IEEE-CIS TECHNICAL CHALLENGE ON ENERGY PREDICTION FROM SMART METER DATA: EVALUATION

https://ieee-dataport.org/competitions/ieee-cis-technical-challenge-energy-prediction-smart-meter-data

Evaluation

Our partner E.ON is interested in predicting with the least amount of data as possible a good estimate of the *total year consumption* for reasons of payment adequacy. Accurately predicting a customer's annual consumption allows E.ON to set their direct debit payments up correctly. Making predictions for smart meters for which we have very little historical consumption data is usually more challenging and relevant to avoiding excessive debt or credit at the end of the year. In addition to that, an accurate monthly consumption prediction is also very valuable for Energy Trading teams, who need to be able to predict with some accuracy how much electricity to buy on the energy market. Having that in mind, submissions are evaluated as follows:

- **Total Year Consumption**: Your predicted total year consumption will be computed as the sum of all the predictions you've made for each individual month. Then, for each smart meter, we will compute a **Relative Absolute Error** between the predicted total year consumption values and real values.

$$year_{rAE} = \frac{\frac{1}{N}\sum_k^N |y_k - t_k|}{\frac{1}{N}\sum_k^N |t_k - \bar{t}|}$$

  Where $\bar{t} = \frac{1}{N}\sum_k^N |t_k|$, N is the total number of smart meters, y_k is the predicted total year consumption of the k-th meter, t_k is the true total year consumption of the k-th meter.

- **Monthly Consumption:** For each smart meter, we will also compute the **Relative Absolute Error** between the predicted monthly consumption values and the real values.

$$month_{rAE} = \frac{1}{N}\sum_k^N \frac{\frac{1}{12}\sum_i^{12}|y_k^i - t_k^i|}{\frac{1}{12}\sum_i^{12}|t_k^i - \bar{t_k}|}$$

  Where $\bar{t_k} = \frac{1}{12}\sum_i^{12}|t_k^i|$, y_k is the predicted monthly consumptions of the k-th meter, $y_k = [y_k^1 \quad \cdots \quad y_k^{12}]$ includes predicted total month consumption for 12 months. t_k is the true monthly consumptions of the k-th meter, $t_k = [t_k^1 \quad \cdots \quad t_k^{12}]$ includes true total month consumption for 12 months.

Both metrics will be considered equally important and aggregated as:

$$total_{rAE} = \frac{1}{2}year_{rAE} + \frac{1}{2}\,month_{rAE}$$

You can download a Python Implementation of these metrics here.

Note that the Leader Board table is updated every 5 minutes. ***In case you submit a wrongly formatted submission, you will be listed at the top of the table with an empty row.***

At the end of the competition, and looking at the aspects explained above, the Technical and Scientific Committees will shortlist the top 5 submissions. Shortlisted authors will be asked to provide a final description of their methodology (4 pages in IEEE format, more details will be provided at the time).

Final submissions will be carefully assessed according to the following criteria:

- Performance in different scenarios, including annual and monthly predictions, as well as predictions with limited historical data of the user.
- Novelty of the proposed approach and appropriate use of Computational Intelligence techniques if any (not required!). The Scientific committee will be asked to rank the shortlisted independently and this will be used to compute a score.

Note that use of data other than the one provided is not allowed. If you do so, we will not consider your submission.