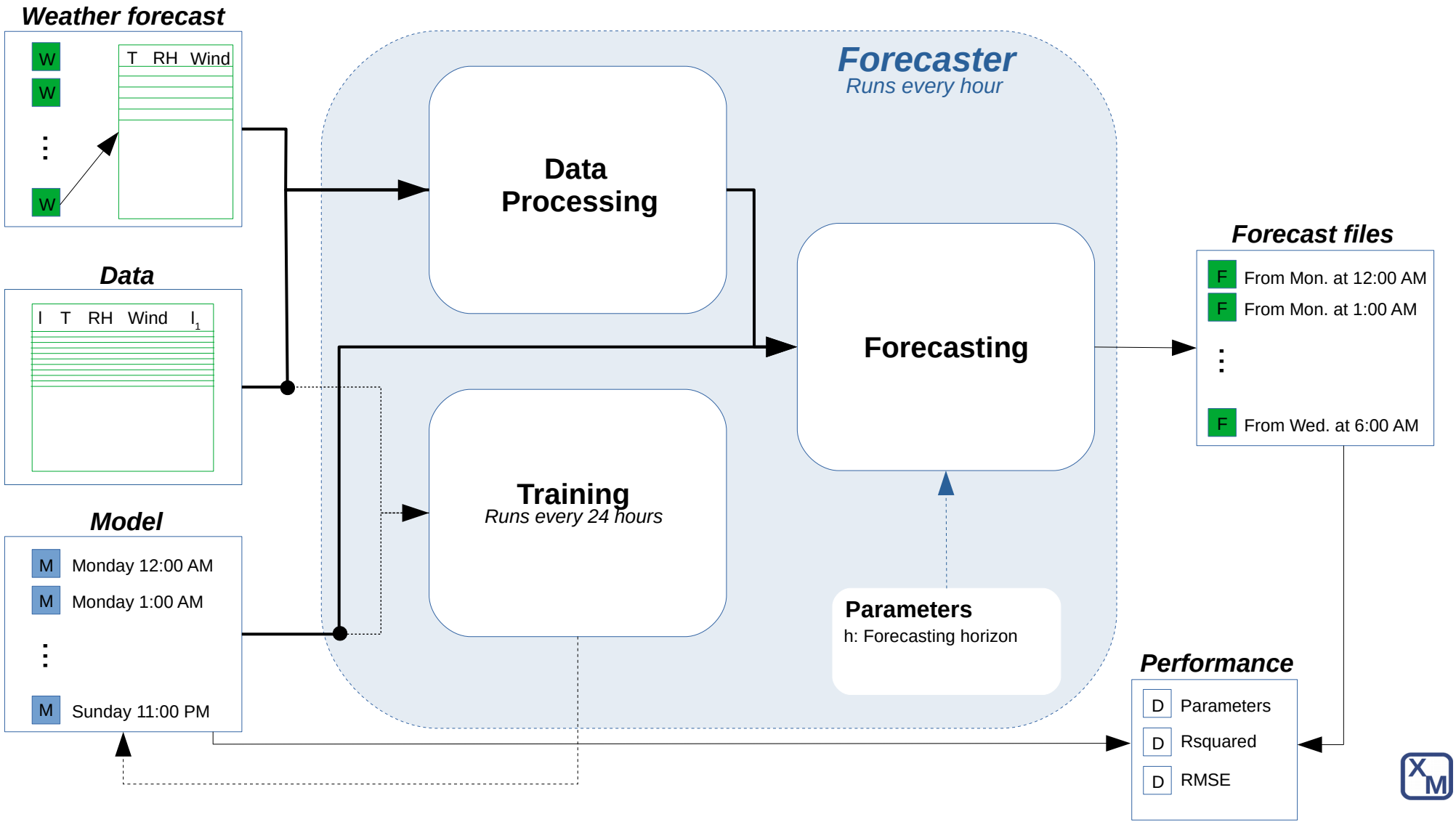
2. How to launch XM_HeatForecast

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



3. Modules

3.1 - Forecaster


Weather forecast
W
W
W
T RH Wind
Data
I T RH Wind I_1
Model
M Monday 12:00 AM
M Monday 1:00 AM
M Sunday 11:00 PM
Forecaster
Runs every hour
Data Processing
Training
Runs every 24 hours
Forecasting
Parameters
h: Forecasting horizon
Forecast files
F From Mon. at 12:00 AM
F From Mon. at 1:00 AM
F From Wed. at 6:00 AM
Performance
D Parameters
D Rsquared
D RMSE

3.2 - GUI

Performance

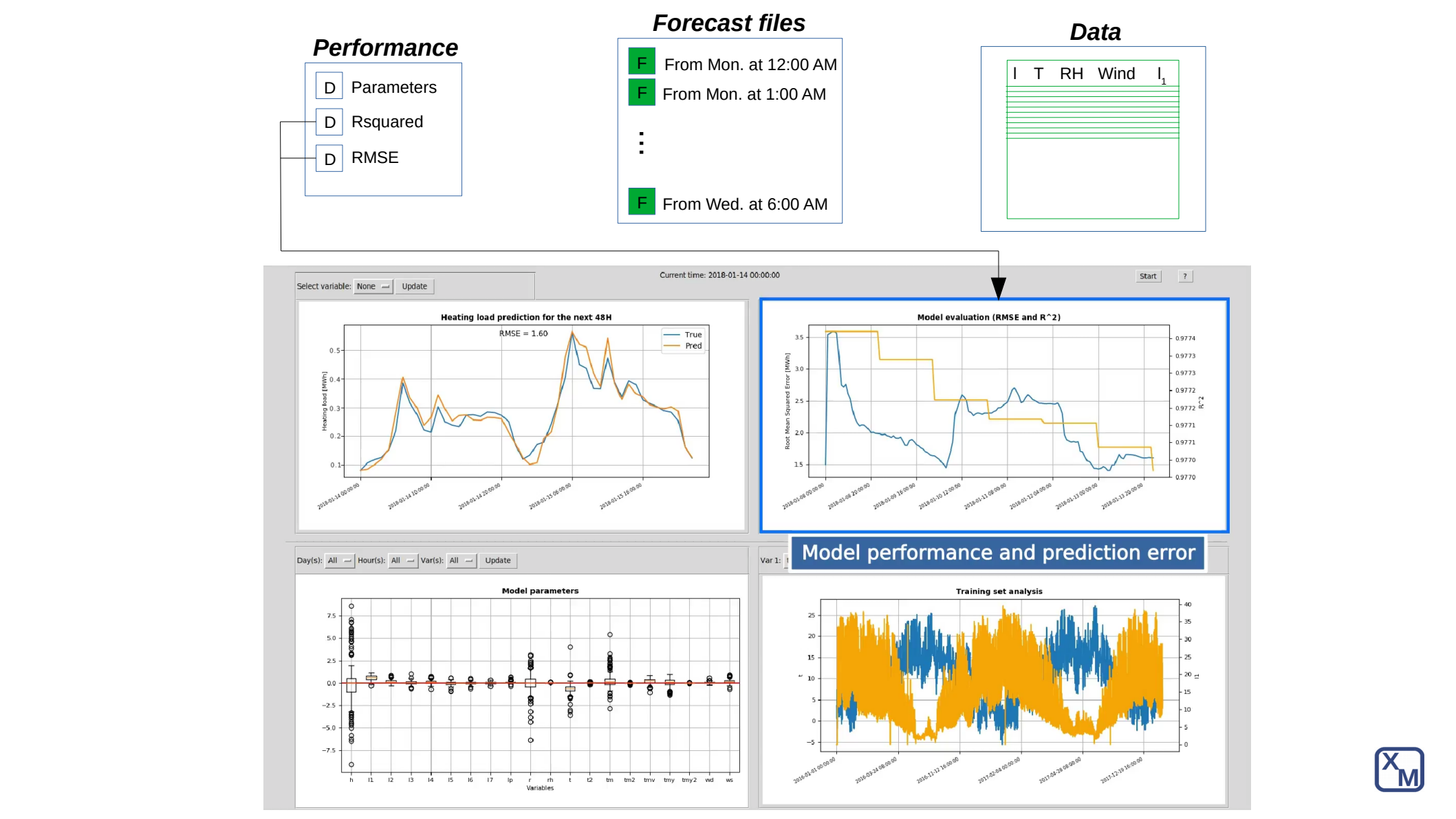
- D Parameters
- D Rsquared
- D RMSE

Forecast files

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

Data

I	T	RH	Wind	I_1


Performance
D Parameters
D Rsquared
D RMSE
Forecast files
F From Mon. at 12:00 AM
F From Mon. at 1:00 AM
F From Wed. at 6:00 AM
Data
I T RH Wind I_1
Select variable: None Update
Current time: 2018-01-14 00:00:00
Start ?
Heating load prediction for the next 48H
RMSE = 1.60
True
Pred
Heating load [MWh]
Model evaluation (RMSE and R^2)
Root Mean Squared Error [MWh]
R^2
Model performance and prediction error
Day(s): All Hour(s): All Var(s): All Update
Model parameters
Variables
Training set analysis

Performance

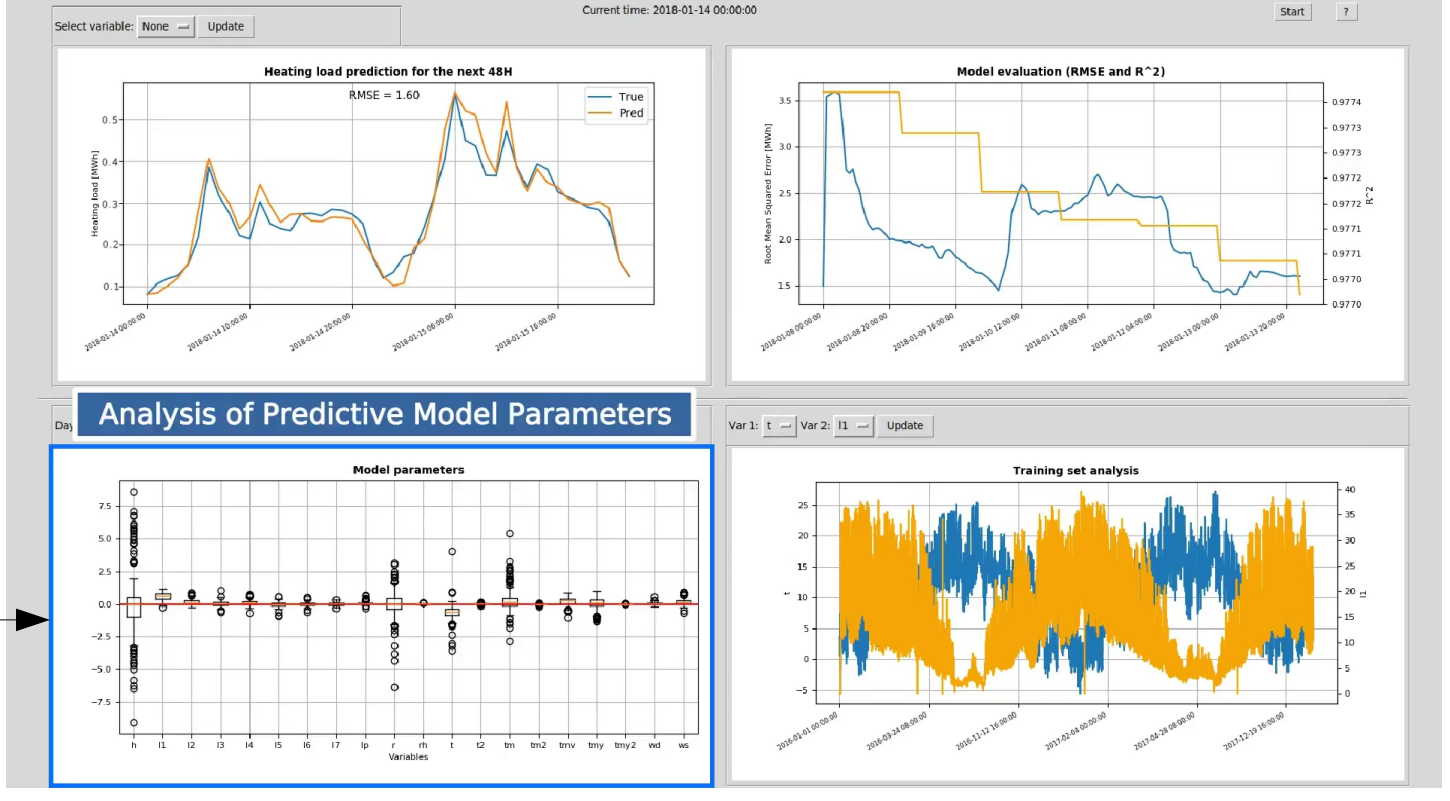
- D Parameters
- D Rsquared
- D RMSE

Forecast files

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

Data

I	T	RH	Wind	I_1



Performance

- D Parameters
- D Rsquared
- D RMSE

Forecast files

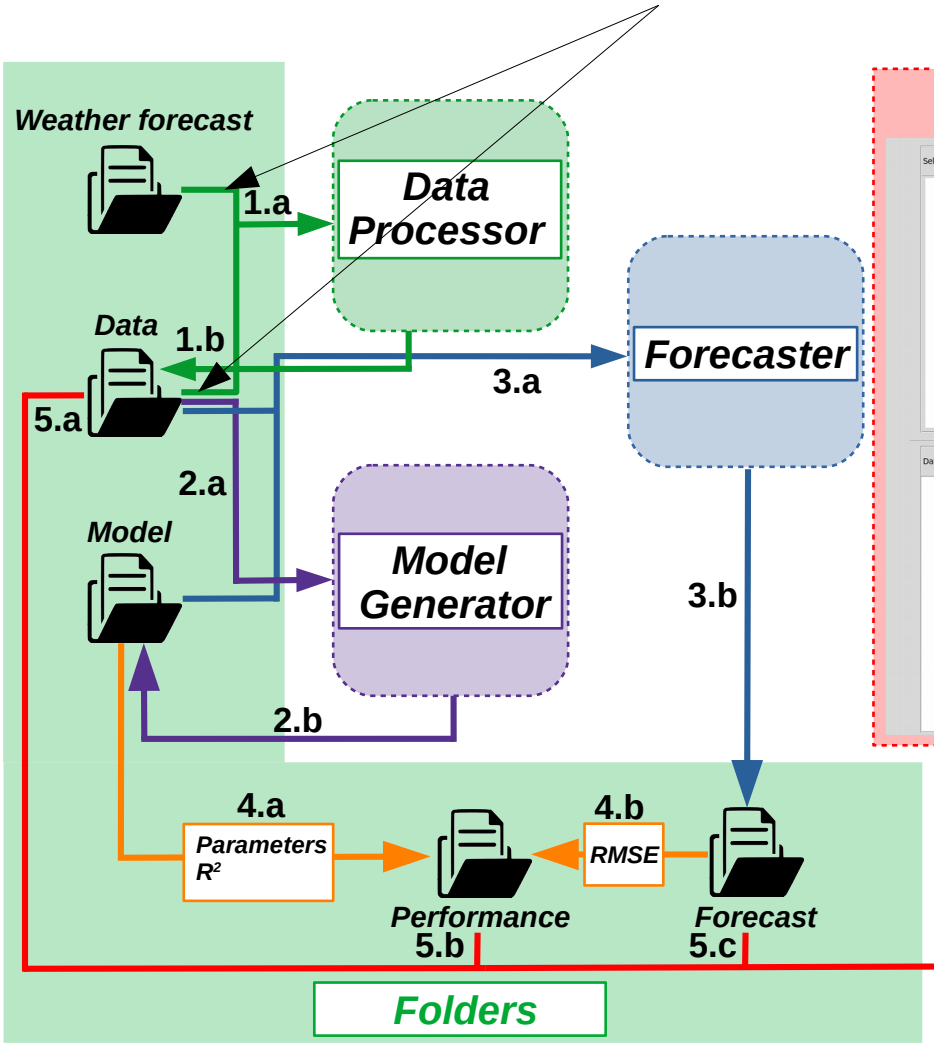
- F From Mon. at 12:00 AM
- F From Mon. at 1:00 AM
- ⋮
- F From Wed. at 6:00 AM

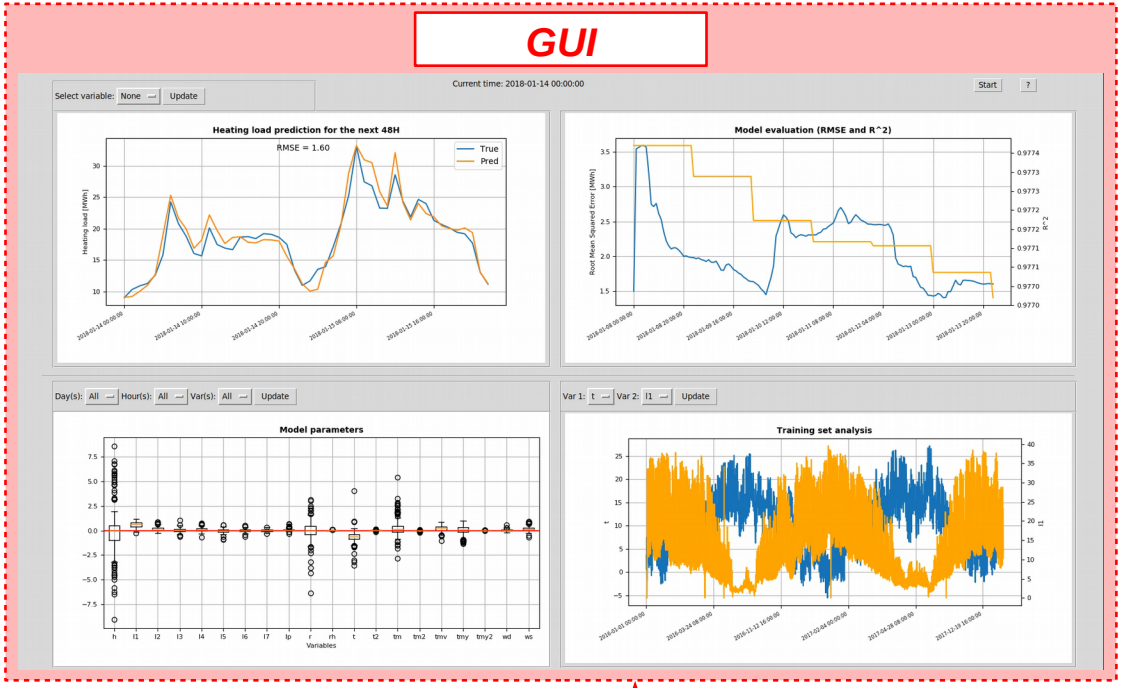
Data

I	T	RH	Wind	I_1

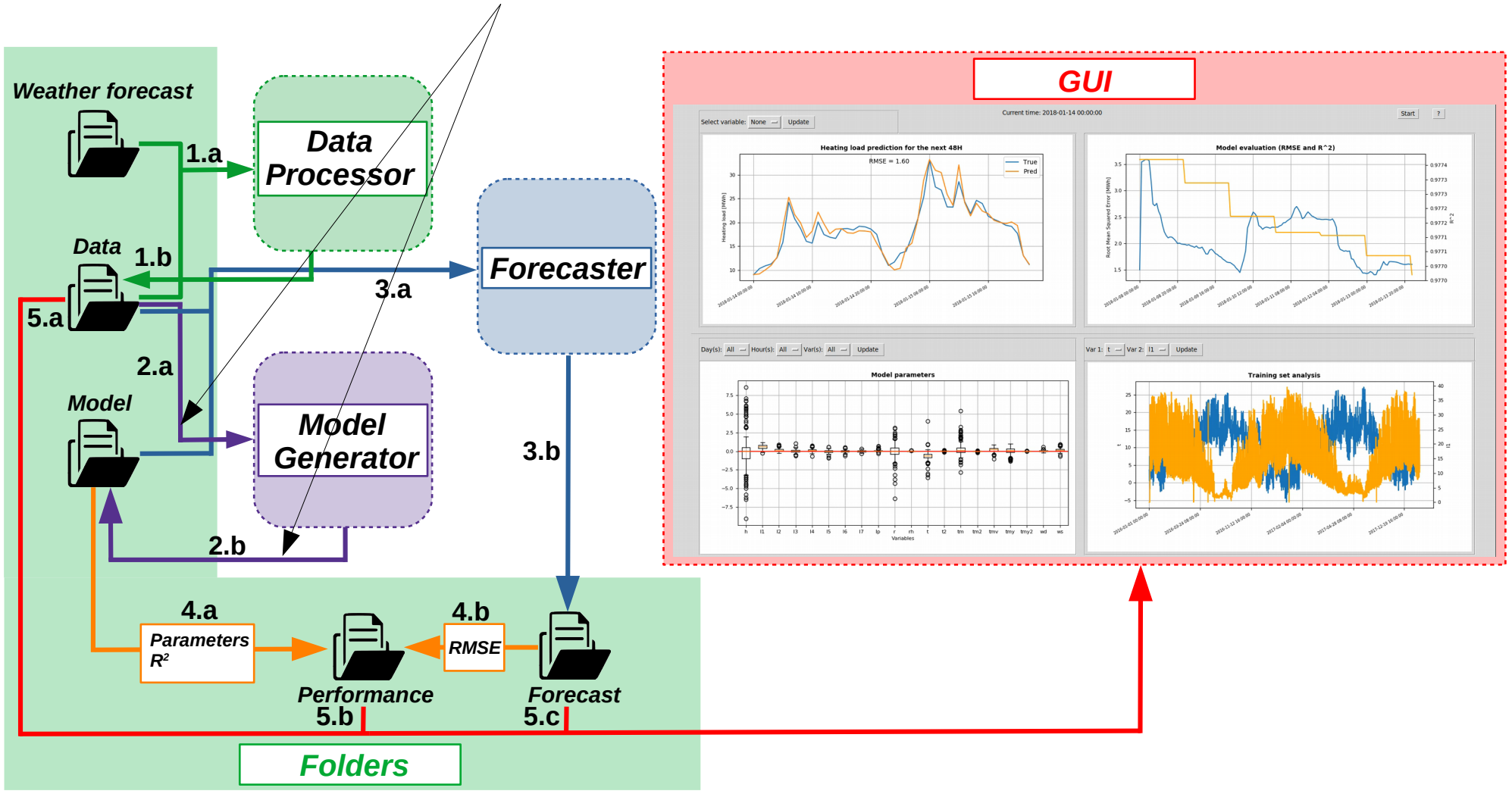
3.3 - Overview

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)

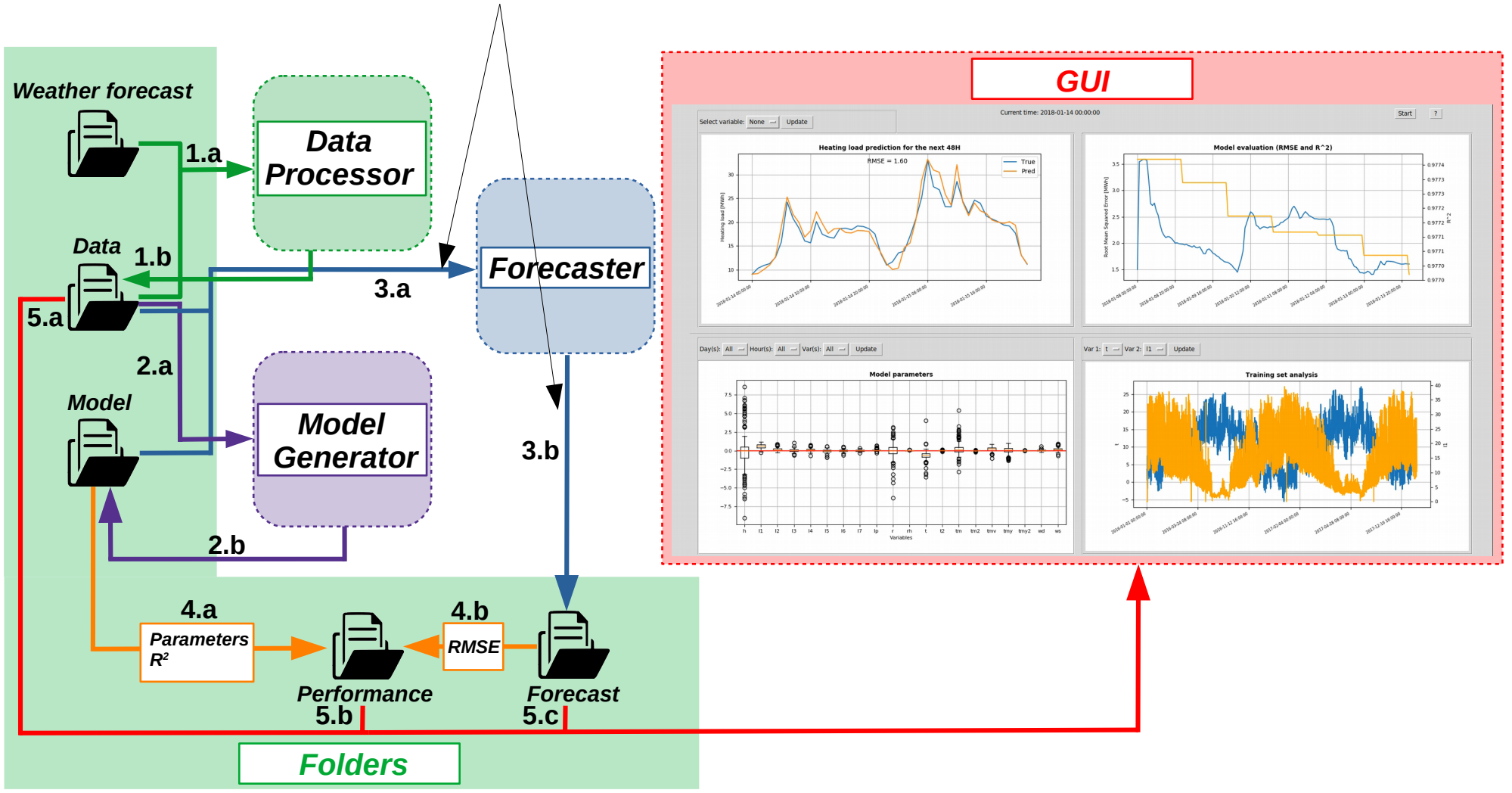




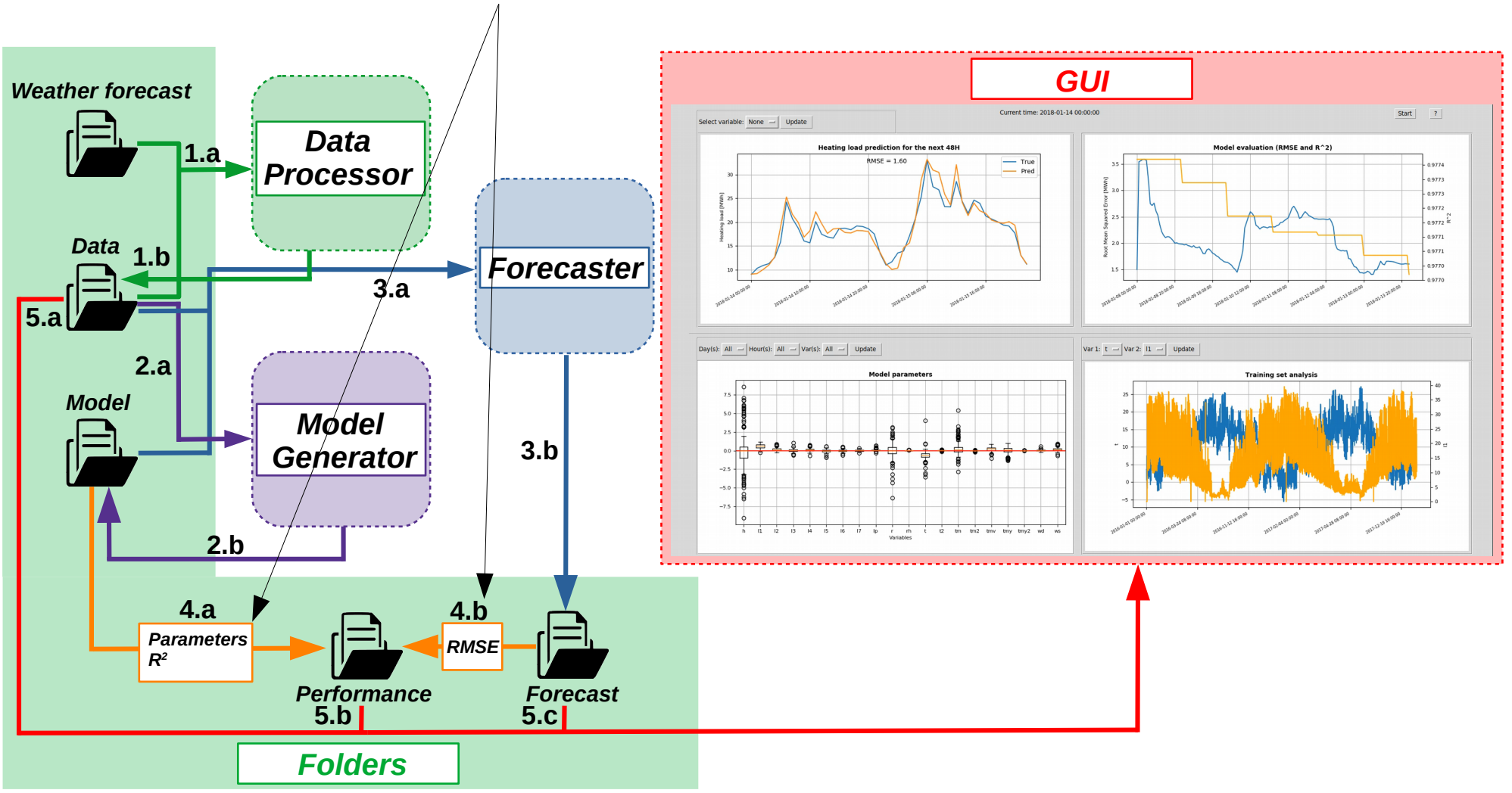
Every 24 hours *Model generator* loads processed data from *Data (2.a)* to train/re-train a model and save it into *Model* folder (2.b)

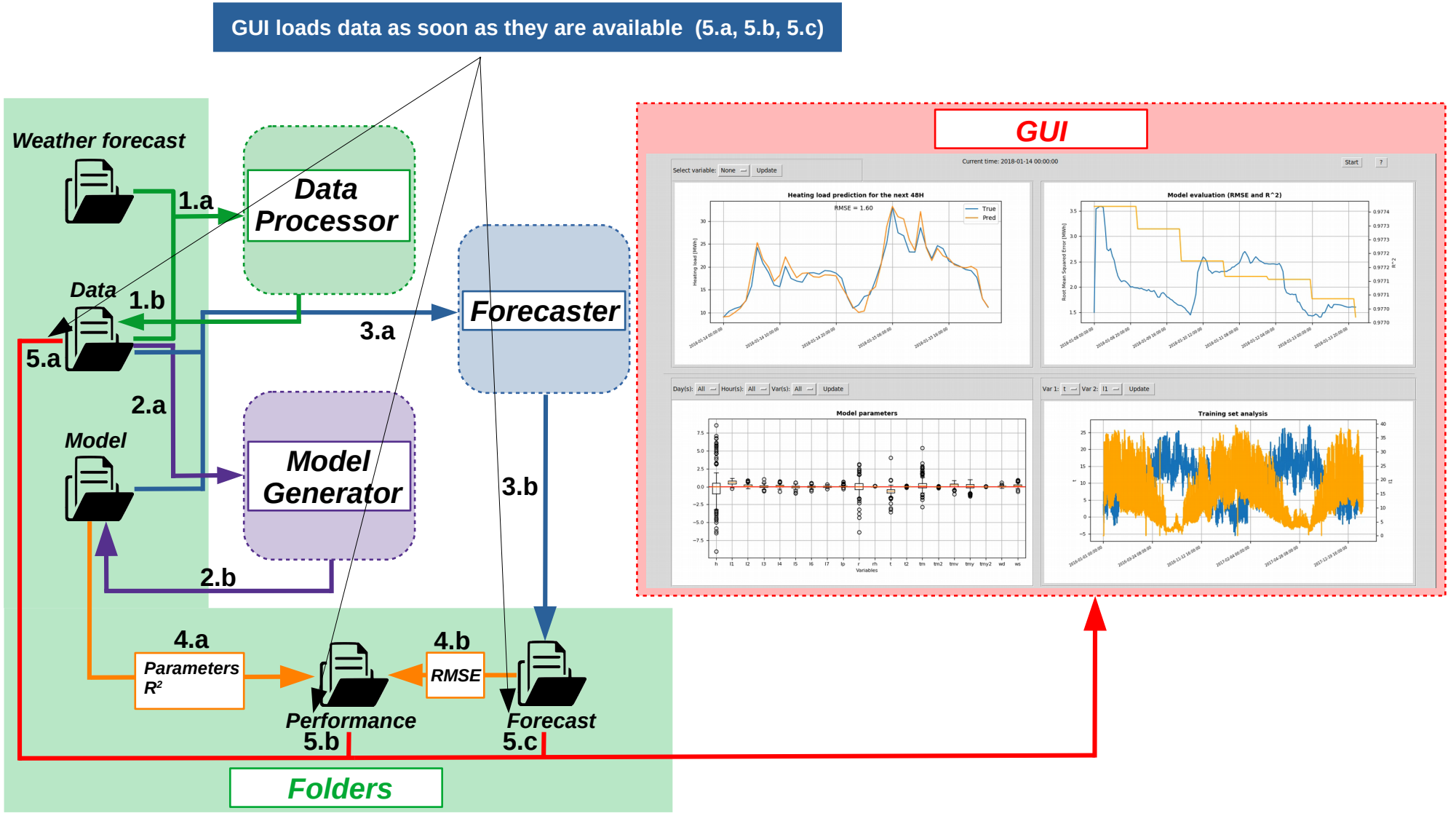


Every hour *Forecaster* loads processed data from *Data* and the current model from *Model* (3.a) to forecast the next 24/48 hours of heating load and save into *Forecast* folder (3.b)

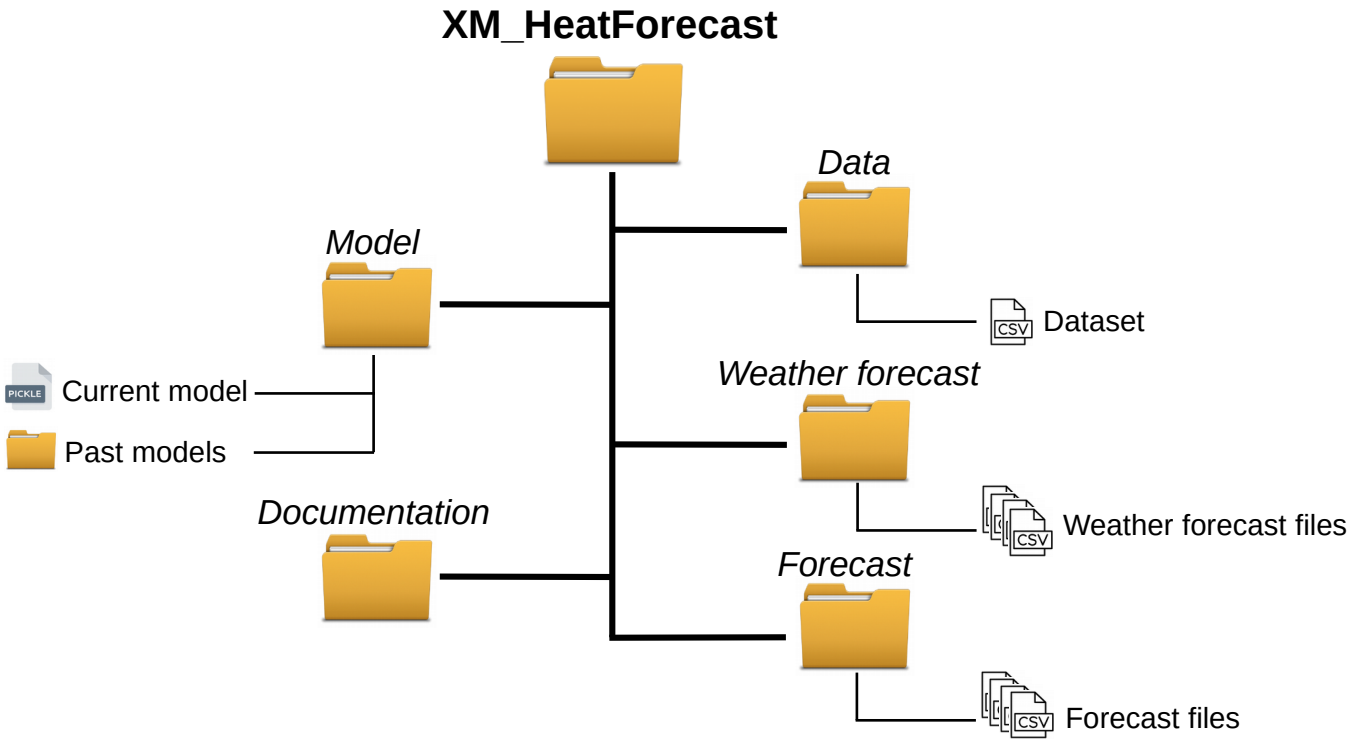


Every 24 hours Parameters and R2 are extracted from current model and saved into Performance folder (4.a). Every hour RMSE is computed (when real load is known) and saved into Performance folder too (4.b)




GUI loads data as soon as they are available (5.a, 5.b, 5.c)
Weather forecast
1.a
Data Processor
Data
1.b
Forecaster
3.a
5.a
2.a
Model
Model Generator
3.b
2.b
4.a
Parameters
R²
4.b
RMSE
Performance
5.b
Forecast
5.c
Folders
GUI
Heating load prediction for the next 48H
RMSE = 1.60
True
Pred
Model evaluation (RMSE and R^2)
Model parameters
Training set analysis

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	l	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